

CONSERVATION OF RESOURCES AND COPING SELF-EFFICACY PREDICTING DISTRESS FOLLOWING A NATURAL DISASTER: A CAUSAL MODEL ANALYSIS WHERE THE ENVIRONMENT MEETS THE MIND

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Disaster research has increasingly examined how personal characteristics mediate emotional recovery following disaster exposure. We investigated the importance of lost resources, coping self-efficacy, and coping behavior as important variables in acute disaster reaction and medium range disaster recovery following Hurricane Andrew. One hundred and eighty participants living in southern Dade county completed the initial phase of the study (1–4 months post-hurricane), with 135 individuals completing the second wave (8–12 months post-hurricane). Results confirmed that lost resources, coping self-efficacy, and coping behavior are important in understanding psychological reactivity following a natural disaster. These variables together provided the best fitted causal model for describing psychological reactions to the hurricane over time. Results are discussed in relation to how coping self-efficacy may serve as an important intra-personal factor that mediates how lost resources are managed and how effective coping ensues. Implications for clinical interventions are also addressed.

Keywords: Coping self-efficacy; Lost resources; Disaster; Coping; Stress

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INTRODUCTION

Approximately 2 million people in the U.S. alone will be significantly effected by a natural disaster each year (Solomon, 1989). Recent visual images of the North Dakota flood devastation, the Southeast tornado damage, and the Florida fire destruction, to name only a few, were seen by millions of viewers on television across the nation. Researchers investigating the psychological response to natural disasters have demonstrated that these tragic events have serious and often long-term emotional ramifications (Green, 1994; Rubonis and Bickman, 1991). More recently, the focus of research has shifted to identifying those who are at particular emotional risk versus those who are more resilient. Researchers have suggested important moderating and mediating factors following severe environmental stressors (Freedy *et al.*, 1992; Gibbs, 1989). The present study extends past research by utilizing both conservation of resources (COR) theory and social cognitive theory (SCT) to help identify those at risk following a disaster. In particular, we attempt in this paper to understand the underlying mechanisms by which lost resources, coping self-efficacy (CSE), and coping behavior influence acute disaster reaction and subsequent disaster recovery following Hurricane Andrew.

COR and SCT: A Disaster Response Model

For the purposes of the present study, loss of resources is defined as both objective and personal resources identified by an individual as depleted by the hurricane (Hobfoll, 1991). CSE is the perceived capability to manage the threatening environmental demands of hurricane recovery (Bandura, 1986). Coping behavior is defined as behaviors enacted in an attempt to respond to disaster recovery demands. These variables were chosen as the focal variables for the structural model predicting acute and medium range psychological distress.

Bandura (1986) suggests that individual reactions to severe stress are significantly determined by self-appraisals of one's ability to cope with environmental demands (i.e., CSE). Freedy *et al.* (1992a), utilizing COR as a theoretical approach to disaster research, suggest that psychological distress following a disaster will be predicted by the extent of resource loss (e.g., objective resources and/or intra-individual

resources). Furthermore, losses prompt coping attempts utilizing other intact resources to regain what was lost (Hobfoll, 1989). The COR theory is particularly useful in studying disaster recovery because it includes both objective resource loss, which is so often profoundly effected by natural disasters, and intra-individual resources. SCT and COR overlap in that both theories include environmental and intra-individual factors and it is postulated that the interaction between these factors determines behavior. We argue that CSE is a key intra-individual resource and may serve as an important mediator between objective resource devastation and subsequent psychological distress following a disaster.

Resource Loss, CSE, and Coping Behavior: Theoretical Relationships

Often for disaster victims traumatic losses are immediate and these losses pertain to resources most valued by people (Hobfoll, 1991). Moreover, many disasters are unanticipated, creating demands that are alien and overwhelming. With this type of extensive, rapid resource depletion, coping resources become over-extended resulting in destructive cycles of continued loss (Hobfoll and Jackson, 1991; Hobfoll and Lilly, 1993). Psychological and physical recovery following a natural disaster depend on individuals' abilities to reverse the myriad of losses suffered (i.e., effective utilization of remaining coping resources) (Freedy *et al.*, 1994; Hobfoll *et al.*, 1995).

Bandura's (1986, 1988) SCT is based on the assumption that humans are self-reflective and are intermittently involved in a self-evaluative process guiding behavior toward desired pursuits (e.g., recovery of lost resources). It is the thesis of this paper that the extent of coping effectiveness and psychological distress resulting from the losses associated with disasters will be influenced by self-evaluation of coping capability (i.e., CSE). Figure 1 depicts a theoretical model integrating the main variables of this discussion (lost resources, CSE, coping behavior, and psychological distress).

As the theoretical model outlines, lost resources negatively impact CSE perceptions, acute active and avoidant coping, acute psychological distress, and medium range psychological distress. Severe storm related losses create intense pressure to adopt coping responses that

will reverse these losses. COR theory predicts that all types of coping behaviors will be initiated after this type of severe loss. Freedy *et al.* (1992b) supported this contention with victims from Hurricane Hugo, such that lost resources predicted both emotion focused (avoidant) and problem focused (active) coping.

