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## Cognitive Mediation of Rape's Mental, Physical, and Social Health Impact: Tests of Four Models in Cross-Sectional Data

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Four nested, theoretically specified, increasingly complex models were tested representing cognitive mediation of rape's effects on mental, physical, and social health. Data were cross-sectional ( $N = 253$  rape survivors). Outcomes were standardized assessments of social maladjustment, physical, and psychological symptoms, including posttraumatic stress disorder (PTSD). The best-fitting model was not fully cognitively mediated. Personological and rape characteristics influenced the level of self-blame experienced and the intensity of maladaptive beliefs about self and others. Self-blame and maladaptive beliefs predicted psychological distress, which strongly influenced all health outcomes. Self-ratings of rape memory characteristics contributed little to predicting postrape distress. The model accounted for 56% of the variance in general distress, including 91% of psychological symptom severity; 54% of PTSD symptoms; 65% of social maladjustment; and 17% of physical symptoms. Longitudinal replication is planned.

One survivor defined rape as forcefully penetrating victims and implanting "land mines of horror" into the bodies of victims (Winkler & Winninger, 1994, p. 248). Empirical data support her metaphor. Long-term negative outcomes have been associated with sexual assault (for reviews, see Crowell & Burgess, 1996; Hanson, Kilpatrick, Falsetti, & Resnick, 1995; Koss et al., 1994). It produces one of the highest rates of posttraumatic stress disorder (PTSD) among civilian traumas (Breslau et al., 1998). In one study of primary care patients, women who had been raped were 3 times more likely to meet criteria for lifetime major depression, were almost 2 times as likely to qualify for dysthymia, and were 2.5 times more likely to report recent depression than nonraped women (Dickinson, de Gruy, Dickinson, & Candib, 1999). Rape survivors also report more physical symptoms and use more medical and mental health services than women untouched by sexual violence (Golding, 1994; Kimerling & Calhoun, 1994; Koss, Koss, & Woodruff, 1991; reviewed in Resnick, Acierno, & Kilpatrick, 1997). Social adjustment is also affected. For example, in one study (Letourneau, Resnick, Kilpatrick, Saunders, & Best, 1996) work function was impaired up to 8 months postassault, and sexual problems were 1.2 times more likely in survivors compared with

nonvictims. These deleterious effects invite consideration of the processes by which rape creates long-lasting harm. We begin with a short overview of the process of recovery derived from clinical observation. Then, the theoretical and empirical foundations of our proposed models are reviewed.

Clinical work with victims has revealed the "overwhelming assault that victimization is to the child's and adult survivor's world of meaning" (Conte, 1988, p. 325). Unexpected acts such as rape stimulate causal attributions, which are attempts to answer the question, "Why did this happen to me?" (Draucker, 1989; Janoff-Bulman, 1992; Wortman & Silver, 1989). Rape is a crime where the victim's responsibility is questioned, even though nothing justifies the behavior of a rapist (Crome & McCabe, 2001, p. 402). Victims may blame external forces, controllable features of their own behavior, and uncontrollable and enduring features of themselves (Janoff-Bulman, 1992). Over time we all develop almost automatic ways of processing the events 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 (bad things happen to bad people; Lerner, 1980) and beliefs about personal control, invulnerability, trust, esteem, and intimacy (McCann & Pearlman, 1990; for a review, see Crome & McCabe, 2001). These are social cognitions, or how people make sense of other people and themselves (Fiske & Taylor, 1984, p. 12). Incongruity between lived experience and social cognitions creates distress and stimulates attempts to resolve the conflict by altering beliefs and by modifying how the incident is interpreted. Social cognitions do not develop and function in a vacuum but rather must be viewed within the context of a person's life. For example, cognitive responses to sexual violence are best understood within the context of an individual's prior and continuing exposure to violence, social traditions, family dynamics, past and present state of mental health, and personality traits that may affect the processing of life experiences.

Emotional processing theories of trauma have at their core the assumption that individuals bring a set of preexisting beliefs about

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the world to the recovery process (e.g., Foa & Riggs, 1995; Foa, Steketee, & Rothbaum, 1989; Horowitz, 1986; Janoff-Bulman, 1992; Joseph, Yule, & Williams, 1995; for a review, see Brewin, Dalgleish, & Joseph, 1996). This class of theories describes how events with emotional importance are integrated into existing cognitive organization. The cognitive readjustments initiated in response to rape are proximal outcomes that, in turn, mediate more distant consequences such as deleterious health effects. 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). In a less fortunate scenario, victims become mired in assigning blame and responsibility and develop maladaptive beliefs that they are bad, incapable of self protection, and unable to trust or be trusted.

Among the earliest consequences of the cognitive changes involved in emotional processing are effects on how the trauma is voluntarily recalled. Memory retrieval has long been understood as reconstructive rather than reproductive (Barclay & Smith, 1992; Middleton & Edwards, 1990). Rather than describing the image on an internal movie screen, a memory is reconstructed and tailored for the particular social situation in which the individual is recalling (Bower & Sivers, 1998). Recall is influenced not just by the strength and elaboration of the neural traces that encoded various classes of memories, such as the sights, sounds, and images, but also by the rememberer's cognitive appraisals. For example, how one recalls an unwanted penetration that involved force will depend on how one appraises the experience. Those who see an incident as "rape" reconstruct it differently than those who see it as a "bad sexual experience" (Carli, 1999; Koss, Figueredo, Bell, Tharan, & Tromp, 1996). Likewise, those who view a rape as having happened because of their own behavior will recall it differently than those who view rape as caused by a sick society that supports male entitlement (Levine, 1997). Survivors who are flooded with highly arousing emotional states and physiologic sensations when they recall their rape experience more distress. When distress is high, social problems and physical illness may be fostered.

Several empirically tested models of the development of PTSD following trauma have focused on mediation by pretrauma characteristics, such as history of child sexual abuse among combat veterans (e.g., King, King, Foy, & Gudanowski, 1996; Taft, Stern, King, & King, 1999; Wagner, Wolfe, Rotnisky, Proctor, & Erickson, 2000). These studies point to explanatory factors that should also be included in any model of postrape distress. However, the only fully cognitively mediated model we located focused on survivors of childhood sexual abuse (Barker-Collo, Melnyk, & McDonald-Miszczak, 2000). These authors confirmed a modified path model, based on Joseph et al. (1995), of survivors' responses to their cumulative exposure to sexual trauma. The model began with personality, which affected perceptions of the victimization. Both of these variables influenced cognitive appraisals of the sexual victimization(s) and the amount of reexperiencing of sexual assault-related sights, sounds, and smells, which in turn directly affected emotional states. The model accounted for 61% of the variance in a subset of Trauma Symptom Checklist (Briere & Runtz, 1989) items pertaining to feelings of isolation, loneliness, anxiety, sadness, fear, inferiority, and guilt.

The goal of the present study was to develop and test a cognitively mediated model of the emotional processing of rape that also incorporated relevant personal characteristics. In contrast to Barker-Collo et al. (2000), we focused on responses to a single rape rather than to cumulative sexual victimization. We previously tested and cross-validated a model of emotional processing but failed to confirm most of the predicted pathways to psychosomatic symptoms (Koss et al., 1996). The present study was based on a face-to-face interview rather than on the brief mailed survey we used in the previous study, thereby permitting broader and better measurement of both cognitive mediation and health outcomes.

#### Four Nested Models of Emotional Processing of Rape

We tested and compared four hierarchically nested structural models of increasing complexity. As in a set of Russian dolls, Model A represented the smallest doll. Model A is entirely included (or nested) in Model B, although paths are added. Model D represents the largest doll that contains all others. In Model A all the negative effects of rape on health were mediated by social cognitions and memory. If Model A failed to fit the data, Models B, C, and D were tested sequentially to identify the best-fitting model that added the fewest pathways not mediated through social cognitions and memory. We included the following sets of mediators (italicized) of rape's health outcomes: (a) *Personological characteristics* represented the individual traits and experiences that characterized the woman who was raped, providing a context for both trauma and recovery. (b) *Rape characteristics* represented the objective and subjective severity of the crime. (c) *Social cognitions* were internal and external causal attributions for the rape and Maladaptive Beliefs that represent the negative outcomes of trauma. (d) *Memory characteristics* were self-ratings of the qualities of the reconstructed memory of rape. (e) *Health outcomes* represented social, physical, and psychological distress and dysfunction. Figure 1 illustrates the predictors that comprised each set of mediators, and the bold arrows depict the hypothesized sequence of mediation in Model A. The dashed arrows and the path notation are explained in the Method section. Our hypothesized sequence of mediation was that a survivor's *personological characteristics*, or personal history, would influence the form of rape to which she was vulnerable. The *rape characteristics*, or actual rape experienced, then influenced how the survivor attributed blame and the formed maladaptive beliefs reflecting the negative influence of trauma. These *social cognitions*, in turn, influenced how the *memory characteristics*, or memory of the rape, was socially reconstructed. The impact on *health outcomes* flowed from how the rape was remembered. The pathways specified in each of the models we tested is illustrated in Figure 2. The legend of Figure 2 depicts the different line patterns used in the figure to identify the pathways that were added in each successively larger model. The empirical foundation for each of the hypothesized pathways in Models A through D is presented in the material that follows.

