

Change in Cognitive Mediators of Rape's Impact on Psychosocial Health Across 2 Years of Recovery

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A previously published cross-sectional model of cognitive mediation of rape's impact on health (M. P. Koss, A. J. Figueredo, & R. J. Prince, 2002) was replicated longitudinally. Rape survivors ($n = 59$) were assessed 4 times at 3–24 months postrape. Growth curve analysis demonstrated significant change in all mediators and outcomes. Previously reported effects of Characterological Self-Blame, Behavioral Self-Blame, and Maladaptive Beliefs on Psychosocial Distress were partially cross-validated in intercept and slope data. The results suggest that Characterological Self-Blame sets the initial level of Psychosocial Distress and that reduction in Behavioral Self-Blame drives recovery. These effects on distress were wholly mediated through self-blame's association with alterations in beliefs about self and others.

The term *cognitive processing* refers to a set of constructs, including attributions and beliefs that covary during recovery and function to stimulate the psychosocial distress that characterizes the long-term aftermath of rape. Recent literature has examined various constructs such as perceived control, negative appraisals of symptoms, and trauma-related beliefs that comprise cognitive processing (Ali, Dunmore, Clark, & Ehlers, 2002; Barker-Collo, Melnyk, & McDonald-Miszczak, 2000; Dunmore, Clark, & Ehlers, 2001; Epstein, Saunders, Kilpatrick, & Resnick, 1998; Frazier, 2003; Halligan, Michael, Clark, & Ehlers, 2003; Jind, 2001; Koss, Figueredo, & Prince, 2002; Owens & Chard, 2001; Resnick, Acierno, & Kilpatrick, 1997). In our previous work, we reported the development of a hypothesized temporal sequence of person and event characteristics and cognitive processing that could mediate the impact of rape on health outcomes (Koss et al., 2002). A limitation of that study was its basis in cross-sectional data. One cannot assume that the snapshot taken at a single assessment represented change as it would unfold across time. The present study addresses that limitation by examining the covariation among the major constructs in the model across time in an independent sample of rape survivors.

Our conceptualization had its intellectual roots in emotional processing models of posttraumatic stress disorder (PTSD; e.g.,

Brewin, Dalgleish, & Joseph, 1996; Ehlers & Clark, 2000; Foa & Riggs, 1995; Horowitz, 1986; Janoff-Bulman, 1992; Joseph, Yule, & Williams, 1995; Rachman, 2001). This class of theories describes how events with emotional importance are integrated into existing cognitive organization. Uncontrollable acts such as rape stimulate *causal attributions*, which are defined as attempts to answer the question, "Why did this happen to me?" (Draucker, 1989; Janoff-Bulman, 1992; Wortman & Silver, 1989). Uncontrollable acts are more distressing than those seen as controllable (Foa, Zinbarg, & Rothbaum, 1992). In the aftermath of trauma, victims may seek to understand their trauma by blaming external forces such as the rapist or society or by turning to internal explanations involving controllable or uncontrollable features of their own behavior or character (Janoff-Bulman, 1992). A recent review concluded that Behavioral Self-Blame was consistently associated with more distress among rape victims (Frazier, Berman, & Steward, 2001). Frazier (2003) called for studies to identify mediators of the relationship between self-blame and distress in rape survivors.

Our previous work suggested that a powerful mediator of the effects of causal attributions on distress is deeply held beliefs that organize and give meaning to our perceptions (Koss et al., 2002). Over time we all develop almost automatic ways of processing the experiences in our lives. When we try to characterize these responses, they are commonly seen to reflect beliefs about ourselves and the world around us including so-called just world assumptions (i.e., bad things happen to bad people; Lerner, 1980) and beliefs about the meaningfulness of life, safety, trust–dependency, personal control, esteem, and intimacy (McCann & Pearlman, 1990; for a review see Crome & McCabe, 2001). Incongruity between lived experience and personal beliefs creates distress and stimulates attempts to resolve the conflict by altering beliefs or by modifying how the incident is interpreted. In optimal recovery, survivors cease their preoccupation with attributing cause and stabilize beliefs about themselves and others that promote healthy functioning (Harvey, 1996; Herman, 1992; Lebowitz, Harvey, & Herman, 1993; McCann & Pearlman, 1990).

The hypothesized sequence of mediation we confirmed in our previous work was the following: (a) personological characteristics—including the personality traits of openness to experience,

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psychological problem history and previous violence exposure—shaped appraisal of the trauma and formed the psychological context in which recovery unfolded; (b) assault severity—including the relationship of the perpetrator, his objective level of violence, and the survivor's subjective fear—influenced causal attributions about why the rape happened, which subsequently influenced where cause for the trauma was attributed; and (c) social cognitions—including causal attributions and personal beliefs—directly influenced the severity of global distress, a higher order construct reflecting health outcomes that were indicated by the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983), the Posttraumatic Symptoms Scale (Foa, 1995), the Social Adjustment Scale—Self-Report (SAS; Weissman & Bothwell, 1976), and the Monthly Health Review (Jenkins, Kreger, Rose, & Hurst, 1980). The results demonstrated that the most powerful mediation of health outcomes was contributed by self-blame and maladaptive beliefs. Characterological self-blame was highly distressing and harmful to health, whereas behavioral self-blame was somewhat protective against distress. Blaming one's character led to substantial maladaptive beliefs, which both directly and indirectly exacerbated global distress and which specifically exacerbated PTSD and social, physical, and emotional symptoms.

