Associations Among Disaster Exposure, Intimate Relationship Adjustment, and PTSD Symptoms: Can Disaster Exposure Enhance a Relationship?

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This study examined associations among disaster characteristics, relationship adjustment, and posttraumatic stress disorder (PTSD) symptomatology 9 months postdisaster in 205 women exposed to extensive flooding. Bivariately, threat/harm and loss exposure dimensions were related to each other but differentially related to relationship adjustment and PTSD symptoms. Results from structural equation modeling revealed a positive and significant direct association between threat/harm and PTSD symptoms. Conversely, loss was not significantly associated with PTSD symptoms, but was positively and significantly associated with relationship adjustment. Relationship adjustment was negatively and significantly related to PTSD symptoms. These data suggest that some aspects of disaster exposure can have a mobilizing and positive effect on intimate relationships. In turn, positive intimate relationships may buffer individuals against PTSD symptoms.

Natural disasters occur with relative frequency and are associated with a number of negative psychological aftereffects, most commonly, posttraumatic stress disorder (PTSD; American Psychiatric Association [APA], 2000; see Norris et al., 2002 for review). Identifying and understanding risk and resilience factors related to the occurrence of PTSD have implications for the prevention or amelioration of it, and a number of potentially important variables have been highlighted. Relevant to the current study, a prior comprehensive review of the disaster literature revealed that two consistent risk factors for adverse outcomes after disaster exposure are female gender and weak or deteriorating psychosocial resources (Norris et al., 2002). Less attention has been paid to the associations among dimensions of disaster exposure, intimate relationship variables, and PTSD symptoms in the wake of a natural disaster in

women specifically. To address this gap in the literature, the goal of the present study was to test the fit of a model accounting for the associations among these variables in a sample of women exposed to severe flooding.

A few studies have investigated the association between individual and intimate relationship functioning in the aftermath of disasters. Several studies have found married status to be protective for men (e.g., Fullerton, Ursano, Kao, & Bharitya, 1999; Ursano, Fullerton, Kao, & Bhartiya, 1995), but being married has been found to be a risk factor for poor postdisaster mental health functioning among women (Brooks & McKinlay, 1992; Gleser, Green, & Winget, 1981; Solomon, 2002).

Although no specific models have been put forth to account for the associations between intimate relationship adjustment and individual postdisaster mental health symptoms, a variety of models have been hypothesized to explain the role of social support, a related interpersonal construct, in individual posttrauma mental health. These theories have broadly been categorized as social causation (i.e., poor social support is an antecedent to individual mental health problems) or social selection (i.e., individual mental health problems erode social support) models (Kaniasty & Norris, 2008). Several studies with combat veterans suggest that social

causation processes are at work in the earlier stages of posttrauma recovery and that social selection processes are operative in the later stages of posttrauma recovery (e.g., Keane, Scott, Chavoya, Lamparski, & Fairbank, 1985; King, Taft, King, Hammond, & Stone, 2006). Similar processes appear to be at play in the context of natural disasters during the earlier and later stages of recovery, respectively. For example, Kaniasty and Norris (2008) found that 6 to 12 months after severe flooding and mudslides in Mexico, higher levels of familial social support predicted lower levels of individual PTSD symptoms. However, at 18- to 24-months postdisaster, higher levels of PTSD symptoms predicted lower levels of social support; social support did not predict PTSD. Between 12- and 18-months postexposure, social support and PTSD symptoms were reciprocally associated.

Relevant to the current study assessing functioning 9-months postdisaster, the processes of social causation appear to account for the association between social support and postdisaster mental health symptoms in the first year of postdisaster recovery. According to Norris and colleagues (Kaniasty & Norris, 2008; Norris, Baker, Murphy, & Kaniasty, 2005), the salient and influential role of social support in mental health adjustment during this period is at least partly attributable to the fact that coping with a natural disaster is both an individual and a communally shared experience. In this communal context, heightened levels of helping and empathy from others are believed to mitigate the development of individual postdisaster psychopathology through a sense of perceived support and social connectedness. By extension, the relative absence of received and perceived supportive behaviors from others is believed to negatively impact mental health adjustment.

