

Post-traumatic Stress Disorder in Vietnam Combat Veterans: Effects of Traumatic Violence Exposure and Military Adjustment

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Thirty high-combat Vietnam veterans with a diagnosis of Post-traumatic Stress Disorder (PTSD) were compared with a second group of 30 high-combat Vietnam veterans without evidence of PTSD on measures of military adjustment and exposure to traumatic violence during combat. Military adjustment was assessed for precombat and combat service periods and included measures of alcohol and drug use, disciplinary actions, and social support. The PTSD-positive group reported significantly greater exposure to traumatic violence and more distress at having observed and participated in such acts than did the PTSD-negative group. Multiple regression analysis revealed the five traumatic violence frequency and distress scales to be significant predictors of severity of PTSD symptoms. Group differences were not attributable to premilitary demographic or social adjustment variables. Analyses of covariance demonstrated that both groups increased their drug and alcohol use and reported fewer social supports from precombat to combat periods. Results support the residual stress model of PTSD etiology, implicating trauma as the major contributing factor in the disorder.

KEY WORDS: veterans; traumatic violence; post-traumatic stress disorder; military adjustment; substance abuse.

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INTRODUCTION

More than a decade after the end of the war in Vietnam, an estimated 40 to 60% of high combat Vietnam veterans report symptoms of post-traumatic stress disorder (PTSD), such as nightmares, intrusive combat-related memories and images, numbing of responsiveness to the external world, and survivor guilt (Egendort *et al.*, 1981; Wilson, 1978). Large number of combat veterans requiring specialized mental health services continue to request treatment at Veterans Administration medical centers and community-based Vet Centers throughout the United States. In the 1980 edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III; American Psychiatric Association, 1980), a formal diagnostic category was created for PTSD under which combat experiences could meet criteria for a severe life stressor required for a positive PTSD diagnosis. These factors have contributed to recent rapid growth in research on combat-related PTSD.

While the advent of PTSD as a psychiatric diagnostic entity is a recent event, theorizing about etiological factors in the development of adverse combat reactions has a longer history. At present there are two principal univariate models, diametrically opposed to each other, available for conceptualizing PTSD etiology. The stress evaporation model (Borus, 1973a, b; Worthington, 1977) emphasizes the role of premilitary psychosocial factors in development of adverse combat psychological reactions, while the residual stress model (Figley, 1978; Wilson, 1978) posits that exposure to a severe stressor is the primary determinant. From a stress evaporation perspective, only those individuals with precombat vulnerability could be expected to develop combat-related PTSD. Conversely, from the residual stress perspective, all individuals would be expected to experience psychological distress following exposure to a severe combat stressor. While single factor models of complex human reactions may appear overly simplistic, they play an important beginning role in identifying relevant variable domains for subsequent research.

Predictably, published reports from World War II and early work done in the 1970s with Vietnam veterans are very limited in design conceptualization and methodology regardless of which model their findings seem to support (cf. Foy, Carroll, and Donahoe, 1987). Supporting the stress evaporation model, Borus (1973a) reported that Vietnam veterans who have been affected for longer periods of time after the war were younger when they entered military service, had less education, and had fewer coping skills than veterans who recovered quickly from war-related stress. Similarly, Worthington (1977) found that postmilitary adjustment problems were related to preexisting social, educational, and vocational deficits. Conversely, a residual stress perspective was favored by Grinker and Spiegel (1945), who found that, af-

ter significant combat exposure, World War II airmen underwent marked personality changes that impeded their readaptation to civilian life. They noted further that the soldiers' stress symptoms were related to the severity of the stressors to which they had been exposed. In another study of World War II veterans, Futterman and Pumpian-Mindlin (1951) reported similar findings and noted that noncombatant personnel stationed in battle zones had also been traumatized by their proximity to violence and death. These studies, however, did not control for critical differences in combat exposure among their subjects and did not employ adequate operational measures of military and social adjustment. Thus findings from these studies regarding the role of premilitary factors and combat exposure in combat-related PTSD do not permit firm conclusions to be drawn.