In the present longitudinal data, we completed two strategies to constructively replicate this model. Elsewhere we apply the structural model developed in the earlier study to the present data (Koss & Figueredo, 2004). However, many of those who commented on the article felt that in spite of multiple measurement points on each participant that raised the effective sample size, the sample size was too small to support the analyses. The present article represents our attempt to accomplish partial replication with a more conservative approach. In consideration of the sample size, we focused on examining the covariation across time of causal attributions, beliefs, and psychosocial health outcomes. We preserve the theoretical feature of our original structural model in that Maladaptive Beliefs were hypothesized to mediate the effects of Behavioral Self-Blame, Characterological Self-Blame, and External Blame on Psychosocial Distress.

Method

Sample

Few crime victims in general (12%; Norris, Kaniasty, & Scheer, 1990) or rape victims in particular (19%, Kimerling & Calhoun, 1994; 9%, Koss, Woodruff, & Koss, 1991) seek services from the formal mental health system. We aimed to recruit a representative group of recent rape victims by broadening the net to all types of community services that rape victims may access. We used multiple recruitment methods, including direct referrals of clients by sexual assault service centers; posters and flyers at other agencies; direct mailings to physicians, clergy, and psychotherapists; and a survey administered to psychology students. No matter how the woman learned of the study, her first contact with the research was by telephone call to the research office. During the intake period, the closest sexual assault center completed 995 intake interviews; 269 clients met eligibility criteria (over 18 years of age, raped within 3 months, and no mental disorder serious enough to interfere with ability to consent), and 48 contacted the study (17.8% participation rate). Other victim programs referred 4 victims. The study received 46 telephone calls from women who learned about the research through letters and posters, of whom 26 qualified for participation (57.0%). The primary reason for screening out a participant from the study was rapes that occurred longer ago than 3 months. Recruitment by survey administered to psychology students iden-

tified an additional 5 contacts. In total, 83 women met inclusion criteria and initially agreed to participate. Of them, 59 completed two or more interviews (71.0%). Survivors were assessed the first time within 3 months of their rape. Additional assessments occurred at three of the following time points: 6, 12, 18, or 24 months postassault for a goal of four assessments. The average number of measurements available for the participants was 3.38 out of 4.00.

The mean age of the participants was 29.5 years ($SD = 10.8$, range = 18.0–57.0 years). The ethnic distribution was 81% White, 7% Hispanic, 7% African American, and 5% Asian American or Pacific Islander. The marital status of the women was 57% single, 10% married or living with a partner, and 33% separated or divorced. Religious affiliation was 41% Protestant or Christian, 31% Catholic, 5% Jewish, 14% other religion, and 10% no religion. The highest educational attainment of the women was 17% high school or less, 55% technical school or some college, 19% completed college, and 10% graduate degree. Of the participants, 55% had a family income of less than \$15,000, 24% had incomes between \$15,001 and \$35,000, and 21% had incomes greater than \$35,000. Compared with the community of Tucson, Arizona, the sample had fewer Hispanic participants despite having (a) bilingual flyers posted in agencies that serve a primarily Spanish-speaking clientele, (b) a bicultural–bilingual telephone screener, (c) availability of transportation and reimbursement for child care, and (d) the capability to conduct the entire set of assessments in Spanish. We have written elsewhere about the challenges to recruit Hispanic participants into rape research, because rape is not disclosed or discussed openly in traditional Mexican culture (see Lira, Koss, & Russo, 1999). The relationship of the perpetrators to the victims in the study included 36% strangers, 25% nonromantic acquaintances, 15% dates, 22% husbands or partners (including ex-husbands and ex-partners), and 2% other relatives.

Purely for the sake of characterizing the sample, we report that all the participants met diagnostic criteria for current PTSD according to *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994) criteria. We may have assessed a few women who were less than 4 weeks postrape and therefore failed the duration criterion; but unfortunately, we did not link our data on the date of the rape derived from telephone screening to our data recorded on the interview protocol regarding the days elapsed since entering the study. Diagnosis was determined by applying the scoring algorithm for diagnostic inclusion to responses obtained from face-to-face administration of the Posttraumatic Diagnostic Scale (Foa, 1995; Foa, Riggs, Dancu, & Rothbaum, 1993).

Procedures

After phoning the research office, potential participants were briefly screened to ensure that they had experienced a sexual assault that met the study definition of rape. These criteria included that the incident (a) had occurred within the prior 3 months and (b) involved some form of penetration (oral, anal, or vaginal) against consent—through the use of physical force or threat of bodily harm—or when they were unable to give consent because of lack of consciousness or intoxication. The screening questions used on the telephone were based on the Sexual Experiences Survey (Koss, Koss, & Woodruff, 1991) and did not include the word *rape*. The internal consistency reliability of these items in our previous study (Koss et al., 2002) was .72. Participants were rescreened at interview. All participants met rape criteria at both screenings. Although participants may have been raped more than once in their lives, they were directed to think of the recent incident or the incident they remembered best as the focus of their responses to interview questions about Characterological Self-Blame, Behavioral Self-Blame, and External Blame.

Interviews were held in an off-campus research facility in a private office setting with a trained female interviewer. Interviewers were mature women ($N = 12$), with a bachelor's degree or above and extensive human service experience, most as nurses or social workers. Their training consisted of a 20-hr training program accompanied by a 230-page training

manual, exemplar videotapes, and practice interviews that were evaluated. All interviews were tape-recorded with the survivor's consent. Ongoing supervision consisted of monitoring each tape for clinical appropriateness, random monitoring of entire tapes, weekly feedback sessions with interviewers, monthly update training, and quality review of every protocol with return to the interviewer for recontact if necessary to complete missing information. Twenty protocols from the face-to-face interviews were compared with protocols filled out by different interviewers who listened to the tape recorded session. The variance components attributable to rater error were separately estimated with a hierarchical general linear model (Cohen & Cohen, 1983). The main effect and interactions of these rater effects were found to be small and relatively homogeneous in magnitude, justifying pooling them into a single error term. The resultant eta of .946 represented the proportion of true score variance as opposed to rater error.