In addition to accounting for the period of disaster recovery, it is also important to appreciate the multidimensional nature of disaster exposure in testing a model of intimate relationship and individual functioning. Several studies indicate that different facets of disaster exposure may impact individual and/or interpersonal functioning. Two different studies of natural disaster victims have examined disaster exposure as consisting of threat and loss dimensions (Norris & Uhl, 1993; Waelde, Koopman, Rierdan, & Spiegel, 2001). Both studies found the dimensions to be statistically related but not isomorphic. Norris and Uhl (1993) found relatively large associations among the various threat and loss variables in their sample of hurricane victims. They also found that higher levels of marital stress were predicted by greater injury, perceived life threat, and financial loss, and was in turn one of a number of domains of chronic stressors that mediated disaster exposure and individual psychological distress. Waelde and colleagues' (2001) study of flood victims also revealed associations between the threat and loss variables, and these stressor characteristics had differential associations with postflood psychological adjustment over time. These findings support other authors' recommendations to examine different dimensions of stressor exposure separately (e.g., Green, 1990).

The present study used structural equation modeling to test a model based on a social causation hypothesis of intimate relationship adjustment in postdisaster PTSD symptoms that also took into account different dimensions of disaster exposure. This model was tested in a sample of women who experienced severe flooding in the Midwest United States approximately 9 months earlier. We specifically hypothesized that the threat/harm and loss characteristics of disaster exposure were related, but separate, constructs in predicting lower levels of relationship adjustment. Lower relationship adjustment was in turn predicted to be associated with higher levels of PTSD symptoms.

METHOD

Participants

The current study utilizes data from a larger study focused on women's experience of marital distress, including intimate aggression experiences, after exposure to massive flooding in the St. Louis, Missouri area (see Taft et al., 2009, for more information on the sample, recruitment methods, and data collection procedures). In brief, 564 letters were sent to a random sample of households living in the affected area, and 205 women volunteered to participate in the assessment. The assessment took place on one occasion, and all measures were completed on a laptop computer. The participants were either married or cohabiting at the time of the flood and for at least 6 months before the flood. The majority of participants identified as Caucasian ($N = 199$; 97%). Average age was 46.7 years ($SD = 16.3$; range 18 to 85). Forty-two percent were employed on a fulltime basis, 14% were employed on a part-time basis, 10% were unemployed or disabled, 11% were retired, 1% were students, and 22% described themselves as homemakers. At the time of the study, 82% of the participants were currently married.

Measures

Participants' disaster exposure was assessed with the Diagnostic Interview Schedule Disaster Supplement (Robins & Smith, 1983), which was delivered in self-report format on computer. Threat/harm aspects of the disaster exposure were represented by participants endorsing: (a) whether or not they saw or did things that they found disgusting, (b) whether or not they experienced illness or injury as a result of the flood, and (c) whether or not anyone else in their household experienced illness or injury as a result of the flood. Loss variables were represented by participants' reports of the depth of flood waters at their home (1 = *not on property* to 6 = *at the attic or over*), the extent of their property damage (1 = *no damage* to 6 = *condemned/demolished*), and whether or not they were displaced as a result of the flood. These variables were selected for inclusion based on research on body handlers (e.g., Ursano &

McCarroll, 1990) and survivors of natural disasters (e.g., Kaniasty & Norris, 2008). Each item was treated as a separate manifest variable that loaded onto its respective latent variable.

The participants' relationship adjustment at the time of assessment was evaluated with the Dyadic Adjustment Scale (Spanier, 1976), a well-validated scale used for assessing perceptions of relationship consensus, cohesion, affectional expression, and satisfaction in romantic relationships (e.g., Carey, Spector, Lantinga, & Krauss, 1993). Scores were summed, with higher scores reflecting higher levels of perceived relationship adjustment ($M = 106.7$; $SD = 20.7$). The Dyadic Adjustment Scale subscales of consensus, cohesion, affection, and satisfaction were used as continuous manifest indicators of relationship adjustment. The internal consistency reliability estimate for the Dyadic Adjustment Scale was $\alpha = .94$ in the current sample.