#### Model A

Model A (see Figure 2) contains 10 hypothesized pathways in a fully mediated model.

1. Psychological Problem History was hypothesized to influence Assault Severity because a record of behavioral problems is asso-

### Mediator Sets

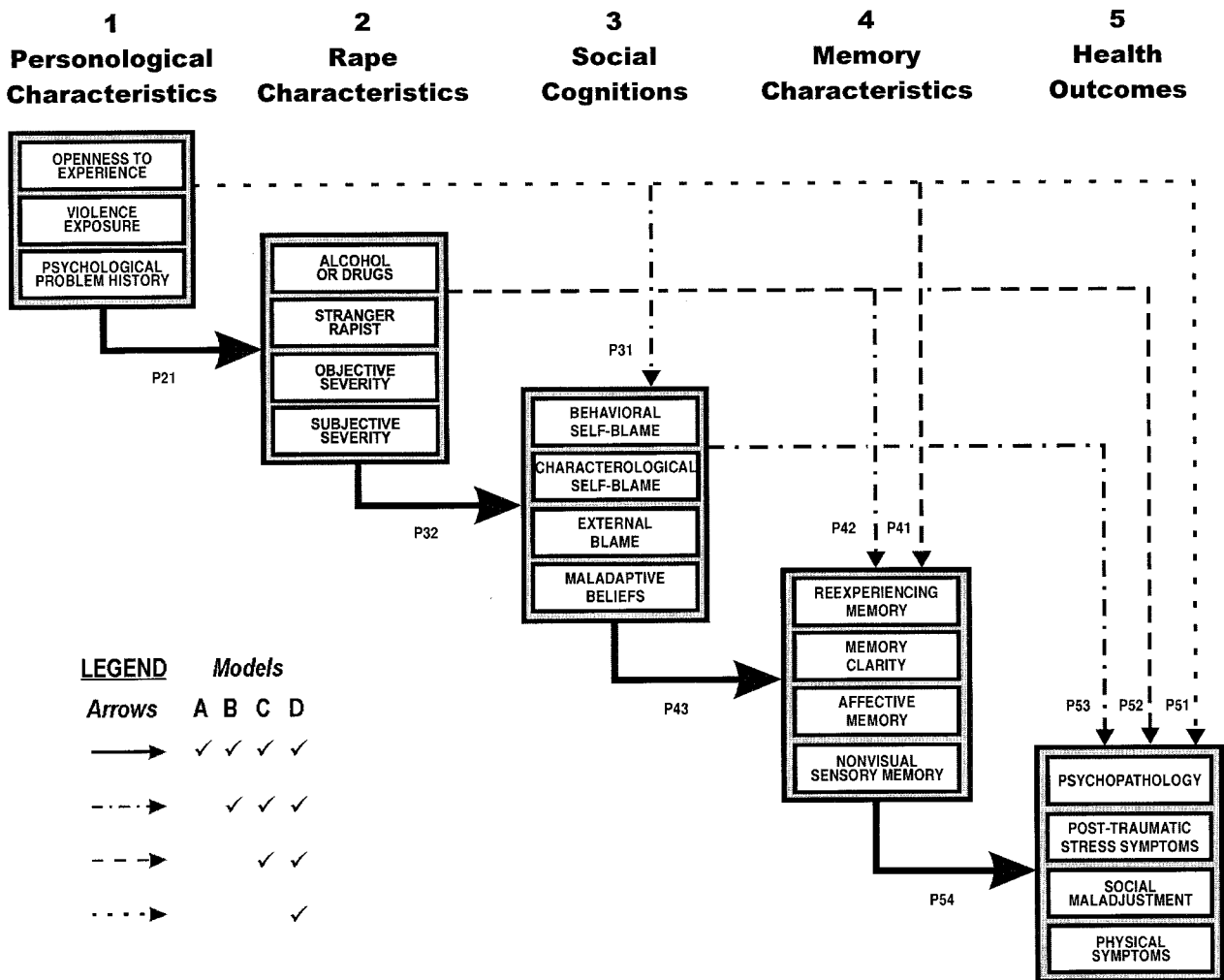


Figure 1. Components of the mediator sets, the hypothesized sequence of mediation, and path notation. In the legend, the check marks indicate which lines compose each model. For example, Model A consists of solid lines only. Model D, the largest model, encompasses all paths illustrated. In path notation, the letter *p* stands for path. The numbers refer to the levels in the sequence of mediation that the effect involves. Thus, P32 refers to a path from variables in the *rape characteristics* set (2) to variables in the *social cognitions* set (3).

ciated with potential impacts on victims of adverse childhood environments such as lower school achievement, concentration in lower paying jobs, nighttime working hours, and living in dangerous neighborhoods, all known vulnerability markers for stranger rape (Bureau of Justice Statistics, 1997).

2. Women who were raped under the influence of Alcohol or Drugs were predicted to have lowered Assault Severity. Assault Severity was a latent construct indicated by the victim's relationship to the perpetrator (stranger vs. known) and objective and subjective severity. Ullman, Karabatsos, and Koss (1999) reported that victim use of alcohol prior to sexual assault increased the chances of a sexual assault culminating in completed rape. Kilpatrick and associates (Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997) failed to find that alcohol problems predicted which

women would be raped. However, we believed that drinking and drug use could influence the assault severity of rapes that do occur. Drinking prior to rape is characteristic of acquaintance rapes, except those perpetrated by husbands (Koss, Dinero, Seibel, & Cox, 1988). Acquaintance rapes, however (although not marital rapes), involve less violence and fewer weapons used than stranger rapes.

3. and 4. Women who had used Alcohol or Drugs were predicted to have higher Behavioral and Characterological Self-Blame than survivors who were not drinking. MacLeod (1999) noted that an intoxicated victim might say her rape was due to her drinking (behavioral self-blame) and that her rape was due to her recklessness (characterological self-blame). Focus groups with college women reveal widespread belief that women who drink are