Measurement

Measures were presented orally and in a standard order with the exception of four measures that were designed for paper-and-pencil response. Paper-and-pencil measures were completed on site, immediately following the interview, and under supervision. After the paper and pencil measures were completed, a written and oral debriefing was performed. The study variables were summed composite scales developed in an independent sample with confirmatory factor analysis to verify the assignment of items to factors in standard measures and to create higher order factors (see Koss et al., 2002).

Causal Attributions

We used the Rape Attribution Questionnaire (Frazier, 2000), consisting of three 7-item subscales that assess Behavioral Self-Blame, Characterological Self-Blame, and External Blame. Ratings were made on a 5-point Likert-type scale, anchored by *never* and *very often*. The Behavioral Self-Blame scale includes items such as, "You put yourself in a vulnerable situation." The Characterological Self-Blame scale includes items such as "You are just the victim type." A typical External Blame scale item is "Men need to feel power over women." Alpha coefficients in our previously reported cross-sectional data were .83, .76, and .81 for Behavioral Self-Blame, Characterological Self-Blame, and External Blame, respectively.

Maladaptive Beliefs

The McPearl Belief Scale—Revision D was administered by self-report at baseline and each of the repeated measurements to assess personal beliefs. This scale was the most recent version then available of the scale now known as the Traumatic Stress Institute/Center for Adult Adolescent Psychotherapy Scale (Pearlman, 1996). This 80-item scale measures individuals' personal beliefs in areas that are likely to be affected by trauma including safety, trust—dependency, control, esteem, and intimacy. For each area there are questions that assess beliefs about the self and beliefs about others. Examples of self-items include, "I have little control over what happens to me," or "I feel confident that I can protect myself from harm." Sample other items include, "Most people destroy what they build," or "Other people are no good." The response scale ranged from 1 (*disagree strongly*) to 6 (*agree strongly*). A higher score indicates maladaptive outcomes of trauma exposure. The Cronbach's alphas for the 10 subscales—which include both self-scales and other scales for safety, trust, esteem, intimacy, and control—in our cross-sectional sample ranged from .55 to .88; the correlations of the subscales with the composite ranged from .44 to .80.

Posttraumatic Stress Symptoms

Symptoms of PTSD were assessed at baseline and at 6, 12, 24, and 36 months with the Posttraumatic Diagnostic Scale (Foa, 1995; Foa et al.,

1993). This 17-item scale provided continuous scores for each subscale (Avoidance, Intrusion, and Hyperarousal) and a Posttraumatic Diagnostic Scale global severity score. In our prior cross-sectional study, the Cronbach's alphas for the Reexperiencing, Avoidance, and Arousal subscales ranged from .71 to .76; the correlations of the subscales with the composite ranged from .80 to .84.

Psychopathology

The BSI was administered by self-report at each measurement point to assess the domain of psychological symptoms (Derogatis & Melisaratos, 1983). In our previously described measurement model, all 10 subscales of the BSI correlated significantly with a single higher order factor that recreated the BSI Global Severity Index recommended by the test's creators. In our prior cross-sectional study, the Cronbach's alphas for the subscales in our sample ranged from .61 to .90; the correlations of the subscales with the composite ranged from .73 to .89.

Social Maladjustment

Social functioning was measured at baseline and each repeated assessment with the SAS (Weissman & Bothwell, 1976). This 53-item questionnaire measures social functioning (a) at school and work, (b) in social and leisure activities, (c) in immediate and extended familial situations, and (d) in dating, marital, parental, familial, school functioning, and financial spheres. In our previous study, the Cronbach's alphas for these subscales ranged from .53 to .69. The correlations of the subscales to the composite ranged from .28 to .82. A few scales had low correlations because they could not be assessed for every participant (i.e., participants who were not parents and persons who were unemployed).

Data Analyses

We preserved sample integrity by estimating latent variable scores from the mean of nonmissing indicator scores (Figueredo, McKnight, McKnight, & Sidani, 2000). With this procedure, only 2 of 59 study participants were entirely lost from data analysis because of missing data. The mean proportions of complete data by composite variable were 99.5% for Behavioral Self-Blame, 99.5% for Characterological Self-Blame, 99.2% for External Blame, 93.1% for Psychopathology, 99.3% for Posttraumatic Stress Symptoms, and 79.4% for Social Maladjustment (the lower percentage of completion is due to domains that were inapplicable to some participants). Demographic variables might have been correlated with some of the study variables, and in our previous studies these effects were statistically controlled by residualization (e.g., Koss et al., 2002; Koss, Figueredo, Bell, Tharan, & Tromp, 1996). We chose not to residualize prior to statistical analysis because of few significant effects observed in our past work (9/821 regressions) and the limited degrees of freedom available for parameter estimation.

Level-1 growth curve analysis. Individual growth curve parameters for all composite scores on which repeated measures were obtained were calculated by simultaneous ordinary least-squares estimation, in which we plotted scores over time and calculated a regression line (Figueredo, Brooks, Leff, & Sechrest, 2000). Each participant was initially treated as a separate case study for analysis, and the following regression parameters were estimated: (a) intercept, representing the best estimate of the starting value on each composite and (b) slope, or unstandardized regression weight, representing the direction and magnitude of average change in status on each composite over time. The times of measurement used in these individual regressions were the exact number of days postintake at which assessments occurred.

