

BRIEF REPORT

Anger and Its Association to Distress and Social/Occupational Functioning in Symptomatic Disaster Relief Workers Responding to the September 11, 2001, World Trade Center Disaster*

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Empirical evidence suggests that anger plays a significant role in posttraumatic stress disorder (PTSD) and may impede recovery from traumatic events. The purpose of this study was to assess the role of anger and its relationship to distress and social/occupational functioning in disaster relief workers (DRWs) who had PTSD symptoms who were deployed to the World Trade Center after September 11, 2001. Six hundred twenty-six utility workers (96% male) completed measures of anger, distress, PTSD severity, and social/occupational functioning. Results indicated that anger was significantly higher in DRWs who had PTSD symptoms than in those who did not, and statistically significant associations were found among anger, distress, PTSD severity, and social/occupational functioning in workers who had PTSD symptoms. Careful assessment of anger in DRWs exposed to traumatic events is warranted as well as longitudinal studies to further understand the relationship between anger and PTSD.

Empirical evidence demonstrating a significant association between anger and posttraumatic stress disorder (PTSD) suggests that anger may be a central feature of the posttraumatic response. For example, several studies (Beckham, Moore, & Reynolds, 2000; Chemtob, Hamada, Roitblat, & Muraoka, 1994; Kulka et al., 1990; Lasko, Gurvits, Kuhne, Orr, & Pitman, 1994; Novaco & Chemtob, 2002; Rosen et al., 1997) have found anger to be substantially elevated in combat veterans who have PTSD. Growing evidence also demonstrates a strong association between anger and PTSD in victims of violent physical or sexual assault (Andrews, Brewin, Rose, & Kirk, 2000; Feeney, Zoellner, & Foa, 2000; Riggs, Dancu, Gershuny,

Greenberg, & Foa, 1992). Schutzwahl and Maercker's (2000) study of East German political prisoners provides further empirical support for the notion of a heightened level of anger in trauma victims.

In the immediate aftermath of the tragic events of September 11, 2001, approximately 3,800 utility workers were deployed to the World Trade Center (WTC) site in order to respond to the need to shut off energy sources that were potentially feeding fires and later to restore gas, steam, and electric power to Lower Manhattan. Many of these workers undertook tasks that were life-threatening and were witness to horrifying images. Although there is some evidence that the rates of PTSD are lower in disaster

*This article was edited by the journal's previous editor, Dean G. Kilpatrick.

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relief workers (DRWs) than in victims of the same disaster (North et al., 2002), the role of anger in symptomatic DRWs has not been reported. The purpose of this study was to explore the relationship between anger and PTSD and its association to distress and social/occupational functioning in a group of DRWs involved in the tragic events of the September 11, 2001, World Trade Center disaster.

METHOD

Participants in this cross-sectional study were utility workers who were deployed to the WTC in the immediate aftermath of the disaster on September 11, 2001, and who participated in a larger study (Difede, Roberts, Jayasinghe, & Leck, in press) that examined the psychological sequelae of this event. The evaluation consisted of self-report measures and a structured clinical interview conducted by doctoral level clinicians. The sample consisted of screened participants completing the State-Trait Anger Expression Inventory-2 (STAXI-2) in consecutive interviews between 21 and 25 months after September 11, 2001. Participants did not differ significantly on any demographic variables from nonparticipant screened workers.

Participant Demographics

Six hundred and twenty-six utility workers (96% male) completed the STAXI-2. The group consisted primarily of middle-aged white married men who had a high school education (see Table 1). The mean number of weeks worked continuously at the WTC was 3.5 (range 0–61); 28% were present on the first day of the attack. The following psychiatric diagnoses were determined: major depressive disorder (3.5% current; 10.4% past), panic disorder (3.0% current; 3.7% past), and generalized anxiety disorder (0.6% current; 1.8% past). Twenty-nine percent (29%) endorsed a past trauma and 18% reported receiving previous mental health treatment.