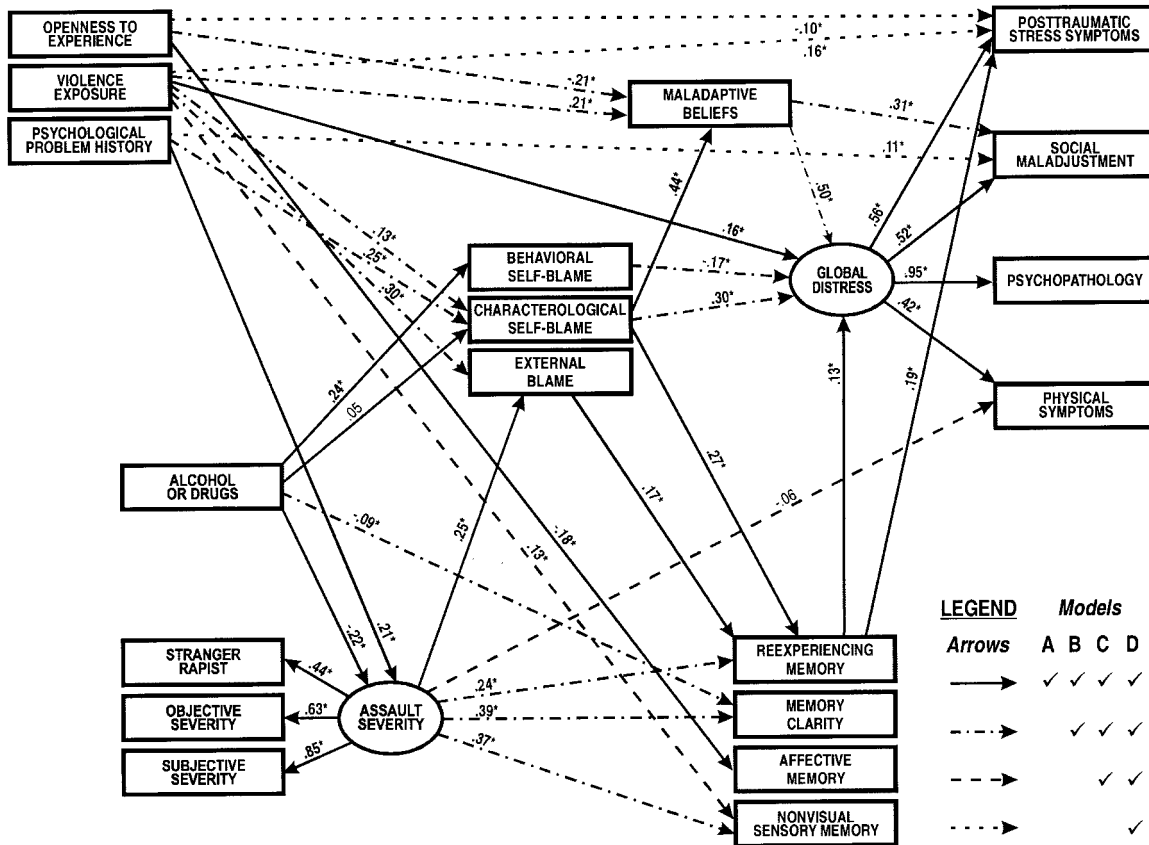


Figure 2. Structural equations model for the cognitive mediation of recovery from rape with path coefficients for Model D. An asterisk (\*) indicates that a path coefficient is statistically significant at an alpha level of  $p < .05$ . A minus sign (–) indicates that a path coefficient represents protective effects.

considered more to blame for the assault than women who do not (Nurius & Norris, 1995). In contrast, Schwartz and Leggett (1999) failed to find that women who were raped while intoxicated blamed themselves more than victims who were not intoxicated, but the sample was relatively small and self-blame was measured by a single item.

5. Assault Severity was expected to affect External Blame. Several studies have reported that survivors raped by total strangers blame their own behavior less than those raped by acquaintances (Frazier & Seales, 1997; Katz, 1991).

6. Higher levels of Characterological Self-Blame were predicted to increase Maladaptive Beliefs. Frazier and Schauben (1994), using zero-order correlations, found that both forms of self-blame (i.e., behavioral and characterological) were correlated with scores on maladaptive beliefs, but the relationship was stronger for characterological self-blame (see also Ullman, 1997).

7. and 8. Characterological Self-Blame and External Blame were hypothesized to affect Reexperiencing Memory. Reexperiencing Memory reflects the extent to which sensations of the original experience were vivified in controlled recall. In contrast, intrusive memories (measured here as part of PTSD assessment) represent involuntary remembering. We hypothesized that blame attributions might have the same effect on voluntary reexperiencing as their reported effects on intrusions. Individuals responsible

for motor vehicle accidents who used self-blame coping showed higher levels of intrusive memories (Delahanty et al., 1997).

9. and 10. Likewise, Reexperiencing Memory was predicted to increase Global Distress and Posttraumatic Stress Symptoms because we expected it to share some of the highly distressing effects of involuntary memory intrusions (Foa & Riggs, 1995; Foster, Webster, & Smith, 1997; for a meta-analysis of risk factors for PTSD, see Brewin, Andrews, & Valentine, 2000). PTSD has been identified as “a major mediator of the relationship between trauma and health” (Friedman & Schnurr, 1995, p. 515; also see Clum, Calhoun, & Kimerling, 2000; Resnick et al., 1997; Taft et al., 1999; Wagner et al., 2000; Wolfe, Schnurr, Brown, & Furey, 1994; Zoellner, Goodwin, & Foa, 2000). Sutherland, Bybee, and Sullivan (1998) demonstrated that the effect of physical abuse on physical health symptoms was mediated through concurrent levels of both anxiety and depression. The result suggests that viewing PTSD as the sole mediator of psychological symptoms may be insufficient. Also, finding that anxiety, as well as depression, mediated the relationship suggested to us that generalized distress might function as a third variable that influences both PTSD severity and physical symptoms. To examine whether the relationship of PTSD and health can be fully accounted for by their shared relationship to distress, we (a) created a Global Distress construct that was hypothesized to influence both Posttraumatic Stress Symptoms

and Physical Symptoms and (b) specified no direct effect from Posttraumatic Stress Symptoms to Physical Symptoms.

Model A also contained seven hypothesized measurement pathways. Objective and Subjective Severity and a Stranger Rapist (as opposed to a known rapist) were predicted indicators of a latent construct called Assault Severity. Post-traumatic stress symptoms, Social Maladjustment, Psychopathology, and Physical Symptoms were predicted indicators of a Global Distress latent construct.

### Model B

This model included all the effects described for Model A and was elaborated by adding 13 pathways that skipped one level in the hypothesized sequence of mediation. For example, effects from *personological characteristics* to *social cognitions* were added that were not mediated by *rape characteristics*. The additional hypotheses included,

1. A personality characterized by Openness to Experience was predicted to reduce Maladaptive Beliefs. Openness is the major personality trait that reflects cognitive flexibility and willingness to consider different facets of experience (DeNeve & Cooper, 1998). Thus, it may mitigate against maladaptive cognitive changes.

2. and 3. Violence Exposure was hypothesized to increase Characterological Self-Blame and External Blame. Repeated physical or sexual abuse in childhood has been associated with increased Characterological Self-Blame attribution for adult victimization (Andrews & Brewin, 1990; Arata, 1999; Arata & Burkhart, 1998). Additionally, women victimized in both childhood and adulthood were more likely to blame others for the assault (Marcus, 1992; see also Follette, Naugle, & Follette, 1997; Ullman, 1997).

4. Violence Exposure was predicted to increase Maladaptive Beliefs following rape. People whose past experiences have led to schemas that are compatible with victimization, such as the belief that people are basically untrustworthy, may respond to future victimization in ways that intensify existing schemas (McCann, Sakheim, & Abrahamson, 1988).

5. Psychological Problem History was hypothesized to exacerbate Characterological Self-Blame. Survivors with low self-esteem, low self-efficacy, and rigid role socialization have been shown to blame themselves more for abuse (Barker-Collo et al., 2000).

6. Alcohol or Drugs used prior to rape were predicted to lower Memory Clarity compared with memories not formed under the influence of drugs. Memory is impaired by intoxication with alcohol, benzodiazepines, and cannabis (Hammersley, 1994). When a person is intoxicated, only the most salient features get remembered; the details do not (Erblich & Earleywine, 1994).

7., 8., and 9. Assault Severity was hypothesized to affect Memory Clarity, Reexperiencing Memory, and Nonvisual Sensory Memory. Evidence has accumulated suggesting that autonomic arousal narrows the focus of attention, but within that focus, memory for the essential features of emotional events is enhanced (Bower & Sivers, 1998). Our earlier work with rape survivors compared their *memory characteristics* with those of nonraped women recalling other intense experiences. Rape memories were rated as relatively less clear and vivid, less well-remembered, and were less thought and talked about (Koss et al., 1996). However,

in that study the rape group contained women raped at any level of severity. Here, we predicted gradations within the rape survivor group according to the Assault Severity experienced, on the basis of empirical data showing that as crimes increase in violence, attention narrows, but recall within that focus is very clear, detailed, and emotionally loaded (reviewed in Koss, Tromp, & Tharan, 1995).

10. Behavioral Self-Blame was hypothesized to produce less General Distress following Janoff-Bulman's (1992) theory.

11. Characterological Self-Blame was predicted to exacerbate Global Distress. These predictions were made in cognizance of a meta-analysis of 50 empirical studies of interpersonal violence and psychological distress, which confirmed that both forms of self-blame resulted in more severe psychological distress (Weaver & Clum, 1995). The structural modeling approach we adopted might be capable of separating the differential effects Janoff-Bulman (1992) specified, which are supported by a wealth of empirical data outside of the sexual assault literature.

12. Maladaptive Beliefs were predicted to increase Global Distress. Several studies have linked changes in beliefs surrounding safety, esteem, and trust to higher distress across recovery (Frazier & Seales, 1997; Goodman & Dutton, 1996; Murphy et al., 1988; Norris & Kaniasty, 1991) and to depressive symptoms (Mackey et al., 1992).

13. Maladaptive Beliefs were predicted to increase Social Maladjustment. Disruption of the "self schema" and identity have been linked to deterioration of relationships (Mackey et al., 1992).

