Quick Response Report #96 BUFFALO CREEK FIRE AND FLOOD REPORT

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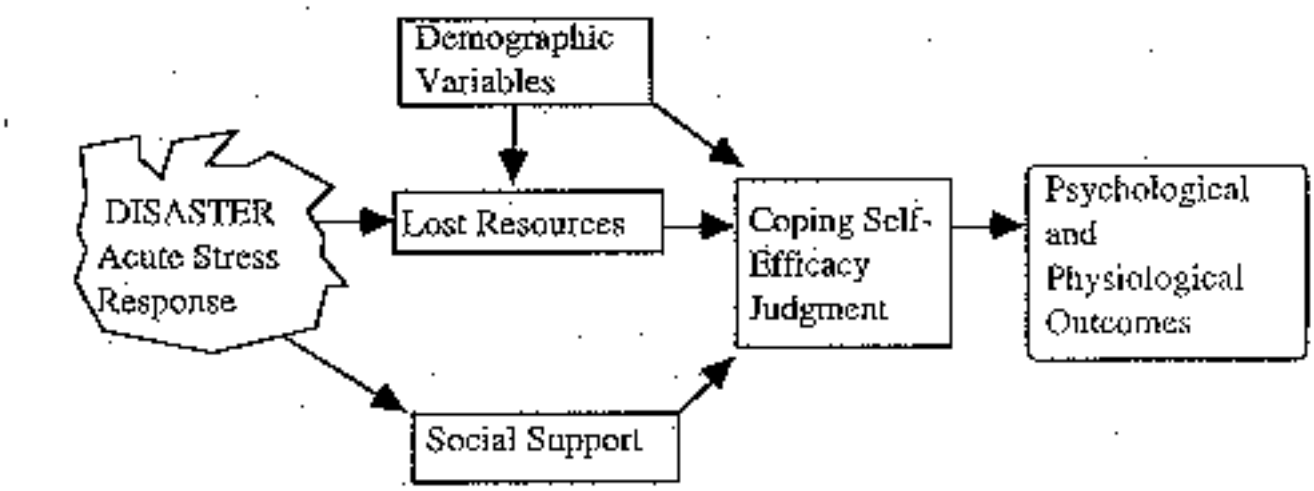
BUFFALO CREEK FIRE AND FLOOD REPORT

On May 18, l996, a 12,000 acre fire nearly destroyed the small mountain community of Buffalo Creek, Colorado. Following the devastation, this community was rocked by a series of flash floods culminating in a severe deluge that claimed two lives and caused extensive infrastructure

damage. The majority of residents were without water for a month. Telephone service was also disrupted. This disaster serves as a very unique continual stressor with the combination of deforestation due to the fire and continual potential for summer thunder storms. The threat of more flash floods is always present. Due to this unique situation, we decided to investigate the psychological and physiological reactions of residents from this small community. Research has found that disasters have very real and important psychological and physical ramifications (Rubonis & Bickman, l99l; Hovanitz, l993). The purpose of this study was to investigate the relationship of subjective appraisals of coping self-efficacy (CSE) with several psychological and physiological factors involved in disaster recovery.

Coping self-efficacy is defined as individuals' judgment of their ability to cope with the environmental demands of the stressful situation. Under general stress conditions, higher CSE has been related to improved psychological adjustment to abortion (Meuller & Major, l989), improved coping with physical assault (Ozer & Bandura, l990), improved immune function (Wiedenfeld et al. l990), lower catecholamine responsivity (Bandura, Taylor, Williams, Mefford, & Barchas, l985), and reduced blood pressure response (Bandura, Reese, & Adams, l982). In relation to severe stressors (i.e., natural disasters and war) CSE was also associated with improved psychological and physiological outcomes (Benight, Antoni, et al., l997; Benight, Ironson, et al., l997; Murphy, l987; and Solomon et al., l988). Results from these previous studies suggest that assessment of CSE perceptions in post-disaster environments may be important and useful for intervention strategies.

The following model was utilized as a theoretical guide to help understand how CSE might relate to acute stress response variables, psychological and physiological outcomes.



CSE, Acute Stress Variables, and Psychological and Physiological Outcomes

Statistical Analysis

Pearson correlations were utilized to test the relationships among all of the variables. In addition, hierarchical multiple regression was used to assess the incremental value of CSE in explaining psychological and physiological distress.