Internal resources such as personal mastery and self-esteem can be profoundly affected when secondary loss cycles emerge and direct coping efforts fail to quickly reverse initial extensive losses (Hobfoll *et al.*, 1995). CSE beliefs will in part determine coping efforts in response to the resource depletion (Bandura, 1997). When CSE beliefs are high individuals will focus efforts on rectifying pressing environmental demands (e.g., housing, food, etc.). However, when CSE perceptions are low, greater energy will be directed at managing increasing emotional distress (i.e., avoidant coping). It is anticipated that CSE will have a positive relationship with active coping and a negative relationship with avoidant coping.

The pathways between psychological distress and coping behaviors are intriguing. Most analyses of stress and coping (e.g., Lazarus and Folkman, 1984) view emotional reactions and coping responses as reciprocal. That is, emotional distress can induce coping reactions, and coping behaviors can also influence emotional distress. In a prospective multi-assessment model, both of these possibilities might well emerge from iterations of data analysis. In a cross-sectional analysis, however, it is unclear whether to expect coping to be a mediator from loss to distress, or whether to expect distress to be a precipitator of coping. Accordingly, both possibilities were considered in preliminary analyses to determine the plausibility of each pathway.

To date, we have not identified any published studies documenting longitudinal associations between resource loss related to a natural disaster with *specific* CSE judgments, coping behavior, and psychological distress indicators in a healthy population. By looking at loss of resources, CSE, and coping behaviors within a longitudinal theoretical model of coping in response to a natural disaster, we can begin to understand the inter-relationships and how they might influence intervention strategies. Although no identified studies were found looking at these variables in combination, there is an existing literature on contributions of these variables separately. These findings will be briefly reviewed.

COR and Natural Disaster Stress: Empirical Findings

Freedy and colleagues applied COR theory in their investigations of Hurricane Hugo in South Carolina and the Sierra Madre Earthquake in California (Freedy *et al.* 1992b; 1994). In their study on Hurricane Hugo, Freedy *et al.* reported a strong positive correlation between resource loss and psychological distress even after controlling for gender, marital status, and income. Similarly, Freedy *et al.* (1994) found that lost resources contributed an additional 11% of the variance in psychological distress after accounting for gender, age, ethnicity, income, previous trauma history, life event history, and life threat. Both of these studies support the importance of resource loss as a primary determinant of psychological outcome following a natural disaster.

CSE and Distress after Natural Disasters

Of the studies which have investigated either global self-efficacy (i.e., perceived efficacy for dealing with life in general) or specific CSE perceptions following disasters, the findings were supportive. Global self-efficacy perceptions correlated negatively with psychological distress and accounted for 25% of the variance in a study on recovery from the Mount St. Helens eruption (Murphy, 1987). Solomon and colleagues studied the role of specific CSE in relation to distress in military combat in Israel and found support for the importance of CSE within highly traumatic situations. Low CSE for military combat was correlated with greater post-traumatic stress disorder (PTSD) symptoms and general psychological distress at 1 and 2 years following the war (Solomon *et al.*, 1988; 1991). More recently, Benight *et al.* (1997) reported that specific post-hurricane recovery CSE beliefs in HIV infected men accounted for 51% of the variance in PTSD symptoms over and above threat of death, CD4 counts, estimated damage, income, and education. In addition, CSE perceptions explained 27% of the variance in general psychological distress.

Coping Behavior and Distress Following Natural Disasters

Researchers often divide coping behavior into active and avoidant coping. Active coping is the direct attempt to change the environment, whereas avoidant coping is the attempt to evade thoughts and feelings

associated with the stressor. Avoidant coping (e.g., denial, disengagement) was significantly associated with elevated psychological distress following two different disasters (Collins *et al.*, 1983; Freedy *et al.*, 1992b). Interestingly, Freedy *et al.* also reported that active coping was associated with psychological distress. This is in contrast to other studies that found reductions in distress with active coping behavior following a disaster (Bachrach and Zautra, 1986; Gleser *et al.*, 1981; Stone and Levine, 1984). Still other investigations have not found a relationship between coping strategies and psychological stress after disasters (Gibbs and Belford, 1988).

In order to test the value of adding these variables together into a theoretical model, three different longitudinal theoretical models from most parsimonious to most complex were evaluated in this study. To conserve space, Fig. 1 depicts the fully integrated model. The most simple model can be seen as a subset of Fig. 1 and tested the effect of resource loss on psychological distress without any intervening variables (Model A). The second model tested resource loss and CSE in order to determine the importance of CSE in predicting psychological distress acutely and longitudinally without coping behaviors (Model B). The third model included each of the variables from Model B and added active and avoidant coping behaviors (Full Model).