Several recent studies of Vietnam veterans support either a residual stress or an interactive model of PTSD etiology (Egendorf *et al.*, 1981; Figley, 1978; Foy *et al.*, 1984; Horowitz and Solomon, 1978; Wilson, 1978). The Foy *et al.* study, in addition to highlighting the relationship between combat exposure and PTSD, reported a positive association between PTSD and a military adjustment index based on measures of disciplinary actions, substance abuse, psychiatric contact, and awards received. However, the temporal relationship between PTSD and military adjustment difficulties could not be examined further because of study design limitations. Specifically, functioning on military adjustment areas was assessed only once over the entire military service period, obscuring any differences that might have been obtained by assessment both prior to and during combat.

Laufer, *et al.* (1983) recently proposed an elaboration of the residual stress model by refining the construct of combat exposure to include exposure to acts of abusive violence. Their findings suggested that witnessing such acts was related to a cluster of PTSD symptoms based on reexperiencing the trauma (e.g., intrusive thoughts and hyperarousal), while actual participation in such acts was related to PTSD symptomatology based on denial of the trauma (e.g., emotional numbing and cognitive difficulties). However, conclusions drawn from these findings must be viewed as tentative due to the preliminary nature of the work. Specific methodological limitations included the assessment of traumatic violence through open-ended questions and assessment of PTSD symptoms through scales that predated DSM-III criteria for the disorder.

Accordingly, the purpose of the present study was to examine the contributions of military adjustment and exposure to traumatic violence to the development of PTSD. Since previous research had shown PTSD to be associated with combat exposure, we chose to study high-combat veterans in order to better examine the contribution of other etiological factors to PTSD. First, we examined the relationship between military adjustment and PTSD

more precisely by obtaining ratings of subjects' alcohol and drug use, disciplinary problems, and social support during military service for two different times: precombat and combat. Second, we examined the relationship between PTSD and traumatic violence by assessing exposure to specific acts of violence and by using PTSD symptomatology based on DSM-III criteria for PTSD.

METHOD

Subjects

Subjects for the study were 60 Vietnam veterans seeking psychiatric services from either the West Los Angeles Veterans Administration Medical Center or the East Los Angeles Veterans Outreach Center.

Approximately half the subjects were referred to the study from outpatient clinics and Vietnam "rap" groups and half were referred from inpatient wards. To be included in the study, subjects had to qualify as high-combat Vietnam war veterans, as indicated by a minimum score of four points on the Combat Exposure Scale of Foy *et al.* (1984) and by their discharge summaries (DD-214 forms) or service records on file with the Veterans Administration regional office. Discharge summaries or VA service records verifying combat experience were available for all but three subjects (95%). Veterans with primary DSM-III diagnoses of schizophrenia, other psychotic disorders, organic brain syndrome, or substance abuse were excluded from the study. Subjects were divided into two groups: 30 subjects each were classified as PTSD-positive or PTSD-negative according to Foy *et al.*'s (1984) PTSD diagnostic scale, using a cutoff score of 16 points.

To examine degree of correspondence between this diagnostic method and hospital chart diagnosis, a chart review was conducted on 72% of the subjects' records. An 84% rate of correspondence was obtained for subjects' PTSD diagnostic status according to medical records and our research diagnostic criteria. This review revealed that seven subjects who did not meet the stricter research criteria had received chart diagnoses of PTSD.

Overall, the PTSD-negative group had received diagnoses of nonprimary substance abuse (67%), PTSD (39%), depression (22%), and personality disorders (22%). Concurrent diagnoses within the PTSD-positive group included substance abuse (48%), depression (44%), personality disorders (32%), and adjustment disorders (4%). Table I depicts demographic and military characteristics of the sample.

Table I. Demographic and Military Characteristics of Positive and Negative PTSD Groups