Table 1. Characteristics of Participants ($N = 626$)

	%	<i>M</i>	<i>SD</i>
Age		44.7	9.4
Gender			
Men	93.1		
Women	3.9		
Ethnicity			
African American	18.6		
White	66.5		
Hispanic	12.1		
Asian	0.9		
Other	1.9		
Education			
Some or no high school	1.4		
High school graduate	44.0		
Some college or training	34.9		
College graduate	13.5		
More than college	6.2		
Marital status			
Cohabiting	2.2		
Separated or divorced	8.9		
Married	73.0		
Widowed	0.3		
Single	15.6		

Measures

Clinician-Administered PTSD Scale. The Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990, 1995) is a structured interview that assesses the frequency and intensity of each PTSD symptom. For the purposes of this study the CAPS, used as a current measure of PTSD, was keyed to “your experience at the WTC.” This study examined three variants of the original scoring rule (F1/I2 rule): full criteria PTSD, 2C (same as full criteria except two versus three C symptoms are present), and subsyndromal PTSD (for full description, see Weathers, Ruscio, & Keane, 1999). The psychometric properties of the CAPS are established, and it is a widely accepted criterion measure of PTSD (Weathers, Keane, & Davidson, 2001).

PTSD Checklist. The PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993), keyed to “your experience at the WTC,” is a *Diagnostic and Statistical*

Manual of Mental Disorders—(DSM-) correspondent, 17-item self-report measure of PTSD that provides a continuous measure of PTSD symptom severity. The PCL is psychometrically sound (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996) and has been used in nearly 200 studies across a variety of trauma populations.

Brief Symptom Inventory. The Brief Symptom Inventory (BSI) is a 53-item abbreviated version of the Symptom Checklist 90-Revised (Derogatis & Melisaratos, 1983). Items are summed to yield scores for nine symptom dimensions and three global indices, including the global severity index (GSI), used as one of the distress measures in this study. The BSI is a widely used self-report measure of psychopathology, and its psychometric properties are well established (Derogatis & Melisaratos, 1983).

The Beck Depression Inventory. The Beck Depression Inventory—Second Edition (BDI-II; Beck, Steer, & Brown, 1996), one of the distress measures in this study, is a 21-item version of the original BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), one of the most widely used self-report measures of depression. The psychometric properties of the original BDI are well established, and the BDI-II also appears to be psychometrically strong (Beck, Steer, Ball, & Ranieri, 1996).

State-Trait Anger Expression Inventory-2. The State-Trait Anger Expression Inventory-2 (STAXI-2, a revised 57-item version of the STAXI; Spielberger, 1988), provides concise measures of the experience, expression, and control of anger. For the purposes of this study, the 15-item STAXI State Anger (S-Ang) scale was used to assess three components of anger: Feeling Angry, Feeling Like Expressing Anger Verbally, and Feeling Like Expressing Anger Physically. The psychometric properties of the STAXI-2 are well established (Spielberger, 1999).

Sheehan Disability Scale. The Sheehan Disability Scale (SDS; Sheehan, 1983) is a 10-point visual analogue scale that assesses disability across three domains: work, social life, and family life. The three items may be summed into

a single dimensional measure of global functional impairment that ranges from 0 (unimpaired) to 30 (highly impaired). This scale has been widely used in psychopharmacology randomized controlled trials and has been demonstrated to show adequate levels of reliability and validity in a psychiatric population (Leon, Shear, Portera, Klerman, 1992).

Statistical Analyses

Bivariate correlations were performed between continuous measures (age, STAXI, BDI, GSI, PCL, SDS, CAPS social, occupational and total scores in participants who had symptoms of PTSD, full criteria, 2C variant, subsyndromal). Bonferroni corrections were made for multiple comparisons. Analysis of variance (ANOVA) or *t* tests were performed between anger, measures of distress, and functional ability and gender, marital status, educational level, and the four diagnostic groups (full criteria, subsyndromal, 2C symptoms, no PTSD).

RESULTS

Levels of Anger, Distress, and PTSD Severity

Of the total group ($N = 626$), 78 were rated as having substantial symptoms of PTSD (36 = full criteria, 13 = 2C variant, 29 = subsyndromal). Table 2 presents the mean STAXI-2 scores, BDI, GSI, CAPS social, CAPS occupational, total CAPS, PCL, and SDS scores.