Thus, it was hypothesized that adding CSE perceptions into a basic theoretical model between lost resources and psychological distress would provide a better explanation of disaster recovery acutely and over time. It was also hypothesized that the complete theoretical

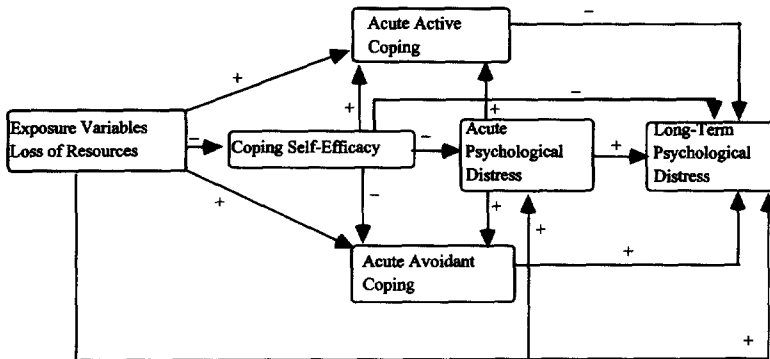


FIGURE 1 Full Model depicting anticipated pathways to acute and longitudinal distress.

coping model, including loss of resources, CSE appraisals, and coping behaviors would be the best statistically fitted model.

METHOD

Participants

This study is part of a larger community study (Ironson *et al.*, 1997) investigating the overall impact of Hurricane Andrew on the general population. Participants were 180 residents from southern Dade county, who completed the first phase of the study. Of this original sample 135 individuals completed the second wave. Thus, we had a follow-up response rate of 75%. General psychological distress levels were found to be significantly higher ($t(165) = 3.1$; $p = 0.0023$) for those participants who did not participate in the second wave of data collection. However, there were no differences between follow-up participants and non-responders on reported PTSD symptoms or the Impact of Event Scale score. Additionally, no differences were found on any of the demographic variables. Participants were recruited through fliers at neighborhood food stores, staff from various companies, and door to door contacts in a range of damaged areas from minimal to extreme damage. All participants lived south of S.W. 88th Street in southern Dade county. Although this was a volunteer sample, effort was made to gather as representative a sample as possible for ethnic and socioeconomic diversity. A random sample was simply not feasible given the logistical conditions following the storm (e.g., no phones, people not living in their homes, looting, etc.). The original sample gathered was relatively diverse, with 79 non-Hispanic Whites, 61 Blacks, 32 Hispanics, and 8 other. Of the 180 participants, 118 were female and 62 were male (for more detailed sample information see Ironson *et al.*, 1997). Due to missing values among the different measures, the final sample for the structural equation analyses including variables from both time points was 124 participants.

Measures

Hurricane Coping Self-Efficacy Measure

The Hurricane Coping Self-Efficacy Measure (Benight *et al.*, in press) was used to assess perceptions of CSE following the hurricane. This

measure was developed with a panel of experts (members of the hurricane research group) and with actual hurricane victims (not included in this sample). The measure includes the primary situational recovery demands that hurricane victims were faced with such as the threat of looting, insurance company difficulties, obtaining shelter, and controlling their emotional reactions. For example, questions were asked concerning the person's belief in his or her own capability for "Maintaining personal security – protecting yourself and your property", "Maintaining financial security – obtaining financial resources either through employment or assistance" (copy is available from the first author). Questions were answered on a 7-point scale with 1 (*Not at all capable*) to 7 (*Totally capable*). Internal consistency reliability for this scale was acceptable at 0.84. Results of a principle components factor analysis revealed a one factor solution with this factor accounting for 52% of the variance. Initial evidence for convergent and divergent validity is also supportive with the CSE measure correlating positively and significantly with overall optimism and social support and negatively with general psychological distress (Benight *et al.*, in press).

Loss of Resources

The conservation of resources-evaluation (COR-E) was developed from Hobfoll's conservation of resources model of stress (Hobfoll, 1989) and has been utilized in previous disaster studies (Freedy *et al.*, 1992b; 1994). Within the disaster context, loss of resources (LOR) is used to assess the degree of loss (e.g., pets, sentimental possessions, time to do work, etc.) experienced by victims. In order to reduce the confounding nature of the initial measure utilized by Freedy, the list of resources utilized for this study included less items related to psychological distress and more focused on material resources (e.g., car, furniture, etc.). The final list included 42 items with a mixture of material and experiential resources. Participants responded to the COR-E on 5-point likert-type scale with 0 (*No loss*) and 4 (*Extreme amount of loss*). Internal reliability for this measure in the current study was 0.94. Test-retest reliability for this measure was 0.67 ($p < 0.001$) over a 9 month time interval. A significant positive correlation of 0.52 ($p < 0.001$) was found between the LOR and damage estimate, providing initial evidence for convergent validity.

