



Battlefield functioning and chronic PTSD: associations with perceived self efficacy and causal attribution

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Abstract

This study has two aims: (1) to examine the associations between battlefield functioning and perceived self efficacy (PSE) and attributional style; (2) to examine the unique and cumulative contributions of battlefield functioning, PSE, and attributional style to long term PTSD. The subjects were three groups of Israeli veterans of the 1973 Yom Kippur, who differed in their battlefield functioning: 112 combat stress reaction (CSR) casualties, 98 veterans who received medals for bravery, and 189 controls. The subjects filled out a series of questionnaires that assessed PTSD, PCE, attributional style and PTSD, two decades after the war. CSR casualties exhibited the lowest level of PSE, decorated veterans the highest. The three groups also differed in locus of control, with different attribution for failure. Discriminant analysis of PTSD and non-PTSD veterans showed that sociodemographic background, battlefield performance, PSE and attributional style classified 81% of all veterans correctly. The implications of these findings are discussed. © 2002 Elsevier Science Ltd. All rights reserved.

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1. Introduction

There is considerable variety in the human reaction to traumatic stress. In the short term, most persons exposed to traumatic events cope well under the threat. About 15–30% (Brewin, Andrews, Rose, & Kirk, 1999; Classen, Koopman, Hales, & Spigel, 1998; Harvey & Bryant, 1999), however, manifest acute stress reactions during or immediately after the traumatic event. Following war, these responses are termed Combat Stress Reaction (CSR, Solomon, 1993), and

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may entail any of a wide range of labile, polymorphic symptoms: restlessness, psychomotor deficiencies, withdrawal, increased sympathetic nervous system activity, stuttering, dissociation, loss of control, nausea, vomiting, paranoid responses, disorientation, and confusion (Bartemeier, 1946; Grinker & Spiegel, 1945; Solomon, 1993). Most armies define CSR as a functional disorder, identified when the soldier ceases to function militarily and acts in a manner that endangers himself and his fellow combatants (Kormos, 1978).

While CSR reflects the soldier's inability to cope with the traumatic stress and function adequately, acts of heroism represent exceptional performance under the threat. War heroes, who are decorated for bravery in recognition of their persistence in the face of fear and their self-sacrifice and leadership on the battlefield (Blake & Butler, 1976; Gal, 1987; McMillan & Rachman, 1987; Rachman, 1990), represent the other end of the spectrum.

Similar diversity in response to war stress has been recognized in the long term. While most veterans show few if any signs of emotional disturbance in the aftermath of combat, an estimated 15% may suffer from long-term adjustment difficulties, the most prevalent of which is Posttraumatic Stress Disorder (PTSD; Kulka et al., 1990; Snow, Stellman, Stellman, & Sommer, 1988). While immediate stress reactions are considered a precursor of chronic PTSD (Classen et al., 1998; Harvey & Bryant, 1998; Solomon & Kleinhaus, 1996), the long term implications of exceptional bravery have not been examined.

The diversity of response in both the short and long term raises the question of what differentiates soldiers who respond in the different ways. This study focuses on two cognitive characteristics- perceived self-efficacy and attributional style. Perceived self-efficacy refers to the individual's perception of his ability to act effectively in the face of a battle-related threat. Attributional style refers to a more global perception of the causes of events.

2. Perceived self-efficacy

Perceived self-efficacy (PSE) refers to "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). According to Bandura (1977, 1982, 1997), individuals tend to make a constant assessment of their range of capabilities to perform specific tasks under various situations. Based on these assessments, they develop beliefs regarding their competence to fulfill prospective roles effectively.

The literature is inconsistent with regard to the relationship between PSE and exposure to stress. Some reports suggest that exposure to stress reduces PSE (Stetson, Rahn, Dubbert, Wilner, & Mercury, 1997). However, there is evidence that, in and of itself, exposure to stress has no impact on the level of PSE (Saigh, Mroueh, Zimmerman, & Fairbank, 1995; Solomon, Weisenberg, Schwarzwald, & Mikulincer, 1988b), and that what matters is the individual's performance under this stress. According to Bandura (1982), successful functioning tends to increase PSE, while failure tends to decrease it. Findings by Solomon and Mikulincer (1992) on implications of wartime functioning on war-related PSE support his contention. Their findings show that 1, 2, and 3 years after a war, veterans who, during the war, had been identified as CSR casualties reported a lower level of PSE than veterans who had not sustained a CSR.