Variable	PTSD+ (n = 30)	PTSD- (n = 30)	PTSD+ × PTSD-
Age (yrs)			
M	36.8	37.4	<i>t</i> (58) = -0.59
SD	4.9	2.6	
Race (%)			
White	56.7	73.3	$\chi^2(2) = 3.42$
Black	20.0	20.0	
Hispanic	23.3	6.7	
Education (%)			
> 11 years	80.0	90.0	$\chi^2(1) = 1.18$
≤ 11 years	20.0	10.0	
Marital status (%)			
Single	63.3	80.0	$\chi^2(1) = 2.05$
Married	36.7	20.0	
Patient Status (%)			
Inpatient	43.3	66.7	$\chi^2(1) = 3.30$
Outpatient	56.7	33.3	
Military branch (%)			
Army	56.7	66.7	$\chi^2(3) = 10.30^a$
Marines	40.0	10.0	
Navy	3.3	16.7	
Air Force	0.0	6.7	
Service entry type (%)			
Enlisted	83.3	63.3	$\chi^2(1) = 3.07$
Drafted	16.7	36.7	
Age entered service (yrs)			
M	18.4	18.6	<i>t</i> (58) = -0.59
SD	1.2	1.4	
Discharge type (%)			
Honorable	80.0	96.7	$\chi^2(1) = 4.04^b$
Other	20.0	3.3	
Combat exposure scale (summary score)			
M	5.6	5.3	<i>t</i> (58) = 1.64
SD	0.7	0.7	

^a*p* < 0.02.

^b*p* < 0.05.

Procedure

Subjects were individually administered a structured interview to elicit premilitary, military, and postmilitary history data, measures of social support, combat exposure, exposure to traumatic violence, and PTSD symptom severity. Four subjects admitted to feeling disturbed by some of the questions and required a brief session of supportive therapy after the interview.

A ward visit or home phone call was made within two days of these sessions, at which time no subject reported any further symptoms of distress.

Instruments and Measures

Premilitary Adjustment Index

Premilitary history data were collected through an index developed by Foy *et al.* (1984) assessing family stability, school achievement, parental socioeconomic status, drug and alcohol use, and disciplinary and legal problems.

Military Adjustment Variables

Disciplinary problems were assessed by asking each subject to list any court martial or nonjudicial disciplinary action (Article 15) he received during his service time, both prior to Vietnam (precombat) and during his tour of duty in Vietnam (combat). Subjects were asked to make separate ratings of their alcohol and drug use on a scale of 1 (no consumption) to 9 (daily intoxication). Each rating was made on a precombat and combat basis. Social support was measured on a precombat and combat basis by the Social Support Questionnaire, or SSQ (Sarason *et al.*, 1983). The SSQ consists of 27 items describing situations in which social support might be important. Each item asks subjects to list the people (0 to 9+) they can rely on for support in the situation described.

Combat Exposure

Degree of combat exposure was assessed through a 7-item, Guttman scale developed by Foy *et al.* (1984) which places war-related events in order of increasing combat involvement. Items range from no combat through having served three tours of duty. Lund *et al.* (1984) reported a coefficient of reproducibility for the scale of .93 and a correlation of .86 with the combat scale used by Egendorf *et al.* (1981).

Traumatic Violence

In order to operationalize the frequency of exposure to acts of traumatic violence and its associated psychological distress, the Traumatic Violence Inventory was developed for this study. The inventory consists of 22 items requiring five responses each. Subjects were first asked to rate on a

scale of 0 (never) to 4 (very often) how frequently they were exposed to each act of traumatic violence, either as a participant or as a witness (Scale 1). If they acknowledged exposure, they were then asked to rate on scales of 0 (none) to 4 (extreme) the level of psychological distress caused by participating in the act at the time it occurred (Scale 2); the level of distress caused by observing the act at the time it occurred (Scale 3); the level of distress in the present caused by the memory of participating in the act (Scale 4); and the level of distress in the present caused by the memory of observing the act (Scale 5). Inventory items were generated from interviews with Vietnam veterans and represented the content of nightmares, flashbacks, and intrusive thoughts they reported. Reliability analyses yielded coefficient alphas of 0.86, 0.77, 0.80, 0.90, and 0.90 for scales 1 through 5, respectively. Test-retest reliability was calculated for each scale in a sample of 13 Vietnam combat veterans over a 2-week period, and produced Pearson's correlation coefficients of 0.95, 0.27, 0.97, 0.83, and 0.96 for scales 1 through 5, respectively.

PTSD Diagnostic Scale

This is a 14-item scale designed by Foy *et al.* (1984) to permit a diagnosis of PTSD based on DSM—III criteria. Scale items were derived from a 43-item symptom checklist which covered a wide range of adjustment problems and psychological symptoms (Carroll *et al.*, 1985; Foy *et al.*, 1984). The PTSD Diagnostic Scale was used to provide a continuous measure of PTSD symptom severity by summing the severity ratings of each scale item.