Psychological Distress: Symptom Checklist-90 Revised (SCL-90R)

The SCL-90R (Derogotis, 1983) was utilized to assess psychological distress following the hurricane. This is a 90-item self-report measure designed to assess psychological distress in psychiatric and medical patients. The questions relate to the past week and are averaged to give an overall psychological distress score called the Global Severity Index (GSI). This instrument has been extensively used in studies investigating emotional reactions to traumatic events (Baum *et al.*, 1983). Internal consistency evaluations for the 9 subscales are very good ranging from 0.77 (psychoticism) to 0.90 (depression). Test-retest reliability with a delay of one week were also very good ranging from 0.78 (hostility) to 0.90 (phobic anxiety) (Derogotis, 1983). This measure demonstrates good sensitivity and convergent validity.

Coping Behaviors

Coping behavior was assessed with a modified version of the COPE (Carver *et al.*, 1989). The COPE is a 60-item measure of different coping behaviors. To avoid excessive participant demand, only 28 items were utilized from the original scale. Participants responded to the statements of different coping behaviors by indicating that they have been doing the behavior 1 (*Not at all*) to 4 (*A lot*). For exploratory purposes, eight additional items were included which assessed self-blame, stoicism, suppressing thoughts and feelings, yearning for things to be different, arguing, looking out for one's own best interests, and trying to help others. A total of 36-items were included. Because this measure was modified from the original COPE we conducted a factor analysis to determine whether the underlying factor structure would suggest an avoidant and active coping dichotomy. A factor analysis with varimax rotation was completed on the COPE using scale scores as "items" (exploratory items were entered as one item scales). The solution yielded two clearly defined factors. The first factor was named avoidant coping and the subscales which loaded on this factor (with a factor loading of 0.50 or larger) were stoicism, suppressing thoughts, suppressing feelings, denial, mental-disengagement, behavioral disengagement, self-blame, yearning for things to be different, and arguing. The avoidant coping scale demonstrated an internal

reliability estimate of 0.86. The second factor was named active coping and the subscales which loaded on this factor were acceptance, positive reframe, planning, actively pursuing change, joking, utilizing social support for advice, and utilizing social support for emotional help. The active coping scale also demonstrated a good internal reliability estimate of 0.82. Scale scores were derived by summing the related items to each of the subscales. A more detailed discussion of specific coping behaviors and disaster recovery is currently in preparation and will not be reported in this study.

Procedure

For time point one, each participant completed a questionnaire packet, and an interview, between 1 and 4 months following the hurricane. The entire procedure lasted approximately two hours. Most participants completed the study at their homes, with a few choosing to come to the university. Participants read the informed consent and indicated their desire to continue by signing the form. Participants were interviewed and then completed the questionnaire packet. Participants were thanked and paid \$60.00 for their involvement.

Time point two consisted of filling out the questionnaire packet again during the 8–12th month following the hurricane. Participants were paid \$25.00 for their time.

Statistical Analyses

To analyze the theoretical relationships among the variables, several path models were tested against one another utilizing LISREL covariate structural analysis (Jöreskog and Sörbom, 1989). This involves using a nested χ^2 analysis to determine the incremental value of adding additional variables into the theoretical models. To assess the fit for each model the χ^2 goodness-of-fit index (GFI; Jöreskog and Sörbom, 1989), adjusted goodness-of-fit (AGFI; Bentler, 1990) root mean square residual goodness-of-fit index (RMSR), root mean square error of approximation (RMSEA) (Steiger, 1990), and parsimony index (Bentler, 1990) were used.

RESULTS

Demographics

Table I depicts the demographic makeup of this sample at time point 1. Included are both general and hurricane related information. The sample was relatively educated with greater than 95% reporting having obtained a high school diploma or greater. Slightly more than 81% reported some college or vocational training. As evidence of the diversity of disaster experience in this sample, the extent of damage ranged from 13% indicating very little damage (e.g., little to no damage to house, car, personal possessions, etc.) to 27% reporting extreme damage (e.g., heavy losses to home, car, etc.). No differences were found on any of the demographic variables between time point 1 participants and time point 2 participants.

TABLE I Descriptive statistics for demographic and hurricane variables

<i>Variable</i>	<i>Percentage</i>
<i>Age</i>	
18-24	16
25-39	40
40-54	30
55-71	14
<i>Ethnicity</i>	
Non-hispanic white	44
Black	34
Hispanic	18
Other	4
<i>Education</i>	
Some high school	5
High school graduate	14
Some college/adv voc	37
College degree	26
Graduate degree	18
<i>Gender</i>	
Female	65
Male	35
<i>Estimated damage</i>	
0-5 low	13
6-9	18
10-13	42
14-18 high	27

TABLE II Intercorrelations among primary variables ($N = 124$)

Variable	1	2	3	4	5	6
1 LOR	—					
2 CSE	-0.29*	—				
3 Avoid	0.53*	-0.42*	—			
4 Active	0.41*	-0.03	0.28*	—		
5 GSI-time 1	0.56*	-0.47*	0.67*	0.22*	—	
6 GSI-time 2	0.48*	-0.50*	0.77*	0.09	0.72*	—
<i>M</i>	43.5	38.5	9.73	22.51	0.78	0.59
<i>SD</i>	28.3	7.4	7.71	7.88	0.66	0.58

