

# Posttraumatic Intrusion, Avoidance, and Social Functioning: A 20-Year Longitudinal Study

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The study assesses posttraumatic intrusion, avoidance, and social functioning among 214 Israeli combat veterans from the first Lebanon War with and without combat stress reaction (CSR) 1, 2, 3, and 20 years after the war. CSR veterans reported higher intrusion and avoidance than did non-CSR veterans. With time, there was a decline in these symptoms. In addition, intrusion and avoidance were associated with problems in social functioning on a given year, and they longitudinally predicted social dysfunction 2, 3, and 20 years after the war. CSR veterans presented stronger temporal covariations between intrusion–avoidance and social functioning. The findings suggest that CSR is a marker for future psychopathology and point to the role of avoidance in social dysfunction.

*Keywords:* PTSD, social dysfunction, military psychiatry, epidemiology, war

Whereas there is considerable evidence for the pathogenic effects of war (Hoge et al., 2004; Magruder et al., 2004), the evidence regarding the longitudinal effects of war is somewhat less consistent (Solomon, 1993). Some studies have documented elevated rates of distress in the period immediately following trauma, followed by rates that decrease gradually with time (e.g., Schnurr, Lunney, Sengupta, & Waelde, 2003; Solomon, 1993). Other studies have found, however, increasing PTSD levels that became chronic (e.g., Bremner, Southwick, Darnell, & Charney, 1996), particularly among aging survivors. Furthermore, elevated levels of both reactivated and delayed-onset posttraumatic stress disorder (PTSD) were observed among elderly participants who had been exposed to a remote trauma (e.g., Op den Velde et al., 1993). Others have observed a fluctuating course, with symptoms waxing and waning (e.g., Hyer, Summers, Braswell, & Boyd, 1995; Port, Engdahl, & Frazier, 2001). Recently, it has been suggested that an interplay between trauma and developmental stage and age may lead to a course of disease in a U-shaped curve with increased level of PTSD immediately after the trauma, followed by a decrease during the time individuals are engaged in raising families and pursuing a career, which is then followed by an increase in PTSD during midlife and old age (McLeod, 1994; Port et al., 2001).

Most longitudinal studies on PTSD have limited applicability to understanding middle-age or older survivors of remote trauma because study samples were relatively young, the time period covered relatively short, or the trauma relatively recent. Furthermore, many of these studies have used a retrospective or a combination of a prospective and a retrospective design (e.g., Op den Velde et al., 1993). Despite the large numbers of surviving veter-

ans of the numerous large-scale wars and armed conflicts of the 20th century, information about PTSD symptoms in the years and decades following these events is minimal. Therefore, most of our knowledge is based on important yet limited case reports (e.g., Cavenar & Nash, 1976), several large-scale retrospective studies (e.g., Port et al., 2001), and a few systematic longitudinal studies (e.g., Orcutt, Erickson, & Wolfe, 2004). These studies are inconclusive and leave many questions unanswered.

Within the course of PTSD, little understood are the changes in the symptom composition. According to the *Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition (DSM-IV;* American Psychiatric Association, 1994), the relative weight of the clusters of PTSD—intrusion, avoidance, and hyperarousal symptoms—changes over time. A more specific scenario is outlined by Horowitz (1982), who suggested that the psychological sequelae of trauma could be summarized in two major intrapsychic manifestations: intrusion and avoidance. *Intrusion* refers to the penetration into consciousness of thoughts, images, feelings, and nightmares about the trauma and to a variety of repetitive behaviors. *Avoidance* reflects the tendencies of psychic numbing, conscious denial of meaning and consequences of the trauma, behavioral inhibition, and counterphobic activities related to the traumatic event. Intrusion is generally the initial phase, followed by avoidance (Horowitz, 1982). Intrusion and avoidance may then alternate in the course of the posttraumatic period, according to the individual's idiosyncratic pattern, until working through occurs (Horowitz, 1982). In recent reviews of studies that used the Impact of Event Scale (IES) to assess the residues of trauma, Sundin and Horowitz (2002, 2003) concluded that the results of 20 prospective studies of survivors of various traumatic events reveal a gradual decline in both intrusion and avoidance with time. At the same time, other studies have reported increased intrusion and avoidance even many years after the trauma (e.g., Op den Velde et al., 1993).