### Model C

This model added three effects that skipped two levels in the hypothesized sequence of mediation. For example, effects of *personological characteristics* on *memory characteristics* were specified that were not mediated by *rape characteristics* or *social cognitions*. The hypothesized pathways were as follows:

1. Higher Violence Exposure was hypothesized to affect Nonvisual Sensory Memory because cognitive schema for these types of events already existed to govern perception and encoding of the subsequent rape (reviewed in Koss et al., 1995).

2. Openness to Experience was predicted to increase Affective Memory of rape. DeNeve and Cooper (1998) argued that Openness to Experience predisposes people to feel both bad and good more deeply. The capacity to feel more deeply would increase negative affect at the time of the rape, resulting in more intense encoding of affect. We reasoned that the emotions experienced when recalling rape would be rated as more intense by those high in Openness to Experience compared with survivors with less predisposition to experience feelings deeply.

3. Assault Severity was predicted to increase Physical Symptoms. Cross-sectional and prospective studies of rape survivors have demonstrated that the number of reported physical symptoms increased linearly with the severity of sexual and physical assault (Koss, Koss, & Woodruff, 1991; see also Kimerling & Calhoun, 1994).

### Model D

The final model added four effects of *personological characteristics* on *health outcomes* that were not mediated by *rape*

*characteristics, social cognitions, or memory characteristics.* They included the following:

1. Openness to Experience was predicted to be slightly protective against Posttraumatic Stress Symptoms. In the earlier models, we had already included the influences of Openness to Experience on *rape characteristics, social cognitions, and memory characteristics.* We predicted that Openness to Experience, as a heritable trait, might reflect some of the genetic and biological influences on PTSD vulnerability that were otherwise unmeasured in our study (e.g., True et al., 1993; for a review, see Dykman, Ackerman, & Newton, 1997).

2. Women reporting high Violence Exposure were hypothesized to experience more Global Distress than those whose lives were less violent. Prior victimization predicts distress in rape survivors (Arata, 1999; Frazier, 1990), and women victimized in both childhood and adulthood report more psychological symptoms compared with women assaulted in adulthood only (Murphy et al., 1988). Although this relationship was not found among crime victims in general (F. H. Norris & Kaniasty, 1994), this previous study did not include sexual assault in assessment of violence exposure.

3. Violence Exposure was hypothesized to increase Posttraumatic Stress Symptoms. A background of highly stressful or traumatic experiences, including previous assaults, has been shown to exacerbate PTSD symptoms (Arata, 1999; Astin, Ogland-Hand, Coleman, & Foy, 1995; King, King, Foy, Keane, & Fairbank, 1999; Nishith, Mechanic, & Resick, 2000; Resnick, Kilpatrick, & Lipovski, 1991).

4. Psychological Problem History was predicted to affect Social Maladjustment. The most disrupted social functioning was among those who had histories of social and behavioral problems compared with those without such histories (Weissman et al., 1999).

## Method

### Participants

Participants were recruited by a postal survey that screened for rape and requested volunteers for a paid private interview. Surveys were mailed to 5,411 female medical center and university employees. Responses were received from 2,142 (42% response rate). Of these women, 618 (29%) met selection criteria for rape, 279 (45%) of whom agreed to participate in the interviews. Subsequently, 267 women (95% of those eligible) were interviewed. Demographic characteristics of interviewees were the following: age  $M = 38$  years; ethnic backgrounds were 88% Anglo, 9% Hispanic, and 3% other ethnic groups. Marital status of participants was 16% single; 54% married or living with a partner; and 30% separated, widowed, or divorced. Religious backgrounds were 32% Catholic, 48% Protestant or other Christian denomination, 11% no religion, and 9% other religion. Educational levels for the participants were 8% high school or less, 37% technical school or some college, 32% completed college, 24% graduate degree. Family income distribution was 15% family income less than \$15,000, 48% income between \$15,001 and \$35,000, and 37% incomes above \$35,000. The mean length of time since the rape discussed in the interview was slightly less than 16 years (range = 0 to 44 years). Demographic comparisons of rape survivors who were interviewed and those who refused consent to be interviewed revealed no significant differences in age ( $p = .473$ ), income ( $p = .466$ ), education ( $p = .691$ ), or religion ( $p = .639$ ). There were small differences in marital status,  $\chi^2(4, N = 249) = 29.47, p < .01$ , and ethnic group,  $\chi^2(4, N = 249) = 14.87, p < .01$ . Compared with all survivors, the group that was interviewed was 89%

non-Hispanic White compared with 80% among survey respondents. These differences occurred in spite of provision of both survey and interview in Spanish, bicultural–bilingual interviewers, and use of a large graphic on the cover of all research materials that depicted a group of women’s faces that differed in skin tone, hair texture, and age and that contained both Spanish and English text. The group that was interviewed also contained 5% fewer married women, 7% more cohabiting women, and 8% more never-married women than the full sample of survey respondents. The marital status differences may relate to the time demands of the interview (2.5 to 4.0 hr), which made it more difficult for women with family commitments to participate. We decided to residualize the study variables to control for demographics following a procedure described later in the article.

Even with the loss of participants from nonresponse and nonconsent, our sampling procedure resulted in a higher representation of the total population of rape survivors than would be possible through study of service seekers because so few seek assistance. Specifically, among a sample of rape survivors who had mental health services included in their medical benefits, only 9% used them, and just 2% attended victim assistance programs (Koss, Woodruff, & Koss, 1991). Among survivors seen in a hospital emergency room, who are thus demonstrated service seekers, just 19% sought any mental health assistance during the 1st year following assault (Kimerling & Calhoun, 1994). Therefore, studies of clinically identified rape survivors start with a low base rate compared with the number of rape survivors in the community and from that foundation lose potential participants because of lack of consent. Our sample, although community-based, still represented significant distress. A total of 23% of the rape survivors met diagnostic criteria for current PTSD according to screening by the Posttraumatic Stress Diagnostic Scale (Foa, 1995) that implements criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994).

### Procedure

Rape survivors were identified on the basis of their responses to the Sexual Experiences Survey (SES), previously modified for use with women workers (Koss, Koss, & Woodruff, 1991). Five questions operationalized rape, which is legally defined as nonconsensual vaginal, oral, or anal penetration achieved by using force, or threat of force, or nonforcibly when the victim is incapacitated and unable to consent. Penetration, no matter how slight, was sufficient to qualify an act as a rape. The recall period was bounded by the participant’s 14th birthday, representing the cut-off age for statutory rape. Only two states set a statutory age (the age below which sexual penetration is automatically rape) below 14 years (Searles & Berger, 1987). A typical item was “Has a man made you have sex by using force or threatening to harm you? When we use the word ‘sex’ we mean a man putting his penis in your vagina even if he didn’t ejaculate (come).” Internal consistency reliability in the present data was .72, consistent with other published figures (Koss, Koss, & Woodruff, 1991).

Survivors who agreed to be contacted were scheduled for a private interview with a female interviewer. Interviews were held in an off-campus research facility. The research was presented to respondents as focusing on women’s life experiences, particularly those involving unwanted sexual experience. To avoid changing women’s cognitive appraisals of their experiences, interviewers did not adopt the word *rape* unless it was the terminology used by the participant. On reporting for their interviews, all survivors were rescreened, and all endorsed one or more items consistent with rape. The index rape was the experience to which respondents directed their attention in responding to interview questions about *rape characteristics, Characterological and Behavioral Self-Blame, External Blame, and memory characteristics.* It represented the most recent rape or the one that was remembered best.

Interviewers were mature women ( $N = 12$ ), with a bachelor’s degree or above, who were mostly 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 that included recontacting the participant to complete missing information.

To determine the level of interrater reliability achieved by our procedures, we compared a sample of 20 protocols from the face-to-face interviews with protocols filled out by a different interviewer who listened to the tape-recorded session. The variance components attributable to rater error were separately estimated using 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  $\eta^2$  of .946 represented the proportion of true score variance as opposed to rater error.

### Measures

Measures were presented in a standard order and were administered orally, with the exception of four measures that were designed for paper-and-pencil response. The written measures were completed on-site, immediately following the interview, under supervision, and followed by a written debriefing that provided participants with resources for sexual assault survivors. Memory characteristics were assessed early in the sequence to avoid priming memory recall by the other components of the interview.