* $p \leq 0.01$.TABLE III Nested model analyses for disaster recovery ($N = 124$)

Model comparison	χ^2 diff	df diff	<i>p</i> -value
Null Model vs. Model A	136.90	3	< 0.001
Model A vs. Model B	39.40	3	< 0.001
Model B vs. Full Model	113.59	8	< 0.001

Path Analyses

Table II depicts the correlation matrix utilized for the path analyses along with the means and standard deviations of the following variables: LOR, CSE, avoidant coping, active coping, GSI-time 1, and GSI-time 2. In preliminary analyses we tested simple models in which loss led to distress through coping and in which loss led to coping through distress. The data supported the pathway from loss through distress to coping. To test the three theoretical models described, a nested models strategy was used (see Table III). The most parsimonious model tested the effect of lost resources on psychological distress (Model A). The second model tested the addition of CSE in predicting psychological distress acutely and longitudinally (Model B). The third model added active and avoidant coping behaviors to Model B (Full Model). The significant χ^2 difference found between Model A and Model B indicates that adding CSE is important in the prediction of psychological distress at time 1 and at time 2. The significant χ^2 difference found between Model B and the Full Model suggests that including acute coping behaviors improves our explanation of the data.

To assess fit of each model, the χ^2 GFI (Jöreskog and Sörbom, 1989), AGFI (Bentler, 1990), RMSR, RMSEA (Steiger, 1990), and the

parsimony index (Bentler, 1990) were utilized. The GFI and the AGFI assess the overall fit of the model to the data with a value of 1.0 considered a perfect fit. The AGFI adjusts the GFI for sample size. The RMSR index is the average difference between the model estimated correlation matrix and the actual correlation matrix. The closer the index is to 0 the better the model fits the data. The RMSEA is an index which attempts to determine the average amount of error that would be attained if the model were to be compared to the population. The closer the approximation the smaller the RMSEA with a lower boundary of 0. Finally, the parsimony index is a theoretical tool which takes into account the number of parameters in the model and the sample size. The larger the number the more parsimonious the model.

Table IV gives the fit information for the models. Based on the goodness of fit indices, the Full Model provided the best fit for the data. Each of the indices, except for the parsimony index, demonstrated the improved fit for the Full Model. The GFI and AGFI were close to 1. The RMSR and the RMSEA were closer to 0 when coping behavior was added to complete the Full Model supporting the more complex model. Lastly, the parsimony index did not suggest the Full Model was better due to the increase in number of variables in the model. This index should be viewed with the other fit indices in mind. If little improvement is seen in the other fit indices and a big drop is found with the parsimony index then one would conclude adding variables is not warranted. However, in this case, the data supported the more complex model. Figure 2 depicts the Full Model with path estimates and standard errors (in parentheses).

The Full Model shows that loss of resources has a significant path to all of the time one variables including CSE, active coping, avoidant coping, and psychological distress. Interestingly, the relationship

TABLE IV Model fit indices for Path Model

	<i>Null Model</i>	<i>Model A</i>	<i>Model B</i>	<i>Full Model</i>
Degrees of freedom	15	12	9	1
Chi-square	291.53	154.63	115.23	1.64
GFI	0.488	0.712	0.795	0.996
AGFI	0.284	0.496	0.521	0.908
RMSR	0.387	0.316	0.271	0.016
RMSEA	0.387	0.311	0.310	0.072
Parsimony index	0.714	0.571	0.428	0.048

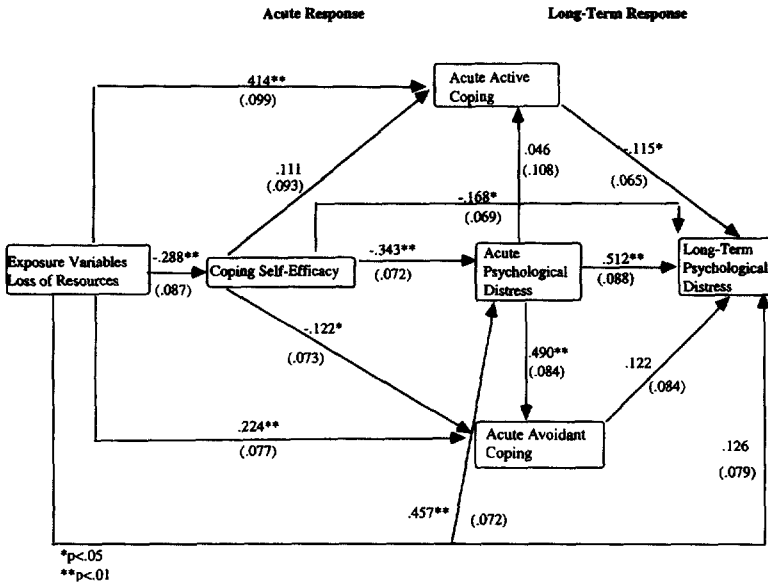


FIGURE 2 Full Model with path coefficients and standard errors in parentheses.