A prospective study (Orcutt et al., 2004) that assessed a large sample of veterans of the Gulf War suggested that the course of PTSD follows two different paths reflecting individual differences. The first was observed among veterans who had initially displayed

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low levels of distress and subsequently revealed moderate increase with time. The second was observed among veterans who had initially manifested considerable distress and is characterized by a significant increase of PTSD with time. Several prospective studies provide some empirical support for this contention. McFarlane (2000) suggested that the course of disease differs and corresponds to the severity of initial symptoms. In clinical populations PTSD tends to be stable, yet in nonclinical populations with initial low distress, a decline in both intrusion and avoidance but not in hyperarousal is expected.

Casualties of *combat stress reaction* (CSR), a condition that results from psychological breakdown on the battlefield, make up one of the most interesting yet rarely studied clinical populations in this regard. CSR consists of various polymorphic and labile psychiatric and somatic symptoms and is diagnosed on the basis of impaired functioning by trained clinicians. Among the symptoms that may characterize this condition are paralyzing fear of death, emotional and physical numbness, withdrawal, severe depression, and impaired combat functioning (Solomon, 1993). A 3-year follow-up of two groups of Israeli veterans, with and without antecedent CSR, assessed changes in PTSD and IES scores (Solomon, 1989a). Results showed that CSR casualties endorsed significantly more intrusion and avoidance than did comparable veterans without CSR. The longitudinal data indicated that in both groups the level of distress declined with time. PTSD rates in the CSR group were 56% in the 1st year, 59% in the 2nd year, and 43% in the 3rd year and 16%, 19%, and 9%, respectively, in a matched control group of combatants without CSR (Solomon, 1993). In addition, time had a differential effect on the composition of the long-term consequences of war in the two study groups, with non-CSRs displaying a less stable symptom pattern in which intrusion and avoidance alternate as the more salient symptom. Whereas intrusion was higher than avoidance 1 year after the war, avoidance was the more salient symptom 2 and 3 years after the war. The change in salience of intrusion and avoidance is consistent with Horowitz's (1982) contention that intrusion and avoidance tend to oscillate in alternating phases. It is also consistent with Horowitz, Wilner, and Alvarez's (1979) observation that intrusion is the more dominant reaction shortly after the traumatic event, but as time passes, working through reduces the intensity of intrusive distress and allows greater utilization of avoidance responses. Similarly, other studies (e.g., McFarlane, 1990, 1992; North, 2001) also found that with time, avoidance and psychic numbing become more salient whereas intrusion tends to weaken. The variation in the nonclinical but not in the clinical group is not explained by Horowitz's (1982) formulation.

More recently, after the introduction of acute stress disorder (ASD) to the *DSM-IV*, claims have been made that there is a need to distinguish, as Solomon, Mikulincer, and Benbenishty (1989) have done, between individuals who had exhibited an initial stress reaction and those who initially appeared to be unaffected. It is not yet clear whether CSR is a specific variant of ASD. On one hand, there are some parallel symptoms observed in both conditions (e.g., dissociation). On the other hand, because of the polymorphic and labile nature of CSR, it cannot be defined as a disorder. Also, its definition refers specifically to the dysfunction on the battlefield and therefore may not apply to other types of trauma. One of the aims of this study was to assess changes in intrusion and avoidance in veterans with and without CSR over 20 years.