Because we expected a negatively accelerated function for recovery from rape, the slopes were theoretically prespecified to be curvilinear, and a natural logarithmic transformation of time was performed prior to the individual regression analyses. Subsequently, we compared the effects of

alternative function forms (i.e., rectilinear, quadratic, and logarithmic). Table 1 presents data from hierarchical tests of significance with variable intercepts and slopes that were conducted to evaluate our hypothesis of curvilinearity. In six of the seven scales tested, the incremental proportion of variance accounted for by the logarithmic function over that of the linear function was statistically significant. The quadratic function also accounted for significantly more variance than the linear function in five of seven scales tested. Comparison of the incremental proportions of variance accounted for by the two alternative curvilinear terms showed that the logarithmic function slightly exceeded that of the quadratic function in five of the seven repeated measures. In addition, the logarithmic function consumed only one model degree of freedom, whereas the quadratic function (requiring the prior inclusion of a linear term) consumed two model degrees of freedom per study participant. Thus, the logarithmic model was selected as both more parsimonious as well as somewhat more explanatory in modeling the observed curvilinearity.

Sufficiently powerful tests of the goodness of fit of our Level-1 growth curve model at the individual level were not possible because only four observations per study participant were available. However, by constructing univariate multiple regressions for each longitudinal scale, with and without random regression coefficients, it was possible to determine collectively how much of the variance across all study participants in repeated observations was explained by each of three alternative growth curve models. In the first alternative model, all rape survivors were assumed to have started at the same level of Psychosocial Distress and to have recovered at an identical rate (i.e., constrained to have both equal intercepts and equal slopes). This is the assumption inherent in analysis of variance approaches to the analysis of longitudinal data. In the second model, all rape survivors were assumed to have started at different levels of symptom severity but to have recovered at the same rate (i.e., constrained to have equal slopes but were permitted to have variable intercepts). In the third model, all rape survivors were permitted to start at different levels of Psychosocial Distress and recover at varying rates of change (permitted to have both variable intercepts and slopes). The data in Table 2 demonstrate that substantial gains in explanatory power were achieved by the random coefficients model (third model), which underlies growth curve analyses, compared with traditional group-level analysis characteristic of fixed-effects multiple regression and repeated measures analysis of variance (Hedeker & Mermelstein, 2000).

The growth curve analysis approach we selected has three potential advantages over more traditional alternatives for handling repeated measures. First, it does not assume equal numbers of repeated observations. Individuals with more data are given more weight in the calculation of parameter estimates (Collins, Schafer, & Kam, 2001). Second, growth curve analysis is a random effects model, so homogeneity of rates of change across time is not assumed (cf. Bryk & Raudenbush, 1992; Laird &

Ware, 1982; Rogosa, Brandt, & Zimowski, 1982). Third, growth curve parameters of both intercepts and slopes, because they are based on all the observations for each individual, are generally much more reliable than single scores measured in a cross-sectional sample.

Level-2 growth curve analysis. Level-2 growth curve analyses were performed separately for the intercept and slope data generated at Level 1 but followed the same three basic steps. First, we performed exploratory factor analyses to create a single Psychosocial Distress factor from the BSI, Posttraumatic Stress Symptoms, and Social Maladjustment. Second, we used multiple regressions to predict Maladaptive Beliefs from Behavioral Self-Blame, Characterological Self-Blame, and External Blame, which were entered simultaneously. Third, we used multiple regressions to predict Psychosocial Distress from Maladaptive Beliefs, Behavioral Self-Blame, Characterological Self-Blame, and External Blame, which were again entered simultaneously. The strategy was to demonstrate mediation by showing that the three forms of blame predicted Maladaptive Beliefs but did not directly predict Psychosocial Distress when Maladaptive Beliefs were entered into the equation, thus showing that the beliefs mediated the effects of blame on symptoms. Simultaneous, as opposed to hierarchical, regression was selected because the latter would have favored our mediation hypotheses; therefore, simultaneous regression provided a more conservative test. As in the Level-1 growth curve analyses, all Level-2 multiple regression analyses used ordinary least-squares estimation.

Results

Level-1 Growth Curve Analysis

Table 3 displays the means and standard deviations of the intercepts and the logarithmic slopes, as well as their associated tests of significance. All these mean growth curve parameter estimates were statistically significant, indicating systematic trends among the entire set of individual regressions. The intercept tests indicate that the starting values were significantly different from zero. The slope tests demonstrate that there were significant changes for the group as a whole and (because the signs were negative) that the change was a decrease in severity across time.

In Table 3, the mean intercepts represent the initial values per item for the items composing each composite scale and are presented in the raw score metric of the items. Thus, the values vary according to the range of the Likert-type response format used for each scale. The mean slopes illustrated in Figures 1 and 2 represent the logarithmic rate of change over time for each composite scale. The slopes appear shallow because the regression weights were

Table 1
Relative Incremental Goodness of Fit of the Two Curvilinear Models Over the Rectilinear Model With Random Regression Coefficients (Squared Multiple Correlations)

Longitudinal scale measure	$\Delta R^2[(T + T^2) - (T)]$ (linear + quadratic) - (linear model)	$\Delta R^2[(T + LNT) - (T)]$ (linear + logarithmic) - (linear model)
Behavioral Self-Blame	.051*	.056*
Characterological Self-Blame	.044	.062*
External Blame	.063	.057
Maladaptive Beliefs	.073*	.059*
Psychopathology	.079*	.088*
Social Maladjustment	.109*	.112*
Posttraumatic Stress Symptoms	.090*	.098*

Note. T = Time postrape in days; T² = quadratic function of postrape in days; LNT = natural logarithm of time postrape in days.

* $p < .05$.