between lost resources and CSE suggests that the greater the resource loss the lower the perceived CSE. Additionally, more resource loss was related to greater reported levels of active and avoidant coping behaviors. Coping self-efficacy perceptions showed significant paths to psychological distress at time 1 and time 2, with greater levels of CSE leading to lower levels of distress. A marginally significant path was also found between CSE appraisal and avoidant coping, with greater levels of CSE leading to lower utilization of avoidant strategies. The pathway from psychological distress at time point 1 was significant with avoidant coping, with greater levels of distress leading to more avoidant coping. Psychological distress at time 1 was also related to distress at time 2. Finally, loss of resources is related to psychological distress at time 2 through active coping behaviors, although the path from active coping to distress at time 2 was only marginally significant. This pathway is interesting with greater levels of lost resources leading to higher active coping at time 1 eventually leading to lower psychological distress at time 2.

DISCUSSION

Results from this study supported the research hypotheses. The longitudinal theoretical path model including loss of resources, CSE, and coping behaviors was the best fitted model. The nested χ^2 analysis, comparing Model B with the Full Model, confirmed the value of including these variables in understanding acute and medium range psychological distress following this type of extreme stress. The directions of the path coefficients were all in the expected direction for these variables.

Before interpreting the model more thoroughly, it must be noted that the goodness-of-fit indices for the Full Model must be interpreted with caution due to the reduced degrees of freedom. It should also be noted that the path coefficients for the pathways from active coping to subsequent psychological distress and from CSE to avoidant coping are slightly below the customary *t*-value of 2.0 as the cutoff for being considered significant. However, due to the theoretical importance of these variables we felt it necessary to include them. Replication of the model with a different population and a different disaster is necessary before any determination can be made as to the importance of these coping behaviors on psychological distress. It is also important to mention that although the model utilized in the present study was found to have significant fit indices, other equivalent models most likely exist (MacCallum *et al.*, 1993). However, MacCallum *et al.* suggest that models which are theoretically driven and parsimonious are preferred. We believe the present Full Model is theoretically driven and relatively parsimonious. However, we caution the reader that equivalent models probably do exist. Future research must confirm or disconfirm this model's utility.

Both SCT and COR theory suggest that psychological outcomes following a severe stressor will be the result of interactions between objective environmental conditions (e.g., lost resources) and internal factors (e.g., CSE) (Bandura, 1997; Hobfoll, 1991). Although SCT tends to emphasize intra-individual factors and COR objective external losses, the present findings indicate that both are important.

In support of Hobfoll's (1989) COR theory, loss of resources provided key information in the Full Model. Material and experiential resource loss was related to psychological distress at time 1, CSE, and

both acute and avoidant coping. These data suggest that lost resources directly influence how emotionally distraught someone is, how capable he/she may feel in restoring life back to normal, and the extent of coping behaviors the individual will enact. The positive relationship of resource loss with psychological distress and both types of coping behavior at time 1 is consistent with previous disaster studies (Freedly *et al.*, 1992b; 1994). These findings underscore that coping responses will be largely based on attempts to recover losses associated with the trauma (Hobfoll, 1991).

The negative influence of resource devastation on CSE perceptions is in agreement with the dynamic reciprocal determinism between environmental conditions and self-appraisals of coping efficacy discussed in SCT (Bandura, 1986). Hobfoll (1989) suggests that a strong sense of environmental control will influence the ability to manage available resources. CSE is central to perceptions of control and the enactment of effective coping strategies (Bandura, 1997). This suggests that CSE may be a pivotal intra-individual resource that regulates how effectively resource losses will be managed. This finding is consistent with previous research on CSE as a predictor variable for psychological distress following disaster (Benight *et al.*, 1997; Murphy, 1987).

Psychological distress reported was only related to increases in avoidant coping. This finding, in conjunction with the negative relationship seen between CSE and avoidant coping and the pathway from lost resources through CSE and distress, suggests that avoidant coping increases as an individual perceives that they are not managing environmental demands. Self-regulation of negative affect and ineffectual direct coping efforts would promote increases in avoidant behaviors (e.g., "I just try not to think about it").

The longitudinal findings were also interesting for the acute factors and subsequent distress. Resource loss was related to subsequent psychological distress through active coping, CSE perceptions, and psychological distress at time 1. Resource loss due to Hurricane Andrew was severe. The effect of these losses on subsequent psychological distress appears to be linked with self-appraisals of restorative capabilities, the level of distress experienced in the first few weeks after the storm, and actual attempts at managing the on-going struggle to regain basic resources (e.g., water, electricity, etc.). These data suggest that active coping may provide more resolutions and improved

functioning over time. This finding is consistent with research where active coping reduced psychological distress following disasters (Bachrach and Zautra, 1986; Gleser *et al.*, 1981; Stone and Levine, 1984). Finally, the path coefficient for acute CSE to subsequent distress was significant, suggesting that early self-appraisals of CSE are important in later recovery.