PTSD, like most psychiatric disorders, creates in its wake problems in daily functioning. Veterans who are bombarded by or frantically warding off intrusive reminders of their war experiences have little energy or peace of mind left to meet the demands of daily life effectively. Studies that assessed the consequences of combat and other traumas on social functioning found considerable impairment in both work (e.g., Rubel, 1990) and intimate relationships (e.g., Riggs, Byrne, Weathers, & Litz, 1998). In addition, some studies found a connection between specific post-traumatic symptoms and problems in functioning. Rubel (1990), for example, found a relationship between avoidance/numbing of responsiveness and social adjustment difficulties. In another study (Davis, Petretic-Johnson, & Ting, 2001), both defensive avoidance and intrusive experiences were significant predictors of fear of intimacy. Finally, North et al. (1999) reported that avoidance and numbing symptoms were associated with functional impairment. However, intrusive reexperience and hyperarousal symptoms were generally unassociated with impairment in functioning.

The implications of intrusion and avoidance in functioning are of considerable clinical importance for millions of veterans around the world who had experienced war trauma in their youth during the numerous wars of the 20th century, as well as for others who have experienced remote trauma. These posttraumatic symptoms affect these individuals' quality of life, as well as the well-being of the people who surround them. This study focuses on two questions: (a) Are there differences between CSR and non-CSR veterans in intrusion, avoidance, and social functioning symptoms over a 20-year period? (This pertains to the question of whether CSR has long-lasting consequences or is a transient condition.) and (b) What is the relative contribution of intrusion and avoidance to problems in social functioning over 20 years, and is this contribution different among the CSR and non-CSR populations?

## Method

### *Participants*

Two groups of male veterans participated in this study. The CSR participants were Israeli soldiers who fought in the 1982 Lebanon War and had been identified by military mental health personnel as psychiatric casualties. Criteria for inclusion in this group were (a) participation in frontline battles during the war, (b) a referral for psychiatric intervention made by the soldier's battalion surgeon during the war, (c) a diagnosis of CSR made on the battlefield by clinicians trained and experienced in the diagnosis of combat-related reactions, and (d) no indication in the clinician's report of serious physical injury and/or other psychiatric disorders. The research staff determined eligibility by using records of clinicians' diagnoses made on the battlefield.

The control group consisted of soldiers who had participated in combat in the same units as the CSR group but were not identified as having CSR. Control participants were matched with the CSR group for age, education, military rank, and assignment. Although it is difficult to control for the subjective stressfulness of any combat experience, this sampling procedure was chosen to ensure that soldiers in both groups were exposed to a similar amount and type of objective stress. All the soldiers in the CSR and control groups underwent stringent physical and psychiatric screening before commencing their military service, and no indication of

diagnosable premorbid symptomatology was recorded in their medical files.

Participants were assessed at four points of time: 1 (Year 1, 1983), 2 (Year 2, 1984), 3 (Year 3, 1985), and 20 (Year 20, 2002) years after the Lebanon War. The data in this study are based on the responses of participants who participated in all four assessments. The complete four-wave measurement data set includes 131 CSR casualties and 83 control participants, representing 71% of those who responded at Times 1–3.

Soldiers' ages in 1983 (first wave of measurement) ranged between 18 and 37 years old ( $M = 25.81$ ,  $SD = 4.72$ ,  $Mdn = 26$ ). Sixteen percent of the participants had completed only eighth grade, 27% had at most some high school, 39% had completed only high school, and 18% had studied beyond high school. Control participants and CSR veterans did not significantly differ in age, education, military rank, and assignment.

The attrition rate may raise doubts about the unbiased nature of the sample. However, high attrition is a common and well-recognized problem in prospective studies. Furthermore, data retrieved from official military records and from the questionnaires filled out at Year 1 revealed that veterans who participated at all four points in time did not significantly differ from those who declined to participate at Times 2, 3, or 4 in sociodemographic and military background, premilitary adjustment, intelligence, or mental and somatic health 1 year after the war.