RESULTS

The PTSD-positive and PTSD-negative groups were compared on Premilitary Adjustment Index scores through *t* tests, which indicated no significant group differences. PTSD-positive subjects achieved a group mean score of -0.53 , and PTSD-negative subjects achieved a group mean of -1.77 , $t(58) = 1.25$, n.s. The groups were compared on the five military adjustment variables—alcohol use, drug use, number of courts martial received, number of Article 15's received, and extent of social network-based on ratings for the precombat and combat periods. Mean values and standard deviations for each of these variables are presented in Table II. As can be seen in the table, the groups differed significantly only on number of courts martial received during the combat period. This finding could be attributed to a single PTSD-negative subject who had four courts martial.

Table II. Military Adjustment Variables^a

Variable	Precombat		Combat	
	PTSD+	PTSD-	PTSD+	PTSD-
Alcohol use (1-9)				
M	2.33	3.03	4.07	4.93
SD	2.11	2.00	2.91	2.82
Drug use (1-9)				
M	1.67	2.00	5.83	4.20
SD	1.83	2.27	3.75	3.40
Number of courts martial				
M	0.03	0.13	0.10	0.43 ^b
SD	0.18	0.35	0.31	0.86
Number of Article 15's				
M	0.40	0.80	0.63	0.53
SD	0.86	1.75	1.10	1.01
Number of persons in social network				
M	1.38	1.23	1.07	0.95
SD	1.22	1.11	1.29	1.05

^aNote. *N*'s of PTSD+ and PTSD- groups = 30 each.

^b $t(58) = -2.00, p = 0.05$.

The comparison of groups was extended using one-way analyses of covariance with repeated measures (precombat and combat periods). Positive or negative PTSD diagnostic status was used as a group variable, and degree of combat exposure was analyzed as a covariate. Combat exposure was significant only for number of courts martial, $F(1, 57) = 5.34, p < 0.05$. The lack of more significant effects for the covariate was expected, given the screening criterion of a high level, and therefore narrow range, of scores on the Combat Exposure Scale ($M = 5.42, SD = 0.72, \text{range} = 4 \text{ to } 7$).

The between-groups difference in alcohol use during military service time was not significant, $F(1, 57) = 2.00, \text{n.s.}$, but both groups increased their alcohol consumption from precombat to combat periods, $F(1, 58) = 23.80, p < 0.00005$. There was no significant interaction between PTSD diagnosis and time, $F(1, 58) = 0.05, \text{n.s.}$

Analysis of drug use revealed a significant interaction between PTSD diagnosis and time, $F(1, 58) = 5.11, p < 0.05$. Because there was a significant interaction, a simple test for main effects was performed for each group. Both effects were significant. For the PTSD-positive group there was a significant increase in drug use from precombat to combat periods, $F(1, 58) = 45.8, p < 0.01$. There was also an increase for the PTSD-negative group, from prior to combat to during combat, $F(1, 58) = 12.8, p < 0.01$.

Echoing the results of the *t* tests, PTSD-negative subjects reported significantly more courts martial than PTSD-positive subjects, $F(1, 57) = 8.92, p < 0.005$. There was no change from precombat to combat, $F(1, 58) =$

Table III. Traumatic Violence Inventory Scores^a

Scale	PTSD+	PTSD-	<i>t</i> (58)
	(<i>n</i> = 30)	(<i>n</i> = 30)	
Frequency of Exposure			
M	40.97	28.53	3.85 ^b
SD	12.49	12.50	
Past distress due to participation			
M	15.87	9.30	2.45 ^c
SD	11.43	9.25	
Past distress due to observation			
M	30.23	20.87	2.68 ^c
SD	15.04	11.85	
Current distress due to participation			
M	27.30	10.27	4.27 ^b
SD	19.04	10.72	
Current distress due to observation			
M	41.83	19.53	5.47 ^b
SD	18.21	12.96	

^aNote. Scale scores range from 0 to 88.

^b $p < 0.001$.

^c $p < 0.02$.

3.88, n.s., and the interaction was not significant, $F(1, 58) = 1.57$, n.s. For number of Article 15s received, there was no difference between groups, $F(1, 57) = 0.25$, n.s., no differences from precombat to combat, $F(1, 58) = 0.01$, n.s., and no significant interaction, $F(1, 58) = 1.44$, n.s.