One possible mechanism that was not addressed in this study that might directly influence extent of resource devastation, CSE perceptions, and effective active coping is the amount of proactive or preventive coping that individuals engage in prior to the landfall of the storm (Aspinwall and Taylor, 1997). Through effective preventive resource accumulation individuals may improve their post-disaster psychological outcomes through these other independent predictors.

Implications

The findings from this study have direct implications for disaster interventions. Based on the pathway from lost resources through active coping to subsequent distress, disaster response teams that provide direct resources (e.g., housing, food, water, and funding for rebuilding) should reduce subsequent distress levels through actual active coping attempts. The findings underscore the necessity of providing direct tangible resources to disaster victims as quickly as possible. In addition, if objective resources can be provided, this should shore up self-perceptions of CSE reducing eventual psychological distress.

Disaster intervention teams could also focus efforts directly at individual perceptions of CSE. One way this might be accomplished would be to design interventions that would provide mastery experiences for specific environmental demands where a person feels especially inefficacious. It is clear that recovery demands following natural disasters are often as important as the event itself (Burnett *et al.*, 1997; Quarantelli, 1985). This is especially true following Hurricane Andrew. Many of life's basic necessities such as water, electricity, and phones were unavailable for as long as 90 days following the storm (Ironson *et al.*, 1997). Literally thousands of people were living in alternative housing for months after the storm. Interventions could be designed to help effected people increase their CSE in dealing with logistical nightmares, material losses, and other major recovery challenges through

incorporating components of cognitive behavioral strategies. Psychologists and other mental health professionals might serve as advocates to help victims effectively navigate the myriad of storm recovery demands. These advocates could help individuals to readjust to the realities of the environment, thereby promoting reasonable goals, countering negative cognitive self-statements, and implementing focused reward systems. This type of *teamwork* should enhance perceptions of environmental mastery (Bandura, 1986). Thus the combination of enhanced objective resource allocation combined with strategies bolstering individual CSE perceptions might enhance already occurring active coping mechanisms thereby reducing distress over time.

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References

- Aspinwall, L.G. and Taylor, S.E. (1997). A stitch in time: Self-regulation and proactive coping. *Psychological Bulletin*, **121**, 417–436.
- Bachrach, K.M. and Zautra, A.J. (1986). Assessing the impact of hazardous waste facilities: Psychology, politics, and environmental impact statements. In Lebowitz, A.H., Baum, A. and Singer, J.E. (eds.), *Advances in Environmental Psychology Exposure to Hazardous Substances: Psychological Parameters*. Erlbaum, Hillsdale, pp. 71–88.
- Bandura, A. (1986). *Social Foundations of Thought and Action*. New Jersey: Prentice-Hall.
- Bandura, A. (1988). Self-conception of anxiety. *Anxiety Research*, **1**, 77–98.
- Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York: Freeman.
- Baum, A., Gatchel, R.J. and Schaeffer, M.A. (1983). Emotional, behavioral, and physiological effects of chronic stress at Three Mile Island. *Journal of Consulting and Clinical Psychology*, **51**, 565–572.
- Benight, C.C., Antoni, M.H., Kilbourn, K., Ironson, G., Kumar, M.A., Fletcher, M.A., Redwine, L. and Schneiderman, N. (1997). Coping self-efficacy buffers psychological and physiological disturbances in HIV-infected men following a natural disaster. *Health Psychology*, **16**, 248–255.
- Benight, C.C., Ironson, G. and Durham, R. Psychometric properties of a hurricane coping self-efficacy measure. *Journal of Traumatic Stress* (in press).
- Bentler, P.M. (1990). Comparative indices in structural models. *Psychological Bulletin*, **107**, 238–246.