### Measures

**IES.** The IES (Horowitz et al., 1979) purports to assess the emotional sequela of extreme stress. For purposes of the present study, the IES was translated into Hebrew by three highly experienced bilingual psychologists and adapted for war experiences (Schwartzwald, Solomon, Weisenberg, & Mikulincer, 1987). As already noted, the PTSD diagnosis includes three major symptom criteria: intrusion, avoidance, and hyperarousal (American Psychiatric Association, 1994). The IES assesses intrusion and avoidance but not hyperarousal. On the basis of a factor analysis, two factor scores were calculated representing the Intrusion and Avoidance scales. The scale consists of 15 items, 7 of which measure intrusive symptoms (intrusive thoughts, nightmares, intrusive feelings, and imagery) and 8 of which tap avoidance symptoms (numbing of responsiveness; avoidance of feelings, situations, and ideas). Combined, they provide a total subjective distress score. Although the avoidance symptoms include both avoidance tendencies and emotional numbing, we adopted Horowitz's (1976) formulation, in which both symptoms are together called avoidance. The respondent is asked to indicate on a 4-point scale ranging from 1 (*not at all*) to 4 (*very often*) how frequently he or she has experienced each reaction during the previous week (see Schwartzwald et al., 1987, for scale items, reliability, validity, scoring procedure, and scale structure). Following Horowitz et al. (1979), we computed mean scores for intrusion and avoidance items by assigning the following weights to each item: 0 (*not at all*) and 1, 3, and 5 (*rarely*, *sometimes*, and *often*) for the three degrees of positive endorsement. High test-retest reliability was found for the IES on previous measurements (Solomon & Mikulincer, 1988). In this study, Cronbach's alpha coefficients were high for both avoidance (ranging from .82 to .89) and intrusion (from .85 to .95) across the four waves of measurement.

**Social functioning.** Problems in social functioning were measured by a 29-item self-report questionnaire. This is an expanded version of a questionnaire developed by Solomon (1989b). The questionnaire assesses problems in five areas of social functioning: (a) work performance (seven items; e.g., "During the last year, I sometimes had difficulties at work which I did not have before"), (b) family functioning (four items; e.g., "During the last year, I talked to my family less than I used to before"), (c) sexual functioning (one item; "During the last year, there has been a reduction in my sexual functioning"), (d) social functioning and interpersonal relations (nine items; e.g., "During the last year, I spent less time with friends"), and (e) social independence (eight items, e.g., "During the last year, I have been more dependent upon other people"). Participants were asked to read each item and to indicate on a dichotomous scale (1 = *true*, 0 = *not true*) whether they had experienced the problem mentioned during the last year. The previous version of the questionnaire was found to have good psychometric properties (Solomon, 1989b). In the present study, Cronbach's alpha coefficients ranged between .88 and .91 across the four waves of measurement.

### Procedure

One, 2, and 3 years following their participation in the 1982 Lebanon War, participants were asked to report to the headquarters of the surgeon general to take part in this study. Participants filled out a battery of questionnaires in small groups. Twenty years after the war, data were collected at the veterans' homes. Participants' informed consent was obtained, and they were informed that the data would remain confidential and in no way influence their status in military or civilian life. Approval was obtained by both the Israel Defense Forces and Tel Aviv University human use committees.

## Results

### *Long-Term Effects of CSR on Posttraumatic Responses and Social Functioning*

In this part of the study, we examined differences between the study groups (CSR, non-CSR) in IES scores (Intrusion, Avoidance) and problems in social functioning across the four waves of measurement. For this purpose, we conducted two-way analyses of variance (ANOVAs) for study group (CSR, non-CSR) and time of measurement (1, 2, 3, and 20 years after the war), with time as a within-subject repeated factor. Table 1 presents the relevant means and standard deviations for these analyses.

**IES scores.** The ANOVA conducted on the IES Intrusion score yielded significant main effects for study group,  $F(1, 206) = 85.71$ ,  $p < .01$ ,  $\eta^2 = .21$ , and time of measurement,  $F(3, 618) = 53.55$ ,  $p < .01$ ,  $\eta^2 = .11$ . As seen in Table 1, veterans who had had a CSR reported higher posttraumatic Intrusion responses across the four times of measurement ( $M = 2.02$ ) than did those in the non-CSR group ( $M = 0.74$ ). In addition, Scheffé tests for repeated measures revealed that the level of posttraumatic Intrusion responses gradually decreased with the passage of time from war ( $M = 1.97$  for Year 1,  $M = 1.68$  for Year 2,  $M = 1.48$  for Year 3, and  $M = 0.96$  for Year 20).