Table 2
*Relative Goodness of Fit of Alternative Specifications of the Level-1 Growth Curve Model
 (Squared Multiple Correlations)*

Longitudinal scale measure	R^2 (LNT) Equal intercepts + equal slopes	R^2 (LNT + ID) Unequal intercepts + equal slopes	R^2 (LNT + ID + LNT \times ID) Unequal intercepts + unequal slopes
Behavioral Self-Blame	.019	.853	.914
Characterological Self-Blame	.028	.842	.911
External Blame	.027	.743	.886
Maladaptive Beliefs	.067	.764	.876
Psychopathology	.167	.777	.869
Social Maladjustment	.075	.675	.825
Posttraumatic Stress Symptoms	.416	.798	.886

Note. LNT = natural logarithm of time posttrauma in days; ID = participant (research participant) identification number.

estimated as effects per day postintake at the level of individual items. Aggregated over the entire study period of almost 2 years (644 days), as well as over all the multiple items on each scale, these per day and per item effects added up. We discuss the clinical significance of the observed changes below. Generally speaking, however, Table 3 shows that the pattern of change was similar across mediators and outcomes.

The initial clinical status of our participants (provided by the intercepts displayed in Table 3) can be compared with normative data for mean raw scores on the beliefs and health items to establish an external point of reference for the recovery being observed. For example, the raw score mean for the intercept on Maladaptive Beliefs was 3.28, which compared with a value of 3.05 reported by Goodman and Dutton (1996) in a sample of episodically homeless, seriously mentally ill women. The mean score on Psychopathology items, as measured by the BSI Global

Severity Index, was 1.64, which represents a t score of 71 when compared with female nonpatients and a t score of 54 with norms for female psychiatric outpatients (Derogatis & Melisaratos, 1983). The mean score for the intercept of Social Maladjustment was 2.11, which is lower than the values reported for female acute depressives and alcoholics (2.53 and 2.36, respectively) but far above the value for community samples (1.61; Weissman, Prusoff, Thompson, Harding, & Myers, 1978). The mean score for the starting value on Posttraumatic Stress Symptoms was 2.29 in the present data compared with 1.98 for individuals in the PTSD-present normative sample and 0.73 for the individuals in the normative sample who did not meet diagnostic criteria for PTSD (Foa, 1995).

Similar comparisons were made for the mean final predicted values for the group as a whole to gauge the clinical status of the rape survivors after approximately 2 years of recovery had passed.

Table 3
Mean Per Item Scores and Standard Deviations for Intercepts and Slopes

Variable and parameter	M	SD	SE	$t(55)$	$p <$
Behavioral Self-Blame ^a					
Intercept	2.113	1.610	0.209	17.944	.01
Slope	-0.058	0.167	0.022	-4.759	.01
Characterological Self-Blame ^a					
Intercept	1.343	1.644	0.213	11.170	.01
Slope	-0.043	0.159	0.021	-3.751	.01
External Blame ^a					
Intercept	2.044	1.520	0.197	18.390	.01
Slope	-0.041	0.205	0.027	-2.714	.01
Beliefs ^b					
Intercept	3.284	1.171	0.155	38.362	.01
Slope	-0.051	0.159	0.021	-4.361	.01
Psychopathology ^c					
Intercept	1.643	0.953	0.124	23.581	.01
Slope	-0.140	0.158	0.021	-12.188	.01
Posttraumatic Stress Symptoms ^d					
Intercept	2.295	0.803	0.104	38.102	.01
Slope	-0.040	0.138	0.018	-3.947	.01
Social Maladjustment ^e					
Intercept	2.113	1.610	0.209	17.944	.01
Slope	-0.058	0.167	0.022	-4.759	.01

^a 0 = never, 4 = very often. ^b 1 = disagree strongly, 6 = agree strongly. ^c 0 = not at all, 4 = extremely. ^d 0 = not at all, 3 = almost always. ^e 1-5, anchors varied by item content.