Posttraumatic stress disorder symptoms were assessed with a modified version of the National Women's Study PTSD module (Kilpatrick, Resnick, Saunders, & Best, 1989). This module is based on the Diagnostic Interview Schedule used in the National Vietnam Veterans Readjustment Study (Kulka et al., 1990). In the current study, participants were asked to report the presence or absence of PTSD symptoms 9-months postdisaster based on the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised* (APA, 1987) in the past month ($M = 6.8$, $SD = 5.6$). Sums of the number of symptoms endorsed in each of the three PTSD symptom clusters (i.e., reexperiencing, avoidance, hyperarousal) were used as manifest variables in the analyses. The internal consistency for this measure was $\alpha = .91$.

Data Analysis

Prior to specifying structural equation models, descriptive statistics for study variables were generated using Predictive Analytics SoftWare Statistics Version 17.0.2 (SPSS, Inc., Chicago, IL). Structural equation modeling (SEM), specifically Mplus, Version 5.1 (Muthén & Muthén, 2008), was used to test the hypothesized associations among study variables. The SEM equations tested the hypotheses that threat/harm and loss associated with disaster exposure would be associated with lower relationship adjustment and that lower relationship adjustment would in turn be associated with higher PTSD symptoms 9-months postdisaster. The full information maximum likelihood estimator was used to compute all SEM solutions to accommodate missing data. Total variety scores for threat/harm exposure (disgust, self illness/injury, other illness/injury) and the loss variable of displacement were submitted to Mplus as categorical data, given the dichotomous nature of these manifest variables. All other variables (i.e., depth of water, extent of property damage, subscale scores on the Dyadic Adjustment Scale and PTSD symptoms) were treated as continuous manifest variables. In light of the inclusion of some categorical variables in the model, solutions were derived using polychoric correlations,

and SEM model estimators were based upon the weighted least-squares with mean and variance adjustment. Factor loadings of the respective items on the latent variables are included in Figure 1. The indirect effects estimates were calculated in Mplus to test whether or not threat/harm and loss were indirectly associated with PTSD symptoms via dyadic adjustment. Total percentages of variance attributable to the indirect effects were calculated as the standardized indirect effect estimates/standardized total effects estimates for all paths.

RESULTS

All participants endorsed one or more variables indicative of threat/harm in response to the flood exposure. The most common threat/harm exposure item endorsed was seeing or doing things that were perceived as disgusting (73.5%). Approximately 20% of participants reported experiencing either personal injury or having someone in their household who was injured. Regarding specific proportions exposed to self- and other-injury, 12.7% of the total sample reported being personally injured, whereas 6.8% reported having someone in their household who was injured. Almost all participants (98.5%) endorsed experiencing at least one form of loss (e.g., having water enter home, having their property damaged, being displaced). The mean height of water entering the home was 4.31 ($SD = 1.52$), with a scale score of 4 equating to the water entering the first floor but under 5 feet and a score of 5 equating to the water being above 5 feet but not to the attic. The mean property damage was 4.58 ($SD = 1.62$), which was between $4 = $ *major damage, but habitable* and $5 = $ *significant damage, temporarily inhabitable*. Finally, most (92.2%) reported being displaced (i.e., having to stay somewhere other than their home) after the flood.