Similar inconsistency marks the study of the relationship between PSE and post-trauma adjustment. Some studies show that trauma survivors who express a high level of PSE with

regard to their performance under the threat manifest low levels of subsequent distress (Benight, Antoni, Kilbourn, & Ironson, 1997; Murphy, 1988) and PTSD (Benight et al., 1997; Regehr, Cadell, & Jansen, 1999; Saigh et al., 1995). Others, however, provide evidence suggesting that the association between PSE and PTSD is transient: while PSE is associated with short term adjustment to traumatic events, this association tends to evaporate over time (Solomon, Benbenishty, & Mikulincer, 1991a). Yet, other studies suggest that PSE and adjustment to trauma may not be closely associated. Some studies revealed that PSE and PTSD do not show simultaneous changes. Solomon and her colleagues (1992) found that an increase in PSE is not followed by improvement in PTSD; Weisenberg, Schwarzwald and Solomon (1991) found that recovery from PTSD is not associated with any change in PSE; and Ferren (1999) reported that PSE is not associated with PTSD among Bosnian and Croatian refugees.

2.1. Causal attribution

Attribution theory assumes that people strive to attain a causal understanding of the world and thus develop ‘theories’ that explain the causes of the occurrence of various events in their world. Weiner’s (1992) theory of causal attribution specifies a three-dimensional taxonomy of the causes of positive and negative events. The dimensions are locus, stability, and controllability. Locus can be external or internal. Persons who make external attributions believe that events are caused by factors external to themselves (i.e. environmental factors); those who make internal attributions perceive events as contingent on their own behavior (i.e. effort, tiredness) or characteristics (i.e. intelligence, laxness; Rotter, 1966). Stability refers to the perception that events are caused by fixed and constant factors (i.e. aptitude) or by fluctuating and variable ones (e.g. luck, weather; Weiner, 1992). Controllability refers to the perception that events caused by factors that the person can control (i.e. effort) or by factors that the person cannot control (i.e. aptitude; Weiner, 1992).

The hypothesis that persons’ functioning under threat is related to their attributional style receives indirect support from Seligman’s (1975) notion of learned helplessness. According to this theory, exposure to uncontrollable stress results in learned helplessness, which is implicated in attributing negative events to internal, stable and global causes (Abramson, Seligman, & Teasdale, 1978). While this model refers mainly to the nature of the stressor, we may hypothesize that individuals who fail to cope under a threat perceive it as uncontrollable, and tend to develop these attributions, more than those who managed to function in face of the threat or who performed exceptionally.

The association between attributional style and PTSD has received some empirical attention. The only dimension for which findings have been consistent, however, is controllability. All the available studies show that PTSD casualties tend to attribute both negative and positive events to uncontrollable factors (Falsetti & Resnick, 1995; Kushner, Riggs, Foa, & Miller, 1992; McCormick, Taber, & Kruegelbach, 1989; Mikulincer & Solomon, 1988; 1989).

The findings on locus of control and stability are mixed. Most of the studies are on locus of control. Some report that persons with PTSD are more inclined than those without PTSD to attribute both positive and negative events to external causes (Casella & Motta, 1990; Mikulincer & Solomon, 1988; Orr et al., 1990; Regehr et al., 1999; Solomon et al., 1988a); and one study, conducted among in-patient Vietnam veterans with PTSD found that external attribution

increased with the severity of their PTSD (Hyer, Boudewyns, & O'Leary, 1987). On the other hand, others found an association between PTSD and internal attribution (Falsetti & Resnick, 1995), and that PTSD sufferers attribute negative events to internal factors and positive events to external ones (McCormick et al., 1989). Finally, some studies found no association between PTSD and locus of control (Joseph, Williams, & Yule, 1992; Mikulincer, Glaubman, Wasserman, & Porat, 1989; Robinson, Sigman, & Wilson, 1997).

With regard to the dimension of stability, PTSD and symptoms of intrusion and avoidance have been found to be associated with stable attributions for negative events (Falsetti & Resnick, 1995; McCormick et al., 1989; Mikulincer & Solomon, 1988), while hyperarousal (Falsetti & Resnick, 1995) and PTSD (McCormick et al., 1989) were found to be associated with unstable attributions for positive events.