Methods

Participants

Participants were recruited through a community meeting and word of mouth. Out of approximately 100 full-time residents, fifty participants completed a questionnaire packet, answered a structured interview, and provided a small sample of blood. Mean age of the participants was 53 (SD = 17). Approximately half of the sample were women (24) and half men (26). The sample was predominately Caucasian (94%).

Measures

Loss of Resources

The Loss of Resources (LOR) scale used in this study was a 40-item, 5-point Likert scale 0 (no loss) and 4 (extreme amount of loss) used to assess the degree of loss (e.g., pets, sentimental possessions, time to do work, etc.) experienced by victims of natural disasters. This scale was adapted from the previous research by Freedy et al. (l992).

Threat of Death

A one-item assessment was utilized to determine an individual's perception that he or she was going to die. The question was worded "At any time during the fire/flood did you think you might die?" The question was answered on a 7-point Likert-type scale with 1 (not at all) and 7 (absolutely).

Social Support

The Interpersonal Support Evaluation List (ISEL) was used to measure social support (Cohen, Mermelstein, Kamarck, & Hoberman, l985). The ISEL is a 40-item assessment. Items are answered either true or false indicating support or lack thereof depending on the wording of the item. The higher the score the greater the perceived support. In support for the validity of the ISEL, significant correlations have been reported with it and other measures of social support (e.g., Inventory of Socially Supportive Behaviors) (Cohen et al., l985).

CSE

A CSE measure was developed specifically for this disaster. Many of the questions were taken from a previously developed Hurricane CSE measure (Benight & Durham, l997). The final version was a 10-item measure utilizing a Likert-type scale (7-point scale, 1 = not at all capable to 7= totally capable) which requires participants to rate themselves on how capable they think they are to successfully deal with specific demands related to disaster recovery (e.g., insurance company difficulties, returning to normal routine, removing debris, and

monitoring emotional reactions). Internal reliability for this scale on the present sample was very good at .93.

Symptom Checklist-90 Revised (SCL-90-R)

The SCL-90-R (Derogatis, 1983) was utilized to assess general psychological distress in the participants since the disasters. This is a 90-item self-report measure where participants are asked to rate 1 (no discomfort) to 4 (extreme discomfort) how much discomfort each of the problems have caused them over the past week. The checklist sums to an overall psychological distress measure called the Global Severity Index (GSI). This instrument has been used extensively in studies investigating emotional reactions to disasters (Baum, Gatchel, & Schaeffer, 1983).

Impact of Events Scale

The Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979) is a 15-item scale designed to assess intrusive thoughts and avoidance of a specific traumatic experience. Participants indicate the frequency of experiencing symptoms on a 4-point Likert-type scale with 1 (not at all) and 4 (often).

Acute Stress Response

Acute stress response was measured with the Acute Stress Response Questionnaire (Classen, Cardena, & Spiegal, l991). This measure assesses acute emotional, physical, and dissociative responses during the trauma.

Immune Response

Immune reactions were measured utilizing Flow Cytometry to determine immune cell phenotyping. Full white blood cell counts, lymphocyte percentages, CD56, and CD69, were assessed.

Results

General Psychological Outcomes of These Disasters

Mean values and standard deviations of the main variables in this study are presented in Table 1. The Global Severity Index (GSI) of the SCL-90-R suggests that these participants were moderately to severely distressed (M = .77, SD = .62). Comparatively, these values are higher than the average for the Beverely Hills Breakfast Club fire (M = .70, those at the fire; Green, Grace, Lindy, Titcher, & Lindy, l983) and almost equal to those from a neighborhood sample taken following Hurricane Andrew (M = .78; Benight, Ironson, et al., l997). However, sampling time is probably influencing these findings in that the Buffalo Creek sample was collected two weeks to two months following the last flash flood. This is in comparison to the six months after the Beverely Hills Club fire and two months to six months for the Hurricane Andrew sample. In general, many of the individuals sampled were experiencing strong emotional distress. The Impact of Event score also supports this conclusion (M = 31.2, SD = 9.2). These findings alone provide important information for disaster relief agencies in dealing with small rural community disasters.

Zero-Order Correlations of Variables

Table 2 provides the zero-order correlations among all of the study variables.