Bivariate associations between the latent variables specified in the model are shown in Table 1. Examination of global and local fit indices indicated that the proposed full SEM model fit the data well. As desired, the chi-square test was not significant, indicating that the theoretically derived model did not significantly differ from the empirically derived model, $\chi^2(20) = 21.12$, $p = .39$,

Table 1. Intercorrelations Among Study Latent Variables ($N = 205$)

Variable	1	2	3	4
1. Threat/harm exposure	—			
2. Loss exposure	.34***	—		
3. Relationship adjustment	−.20**	.14*	—	
4. PTSD symptoms	.48***	.11*	−.40***	—

Note. PTSD = posttraumatic stress disorder.
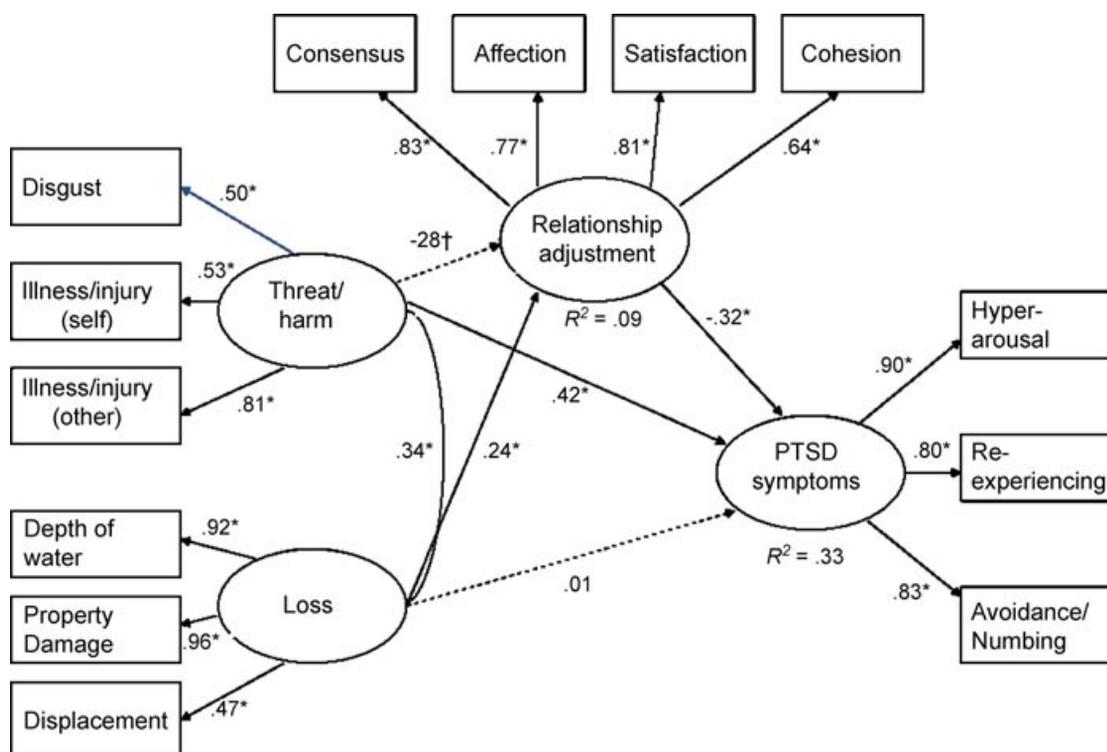* $p < .05$. ** $p < .005$. *** $p < .0001$.

Figure 1. Standardized structural model for indirect effects of dyadic adjustment on posttraumatic stress disorder (PTSD) symptoms. Nonsignificant paths are represented by a dashed line. * $p < .05.$ † $p < .10.$

comparative fix index $= .99$, root mean square error of approximation $= .02$. All measures loaded significantly on their respective factors (see Figure 1).

Results of the SEM indicated that the threat/harm and loss exposure latent variables were significantly related to each other, but were differentially related to relationship adjustment and PTSD symptoms. Specifically, there was a positive and significant association between threat/harm and PTSD symptoms, as well as a marginally significant and negative association ($p = .06$) between threat/harm and relationship adjustment. Conversely, loss was not significantly associated with PTSD symptoms, but was positively and significantly associated with relationship adjustment. As predicted, relationship adjustment was negatively and significantly related to PTSD symptoms. Tests of indirect associations between the trauma exposure variables and PTSD symptoms revealed that both threat/harm (standardized indirect effect $= .09$, $p < .05$) and loss (standardized indirect effect $= -.07$, $p < .05$) were indirectly associated with PTSD symptoms through dyadic adjustment. The threat/harm indirect pathway through dyadic adjustment accounted for 10% of the total variance of model pathways predicting PTSD, and the indirect effect of loss through dyadic adjustment accounted for 8% of the total variance of model pathways predicting PTSD.