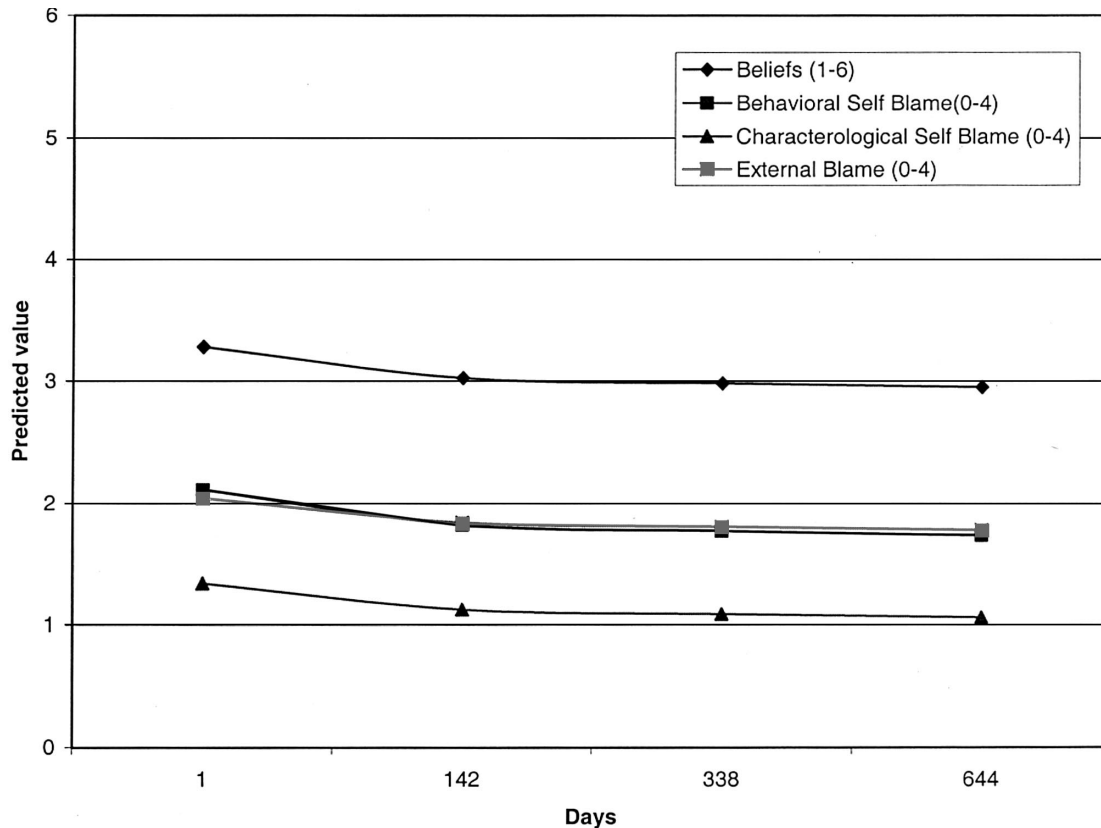


Figure 1. Raw mean change per item over time on cognitive mediators.

The final expected value on the BSI Global Severity Index was 0.95, which corresponds to a *t* score of 44 with female outpatient norms and 64 with norms for nonpatients (Derogatis & Melisaratos, 1983). Compared with the starting *t* score of 71 with nonpatient norms, the final value represents a reduction in Psychopa-

thology of approximately 0.70 standard deviation. The final expected value for SAS was 2.04, which was approximately the same as the starting value of 2.11 (*SD* = 0.34 among community women; Weissman et al., 1978). The final predicted score for PTSD was 0.74, which was approximately equal to the value for

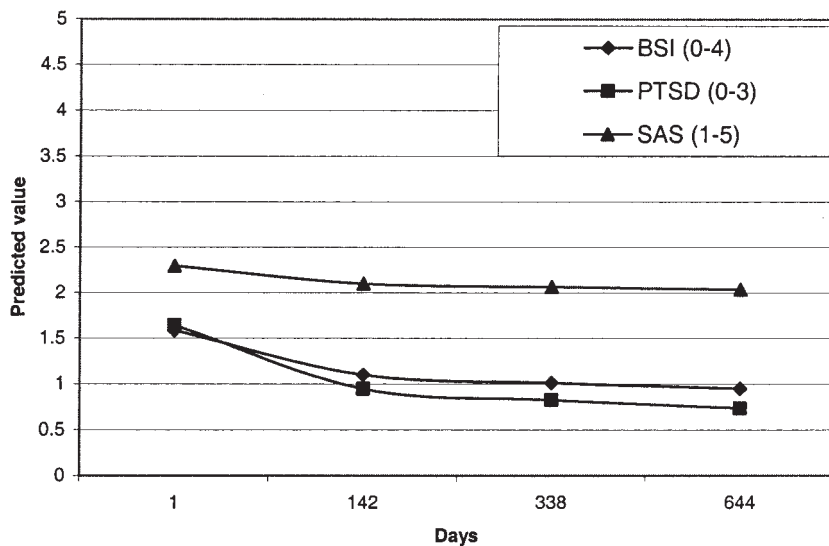


Figure 2. Raw mean change per item over time on Psychosocial Distress outcomes. BSI = Brief Symptom Inventory; PTSD = posttraumatic stress disorder; SAS = Social Adjustment Scale—Self-Report.

the norm group that did not meet PTSD criteria. Compared with the starting value of 2.30, the final value represents a decline in severity of 2.50 standard deviations (*SD* in non-PTSD sample = 0.62; Foa, 1995).

Table 3 shows that the interindividual variability among growth curve parameters in recovery from rape was appreciable. Table 4 also displays the bivariate correlation of each intercept with each corresponding slope. All of these correlations were significant and negative. This indicates that the more severe the starting level of each variable, the more rapid the recovery over time. Level-2 growth curve analysis was undertaken to explain the interindividual variation.

Level-2 Growth Curve Analysis

The results of the exploratory factor analyses on the indicators of Psychosocial Distress are shown in Table 5. Consistent with our previous reports (Koss et al., 2002), a single general factor explained the covariation among Psychopathology, Social Maladjustment, and Posttraumatic Stress Symptoms. The intercepts converged on a single intercept factor, and the slopes converged on a single slope factor for general Psychosocial Distress. Using the Psychosocial Distress factor, we display the bivariate correlations among growth curve parameters in Table 6.

The multiple regressions also showed results that were generally consistent with our previous findings (Koss et al., 2002). For the intercepts, Characterological Self-Blame was the only significant predictor of Maladaptive Beliefs ($\beta = .39$, $t(53) = 2.10$, $p = .04$). Neither the intercepts of Behavioral Self-Blame ($\beta = .05$), $t(53) = 0.25$, $p = .81$, nor that of External Blame ($\beta = .12$), $t(53) = 0.94$, $p = .35$, significantly predicted the intercepts of Maladaptive Beliefs. For the slopes, Behavioral Self-Blame was the only significant predictor of Maladaptive Beliefs ($\beta = .36$), $t(53) = 2.37$, $p = .02$. Neither the slopes of Characterological Self-Blame ($\beta = -.11$), $t(53) = -0.70$, $p = .49$, nor that of External Blame ($\beta = -.14$), $t(53) = -1.09$, $p = .28$, significantly predicted the slopes of Maladaptive Beliefs.