#### Personological Characteristics

**Openness to Experience.** The Openness to Experience Scale of the NEO Personality Inventory (Costa & McCrae, 2001) is a written measure that assesses an enduring psychological trait. It consists of 48 items, comprising six subscales, responded to on a 5-point scale anchored by *strongly disagree* and *strongly agree*. Sample items are "I am pretty set in my ways" and "I find it hard to get in touch with my feelings." The Cronbach's alphas for the subscales in our sample ranged from .47 to .82; the correlations of the subscales with the composite ranged from .43 to .70.

**Violence Exposure.** This measure consisted of 44 standard interview questions that allowed the respondent to indicate how many times each particular act had occurred. Included were 7 items from the National Crime Victimization Survey to assess stereotypical street crime (robbery, assault, burglary, and mugging items; e.g., see Bureau of Justice Statistics, 1997); 6 items about physical violence in the respondent's home while growing up (adapted from Straus, 1990); 4 questions regarding sexual abuse (from Finkelhor, 1979); and 5 questions from the SES to measure any rapes since the respondent's 14th birthday beyond the rape that served as the index event on which the interview focused (Koss, Woodruff, & Koss, 1991). Finally, the Conflict Tactics Scale (Straus, 1990) was used to measure verbal and physical aggression within relationships since age 18. The Cronbach's alphas for the subscales in our sample ranged from .48 to .88; the correlations of the subscales with the composite ranged from .50 to .64. It was necessary to drop 14 of the 267 participants (5%) because examination of their responses to the Violence Exposure measure items revealed only childhood rape. To qualify for inclusion in the study, the respondent's index rape needed to have occurred in adulthood.

**Psychological Problem History.** These 16 items assessed the frequency with which the respondent reported prior behavior problems, acting out, referral to juvenile services, substance abuse or psychological treatment, psychiatric hospitalization, suicide attempts, and psychoactive medication use (adapted from Foa, Rothbaum, Riggs, & Murdock, 1991). The Cronbach's alpha was .80 in our data.

#### Rape Characteristics

The measure used to obtain a rating of objective severity was the six-item Wolfgang Crime Severity Index (Wolfgang, Figlio, Tracey, & Singer, 1985). The overall Cronbach's alpha for the unweighted and standardized form of these items was .55. Subjective severity was measured on a 4-point scale by response to the item "How likely did you think it was that you would be killed, disfigured, or seriously injured?" The relationship to the rapist was categorized into seven response options that were collapsed into a dichotomy of (1) *stranger* versus (0) *acquaintance* rapist. The item "Were you under the influence of alcohol or drugs at the time?" scored 1 for *yes* and 0 for *no*, measured alcohol or drug use at the time of the rape.

#### Social Cognitions

**Causal attributions.** Some assessments treat blame so that it adds up to 100%. Therefore, assigning less blame to society dictates increasing the amount of blame attributed to the self. In contrast, we followed Janoff-Bulman's (1992) conceptualization in which the forms of blame are independent. We used the Rape Attribution Questionnaire (Frazier, 2000), consisting of three 7-item subscales that assess Behavioral and Characterological Self-Blame and External Blame. Ratings were made on a 5-point Likert 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 item is "Men need to feel power over women." Reliabilities reported at 3, 10, and 30 days postrape ranged from .64 to .89. Alpha coefficients in the present data were .83, .76, and .81 for Behavioral and Characterological Self-Blame and External Blame, respectively.

**Maladaptive beliefs.** The McPearl Belief Scale—Revision D is a written measure that assessed beliefs. This was the most recent version available of the scale now known as the Traumatic Stress Institute/Center for Adult and Adolescent Psychotherapy Belief Scale (Pearlman, 1996). A higher score on this 80-item scale indicates beliefs that reflect maladaptive outcomes of trauma exposure. The items range from self-oriented statements such as "I find myself worrying a lot about my safety" to beliefs about others such as "The world is filled with emotionally disturbed people." The Cronbach's alphas for the 10 subscales in our sample ranged from .55 to .88; the correlations of the subscales with the composite ranged from .44 to .80.

#### Memory Characteristics

Participants were asked to recall their rape and then respond to the Memory Characteristics Questionnaire (MCQ; Suengas & Johnson, 1988), which required them to make self-ratings (also called *metamemory* ratings) about the qualities of their recall. All items were rated on a 7-point scale with anchor words that varied by item. The following are three illustrative items with the anchors: (a) "Your memory for the event is *little or none to sharp, clear*." (b) "Your feelings at the time were *positive to negative*." (c) "To what extent are you reexperiencing in your mind or body the EMOTIONS OR FEELINGS that you had during the event? *no reexperiencing to Complete reexperiencing* [caps in original]." The full MCQ includes the 17 items that compose the four factors constructed and cross-validated by Koss et al. (1996). In the present study, the full scale was used, and the additional items were assigned to the previously developed factors on a theoretical basis. The procedures used to support these item assignments are detailed later in the description of the measurement model. The factors, as well as their internal consistency reliabilities in the present data, were as follows. The first factor, Memory Clarity ( $\alpha = .89$ ), consisted of 28 questions pertaining to visual details of the event, emotional intensity felt at the time of the event, and how often the memory is thought and talked about. The Affective Memory factor ( $\alpha = .61$ ) contained 4 items including



ratings of emotional valence, which required respondents to assign a number to represent how positive or negative their feelings were now and at the time and a rating of the unexpectedness of the rape. The Reexperiencing Memory factor ( $\alpha = .80$ ) contained 8 items reflecting participants' reexperiencing, during voluntary recall, of the physical sensations, emotions, and thoughts that characterized the original event. "Control over remembering" distinguished Reexperiencing Memory from involuntary memory intrusion, which was assessed as part of PTSD measurement (discussed shortly). The fourth factor, Nonvisual Sensory Memory ( $\alpha = .72$ ), consisted of 5 questions about sensory components of memory including touch, smell, taste, or sound (vision loaded on the Memory Clarity factor).

### Health Outcomes

*Brief Symptom Inventory (BSI).* The BSI (DeRogatis & Melisaratos, 1983) is a written measure consisting of 53 items that cover a range of psychopathology including somatization, depression, anxiety, hostility, phobic anxiety, paranoid ideation, obsessive-compulsive behavior, interpersonal sensitivity, and psychoticism. 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.

*Posttraumatic stress symptoms (PTSD).* Symptoms of PTSD were assessed with the 17-item Posttraumatic Stress Diagnostic Scale (Foa, 1995; Foa, Riggs, Dancu, & Rothbaum, 1993), which corresponds to *DSM-IV* PTSD criteria. The Cronbach's alphas for the Reexperiencing, Avoidance, and Arousal subscales in our sample ranged from .71 to .76; the correlations of the subscales with the composite ranged from .80 to .84.

*Social Adjustment Scale-Self-Report version (SAS).* Social functioning was measured with the 53-item written SAS self-report that measures social functioning at work and home; social and leisure activities; extended family, marital, parental, nuclear family unit; and finances (Weissman & Bothwell, 1976). The Cronbach's alphas for the subscales in our sample ranged from .53 to .69; the correlations of the subscales with the composite ranged from .28 to .82. We did not include within our composite marital or parental functioning because many of our participants were not currently married or did not have children at home. Throughout we replaced the word "husband" with "partner" to avoid heterosexist bias.

### Physical Symptoms

Physical symptoms were assessed with the Monthly Health Review, which asks respondents to recall their symptoms during the previous 30 days (Jenkins, Kreger, Rose, & Hurst, 1980). This instrument was developed to track the health of air traffic controllers and the symptoms reflect the physical health problems typical of people undergoing chronic stress. The items of the Monthly Health Review were sorted into nine symptom subscales by an experienced, board-certified internist and assessed for internal consistency. The Cronbach's alphas for the subscales in our sample ranged from .37 to .75; the correlations of the subscales with the composite ranged from .58 to .90. Because of low reliability, the injury items ( $\alpha = .22$ ) were dropped.

## Data Analyses

### Univariate Analyses

The procedures for ensuring data quality resulted in very few missing data (mean proportion of complete data exceeded 99% for every composite scale). Yet even with trivial numbers of missing items, multivariate data analysis can result in exclusion of a large number of participants because of the cumulative loss of cases. We preserved sample integrity by estimating latent variable scores from the mean of nonmissing indicator scores (Figueredo, McKnight, McKnight, & Sidani, 2000). Using this procedure, we lost only 4 of 253 study participants from the sample. To determine the

amount of variance in study variables accounted for by demographics, we entered them into regression equations to predict each of the individual items to be included in the multivariate model. Overall, 9 of 821 regressions resulted in  $R^2$ s significant at the Bonferroni-corrected probability of  $p < .00$ . Six effects involved race-ethnicity and three involved age. We chose to residualize the study variables prior to analysis to control for the influence of race-ethnicity and age without explicitly including them in the multivariate model (Cohen & Cohen, 1983; P. M. Bentler, personal communication, October 1989).