- Burnett, K., Ironson, G., Benight, C.C., Wynings, C., Greenwood, D., Carver, C., Baum, A. and Schneiderman, N. (1997). Measurement of perceived disruption during rebuilding following Hurricane Andrew. *Journal of Traumatic Stress*, **10**, 673-681.
- Carver, C., Scheier, M.F. and Weintraub, J.K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, **56**, 267-283.
- Collins, D.L., Baum, A. and Singer, J.E. (1983). Coping with chronic stress at Three Mile Island: Psychological and biochemical evidence. *Health Psychology*, **2**, 149-166.
- Derogotis, L.R. (1983). *The SCL-90R Manual; Scoring Administration, and Procedures for the SCL-90R*. Baltimore, John Hopkins University School of Medicine, Clinical Psychometrics Unit.
- Freedy, J.R., Resnick, H.S. and Kilpatrick, D.G. (1992a). Conceptual framework for evaluating disaster impact: Implications for clinical intervention. In L.A. Austin (Ed.), *Responding to Disaster* (pp. 3-23). Washington D.C.: American Psychiatric Press, Inc.
- Freedy, J.R., Shaw, D.L., Jarrell, M.P. and Masters, C.R. (1992b). Towards an understanding of the psychological impact of natural disasters: An application of the conservation of resources stress model. *Journal of Traumatic Stress*, **5**, 441-454.
- Freedy, J.R., Saladin, M.E., Kilpatrick, D.G., Resnick, H.S. and Saunders, B.E. (1994). Understanding acute psychological distress following natural disaster. *Journal of Traumatic Stress*, **7**, 257-273.
- Gibbs, M.S. (1989). Factors in the victim that mediate between disaster and psychopathology: A review. *Journal of Traumatic Stress*, **2**, 489-514.
- Gibbs, M. and Belford, S. (1988). Toxic threat, coping style and symptoms of emotional distress, Presented at the Annual Meeting of the American Orthopsychiatric Association, San Francisco, CA.
- Gleser, G.C., Green, B.L. and Winget, C. (1981). *Prolonged Psychological Effects of Disaster: A Study of Buffalo Creek*, New York: Academic Press.
- Green, B. (1994). Psychosocial research in traumatic stress: An update. *Journal of Traumatic Stress*, **7**, 341-362.
- Hobfoll, S.E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, **44**, 513-524.
- Hobfoll, S. (1991). Traumatic stress: A theory based on rapid loss of resources. *Anxiety Research*, **4**, 187-197.
- Hobfoll, S., Briggs, S. and Wells, J. (1995). Community stress and resources: Actions and reactions. In S.E. Hobfoll and M.W. de Vries (Eds.), *Extreme Stress and Communities: Impact and Intervention* (pp. 137-158). Netherlands: Kluwer Academic Publishers.
- Hobfoll, S. and Jackson, A. (1991). Conservation of resources in community intervention. *American Journal of Community Psychology*, **19**, 111-121.
- Hobfoll, S. and Lilly, R. (1993). Resource conservation as a strategy for community psychology. *Journal of Community Psychology*, **21**, 128-148.
- Hobfoll, S., Dunahoo, C. and Monnier, J. (1995). Conservation of resources and traumatic stress; In J. Freedy and S. Hobfoll (Eds.), *Traumatic Stress from Theory to Practice* (pp. 29-47). New York: Plenum Press.
- Ironson, G., Wynings, C., Schneiderman, N., Baum, A., Rodriguez, M., Greenwood, D., Benight, C.C., Antoni, M., LaPerriere, A., Huang, H.S., Klimas, N. and Fletcher, M.A. (1997). Post-traumatic stress symptoms, intrusive thoughts, loss, and immune function after Hurricane Andrew. *Psychosomatic Medicine*, **59**, 128-141.
- Jöreskog, K.G. and Sörbom, D.G. (1989). *LISREL 7 User's Reference Guide*. Mooresville, IN: Scientific Software.
- Lazarus, R.S. and Folkman, S. (1984). *Stress, Appraisal, and Coping*. New York: Springer, Publishing Company.

- MacCallum, R.C., Wegener, D.T., Uchino, B.N. and Fabrigar, L.R. (1993). The problem of equivalent models in applications of covariance structure analysis. *Psychological Bulletin*, **114**, 185–199.
- Murphy, S. (1987). Self-efficacy and social support mediators of stress on mental health following a natural disaster. *Western Journal of Nursing Research*, **9**, 58–86.
- Quarantelli, E.L. (1985). An assessment of conflicting views on mental health: The consequences of traumatic events. In C.R. Figley (Ed.), *Trauma and its Wake* (pp. 173–215). New York, NY: Brunner/Mazel.
- Rubonis, A.V. and Bickman, L. (1991). Psychological impairment in the wake of disaster: The disaster-psychopathology relationship. *Psychological Bulletin*, **109**, 384–399.
- Solomon, S.D. (1989). Research issues in assessing disaster's effects. In R. Gist and B. Lubin (Eds.), *Psychosocial Aspects of Disaster* (pp. 308–340). New York: Wiley and Sons.
- Solomon, Z., Weisenberg, M., Schwarzwald, J. and Mikulincer, M. (1988). Combat stress reaction and posttraumatic stress disorder as determinants of perceived self-efficacy in battle. *Journal of Social and Clinical Psychology*, **6**, 356–370.
- Solomon, Z., Benbenishty, R. and Mikulincer, M. (1991). The contribution of wartime, pre-war, and post-war factors on self-efficacy: A longitudinal study of combat stress reaction. *Journal of Traumatic Stress*, **4**, 345–361.
- Steiger, J.H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, **25**, 173–180.
- Stone, R.A. and Levine, A.G. (1984). *Reactions to collective stress: Correlates of active citizen participation at love canal. Paper presented at the annual meeting of the American Psychological Association, Toronto, Canada.*