CSE and Acute Reactions

In order to determine the relationship of acute stress reactions (i.e., emotional, physical, and cognitive reactions reported by participants as happening during the disasters) with CSE we looked at zero order correlations. Table 2 provides these correlations. Acute emotional, physical, and cognitive reactions were all related to CSE judgments. The relationships were stronger for the acute reactions reported for the fire than for the flood. This may in part be due to the unpredictable nature of the fire and that it potentially wielded a wider range of impact than the floods. The fire could have destroyed the entire community, whereas the

floods inflicted more localized destruction.

CSE Judgments and General Psychological Distress

In order to investigate the importance of CSE in explaining psychological distress, hierarchical multiple regression analyses were completed for the GSI and IES. Income, LOR, social support, and threat of death were utilized as control variables. CSE judgments were then entered into the equation to determine if they added any additional explained variance to the regression model. Results confirmed that CSE is an important variable in understanding psychological distress following this unique disaster. CSE explained an additional 5% of the variance (F (1,36) = 12.76, p = .001) for the GSI and 6% of the variance for the IES score (F (1,37) = 5.74, p = .0219). The standardized beta weight for CSE was in the expected direction (Beta = -.40, for GSI and -.42, for IES). These suggest that the lower the CSE the greater the reported distress.

CSE Judgments and Immune Function

In a similar format, a multiple regression analyses was completed to determine the value of CSE judgments in explaining variance for the different immune measures. Table 3 demonstrates the increment to RE2 values for CSE in each of the different regressions. As the table demonstrates, none of the increment to RE2 tests were significant. The association of CSE judgments with CD56-Natural Killer Cells was marginal (p = .20). However, the other associations were virtually nonexistent.

Discussion and Implications

The relationships found between CSE and the acute stress response variables suggest that individuals with higher acute reactions during a disaster have lower levels of CSE. This is the first paper that we are aware of to investigate the relationship of acute stress reactions with

CSE. However, due to the correlational nature of these data it is not possible to determine if the acute responses actually lead to lower CSE judgments or if those with lower CSE perceptions report greater acute responses. Longitudinal data are required for this answer. It is theoretically plausible that individuals who have a much stronger acute reaction will demonstrate lower CSE judgments later on. This would be consistent with the longitudinal research which has demonstrated a relationship between acute reactions and later Post-Traumatic Stress Disorder development (Koopman, Classen, & Spiegel, l994)

The general psychological findings reported above are consistent with previous studies investigating the role of CSE judgments and distress following disasters (Benight, Antoni, et al., l997; Benight, Ironson, et al., l997; Murphy, l987; and Solomon et al., l988). These findings suggest that individuals' appraisals of perceived ability to cope with environmental demands are associated with reported psychological distress. CSE did not appear to be an important variable for explaining peoples' immune levels. Before addressing the implications of these findings it is important to note the limitations of the study.

This study is correlational and causation cannot be inferred from these findings. Thus, it is impossible to determine whether higher levels of distress lead to lower CSE judgments or the other way around. It is conceivable, however, given the experimental studies which have manipulated CSE levels and found differential outcomes (Bandura in-press) that CSE levels, at least in part, are contributing to psychological distress following a disaster. This study is also limited based on its small sample size and homogeneity of the sample. Generalization of these findings to other terrorism actions or to other samples is not warranted.

The implications of these findings are important for developing psychosocial interventions facing the aftermath of rural disasters. Interventions designed for small rural communities that are facing continual distress due to a recurrent stressor might focus on specific environmental demands where a person feels inefficacious (e.g., dealing with intrusive thoughts about the disasters, or cleaning up debris). These interventions would differ significantly from the current mental health approach to this type of problem. Having been in Buffalo Creek within

days of the flood and at several community meetings, the mental health response was one based on education and providing treatment to those who seek it out. It became clear to me after interviewing approximately half of this community, and having been raised in a community only 20 minutes from Buffalo Creek, that rural residents are not accustomed to seeking out mental health treatment. Suggesting that people can travel 50 or so miles to see a counselor is probably unrealistic, especially given the intense post-disaster recovery demands. These data would suggest that many of the participants were experiencing significant emotional distress. Thus, a new model is needed for intervention if we are to connect with these individuals. Perhaps an intervention labeled more as education where individuals can come by and talk to a person at the site of the disaster to gather more information would be more helpful. During these discussions, specific cognitive behavioral strategies could be utilized to help the person. For example these "educational sessions" could be designed to help individuals set realistic goals for recovery, focus on controllable aspects of the environment, expect to have emotional reactions that are uncomfortable, etc. Individuals need to have their experiences normalized and be taught more specific coping skills (e.g., relaxation training) that would enhance efficacy perceptions. In addition, during these quick sessions more in-depth assessments could be completed to determine those who are facing deeper emotional responses. For these people, utilization of alternative treatments such as Eye Movement Desensitization and Reprocessing Therapy or more in-depth therapy could be provided, or at least offered, after a therapeutic relationship had developed.