Maladaptive Beliefs were then included with the blame variables in simultaneous multiple regressions to predict Psychosocial Distress intercepts and slopes. The only significant predictor of Psychosocial Distress was Maladaptive Beliefs for the intercepts ($\beta = .61$), $t(52) = 5.41$, $p < .01$, as well as for the slopes ($\beta = .52$), $t(52) = 4.40$, $p < .01$. With Maladaptive Beliefs entered into the equation, Behavioral Self-Blame was a significant predictor of neither the intercepts ($\beta = -.02$), $t(52) = -0.15$, $p = .88$, nor the

Table 5
Factor Loadings for Exploratory Factor Analyses of Indicators of Psychosocial Distress

Indicator	Psychosocial Distress
Intercept	
Psychopathology	.789
Posttraumatic Stress Symptoms	.675
Social Maladjustment	.738
Slope	
Psychopathology	.730
Posttraumatic Stress Symptoms	.629
Social Maladjustment	.611

slopes of Psychosocial Distress ($\beta = .21$), $t(52) = 1.59$, $p = .12$. Characterological Self-Blame was a significant predictor of neither the intercepts ($\beta = .06$), $t(52) = 0.39$, $p = .70$, nor the slopes ($\beta = -.09$), $t(52) = -0.64$, $p = .53$, of Psychosocial Distress. Finally, External Blame was a significant predictor of neither the intercepts ($\beta = .17$), $t(52) = 1.68$, $p = .10$, nor the slopes ($\beta = .01$), $t(52) = 0.10$, $p = .92$, of Psychosocial Distress. Thus, we may conclude that any effects of the blame variables on both the intercepts and slopes of Psychosocial Distress were fully mediated by those of Maladaptive Beliefs.

Summary of Effects

The intercept analyses accounted for 48% of the variance in Psychosocial Distress, which accounted for 62% of the variance in Psychopathology, 54% of the variance in Social Maladjustment, and 46% of the variance in Posttraumatic Stress Symptoms. The slope analyses accounted for 36% of the variance in Psychosocial Distress, which accounted for 53% of the variance in Psychopathology, 37% of the variance in Social Maladjustment, and 40% of the variance in Posttraumatic Stress Symptoms.

Discussion

Initially these rape survivors had clinically significant levels of distress. For example, initial Global Severity Index scores on the BSI were two standard deviations above the community norms and the PTSD scores were two and a half standard deviations higher; however, SAS scores were within one standard deviation of community samples. The consensus is that *normal* is defined as scores that are within one standard deviation of the mean; two standard deviations higher represent disturbance and three standard deviations from the average score of nonpatient community samples reflect more severe disturbance (Jacobson & Truax, 1991; Kendall & Grove, 1988; Ogles, Lambert, & Masters, 1996). At the end of 2 years of recovery, PTSD was over two standard deviations lower on average than at baseline, and the final scores were similar to those from non-PTSD norm groups. This amount of change is highly clinically significant. Scores on the Global Severity Index of the BSI declined by 0.70 standard deviations but were still more than one standard deviation elevated from nonpatient norms. Frazier (2003) observed after 1 year of follow-up that rape survivors displayed psychopathology that was approximately one standard deviation elevated. Our findings are similar except for the better prognosis for PTSD.

Table 4
Bivariate Correlations Between Intercepts and Corresponding Slopes

Intercept–Slope	Correlation
Behavioral Self-Blame	-.362*
Characterological Self-Blame	-.622*
External Blame	-.581*
Maladaptive Beliefs	-.510*
Psychopathology	-.565*
Posttraumatic Stress Symptoms	-.465*
Social Maladjustment	-.509*

* $p < .05$.

Table 6
Bivariate Correlations Between Growth Curve Parameters

Variable	1	2	3	4	5
1. Behavioral self-blame	—	.526*	.113	.287*	.323*
2. Characterological self-blame	.739*	—	.233*	.047	.057
3. External blame	.061	.206	—	-.129	-.050
4. Maladaptive beliefs	.341*	.448*	.201	—	.575*
5. Psychosocial distress	.243	.356*	.309*	.667*	—

Note. Correlations between intercepts are displayed below the diagonal; correlations between slopes are displayed above the diagonal.

* $p < .05$.

Significant decreases in Characterological Self-Blame, Behavioral Self-Blame, External Blame, and Maladaptive Beliefs also were observed across 2 years of recovery. These changes covaried with reductions in Psychosocial Distress, Psychopathology, Post-traumatic Stress Symptoms, and Social Maladjustment. Of the three causal attributions, only Characterological Self-Blame was related to the prediction of Maladaptive Beliefs in the intercept data with multiple regression. It ceased to be a significant predictor of Psychosocial Distress after we accounted for the influence of Maladaptive Beliefs. This finding indicates that the effects of Characterological Self-Blame on distress at baseline were fully mediated by their influence on formation of Maladaptive Personal Beliefs. In regression analysis of the slopes data, only the reduction in Behavioral Self-Blame was related to the observed decline in Maladaptive Beliefs. Again, it was no longer a significant predictor of decrease in Psychosocial Distress after we accounted for improvements in Maladaptive Beliefs. Looking at the findings from both the intercept and slopes data suggests that Characterological Self-Blame, which we previously reported was influenced by prior exposures to violence and the psychological problem history that resulted from these experiences, was important in determining the initial level of Maladaptive Beliefs and Psychosocial Distress. Reduction in Behavioral Self-Blame was more prominent over time in accounting for decreased distress during recovery. External Blame predicted neither Maladaptive Beliefs nor Psychosocial Distress. Thus, our findings suggest that both forms of self-blame were unhelpful and that recovery occurred when any type of preoccupation with attributing causes became less intense.

The temporal sequence we previously reported in cross-sectional data was partially replicated. The present results, as well as our previous study, highlight the provocative effect of Characterological Self-Blame on initial levels of Maladaptive Beliefs and the absence of either positive or negative effects for External Blame. We previously reported a small but significant protective effect of Behavioral Self-Blame on distress. That effect did not replicate. In the present data, reductions over time in Behavioral Self-Blame promoted recovery. We also replicated the significant contribution of Maladaptive Beliefs to the prediction of Psychosocial Distress and to the prediction of the specific forms of mental and social problems. In the present data, Maladaptive Beliefs account for nearly 50% of the variance in the initial level of Psychosocial Distress and 36% of the variance in reduction in distress over time. Although there is a range of empirically validated psychotherapeutic interventions for rape survivors (e.g., Foa et al., 1999; Resick, Nishith, Weaver, Astin, & Feurer, 2002), our

results suggest that a component addressing the cognitive processes by which beliefs are challenged by traumatic experiences and reformed in the aftermath would characterize an approach that is fully grounded in basic research.