The two main effects were qualified by a significant interaction for study group and time of measurement,  $F(3, 618) =$

Table 1  
Means and Standard Deviations on IES Scores and Problems in Social Functioning According to Study Group and Time of Measurement

Variable	CSR ( <i>n</i> = 131)		Non-CSR ( <i>n</i> = 83)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
IES Intrusion				
Year 1	2.57	1.45	1.04	0.93
Year 2	2.23	1.38	0.79	0.90
Year 3	2.03	1.41	0.61	0.87
Year 20	1.24	1.19	0.52	0.94
IES Avoidance				
Year 1	1.70	1.15	0.97	0.92
Year 2	1.66	1.16	0.76	0.97
Year 3	1.59	1.15	0.73	0.86
Year 20	0.68	0.88	0.43	0.86
Problems in social functioning				
Year 1	8.36	6.02	3.06	3.90
Year 2	7.99	6.11	3.75	4.70
Year 3	7.94	5.49	3.63	3.98
Year 20	5.45	5.09	2.90	4.33

Note. IES = Impact of Event Scale; CSR = combat stress reaction.

9.69,  $p < .01$ ,  $\eta^2 = .03$ . A test for simple main effects examining the source of the significant interaction revealed the following pattern of differences: In the CSR group, we found a significant healing effect of time on posttraumatic Intrusion responses,  $F(3, 618) = 47.88$ ,  $p < .01$ ,  $\eta^2 = .12$  (see means in Table 1). However, this effect was not significant in the non-CSR group,  $F(3, 618) = 2.12$ ,  $\eta^2 = .01$ . As seen in Table 1, although IES Intrusion scores decreased with the passage of time in the two study groups, the changes were more dramatic in the CSR than non-CSR group. Accordingly, the difference between the CSR and non-CSR groups in posttraumatic Intrusion responses was smaller 20 years after war, though still significant,  $F(1, 206) = 21.04$ ,  $p < .01$ ,  $\eta^2 = .09$ , than during the 1st postwar year (see means in Table 1).

The ANOVA conducted on the IES Avoidance scores also yielded significant main effects for study group,  $F(1, 206) = 38.69$ ,  $p < .01$ ,  $\eta^2 = .09$ , and time of measurement,  $F(3, 618) = 29.55$ ,  $p < .01$ ,  $\eta^2 = .09$ . Veterans in the CSR group reported higher posttraumatic Avoidance responses across the four times of measurement ( $M = 1.41$ ) than did those in the non-CSR group ( $M = 0.72$ ). In addition, Scheffé tests indicated that whereas the IES Avoidance score did not significantly differ 1, 2, and 3 years after war ( $M = 1.42$  for Year 1,  $M = 1.31$  for Year 2, and  $M = 1.25$  for Year 3), it decreased significantly 20 years after war ( $M = 0.59$  for Year 20).

The ANOVA also revealed a significant interaction for study group and time of measurement,  $F(3, 618) = 7.32$ ,  $p < .01$ ,  $\eta^2 = .03$ , on Avoidance scores. A test for simple main effects examining the source of the significant interaction revealed that the decrease in posttraumatic Avoidance responses 20 years after war was significant in the CSR group,  $F(3, 618) = 42.26$ ,  $p < .01$ ,  $\eta^2 = .13$  (see means in Table 1). However, this effect was not significant in the non-CSR group,  $F(3, 618) = 2.74$ ,  $\eta^2 = .02$ . Although IES Avoidance scores decreased with the passage of time in the two

study groups, the changes were more dramatic in the CSR than non-CSR group (see means in Table 1). Accordingly, the difference between the CSR and non-CSR groups in posttraumatic Avoidance decreased with the passage of time: Whereas this difference was significant 1, 2, and 3 years after war ( $F$ s of 23.10, 34.02, 33.08;  $p$ s  $< .01$ ), it was not significant anymore 20 years after war,  $F(1, 206) = 3.55$ ,  $\eta^2 = .02$  (see means in Table 1).