The current study examines the associations between battlefield functioning, long term PTSD, and cognitive perceptions in three groups of veterans of the 1973 Yom Kippur War: CSR casualties, soldiers decorated for heroism, and controls—soldiers who neither broke down nor received a medal.

The study has two aims: the first is to examine the associations between battlefield functioning and battle-related PSE and attributional style. The question here is whether the three groups of veterans differ in their PSE and attributional style, as measured two decades after the war. The second aim is to study the unique and cumulative contributions of battlefield functioning, PSE, and attributional style to long term emotional adjustment among the veterans, as manifested in PTSD.

3. Method

3.1. Subjects

This study examined 393 Israeli veterans of the 1973 Yom Kippur War from three groups:

Decorated veterans. 150 soldiers received medals for bravery in the 1973 Yom Kippur War. Of these, 16 were abroad at the time of the study. Of the remaining 134, 98 participated in the study, constituting a 73% response rate.

Combat Stress Reaction (CSR) casualties. The research team obtained the medical records of a treatment installation where clinicians diagnosed and treated a total of 178 CSR casualties during the Yom Kippur War. Nine of these men were out of the country at the time of the research. Of the remaining 169, 112 participated in the study, constituting a 66% response rate.

Controls. Two hundred and eighty combat veterans of the Yom Kippur War were sampled from IDF computerized data banks. Twenty were abroad at the time of the research and five were deceased. Of the remaining 255, 189 participated in the study, constituting a 74% response rate.

Examination of sociodemographic variables revealed that the groups differed in age, ethnic background, marital status, educational background, and military rank during the war (see Table 1). CSR casualties and decorated veterans were older during the war ($M=25.27$, $S.D.=3.85$; $M=26.79$, $S.D.=6.96$, respectively) than the controls ($M=22.30$, $S.D.=3.60$; $F(2,370)=30.71$; $P<0.001$). A higher proportion of the CSR casualties than of the controls and the decorated veterans originated from Asia or Africa. They also had fewer years of schooling

Table 1
Frequencies of sociodemographic variables according to battlefield functioning

	CSR casualties		Controls		Decorated veterans		
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	
<i>Ethnic background</i>							$X^2(4) = 22.11^{***}$
Israel	58	52	108	59	75	81	
Asia/Africa	47	42	63	34	12	13	
America/Europe	7	6	13	7	6	6	
<i>Marital status</i>							$X^2(2) = 35.51^{***}$
Bachelor	44	39	134	74	49	53	
Married	68	61	48	26	44	47	
<i>Education</i>							$X^2(2) = 19.70^{***}$
Less than 12 years	46	41	47	25	13	14	
12 years and more	65	59	136	75	87	86	
<i>Military rank</i>							$X^2(6) = 83.39^{***}$
Privates	88	81	116	65	31	34	
Corporals/sergeants	9	8	18	10	4	3	
1st/2nd lieutenants	10	9	41	23	36	39	
lt. col./majors	2	2	4	2	21	22	

*** $P < 0.001$.

and lower military ranks. Most of the decorated veterans were born in Israel. Most had high education and more than half were officers during the war. These background differences will be taken into account in analyzing the results.

3.2. Measures

3.2.1. Efficacy under war-threat

Efficacy under war-threat was examined by a self-report scale (Solomon, Margalit, Waysman, & Bleich, 1991b) that was elaborated for the current study. The scale consisted of seven items, asking about source of confidence under war-related threat.

Factor Analysis with Varimax Rotation yielded two factors (eigenvalue > 1), which explained 66.56% of the variance. The first factor, trust in army authorities, explained 38.33% of the variance, and included four items that tapped the degree to which the respondent trusted the various army authorities during wartime. The second factor, PSE, explained 28.23% of the variance, and included three items regarding perceived self-efficacy under war-related threat.

Internal consistency for both factors was high ($\alpha = 0.81$ for trust in army authorities; $\alpha = 0.70$ for PSE), indicating high reliability.