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Table 1. Means and Standard Deviations on Demographic and Primary Variables

Variable	M	SD

Age	53	17
Incomea*	7	1-13
Educationa*	3	1-5
LOR	26	28
Threat of Death Fire	1.7	1.3
Threat of Death Flood	1.9	1.8
Social Support	35.5	5.1
CSE	50.40	11.6
GSI	.77	.62
Total IES	31.2	9.2
Acute Emotional Reaction-Fire	24.3	7.3
Acute Physical Reaction-Fire	12.4	6.0
Acute Dissociative Reaction-Fire	13.7	5.6
Acute Emotional Reaction-Flood	21.6	6.6
Acute Physical Reaction-Flood	11.4	4.8
Acute Dissociative Reaction-Flood	12.3	5.0
WBC	7026.3	2551.9
Lymphocyte %	35.5	13.1
CD56-Natural Killer Cells	17.9	8.2
CD69	61.8	27.9

Note. For income the ranges were1=under 5,000 to 13=over 60,000. For education the ranges were 1= some high school to 5 = graduate degree. *values presented are the median and range.

Table 2. Correlations Among All of the Variables in the Study

Table 2. Correlations among all of the variables in the study

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.	--																	
2.	-.56	--																
3.	-.53	.53	--															
4.	-.63	.76	.79	--														
5.	-.43	.54	.24	.47	--													
6.	-.47	.38	.61	.61	.59	--												
7.	-.37	.48	.36	.61	.77	.68	--											
8.	.06	-.24	.02	-.08	-.20	.05	-.10	--										
9.	.41	-.41	-.53	-.60	-.27	-.41	-.37	.35	--									
10.	.08	-.20	-.38	-.25	-.32	-.32	-.18	.37	.36	--								
11.	.50	-.26	-.41	-.36	-.04	-.21	-.04	-.17	.24	.12	--							
12.	-.77	.50	.54	.57	.39	.48	.34	-.06	-.46	-.18	-.47	--						
13	-.40	.46	.45	.53	.49	.32	.44	-.00	-.36	-.23	-.55	.32	--					
14.	-.70	.70	.59	.66	.66	.58	.51	-.10	-.43	-.31	-.42	.64	.56	--				
15.	-.77	.66	.65	.64	.47	.49	.37	-.07	-.48	-.30	-.59	.76	.63	.80	--			
16.	.11	-.00	-.09	-.14	.08	-.07	-.10	.21	.15	.02	-.00	-.17	.09	.07	-.10	--		
17.	.02	-.08	.14	.14	-.04	.22	.24	-.11	-.25	.00	.06	-.02	-.06	-.14	.04	-.46	--	
18.	.04	-.01	-.14	-.14	.16	.03	-.03	.06	.22	.09	.19	.00	-.14	-.01	-.11	.39	.03	--
19.	.14	-.20	.07	-.22	.16	.04	.16	.06	24	.14	.12	.10	-.22	-.02	-.10	-.06	-.03	-.06

Note: Correlation > .37, p <= .01, correlation > .27 p <= .05

1=CSE
2=Acute Emotional Reaction to Fire
3=Acute Physical Reaction to Fire
4=Acute Cognitive Reaction to Fire
5=Acute Emotional Reaction to Flood
6=Acute Physical Reaction to Flood
7=Acute Cognitive Reaction to Flood
8=Education
9=Age
10=Income
11=Social Support
12=Threat of Death
13=Impact of Event
14=GSI
15=WBBCT
16=%Lymphocyte
17=CD69
18=CD56

Table 3. Increment to R2 values for CSE for each of the immune factors

Immune Factor	delta R2	P-Value
WBC	.00	.94
Lymphocyte%	.00	.80
CD56-Natural Killer	.06	.20
CD69	.00	.83

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