*Social functioning.* The ANOVA conducted on problems in social functioning yielded significant main effects for study group,  $F(1, 206) = 48.55$ ,  $p < .01$ ,  $\eta^2 = .14$ , and time of measurement,  $F(3, 618) = 13.63$ ,  $p < .01$ ,  $\eta^2 = .05$ . As seen in Table 1, CSR veterans reported more problems in social functioning across the four times of measurement ( $M = 7.44$ ) than did those in the non-CSR group ( $M = 3.33$ ). Scheffé tests for repeated measures revealed the following differences: Whereas the number of problems in social functioning did not differ significantly over time 1, 2, and 3 years after war ( $M = 6.32$  for Year 1,  $M = 6.36$  for Year 2, and  $M = 6.28$  for Year 3), the report of these problems significantly decreased 20 years after war ( $M = 4.47$  for Year 20).

The interaction for study group and time of measurement was also significant,  $F(3, 618) = 4.88$ ,  $p < .01$ ,  $\eta^2 = .02$ . A test for simple main effects examining the source of the significant interaction revealed the following differences: In the CSR group, we found a significant decrease in the number of reported problems in social functioning 20 years after war,  $F(3, 618) = 15.10$ ,  $p < .01$ ,  $\eta^2 = .09$  (see means in Table 1). However, this effect was not significant in the non-CSR group,  $F(3, 618) = 1.41$ ,  $\eta^2 = .01$ . As seen in Table 1, although the report of problems in social functioning decreased 20 years after war in the two study groups, this decrease was more dramatic in the CSR than non-CSR group. Accordingly, the difference between the CSR and non-CSR groups in the number of reported problems in social functioning was smaller 20 years after war, though still significant,  $F(1, 206) = 13.84$ ,  $p < .01$ ,  $\eta^2 = .06$ , than during the 1st, 2nd, and 3rd postwar years (see means in Table 1).

#### *Intraindividual Covariation of Posttraumatic Responses and Social Functioning*

In this section, we examined (a) whether a veteran's report of problems in social functioning on a given time of measurement was significantly associated with his own concurrent report of posttraumatic responses (intrusion, avoidance) and (b) whether the strength of this association was different in CSR and non-CSR groups. Specifically, we examined the main and interactive effects of IES scores on a given point of time and study group (CSR, non-CSR) on reports of problems in social functioning at the same time of measurement. Because these variables reside at two levels, between participants (study group) and within participants (IES scores, problems in social functioning), their associations were examined with hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992).

At the lower of the two levels, we included variations in IES scores and problems in social functioning across the four times of measurement; variables nested within individuals. At the upper level of the two-level model, we included a dummy variable contrasting CSR (1) versus non-CSR (-1) veterans. In HLM, the two levels of the analysis are addressed simultaneously in a hierarchically nested data set, which in our case nested IES and social



functioning scores within persons. This procedure provides independent coefficients for the associations among constructs at the lower level (e.g., within-person associations between IES scores and social functioning on a given year) and models them at the upper level (between-persons effects of CSR occurrence) with the use of maximum-likelihood estimation.

The lower level analysis predicted, for example, the amount of reported problems in social functioning on a specific year from the IES Intrusion and Avoidance scores the same year using the following equation:

$$SF_{ij} = b_{0j} + b_{1j}INT_{ij} + b_{2j}AVO_{ij} + e_{ij}, \quad (1)$$

where  $SF_{ij}$  refers to an individual's report of problems in social functioning on a given year (i.e., the  $i$ th year for the  $j$ th participant);  $b_{0j}$  refers to that individual's average problems in social functioning across all the assessment years;  $INT_{ij}$  and  $AVO_{ij}$  refer to the reports of intrusion and avoidance by that individual on the same year,  $b_{1j}$  and  $b_{2j}$  are regression coefficients indicating the degree of change in problems of social functioning on a given year produced by a one-unit change in intrusion and avoidance within the individual, and  $e_{ij}$  is error.