3.2.2. Attributional style

Attributional style was measured by an eight-item self-report questionnaire similar to that used by Arkin and Maruyama (1979), which was elaborated by Mikulincer and Solomon (1988). The

questionnaire contains two sets of four questions each, describing reasons for failure and success. For failure, the four stipulated reasons were lack of ability, lack of effort, bad luck, and the objective difficulty of the situation. For success, the four reasons were ability, good luck, effort, and low task difficulty. Subjects were asked to rate the impact of each reason for their failure and success on a four-point scale.

For both failure and success, three distinct dimensional scores were computed- Locus, Stability, and Controllability. Positive scores reflect predominantly internal, stable and controllable attributions, whereas negative scores reflect predominantly external, unstable and uncontrollable attributions. [For detailed information about the instrument's validity and computational procedure, see Mikulincer & Solomon (1988).]

To indicate that this measure does not coincide with war-related self-efficacy, a series of correlations was conducted. Four of the six attribution scores were not correlated with either trust in the army or self-efficacy, and the other two, locus of success and stability of failure, correlated only weakly with these measures, indicating that the two instruments assess distinct variables.

3.2.3. *Post traumatic stress disorder*

PTSD was measured by the PTSD Inventory (Solomon et al., 1993), a self-report scale based on DSM criteria. The questionnaire consists of 17 statements corresponding to the 17 PTSD symptoms listed in the DSM. Subjects are asked to indicate for each statement whether or not they had the symptom 'during the last month'. Based on the DSM criteria, a respondent is considered to have PTSD if he endorses at least one intrusive, three avoidant, and two arousal symptoms.

Internal consistency among the 17 items was high, and the scale was found to have high convergent validity with diagnoses made on the basis of structured clinical interviews (Solomon et al., 1993).

3.3. *Procedure*

Potential subjects were sent letters asking them to participate in the study. A few days later, the letters were followed up with a telephone call to each potential subject, to once again explain the purpose of the study and to schedule the assessments.

Subjects were seated in groups of 30–50 to fill out a battery of questionnaires. This took approximately 2 h including a short break. Prior to their filling out the questionnaires, subjects were assured that the data would remain confidential and would in no way affect their status in military or civilian life.

4. Results

4.1. *Efficacy under war-threat, attributional style, and battlefield functioning*

First, the associations of battlefield functioning with efficacy under war-threat and attributional style were examined. A series of one-way analyses of variance were conducted, with group (CSR casualties, decorated veterans, and controls) as the independent variable, and efficacy under war-threat and attributional style as the dependent variables. Table 2 presents the means and standard deviations of efficacy under war-threat and attributional style for each of the three groups.

Table 2

Means and standard deviations of war-related efficacy and attributional styles according to battlefield functioning

	CSR casualties		Controls		Decorated veterans		
	M	S.D.	M	S.D.	M	S.D.	
<i>Efficacy under war-threat</i>							
PSE	3.69	0.81	3.94	0.69	4.12	0.58	$F(2,380) = 9.91^{***}$
Trust in army authorities	3.92	0.81	3.85	0.70	3.57	0.69	$F(2,380) = 6.45^{**}$
<i>Attributional styles</i>							
Failure							
Locus	0.63	1.59	1.26	1.79	1.60	1.59	$F(2,388) = 9.04^{***}$
Stability	-0.39	1.58	-0.49	1.55	-0.31	1.24	$F(2,388) = 0.46$
Controllability	-3.11	2.17	-2.79	1.91	-2.40	1.76	$F(2,388) = 3.35^*$
Success							
Locus	3.01	1.84	3.16	1.78	3.27	1.67	$F(2,388) = 0.57$
Stability	-0.33	1.19	-0.39	1.21	-0.24	1.29	$F(2,388) = 0.50$
Controllability	-2.69	1.49	-2.99	1.38	-2.92	1.26	$F(2,388) = 1.70$

* $P < 0.05$.** $P < 0.01$.*** $P < 0.001$.

As can be seen, the three groups differ in the efficacy under war-threat measures. Duncan contrasts indicated that the decorated veterans reported higher PSE than controls, who in turn reported higher PSE than the CSR casualties. In addition, decorated veterans reported a lower level of trust in army authorities than the CSR casualties and controls.

The three groups also differ in the dimension of locus of control in their attribution for failure. Duncan contrasts indicated that the decorated veterans and controls are more inclined than the CSR casualties to attribute failure to internal factors, whereas CSR casualties are more inclined than the decorated veterans to attribute failure to uncontrollable factors. The three groups did not differ in their attributions of failure to stable causes or in any of the dimensions in their attributions of success.