Demographic Correlates With Measures of Anger, Distress, and Functioning

A significant negative association was found between age and social functioning ($r = -.29$, $p < .05$); older workers reported more social dysfunction. There were also significant ethnic/cultural differences on the STAXI-2 (S-Ang), $F(2, 69) = 7.4$, $p < .001$; and CAPS social functioning, $F(2, 67) = 3.5$, $p < .05$. Post hoc analysis revealed that Hispanic participants had significantly higher anger scores and more social impairment than white

Table 2. Means and Standard Deviations for Anger, Distress, and Social/Occupational Disability in PTSD Symptomatic Groups ($n = 78$)

Measure	<i>M</i>	<i>SD</i>	Severity
STAXI-2	20.7	8.7	80th percentile
STAXI-FA	7.8	3.5	
STAXI-FAV	6.9	3.6	
STAXI-FAP	6.0	2.4	
BDI	13.9	8.2	Mild to moderate
GSI	.9	.64	Mild
SDS	11.0	7.8	Mild to moderate
PCL	43.4	14.0	Moderate
CAPS Social	1.32	1.2	Mild to moderate
CAPS Occupational	.76	.97	Minimal
CAPS Total	46.0	16.7	Moderate

Note. PTSD = Posttraumatic Stress Disorder; STAXI-2 = State-Trait Anger Expression Inventory-2; STAXI-FA = STAXI Feeling Angry subscale; STAXI-FAV = STAXI Feel Like Expressing Anger Verbally subscale; STAXI-FAP = STAXI Feel Like Expressing Anger Physically subscale; BDI = Beck Depression Inventory; GSI = Global Severity Index of Brief Symptom Inventory; SDS = Sheehan Disability Scale; PCL = PTSD Checklist; CAPS = Clinician-Administered PTSD Scale.

participants. Finally, there were significant group differences on the BDI and GSI in terms of marital status, $F(3,76) = 2.8, p < .05$; $F(3, 76) = 4.2, p < .01$, respectively; married workers endorsed significantly fewer depressive symptoms than single workers. Statistically significant correlations between anger, distress, PTSD severity, and social/occupational functioning in symptomatic workers are shown in Table 3.

Between-Group Differences on Anger, Distress, and Functioning

Mean total score for the STAXI-2 (S-Ang), including the subscale scores, BDI, GSI, PCL, CAPS social, CAPS occupational, CAPS total, and SDS, for the four groups (full PTSD, 2C variant, subsyndromal PTSD, no PTSD) are presented in Table 4. Analysis of variance (ANOVA) revealed significant group differences on the STAXI-2 (S-Ang), $F(3, 606) = 27.7, p < .001$; BDI, $F(3, 625) = 111.3, p < .001$; GSI, $F(6, 606) = 89.9, p < .001$; PCL, $F(3, 614) = 136.6, p < .001$; SDS, $F(3, 445) = 52.1, p < .001$; CAPS total score, $F(3, 353) = 244.7, p < .001$;

CAPS social, $F(3, 553) = 145.8, p < .001$; and CAPS occupational, $F(3, 545) = 52.5, p < .001$. Post hoc analysis revealed that the three symptomatic groups (full criteria, 2C variant, subsyndromal) had significantly higher scores on the STAXI-2 (S-Ang), BDI, GSI, PCL, CAPS total, CAPS social, and SDS than those who were negative for PTSD. Also, those meeting full criteria for PTSD were significantly more distressed (BDI, GSI) than the other two symptomatic groups (2C variant, subsyndromal). The three symptomatic groups did not differ from one another in terms of their scores on the STAXI-2 (S-Ang) or the SDS. Finally, in terms of PTSD severity, the workers who had full criteria for PTSD had higher scores than the subsyndromal group but did not differ significantly from the 2C variant group.