In examining person-level (upper-level) effects, we computed constant ( $b_{0j}$ ) and slope terms ( $b_{1j}$ ,  $b_{2j}$ ) for each participant. The constant term (or intercept) for each participant,  $b_{0j}$ , is represented as

$$b_{0j} = a_0 + a_1CSR_j + u_{0j}, \quad (2)$$

where  $a_0$  refers to the sample-wide mean of problems in social functioning across all the assessment years,  $CSR_j$  is a participant's CSR status (yes, no),  $a_1$  is the regression coefficient indicating the degree of change in a participant's mean of problems in social functioning (across all the assessment years) produced by a one-unit change in that person's CSR status, and  $u_{0j}$  is error.

The slope of the association between IES Intrusion and problems in social functioning on a given year for each participant,  $b_{1j}$ , is

$$b_{1j} = c_0 + c_1CSR_j + u_{2j}, \quad (3)$$

where  $c_0$  represents the average contribution of IES Intrusion on a given year to problems in social functioning the same year for the entire sample,  $CSR_j$  is a participant's CSR status,  $c_1$  is the regression coefficient indicating the degree of change in the slope of the association between IES Intrusion and social functioning on a given year produced by a one-unit change in CSR status, and  $u_{2j}$  is error.

The slope of the association between IES Avoidance and problems in social functioning on a given year for each participant,  $b_{2j}$ , is

$$b_{2j} = d_0 + d_1CSR_j + u_{3j}, \quad (4)$$

where  $d_0$  represents the average contribution of IES avoidance on a given year to problems in social functioning the same year for the entire sample,  $CSR_j$  is a participant's CSR status,  $d_1$  is the regression coefficient indicating the degree of change in the slope of the association between IES avoidance and social functioning on a given year produced by a one-unit change in CSR status, and  $u_{3j}$  is error.

These equations allowed us to answer the main study questions concerning the contribution of CSR and IES scores to reports of problems in social functioning across the four waves of measurement. The lower level question, "Did IES Intrusion and IES

Avoidance scores on a given year make a unique contribution to reports of problems in social functioning the same year within a participant?", was assessed by the sample-average slopes,  $c_0$  and  $d_0$ , from Equations 3 and 4. The person-level question, "Did participants' CSR status make unique contributions to their average reports of problems in social functioning across the entire assessment period?", was assessed by the intercept term,  $a_1$ , from Equation 2. A third question was asked about the interaction between upper and lower levels: "Did the association between IES scores on a given year and problems in social functioning the same year vary in magnitude as a function of a participant's CSR status?" The terms  $c_1$  and  $d_1$  in Equations 3 and 4 provided the answer to this question. These terms reflect the interactions between CSR status and IES scores on a given year as predictors of problems in social functioning the same year.

The HLM analysis revealed significant lower level effects for the two IES scores on a given year to the report of problems in social functioning the same year ( $b = .16, p < .05$  for Intrusion;  $b = .26, p < .01$  for Avoidance). The higher the Intrusion or Avoidance scores on a given year, the higher the number of reported problems in social functioning the same year. As already observed in the previously reported ANOVAs, CSR status had a significant effect on the report of problems in social functioning across the entire assessment period ( $b = .44, p < .01$ ). CSR status also significantly moderated the intraindividual association between IES Intrusion and problems in social functioning on a given year ( $b = .18, p < .05$ ). Using Aiken and West's (1991) procedure, we found that the IES Intrusion score on a given year was significantly associated with more problems in social functioning the same year among CSR veterans ( $b = .34, p < .01$ ) but not among non-CSR veterans ( $b = -.02$ ). Finally, the HLM analysis revealed that CSR status did not significantly affect the intraindividual association between IES Avoidance and problems in social functioning on a given year ( $b = .01$ ). In other words, IES Avoidance score on a given year was significantly associated with more problems in social functioning the same year among both CSR and non-CSR veterans ( $bs$  of .27 and .25; both  $ps < .01$ ).<sup>1</sup>