### Multivariate Analyses

*Scale construction.* Although the present sample size was moderate ( $N = 253$ ), it was too small in relationship to the number of items to support either confirmatory or exploratory item-level factor analytic procedures for scales. We chose to perform scale construction prior to structural equations modeling to minimize the number of parameters estimated.<sup>1</sup>

*Power analysis.* Power analysis was performed using the power-estimating algorithm developed by MacCallum, Browne, and Sugawara (1996) to assess the ability of our data to reject the theoretically specified structural equations model given the sample size available and the number of free model parameters to be estimated. For a conventional power level of .80 (Cohen & Cohen, 1983), the minimum sample size required to test Model D would have been 115 usable cases with the null hypothesis root-mean-square error of approximation (RMSEA) set at the default value of .05, the alternative hypothesis RMSEA set at the default value of .08, and the alpha level set at the conventional .05. Our available sample size of 249 participants yielded an estimated statistical power of .996 for our most complex model (Model D).

We also applied some conventional rules of thumb to evaluate the efficiency of parameter estimation of our structural equations model. For Model D, the number of path coefficients to be estimated was 49 (37 directional pathways and 12 residual correlations), yielding a 5.08:1 ratio of usable cases to free model parameters. This ratio met Bentler's (1995) acceptable minimum ratio for confirmatory structural models. The total of 18 variables (simple and composite scales) that were used in Model D yielded a ratio of 13:1, which exceeded the 10:1 ratio of usable cases to study variables that Cohen and Cohen (1983) consider an acceptable minimum for confirmatory regression models.

*The measurement model.* Two latent constructs were created within the structural equations model. The first was an Assault Severity factor indicated by Stranger Rapist, Objective Severity, and Subjective Severity. Alcohol or Drugs reflected a victim behavior and was not considered a candidate indicator of Assault Severity. The second was a Global Distress factor indicated by all four composite scales comprising the Health Out-

<sup>1</sup> Items were assigned to either simple scales or subscales on the basis of standard scoring of the measures. Subscales were then assigned to composite scales representing more general constructs. Simple scales were used directly in the model with no further aggregation. The correlation of each subscale to its composite was tested for statistical significance. In many instances our procedures resulted in scales identical to published indices including Openness to Experience (identical to NEO Openness Scale), Behavioral, Characterological, and External Blame (as developed by Frazier, 1990), Post-traumatic Stress Symptoms (identical to the PDS total severity score), Psychopathology (identical to Global Severity Index), and Social Maladjustment (comparable to Global Adjustment Index). In other cases, although the items came from published measures, the composites were our own, including the Violence Exposure, Psychological History, Maladaptive Beliefs, Memory Characteristics, and Physical Health. All scale scores were estimated by unit-weighting, using the unweighted mean of the standardized scores of the component items (Gorsuch, 1983). This scoring procedure made the covariance matrix virtually identical to a correlation matrix.

comes: Psychopathology, Social Maladjustment, Posttraumatic Stress Symptoms, and Physical Symptoms.

*The structural model.* We have taken cross-sectional data and ordered the variables in a theoretically specified mediational sequence. To report the results, we use conventional path analytic notation for cross-sectional mediational models but apply it to entire sets of variables instead of limiting it to individual variables (for a discussion of the notation see James, Mulaik, & Brett, 1982). We refer to each of these five sets of variables, hypothesized to be successive levels of mediation, by their ordinal number in the sequence: Level 1 = *personological characteristics*, Level 2 = *rape characteristics*, Level 3 = *social cognitions*, Level 4 = *memory characteristics*, and Level 5 = *health outcomes*. The latent constructs of Assault Severity and Global Distress were assigned the same level of mediation as their indicators and are not shown. We denote all direct pathways between variables in Levels 1 and 2 as P21 (*P* stands for path) effects, all those between Levels 2 and 3 as P32 effects, all those between Levels 3 and 4 as P43 effects, and all those between Levels 4 and 5 as P54 effects. The notation is illustrated in Figure 1. For example, a P21 effect is from a scale in the *personological characteristics* set to a scale in the *rape characteristics* set. Similarly, direct pathways between Levels 1 and 3 are P31 effects, between Levels 2 and 4 are P42 effects, and Levels 3 and 5 are P53 effects, and so on. Consistent with this nomenclature, direct pathways between scales within the same set are denoted P11 effects, P22 effects, P33 effects, P44 effects, and P55 effects, respectively, as are the measurement model parameters or factor loadings for the latent variables.

Using this notation, Model A limited the hypothesized direct pathways to those that moved sequentially through all the levels of mediation including P21 effects, P32 effects, P43 effects, and P54 effects, as well as P11 effects, P22 effects, P33 effects, P44 effects, and P55 effects. Model B added direct pathways that skipped one level of mediation, including P31 effects, P42 effects, and P53 effects, as well as all effects specified in Model A. Model C added direct pathways that skipped two levels of mediation in the hypothesized sequence, including P41 effects and P52 effects, as well as all effects specified in Model B. Model D added P51 effects, which were direct pathways that skipped three levels of mediation, as well as all effects specified in Model C.

Although the four nested models constituted multiple respecifications of the same model, none of the structural parameters added in each step were empirically specified (e.g., by the use of Lagrange Multiplier tests). Admittedly, our procedures did not exhaust the possible alternative models that could potentially explain the data, but they did provide empirical information on the degree of model elaboration required to fully account for the observed effects. Table 1 presents the residual correlations among variables within Levels 1, 3, and 4 for which no latent constructs were created. These theoretically specified residual correlations were estimated in all models tested. No other residual correlations were specified.

## Results

Table 2 presents a summary of the statistical and practical goodness-of-fit indices for all four alternative models tested. Model A, the fully mediational model, was the most parsimonious, but it did not adequately fit the data,  $\chi^2(142, N = 249) = 514.58$ ,  $p < .01$ . The fit indices for Models B and C were acceptable; however, the difference tests comparing Models A to B, B to C, and C to D were all statistically significant and substantial in magnitude (see Table 2). Thus, the loss of model parsimony represented by the three respecifications was compensated by gains in model goodness of fit.

The chi-square value for Model D was not statistically significant,  $\chi^2(122, N = 249) = 137.877$ ,  $p = .15$ , indicating that this model predicted all of the observed covariances to within the expected margin for sampling error. The practical indices of fit for Model D were also acceptable. The Bentler-Bonett normed fit index (NFI) was .920, the comparative fit index (CFI) was .990, and the robust comparative fit index (robust CFI), which does not assume a multivariate normal distribution, was .991. Index values greater than .90 are generally considered satisfactory levels of practical goodness of fit (Bentler, 1995; Bentler & Bonett, 1980). Of these fit indices, the two CFIs were given greater weight because they are adjusted for model parsimony and perform well with moderate to small sample sizes ( $N < 250$ ), especially with maximum-likelihood estimation (Bentler, 1990; Hu & Bentler, 1999).

The coefficients of determination are squared multiple correlations and indicate the amount of variance accounted for by the modeled effects. The coefficient of determination was  $R^2 = .558$  for the General Distress factor. For each of the specific outcome factors, they were  $R^2 = .906$  for the Psychopathology,  $R^2 = .649$  for the Social Maladjustment,  $R^2 = .538$  for Posttraumatic Stress Symptoms, and  $R^2 = .172$  for Physical Symptoms. These coefficients exceeded the figure for common factor variance with General Distress because there were additional direct effects on the specific outcome factors. The standardized root-mean-square residual (SRMR) and RMSEA were acceptably low (SRMR = .048, RMSEA = .023), indicating a very small average magnitude for the unexplained components of the observed correlations.

The results of Model D are depicted in Figure 2. This figure contains all the tested pathways including 7 statistically significant measurement pathways, 28 statistically significant structural path-

Table 1  
Residual Correlations Within Sets

Measure	1	2	3	4	5	6	7	8	9	10
1. Violence Exposure	—									
2. Psychological Problem History	.424*	—								
3. Openness to Experience	.107	-.030	—							
4. Characterological Self-Blame				—						
5. External Blame				.291*	—					
6. Behavioral Self-Blame				.696*	.188*	—				
7. Memory Clarity							—			
8. Affective Memory							.086	—		
9. Reexperiencing Memory							.495*	.121	—	
10. Nonvisual Sensory Memory							.673*	.049	.359*	—

\*  $p < .05$ .