DISCUSSION

The current study evaluated a theoretically derived model that takes into account the simultaneous associations among disaster exposure, relationship adjustment, and PTSD symptoms 9-months postdisaster. In contrast to the majority of studies in the area of trauma and intimate relationships, which have relied primarily on samples of male combat veterans and their female partners (see Monson, Fredman, & Dekel, 2010, for review), this sample consisted of women exposed to a natural disaster. The current study also extends previous work on the discriminative value of threat/harm versus loss aspects of disaster exposure in the context of natural disasters by examining each construct's associations with relationship adjustment and PTSD symptoms.

In this investigation, threat/harm and loss exposure were significantly related, but not isomorphic. This finding, in tandem with their differential associations with relationship adjustment and PTSD symptoms, supports the notion put forth by other researchers that different aspects of trauma exposure should be considered separately. In addition, the indirect association between each of the disaster exposure variables and the women's PTSD symptoms through their relationship adjustment highlights the important role of interpersonal factors in individual mental health

problems after disaster exposure (e.g., Kaniasty & Norris, 2008). An unanticipated and interesting finding was the positive association between loss and dyadic adjustment. Related to this finding, 58% of the women in the current sample reported feeling closer to their family members as a result of the flood (Resick, Mechanic, & Griffin, 1997). Thus, it appears that adversity, at least in the short term, can have a mobilizing effect on women's close relationships. This interpretation is consistent with Norris and colleagues' social support mobilization theory (2005), as well as Hobfoll's conservation of resources theory (1989), which posits that to cope with a loss of resources, people turn to and employ their other remaining resources (e.g., relationships). It is also consistent with literature on the potential for posttraumatic growth following trauma exposure (Tedeschi & Calhoun, 2004). That better dyadic adjustment was related to lower levels of PTSD symptoms raises the possibility that intimate relationships can play an important role in mitigating postdisaster psychopathology, particularly in the context of significant instrumental losses.

There are several limitations to this study. First, the cross-sectional nature of the data does not allow us to test the directionality of the constructs of threat/harm, loss, relationship adjustment, and PTSD symptoms. Further, because participants were asked to reflect on their disaster exposure approximately 9 months after the disaster, their current dyadic adjustment and PTSD symptoms could have altered their perceptions of the threat/harm and loss they experienced. In addition, only the female participants' dyadic adjustment was assessed; future studies should include partners' dyadic adjustment to have a more complete understanding of the role of dyadic adjustment in the disaster exposure-PTSD association. Finally, these results in a sample of female flood victims may not generalize to male and female victims who have experienced other types of natural disasters or victims of other types of trauma, especially those whose traumas (e.g., rape, combat) were not simultaneously experienced by an intimate partner. There may be something unique about sharing a trauma that facilitated the bond that was reported by the participants.

To extend the findings from the present study, future research in this area should be longitudinal in nature to help clarify the relative influences of disaster exposure variables, relationship adjustment, and postdisaster psychopathology and should investigate whether findings generalize across gender and different populations of natural disaster survivors. The current study underscores previous calls for prevention strategies focused on marshalling people's own naturally occurring resources, including intimate relationships, to buffer against negative psychological sequelae of natural disaster exposure (Monnier & Hobfoll, 2000). Additional work on the specific association between the avoidance/numbing symptoms of PTSD and relationship adjustment would also help to elucidate potential mechanisms accounting for the relation between PTSD and intimate relationship functioning in this context. Future work investigating the naturalistic course of the reciprocal association between relationship functioning and individual mental health, as well as the effects of targeted interventions explicitly designed to potentiate relationship adjustment in the wake of a natural disaster, could have important clinical and public health implications for trauma recovery.

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