4.2. Discriminant analysis

To examine the unique and cumulative contribution of battlefield functioning, efficacy under war-threat, and attributional style to the veterans' emotional adjustment, we used discriminant analysis. PTSD was the dependant variable, and 14 independent variables were entered: socio-demographic background variables (age, ethnic origin, military rank, education), battlefield functioning (since this is a discrete variable, two demi-variables were calculated: Group 1 comparing CSR casualties with decorated veterans and controls, and group 2, comparing decorated veterans with CSR casualties and controls), efficacy under war-threat (PSE, trust in army authorities), and attributional style (locus, stability, and controllability for both success and failure). Information on all 14 variables was available for 356 subjects. The discriminant analysis yielded one discriminant function, with a canonical correlation coefficient of 0.37; eigenvalue = 0.15; Wilks' lambda, 0.87; $X^2(14) = 49.49$; $P < 0.001$.

Table 3 presents the variable loadings on the discriminant function. The larger the variable loading, the more the variable contributes to the prediction of the distinction between the groups. A pooled within-groups correlation between discriminating variables and a canonical discriminant function of 0.20 constitute the threshold to be considered as a predicting variable (Tabachnick & Fidell, 1996).

As can be seen in the table, Group 1, comparing CSR casualties with decorated veterans and controls, made a substantial contribution to mental health status. Group 2, comparing decorated veterans with CSR casualties and controls, made a lower yet significant contribution to mental health status. That is, more CSR casualties than controls and more controls than decorated veterans were identified as having PTSD.

Of the pre-war sociodemographic variables, mental health status was predicted by ethnic origin, education, and military rank. That is, veterans of Eastern ethnic origin, with lower level of education, and lower military rank were more prone to PTSD than veterans from Western countries, with higher levels of education and high military ranks.

PSE made a major contribution to the prediction of mental health status: PTSD veterans had lower PSE than their non-PTSD peers. Trust in army authorities made only a minor contribution.

Table 3
Variable loadings

Discriminating variable	Standardized canonical discriminant function coefficient	Pooled within groups correlation between discriminating variables and canonical discriminant function ^a
<i>Sociodemographic background</i>		
Age	0.04	0.05
Ethnic background	−0.26	−0.41
Education	0.37	0.50
Military rank	0.05	−0.28
<i>Battlefield functioning</i>		
Group1	0.41	0.54
Group2	0.10	−0.24
<i>Efficacy under war-threat</i>		
PSE	0.37	0.49
Trust in army authorities	0.10	0.11
<i>Attributional style</i>		
Success		
Locus	0.16	0.26
Stability	0.08	0.14
Controllability	−0.09	0.06
Failure		
Locus	−0.08	0.23
Stability	0.07	−0.26
Controllability	0.58	0.56

^a The values of mental health status were 1, PTSD; 2, non-PTSD.

Four dimensions of attributional style exceeded the 0.20 threshold: locus, stability and controllability for failure and locus for success, as controllability attributed to failure made the most significant contribution. PTSD veterans tended to attribute failure to less internal, more uncontrollable, and more stable factors, and success to less internal factors than non-PTSD veterans. Stability and controllability of success did not make a significant contribution to the discriminant function.

Finally, the discriminant analysis examines the potency of correct classifications of cases to appropriate groups according to the predictors. As can be seen in Table 4, the discriminant function classifies 81% of all veterans correctly—73% of the PTSD veterans and 81% of the non-PTSD veterans.

5. Discussion

The first aim of this study was to examine the associations of battlefield functioning with PSE and attributional style. As hypothesized, battlefield functioning was found to be related to PSE. CSR casualties exhibited the lowest level of PSE, and decorated veterans the highest. The three groups also differed in locus of control with respect to their attributions for failure: the CSR casualties were less inclined than the decorated veterans and controls to attribute failure to internal factors, and more inclined than the decorated veterans to attribute failure to uncontrollable factors.

The associations between PSE, attributional style and battlefield functioning may have any of three different directions of influence: the first is that battlefield functioning affects PSE and attributional style; this explanation views PSE and attributional patterns as stemming from the way in which the individual deals with the event. It views exceptional performance as increasing PSE and augmenting the tendency to attribute failure to internal and controllable factors, and failure to perform as decreasing PSE and these attributional tendencies.