Table 2  
Fit Indices and Comparisons of Hierarchically Nested Structural Equation Models

Model	$\chi^2$	df	p	NFI	CFI	Robust CFI
A	514.580	142	.001	.703	.762	.745
B	186.891	129	.001	.892	.963	.961
C	170.034	126	.005	.902	.972	.971
D	137.877	122	.154	.920	.990	.991
A-B	327.689	13	.000	-.189	-.201	-.216
B-C	16.857	3	.001	-.010	-.009	-.010
C-D	32.157	4	.000	-.018	-.018	-.020

Note.  $N = 249$ . NFI = normed fit index; CFI = comparative fit index.

ways, and 2 nonstatistically significant structural pathways. All path coefficients were statistically significant at an alpha level of  $p < .05$  except where noted. Path coefficients preceded by a negative sign represent protective effects. The path coefficients are standardized regression weights obtained by maximum likelihood estimation. The correlated residuals presented in Table 1 are not depicted in the diagram. The following description of the findings classifies the direct effects of each construct in the hypothesized causal sequence identified as skipping either 0 or 1 (Model A), 2 (Model B), 3 (Model C), or 4 (Model D) levels of mediation, thereby providing the complete specifications of these models. However, the structural path coefficients were obtained from Model D.

### Effects on Rape Characteristics

#### P22 Effects

The factor loadings from the Assault Severity factor to Stranger Rapist (.44), Objective Severity (.63), and Subjective Severity (.85) were all positive, substantial in magnitude, and statistically significant. The presence of Alcohol or Drugs in the victim's system had a significant and negative direct effect on the Assault Severity factor (-.22).

#### P21 Effects

Psychological Problem History had a direct effect on the Assault Severity factor (.21).

### Effects on Social Cognitions

#### P33 Effects

Because Behavioral Self-Blame, Characterological Self-Blame, and External Blame were not hypothesized to causally influence each other but, instead, to freely intercorrelate (see Table 1), there were no directional effects modeled among them. Characterological Self-Blame had a direct and positive effect on Maladaptive Beliefs (.44).

#### P32 Effects

Rape characteristics had two of the three hypothesized direct effects on social cognitions. The Assault Severity factor directly increased External Blame (.25). Alcohol or Drugs had a significant

positive direct effect on Behavioral Self-Blame (.24) and a non-significant direct effect on Characterological Self-Blame (.05).

#### P31 Effects

These were hypothesized effects of *personological characteristics* on *social cognitions* that were independent of *rape characteristics*. These pathways included the positive direct effects of Violence Exposure on Characterological Self-blame (.13), External Blame (.30), and Maladaptive Beliefs (.21). Openness to Experience had a negative direct effect on Maladaptive Beliefs (-.21). Psychological Problem History had a positive effect on Characterological Self-Blame (.25).

### Effects on Memory Characteristics

#### P44 Effects

Because *memory characteristics* were not hypothesized to causally influence each other, but instead to freely intercorrelate (see Table 1), there were no directional effects modeled among them.

#### P43 Effects

These effects were hypothesized influences of *social cognitions* on *memory characteristics*. Both Characterological Self-Blame (.27) and External Blame (.17) had direct effects on Reexperiencing Memory.

#### P42 Effects

Rape characteristics also had direct effects on *memory characteristics* that were not mediated by *social cognitions*. Alcohol or Drugs had a direct effect on the Memory Clarity factor (-.09). Assault Severity had three direct effects on memory ratings including Reexperiencing Memory (.24), Nonvisual Sensory Memory (.37), and Memory Clarity (.39).

#### P41 Effects

*Personological characteristics* had direct effects on memory that were mediated neither by *rape characteristics* nor by *social cognitions*. These pathways were the direct effect of Violence Exposure on Nonvisual Sensory Memory (.13) and the direct effect of Openness to Experience on the Affective Memory factor (-.18).

### Effects on Health Outcomes

#### P55 Effects

The factor loadings from the Global Distress factor to Psychopathology (.95), Social Maladjustment (.52), Posttraumatic Stress Symptoms (.56), and Physical Symptoms (.42) were all positive, substantial in magnitude, and statistically significant. However, there were some direct effects on these specific *health outcomes* that were not mediated by the General Distress factor.

### P54 Effects

The only direct effect of *memory characteristics* on *health outcomes* was that of Reexperiencing Memory on Global Distress (.13). In addition, Reexperiencing Memory had a direct effect on Posttraumatic Stress Symptoms (.19) that was not mediated by Global Distress.

### P53 Effects

These were effects of *social cognitions* on *health outcomes* that were not mediated by *memory characteristics*. Behavioral Self-Blame (-.17), Characterological Self-Blame (.30), and Maladaptive Beliefs (.50) had direct effects on Global Distress that were not mediated by *memory characteristics*. Furthermore, Maladaptive Beliefs also had a direct effect on Social Maladjustment (.31).

### P52 Effects

One effect of *rape characteristics* on *health outcomes* not mediated by *social cognitions* or *memory characteristics* was hypothesized. This pathway, from Assault Severity to Physical Symptoms, was nonsignificant (-.06).

### P51 Effects

These were hypothesized effects of *personological characteristics* on *health outcomes* that were not mediated by any of the intervening levels of mediation. One of these pathways included the positive direct effect of Violence Exposure on Global Distress (.16), but the rest were directly on specific health outcomes and were not mediated by Global Distress. These specific pathways included the positive direct effect of Violence Exposure on Posttraumatic Stress Symptoms (.16), as well as the negative direct effect of Openness to Experience on Posttraumatic Stress Symptoms (-.10). Psychological Problem History also had a significant direct effect on Social Maladjustment (.11) that was not mediated by Global Distress.

### Total Effects

We used the standardized total effects reproduced by the model to make a quantitative assessment of which composites and constructs were contributing most to the prediction of Global Distress. These coefficients reflect the magnitude of all direct and indirect influences. In the *personological characteristics* set they were -.106 for Openness to Experience, .343 for Violence Exposure, and .145 for Psychological Problem History. In the *rape characteristics* set they were .037 for Rape and -.023 for Alcohol or Drugs. In the *social cognitions* set they were -.173 for Behavioral Self-Blame, .554 for Characterological Self-Blame, .023 for External Blame, and .499 for Maladaptive Beliefs. In the *memory characteristics* set they were .132 for Reexperiencing Memory.

### Discussion

The fully mediational (Model A) could not adequately account for the *health outcomes* of rape. The final alternative, Model D, was very successful in terms of explained variance in accounting for adverse social and psychological outcomes and less successful

in predicting physical health. This result is not surprising given that physical disease is subject to a number of nontrauma-related and noncognitive influences. Although the fully mediational model was not acceptable, of the 20 additional pathways that were required, 13 of them (65%) were direct pathways skipping only one level in the hypothesized sequence, whereas only 3 of them (15%) were direct pathways skipping two levels of mediation, and only 4 of them (20%) were direct pathways skipping three levels of mediation. The rejection of the fully mediated model, therefore, was due primarily to a large number of direct pathways skipping only one level of mediation in the hypothesized sequence. The four major conclusions of the study and their limitations are discussed in the following material.

First, the *personological characteristics* set had influences at every level of the model, but in terms of sheer numbers of significant pathways, the most potent of its components was Violence Exposure. When the effects of rape were compounded by previous violence exposure, survivors attributed the causes of their rape to their own character more strongly than survivors with lower exposure, showed heightened blame of external causes for rape, held more Maladaptive Beliefs, and described memories richest in Nonvisual Sensory Memory detail. The net result was more General Distress and higher levels of Posttraumatic Stress Symptoms. Violence Exposure contributed far more variance to predicting the severity of distress than the specific characteristics of the rape itself, consistent with past research (e.g., Dunmore, Clark, & Ehlers, 1999; King et al., 1996). The results add to existing literature documenting the deleterious consequences of developmental exposure to violence and emphasize the need to continue primary prevention of violence within America's communities and homes. For clinicians who respond to rape in the immediate crisis, the results caution against simplistic notions that certain types of rapes are more devastating than other types. The personal characteristics of the woman who was raped had more influence on the recovery processes than the crime characteristics. For clinicians treating the long-term impacts of rape, the results argue for a treatment plan that addresses how lifetime exposure to violence has shaped current emotional processing (Lebowitz, 1993).