The present study and Frazier (2003) both (a) followed rape victims longitudinally and (b) used the Rape Attribution Questionnaire and the BSI to measure mental health outcomes; therefore, it is reasonable to compare the results. Frazier (2003) reported that Behavioral Self-Blame was associated with increased distress at all four of her measurement points. Our slopes findings were consistent in that we found that reduction in Behavioral Self-Blame was associated with decreased distress over time. However, our intercept results do not demonstrate a significant correlation of Behavioral Self-Blame and distress. The present results extend Frazier's (2003) work by demonstrating that the effects of both forms of self-blame on distress are mediated by their influence on Maladaptive Beliefs. Frazier (2003) tested a temporal theory of self-blame wherein Behavioral Self-Blame was conceptualized as reflective of past control, and her results suggest that Behavioral Self-Blame is not helpful, in contrast to Janoff-Bulman's (1992) original conceptualization, but instead is distressing. We are concerned that this temporal conceptualization omits Characterological Self-Blame. Because you cannot change enduring features of your character, it fails to offer past, present, or future control. Yet, our results suggest that Characterological Self-Blame played a role in setting the baseline level of Maladaptive Beliefs formed in response to rape. In addition, our previous findings demonstrated that the severity of this form of self-blame in particular is influenced by the victim's past exposure to violence and prior psychological problems, which provides explanations for some of the interindividual variability in the pattern of recovery that we document here. Frazier (2003) reported that a linear function best accounted for the observed pattern of change. That function shape predicts that the rapid rate of recovery observed within her 1-year follow-up period would continue through the additional year of measurement in our study. However, we found that a curvilinear function best fit our data. Improvement within the first 5 months was most rapid, but after that change improvement slowed down and recovery flattened out before survivors declined to the levels of distress that characterize population means.

The results support the importance of recent work that has moved toward better elaborated conceptualization and measurement of cognitive processes that occur in the aftermath of severe trauma (e.g., Ali et al., 2002; Dunmore et al., 2001; Frazier, Conlon, & Glaser, 2001; Rauch, Hembree, & Foa, 2001). New measurement tools have been developed to assess phenomena such

as cognitive-processing styles; appraisals of reactions during the assault; appraisals of the sequelae; appraisals of other's responses; perceived permanent change; maladaptive control strategies; trauma-sensitive beliefs (e.g., Ali et al., 2002); past, present, and future control over future assault and recovery (Frazier, 2003; Frazier, Berman, & Steward, 2001); and perceptions of positive and negative life changes (Frazier, Conlon, & Glaser, 2001). Although we applaud better and more specific item-level assessments that are grounded in clinical observation, we also caution about conceptual clarity. We noted that similarly worded items variously measure concepts labeled as personal beliefs, appraisals, and attributions. For example, Dunmore et al. (2001) measured trauma sensitive beliefs after assault with items including, "People only get assaulted if they have done something foolish or careless" (p. 1069) and measured negative appraisals of actions with items including, "It is my fault that the assault happened because I could have prevented it and I didn't" (p. 1068); however, their conceptualization omits any discussion of causal attributions. Frazier's (2003) conceptualization of present control attributions conceptually overlaps what Halligan et al. (2003) call negative appraisals of symptoms. And, Frazier's conceptualization of future control is similar to the assessment of beliefs about self- and other-control that are part of an established measurement of Maladaptive Beliefs. A next step in this literature is to develop measurement models that (a) take the items that indicate these newly identified concepts of cognitive processing, (b) subject them to theoretical analysis, (c) assign them rationally to factors, and (d) confirm that factor structure. This process would result in greater theoretical clarity and consistency across studies and would increase measurement precision.

Our findings are governed by certain constraints and limitations. Our sample plan aimed to recruit rape survivors through a broad range of sites that provided service. However, we cannot directly compare our volunteer rape survivors with those survivors who chose not to volunteer. Through census data, we concluded that our sample underrepresented Hispanics and American Indians despite considerable attention to cultural competence that we earlier described. Although readers understand the difficulty of identifying and maintaining a sample of rape survivors recruited in the immediate aftermath of trauma, nevertheless, our sample size may not have provided enough power to detect weak effects.

Brewin et al. (1996) suggested that recovery from trauma is characterized by spontaneous or programmed habituation to the traumatic images, restoration of a sense of safety, absolution of others from responsibility for the trauma, and other attempts to integrate new information. The present results, based on observation of recovery from sexual assault, suggest that (a) over time habituation to traumatic images did occur as reflected by reductions in PTSD, (b) preoccupation with blame, both directed at the self and others, decreased, and (c) sense of control and other core beliefs were repaired. Although an influence of rape on global distress was still detectable after 2 years, PTSD symptoms were no longer clinically significant. It is our hope that clinicians will use the experiences of the rape survivors who courageously participated in this research to offer some comfort to victimized clients who are struggling with overwhelming levels of pain. Using the resources of family, friends, and in some cases, community-based supportive care or psychotherapy, these rape survivors accomplished the changes that clinicians have identified as characteristic of rape recovery. Change was especially rapid during the first 142

days following assault. Finally, we find it most hopeful that those who were initially most distressed recovered the fastest and to a greater extent until they reached the level of less-distressed survivors.

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