The second possibility is that the quality of battlefield functioning stems from PSE and attributional style. This interpretation views combatants with low PSE as more susceptible to CSR than their high PSE peers. It suggests that low PSE contributes to high anxiety and hence poor functioning on the battlefield, while high PSE inclines combatants to fulfill their self-perception in acts of heroism.

The third possibility is that battlefield functioning and PSE and attributional style have reciprocal impacts: low PSE increases vulnerability to CSR, which in turn reduces PSE, while high

Table 4
Classification results^a

Actual Group	N	Predicted group membership	
		PTSD	Non-PTSD
PTSD	22	16 (72.7%)	6 (27.3%)
Non-PTSD	334	63 (18.9%)	271 (81.1%)

^a Per cent of grouped cases correctly classified = 80.6%.

PSE increases the likelihood of heroic action, which in turn increases the veteran's PSE. The reciprocal pattern is consistent with Bandura's (1997) concept that PSE is not only an outcome of experience, but also affects future experiences, by influencing motivation, thought processes, affective states, and actions.

The finding that CSR casualties tend to attribute failure to external and uncontrollable causes seems inconsistent with their low PSE. Their low PSE means that the casualties doubt that they will be able to function adequately under a similar war-related threat in the future, and suggests that the sense of helplessness and powerlessness that has been associated with CSR (Solomon, 1993) is deeply imprinted on the casualty's psyches for a long time afterwards. On the face of it, one would expect veterans with such self-perceptions to attribute failure to internal and controllable deficiencies. The seeming discrepancy may be accounted for in either of two ways: one is that the sense of personal responsibility for the wartime breakdown that is reflected in the CSR casualty's low PSE is not generalized to other experiences. The other is that the casualties' external attribution reflects their efforts to deny responsibility for their breakdowns.

In contrast to the CSR casualties, the decorated veterans seem to be more inclined to take responsibility both under war threat and in general. This tendency was observed in their tendency to attribute failure to internal and controllable factors, as well as in their high sense of PSE and their distrust in the efficiency of the army authorities under war-threat. Again, these perceptions may precede their battlefield exceptional functioning, and enable their acts. An act of heroism means that a person takes responsibility and acts in a manner that changes the situation. The initiation of these exceptional actions may reflect the person's belief that he can do things that other people may not be able to do. This notion received indirect support by a previous study that found decorated war veterans to be high sensation seekers, who tend to look for novel and non conventional experiences (Neria, Solomon, Ginzburg, & Dekel, 2000). Alternatively, these cognitions may be a generalization of their specific war experience, as the experience of heroism may imprint these perceptions in the decorated veterans.

The second aim of the study was to assess the unique and cumulative contributions of battlefield functioning, PSE, and attributional style to chronic PTSD. Cognitive perspectives of PTSD stress the importance of the trauma victim's perceptions of the trauma, of himself and of the world, for his adjustment. According to these views, cognitive and emotional processing of the trauma and its implications that result in negative appraisals, lead to a persistent sense of threat and generalized negative perception of oneself and the world (Brewin, Dalgleish, & Joseph, 1996; Dunmore, Clark, & Ehlers, 2001; Ehlers & Clark, 2000; Janoff-Bulman, 1992). The negative emotions that arise from these appraisals may disturb the cognitive processing that is needed to integrate the trauma memories into the individual's autobiographical memories, thus preventing the successful completion of the working through, which may lead to chronic PTSD (Brewin et al., 1996; Ehlers & Clark, 2000).

The findings of the current study are consistent with these suggestions. Both PSE and attributional style were associated with long term PTSD. PTSD veterans had lower PSE than their non-PTSD peers. These findings are consistent with previous findings (Benight et al., 1997; Regehr et al., 1999; Saigh et al., 1995). The low level of PSE among PTSD veterans may be related to various characteristics of the PTSD. It may be related to the loss of control over one's inner experiences and responses that is implicit in the intrusive symptoms and overwhelming anxiety that are part of the syndrome. It may also be related to the reduced level of functioning of the PTSD

veterans. The literature has consistently documented these veterans' adjustment difficulties, manifested, for example in decreased sexual, social, and vocational functioning (Solomon, 1993). Given such difficulties, veterans may doubt their ability to function under a subsequent war threat.