Second, the results documented the powerful mediation of health impact contributed by *social cognitions*. Self-blame and maladaptive beliefs were dominant forces in shaping rape's *health outcomes*. In previous studies using univariate and regression analyses, both behavioral and characterological self-blame have been linked with distress (e.g., Frazier, 2000; Frazier & Schauben, 1994; Hill & Zautra, 1989; Meyer & Taylor, 1986). Using the simultaneous, multivariate context that structural modeling allows, we were able to produce evidence consistent with Janoff-Bulman's original theory (1992) that characterological self-blame was highly distressing and harmful to health, whereas behavioral self-blame was somewhat protective against distress. This result must be interpreted with caution, however, because the self-blame scales are correlated. Blaming one's character for rape led to substantial Maladaptive Beliefs, which in turn both directly and indirectly exacerbated Global Distress and all the *health outcomes*. MacLeod (1999) provided some useful distinctions about self-blame. He views characterological self-blame as self-attributions of responsibility (also see Shaver & Drown, 1986). In contrast, behavioral self-blame is viewed as self-attributions of causality that reinforce

illusions that future outcomes are controllable. Thus, a survivor who understands her rape as being caused by too much socializing in risky environments, such as bars, will have a heightened sense that her future likelihood of rape is under her control. This is true even if her understanding of the causes of rape is factually baseless, as such illusions play an important role in maintaining mental health (Taylor & Brown, 1988). Frazier and Schauben (1994) found that recovery from rape was better among victims who believed that future rapes were less likely. Neither external nor characterological self-blame offers an illusion of control over future outcomes.

Gilfus (1999) has suggested that people with extensive trauma histories and socioeconomic stress may not ever have had the luxury of believing that the world is a safe place. Their "maladaptive beliefs" allow them to survive in a harsh environment. Our results support this perspective in that the highest degrees of responsibility attributions and maladaptive beliefs were seen in survivors with multiple violence experiences across the life span and associated prior behavioral and social difficulties. For them, rape may have served to confirm and intensify existing beliefs rather than shatter them.

The findings demonstrate that making attributions of responsibility for rape and holding maladaptive beliefs predict worse *health outcomes*. Anything that focuses on fixing responsibility for rape or confirms maladaptive beliefs such as powerlessness and helplessness would according to our findings increase distress and prolong recovery. We have concerns that the procedures that exist in our society for victims to report rape and to have the perpetrator held responsible stimulate the same processes that we have found deleterious. The objective of the justice system is to fix responsibility, and there are myriad ways that its processes stimulate self-blame (see Bublick, 1999; Frazier & Haney, 1996). Working with prosecutors is very disempowering because more than 50% of rapes are turned down for charging, almost always against the victim's express wishes. In those cases that go to trial, the adversarial nature of our justice system creates additional victim trauma. For example, testifying in a trial was one of four significant predictors of PTSD symptoms in adult survivors of child rape and having a civil lawsuit pending was one of three predictors of depression symptoms among adult victims (Epstein, Saunders, & Kilpatrick, 1997; Mackey et al., 1992). Elsewhere we have reviewed the empirical literature on law enforcement and prosecutorial responses to violence against women and have described alternative approaches that are more sensitive to survivor concerns, are more focused on redress than responsibility, counteract victimization-induced helplessness, and are better attuned to reintegrating survivor and perpetrator into a network of community support (Figueredo, 2001; Koss, 2000). Our team is now implementing the Responsibility and Equity for Sexual Transgressions Offering a Restorative Experience (RESTORE) Program, a restorative justice-based alternative process for adjudicating selected sexual offenses committed in Pima County, Arizona. We strongly urge that advocates and practitioners inform themselves of this literature before they reflexively conclude that pursuing prosecution or litigation will be in the best interests of their client's recovery.

Third, mediation of *health outcomes* by *memory characteristics* was minimal. The results, consistent with literature on emotional memory, indicated that more-severe rapes produced memories

higher in Reexperiencing Memory, Memory Clarity, Affective Memory, and Nonvisual Sensory Memory (see Bower & Sivers, 1998). However, the influences of self-rated memory phenomena on *health outcomes* were limited to two small effects of Reexperiencing Memory on Global Distress and Posttraumatic Stress Symptoms. Conceptualizations of clinical recovery have emphasized increased control over remembering as a hallmark of successful outcomes (Harvey, 1996). Although it may be important to have choice on whether to recall the rape or not, the characteristics of the memory when it is recalled had minimal influence on *health outcomes*. The present study represents the third time that we have reported failure to confirm a compelling mediational role for *memory characteristics*, a finding we cross-validated in two independent samples in an earlier study (Koss et al., 1996). In that study, we expressed caution about accepting our findings because our data were derived from a brief mailed survey. In this study, a lengthy standard interview permitted significantly augmented assessment of *personological, rape, and memory characteristics* and *health outcomes*. Some readers of our earlier article (Koss et al., 1996) have suggested that the results occurred because people are incapable of making accurate ratings of their own memory experience (metamemory ratings). However, we note that diagnosis of PTSD's intrusion component depends on similar introspection by the patient. We have recorded memory narratives from these participants and plan to score them to obtain affect, clarity, reexperiencing, and sensation ratings that do not depend on self-report. This methodology will allow a final opportunity for us to replicate the relationships that we have been reporting. We also echo existing calls for increased attention to the phenomenology of intrusive memories (Brewin et al., 1996). These initiatives would position the field to address a number of vexing questions about memory's mediational role in trauma response and inform thinking about routes of intervention. If the present results stand, they raise doubts about memory processing as a route of intervention to decrease distress and PTSD. Our model suggests that cognitive processing of attributions and beliefs would have far larger effects on distress reduction.

Fourth, our conceptualization of Global Distress as a third variable that predicts both Posttraumatic Stress Symptoms and Physical Symptoms was confirmed. Therefore, studies reporting correlations of PTSD and illness without including measurement of Global Distress are vulnerable to the criticism that the results are spurious. Several processes have been hypothesized to explain how Posttraumatic Stress Symptoms could absorb trauma and transform its effects into ill health. For example, the heightened cardiovascular reactivity that is associated with PTSD could precipitate deleterious health changes (Friedman & Schnurr, 1995). Alternatively, the disordered sleep physiology and adrenergic dysregulation associated with PTSD could disrupt physical health. Alternatively, memory intrusions and vivid flashbacks might increase autonomic arousal, leading to direct stress on the immune system and/or to the patient misinterpreting physical expressions of autonomic arousal as disease. In light of the third variable relationship that we have identified, future research to test these hypothesized mediating processes of PTSD's relationship to health should also include measurement of distress.

The strength of the current study is the development and testing of theoretically based alternative models of emotional processing that organize a large amount of data on rape recovery. However,

the findings are governed by certain limitations. Caution must be used in interpreting relationships in cross-sectional data. The present study focused on female rape survivors and may not characterize the responses of men who have been raped. Although our analyses suggested that demographic variables accounted for little variance in our predictors, the sample did consist primarily of urban, employed, White women, with higher-than-average levels of education. Elsewhere we have begun publication of independent data from smaller but more diverse samples (Ramos, Koss, & Russo, 1999; Russo, Koss, & Ramos, 2000). The rapes discussed occurred an average of 16 years prior to the study, with a range of 0 to 44 years. The passage of time is well known to ameliorate the effects of trauma (Weaver & Clum, 1995). The study was not designed to estimate the average effects of rape, either short- or long-term. What our model was intended to explain were the hypothesized intervening levels of mediation in emotional processing. To make the study possible, we used the naturally occurring variation across individuals at different stages of the recovery process. No effort was made to statistically control for the effect of time since rape because doing so would have eliminated our major source of systematic variation. One can always question whether these systematic heterogeneities might be attributable to confounds such as unmeasured cohort effects (Cook & Campbell, 1979) rather than to the observed variance in time and recovery. Nor can we conclude that the present snapshot taken at one point in time represents the processes as they would unfold in the immediate postrape period. Our next step is to analyze longitudinal data that we have collected in an independent sample of rape survivors assessed for 2 years beginning within 3 months of assault.

There are multiple alternative models that could be tested in these data, and readers may have different ideas about which effects should have been hypothesized and tested. Yet, we feel confident that our results reaffirm the central role of *social cognitions* in posttrauma response. We argue for an extended agenda of future research on cognitions. The intricacies of how survivors appraise their behavior during a traumatic event are beginning to be studied (e.g., Dunmore, Clark, & Ehlers, 1997, 1999; Regehr, Cadell, & Jansen, 1999). The results also support the need for further development of cognitive-experiential reprocessing interventions aimed at assessing and consciously managing the modification of beliefs (e.g., Resick & Schnicke, 1993; Slaton & Lyddon, 2000).

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