Finally, there was not a significant difference between groups on the number of persons in the social network, $F(1, 57) = 0.17$, n.s., but both groups reported a significant decrease in the size of the network from precombat to combat periods, $F(1, 58) = 7.55$, $p < 0.01$. The interaction effect was not significant, $F(1, 57) = 0.01$, n.s.

Traumatic Violence and PTSD

Since the PTSD-positive and PTSD-negative groups were equivalent on combat exposure scores, they were not expected to differ on exposure to traumatic violence. However, significant differences were obtained between groups on all five traumatic violence scales covering frequency of exposure and its related distress. Table III depicts group mean scores for the Traumatic Violence Inventory scales. In order to examine the influence of traumatic violence and other military variables on PTSD, five stepwise mul-

multiple regression analyses were conducted. Each of these used one of the five traumatic violence scales, combat exposure, and the five military adjustment measures as independent variables. PTSD summary score was the dependent variable in every case. In four out of five of these equations, a significant portion of the variance in PTSD summary score was explained by the regression equation, but in each case only the traumatic violence scale made a significant contribution to predicting the PTSD summary score. The multiple regression results associated with frequency of exposure to traumatic violence (Scale 1) produced $R = 0.51$, $F(1, 58) = 19.87$, $p < 0.01$. The other three equations that achieved significance produced multiple R 's ranging from 0.27 to 0.61.

DISCUSSION

The results of this study provide strong support for a residual stress model of PTSD etiology. There were no significant differences in premilitary adjustment between PTSD-positive and PTSD-negative veterans. However, even after employing samples in which combat exposure was equivalently high, PTSD-positives reported more exposure to traumatic violence. Both positive and negatives reported declines in military adjustment (increased alcohol and drug use and fewer social supports) following exposure to combat.

Using the present research criteria for assigning subjects to PTSD-positive and PTSD-negative groups made the present study methodology comparable to the two previous studies in this series conducted in this laboratory (Foy *et al.*, 1984; Carroll *et al.*, 1985). Additionally, using PTSD score as a continuous variable with a specific cutoff score to determine group assignment ensured that there was no overlap across groups on assessed PTSD intensity. This method avoids the problem of relying upon hospital chart diagnosis for which diagnostician interreliability is unknown.

The relationship observed between traumatic violence exposure and PTSD symptom severity is compatible with earlier reports highlighting the correlation between combat exposure and PTSD (Egendorf *et al.*, 1981; Figley, 1978; Foy *et al.*, 1984). These results are also consistent with several previous reports linking exposure to traumatic violence with the onset of PTSD symptoms (Futterman and Pumpian-Mindlin, 1955; Hendin *et al.*, 1984; Laufer *et al.*, 1983).

The variability in degree of traumatic violence exposure in this sample of high-combat veterans suggests that traumatic violence represents a refinement of the construct of combat exposure. Its significant relationship with PTSD in high-combat veterans, as found in this study, suggests that it should

be assessed separately when there is high combat exposure reported. While further reliability and validity work should be conducted on the new measure of traumatic violence, mental health practitioners might consider incorporating such an assessment when the veteran reports a level of combat exposure equivalent to at least "4" on the 7-point scale used by Foy *et al.* (1984). An early focus on the issue of trauma could serve to clarify directions for treatment and communicate an attitude of understanding and acceptance by the therapist, thus facilitating successful therapy.

Results of the present study also seem to provide clarification of the relationship found between military adjustment and PTSD intensity reported in our earlier work (Foy *et al.*, 1984). Specifically, the present findings of decreases in military adjustment measures after combat exposure strongly suggest that poor military adjustment is best viewed as consequential, not antecedent, to the development of combat-related PTSD.

The present study is necessarily limited by the use of retrospective self-reports, although information about most veterans' reported combat experiences was verified through available military service records. Also, the results could have been influenced by possible non-independence between measures of traumatic violence exposure and PTSD. Results do not necessarily apply to veterans who have not sought psychiatric treatment or who have done so in facilities other than V. A. medical centers. Future research is needed to determine the applicability of these findings to other veteran populations and to other kinds of trauma.

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