Findings also showed that PTSD veterans had different attributional styles than their non-PTSD peers. Namely, PTSD veterans were more inclined to attribute both failure and success to external factors than non-PTSD veterans, and more inclined to attribute failure to uncontrollable and stable factors as well. The tendency of PTSD veterans to make external attributions has been found in previous studies (Casella & Motta, 1990; Mikulincer & Solomon, 1988; Orr et al., 1990; Regehr et al., 1999; Solomon et al., 1988a). Mikulincer and Solomon (1988) suggest that such external attribution points to a global factor in the attributional style of PTSD veterans, namely the externalization of responsibility for both negative and positive events. This suggestion gains support from the finding that PTSD veterans tend to attribute negative events to uncontrollable factors.

Various authors suggest that attributional style is associated with emotional and cognitive reactions. Weiner (1992) suggests that internal attributions for success tend to increase self-esteem, while attributing success to external factors prevent individuals from enhancing self-esteem following positive events. It has also been suggested that attribution of failure to uncontrollable factors leads to deep feelings of shame (Weiner, 1992) and helplessness (Maier & Seligman, 1976), and that the attribution of stability to the causes of negative events fosters feelings of helplessness and hopelessness (Weiner, 1992). These reactions have consistently been shown to be associated with PTSD: findings show that PTSD casualties suffer from reduced self-esteem, and heightened shame, helplessness, and hopelessness (e.g. Brewin, Andrews, & Rose, 2000; Wong & Cook, 1992). In fact, pessimism regarding the future is part of the DSM-IV (APA, 1994) criteria for PTSD, and shame is one of the most prevalent associated features.

Long-term PTSD was found to be associated with battlefield functioning. Significantly more CSR casualties than controls and significantly more controls than decorated veterans were identified as having PTSD two decades after the war. While the association between wartime CSR and long-term adjustment has been amply documented (Solomon, 1993), the relationship between heroism and long-term adjustment has not been studied to date. The current findings indicate that exceptional functioning on the battlefield is also implicated in long-term adjustment. The better adjustment of the decorated heroes may reflect much the same resilience to the stresses of war that enabled them to act heroically in the first place. Concomitantly, it may reflect the impact of their outstanding performance, and the public recognition they received for it, which seems to have provided these veterans with a protective shield from the detrimental impact of exposure to war stress.

Both battlefield performance and PTSD were associated with sociodemographic background: the CSR and PTSD veterans had less schooling than the decorated veterans and higher percentages of them were of eastern ethnic origin. These findings are consistent with other reports showing that sociodemographic background, and especially level of education, is related to adjustment in general (Ross & Van Willigen, 1997) and following stress in particular (Neria, Solomon, & Dekel, 1998; Strober, 1994).

The salutogenic power of education may derive from several non-exclusive factors. First, the key qualities that are needed for a formal education (e.g. motivation, persistence) may also

promote coping. Second, education may help to develop qualities that are important in coping and adjustment. Such qualities may include, for example, sense of coherence (Antonovsky, 1987) and self-esteem (Solomon, 1993), both of which have repeatedly linked to education and adjustment. Finally, education may promote adjustment by helping persons exposed to stress to recruit and channel resources, such as formal support.

Alternatively, it may be that the association between background and long-term adjustment may reflect differences in ways of reporting distress rather than differences in the level of distress. It may be that veterans of lower socioeconomic status tend to report more adjustment difficulties than their higher socioeconomic peers both during and after battle. Studies show that cultural differences may explain differences in defining problems, attitudes regarding factors that cause problems, and patterns of help seeking (e.g. Acevedo, 2000; Yamashiro & Matsuoka, 1997).

This study examined a wide spectrum of human functioning under stress, from the failure to function, through normative performance, and up to exceptional performance. The stress literature tends to focus on either normative fulfillment or failure to fulfill tasks under stress, and opportunities to operationalize and study exceptional performances are rare. The findings of the study point to the significant role of cognitive factors in immediate functioning and long-term adjustment to war-stress. Unfortunately, since the study was conducted after the war, causal directions cannot be determined. Further research is needed to refine our understanding of the reciprocal relations between cognitive perception, performance under traumatogenic stress, and long term adjustment.

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