DISCUSSION

Results of this study demonstrate that anger score was significantly elevated in the utility workers who had PTSD symptoms versus scores of those without symptoms and extend findings for other trauma victims, including Vietnam veterans and victims of physical or sexual abuse, in which anger is substantially elevated. Interestingly, anger was not only significantly elevated in workers who met full criteria for PTSD but also in those who met the 2C rule and subsyndromal PTSD. These findings highlight the utility of examining the three variants of the F1/12 rule because significant information might have been overlooked by exploring a diagnosis of full criteria PTSD alone. Implications of these associations suggest the importance of careful assessment of anger in DRWs exposed to traumatic events because treatments may be best tailored to include an anger management component.

Another significant finding that emerged is that anger was significantly associated with distress, social/occupational functioning, and mild disability in this sample of workers who had symptoms of PTSD. Because of the cross-sectional nature of the study any causal relationship between anger and PTSD cannot be inferred. Other limitations to the study concern its generalizability because only

Table 3. Pearson Moment Correlations Among Anger, PTSD Severity, Distress, Functioning ($n = 78$)

Measure	1	2	3	4	5	6	7	8
1. STAXI-2	—							
2. BDI	.35**	—						
3. GSI	.48***	.82***	—					
4. Sheehan	.47***	.64***	.65***	—				
5. PCL	.43***	.66***	.76***	.46***	—			
6. CAPS Social	.41***	.35**	.48***	.33*	.38**	—		
7. CAPS Occupational	.21	.29*	.32**	.24	.26*	.50***	—	
8. CAPS Total	.39**	.62***	.65***	.43**	.62***	.64***	.42**	—

Note. PTSD = posttraumatic stress disorder; STAXI-2 = State-Trait Anger Expression Inventory-2; BDI = Beck Depression Inventory; GSI = Global Severity Index of Brief Symptom Inventory; Sheehan = Sheehan Disability Scale; PCL = PTSD Checklist; CAPS = Clinician-Administered PTSD Scale.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4. Means of Full Criteria PTSD, Subsyndromal PTSD, 2C Symptoms, No PTSD on Anger, Distress, and Functioning

Measure	Full criteria ($n = 36$)		Subsyndromal ($n = 29$)		2C symptoms ($n = 13$)		Negative ($n = 548$)	
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)
STAXI-2	21.9	(8.9) ^a	21.5	(11.1) ^a	22.0	(14.8) ^a	15.9	(2.9) ^b
BDI	20.1	(6.1) ^a	12.9	(8.0) ^b	14.8	(9.4) ^b	4.2	(4.8) ^c
GSI	1.3	(.43) ^a	0.97	(.82) ^{ab}	0.95	(.56) ^b	0.25	(.38) ^c
PCL	54.8	(9.4) ^a	45.5	(11.7) ^b	46.0	(14.3) ^{ab}	25.1	(8.8) ^c
CAPS S	2.2	(1.0) ^a	1.2	(1.2) ^b	1.5	(.84) ^b	0.10	(.44) ^c
CAPS O	1.2	(1.3) ^a	0.54	(.94) ^b	0.67	(.52) ^b	0.07	(.36) ^c
CAPS T	55.8	(19.9) ^a	39.6	(19.7) ^b	42.2	(9.6) ^b	8.2	(7.4) ^c
SDS	14.0	(5.4) ^a	10.4	(10.0) ^a	13.2	(7.4) ^a	2.5	(4.5) ^b

Note. PTSD = posttraumatic stress disorder; STAXI-2 = State-Trait Anger Expression Inventory-2; BDI = Beck Depression Inventory; GSI = Global Severity Index of Brief Symptom Inventory; Sheehan = Sheehan Disability Scale; PCL = PTSD Checklist; CAPS = Clinician-Administered PTSD Scale (S = social functioning, O = occupational functioning, T = total scale score). Means with different superscripts differ significantly ($p < .05$) by Tukey's honestly significant difference test.

DRWs who were predominantly male were included. Longitudinal studies examining the role of anger in individuals exposed to traumatic events are warranted to examine the question of whether anger is simply concomitant to PTSD or whether it plays a role in the development and/or maintenance of the disorder.

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