### *Initial Posttraumatic Responses and Changes in Social Functioning Over Time*

In this part of the study, we examined whether IES Intrusion and Avoidance scores 1 year after war significantly predicted subsequent changes in social functioning problems 2, 3, and 20 years after the war. For this purpose, we conducted three-step hierarchical regressions for the number of problems in social functioning that participants reported 2, 3, and 20 years after war. These regressions were conducted separately for CSR and non-CSR veterans in order to examine the differential contribution of initial

<sup>1</sup> To deal with a potential floor effect explanation of the observed associations in the non-CSR group (due to the relatively low level of Intrusion, Avoidance, and problems in social functioning), we split the non-CSR group into two subgroups: (a) veterans who revealed relatively high levels of IES scores (average of Intrusion and Avoidance) 1 year after the war (above the median) and (b) veterans who scored below the median in this score. HLM analyses performed separately for each of these two subgroups revealed similar significant effects to those found in the HLM analysis conducted with the entire non-CSR group.

Table 2  
*Standardized Regression Coefficients of the Contribution of Intrusion and Avoidance at Year 1 to Changes in Social Functioning Problems in Each Study Group*

Effect	CSR ( <i>n</i> = 131)			Non-CSR ( <i>n</i> = 83)		
	Year 2	Year 3	Year 20	Year 2	Year 3	Year 20
Step 1						
Year 1's functioning	.51**	.55**	.34**	.63**	.64**	.38**
Step 2						
Year 1's Intrusion	.15	.04	.16	.05	.08	-.01
Year 1's Avoidance	.24*	.20*	.13	-.01	-.05	.10
Step 3						
Intrusion × Avoidance	-.14	-.13	-.24*	.07	.11	-.13

Note. CSR = combat stress reaction.

\*  $p < .05$ . \*\*  $p < .01$ .

posttraumatic responses among veterans with or without a diagnosable breakdown during battle.

In the first step of the regressions, we included the number of problems in social functioning that participants reported 1 year after war as the predictor of subsequent reports of problems in social functioning. In the second step, we included participants' IES Intrusion and Avoidance scores 1 year after war as additional predictors in order to examine their unique contribution to subsequent reports of problems in social functioning beyond the variance explained by the number of problems in social functioning reported at Year 1. In other words, we examined the contribution of IES Intrusion and Avoidance scores at Year 1 (1 year after war) to changes in social functioning from that assessment time to each of the three next points of assessment (2, 3, and 20 years) that were not predicted by the initial assessment of social functioning. In the third step, we introduced the interactive (product) term between IES Intrusion and IES Avoidance as an additional predictor in order to examine whether specific combinations of Intrusion and Avoidance at Year 1 significantly contributed to changes in social functioning from that assessment time to the three next points of assessment. Table 2 presents the relevant statistics for these regression analyses.

In the CSR group, the regression analyses revealed a significant contribution of social functioning problems at Year 1 to reports of problems in social functioning at Years 2, 3, and 20 (see Table 2). However, beyond these interesting effects reflecting the stability of social functioning problems over a 20-year period, regression analyses revealed significant effects of initial levels of Avoidance responses at Year 1 on changes in social functioning problems at Years 2 and 3. As can be seen in Table 2, the higher the posttraumatic Avoidance 1 year after war, the higher the number of reported problems in social functioning 2 and 3 years after war beyond the level of problems expected from a participant's report of these problems at Year 1. Of interest, no significant effects of Intrusion responses at Year 1 were found on changes in social functioning problems at Years 2 and 3 (see Table 2). In addition, the interaction between Intrusion and Avoidance at Year 1 did not significantly contribute to subsequent changes in social functioning 2 and 3 years after war (see Table 2).

Twenty years after the war (Year 20), the regression analysis revealed that CSR veterans' Intrusion and Avoidance scores 1 year after war did not significantly contribute to changes in reports of

problems in social functioning (see Table 2). However, the interaction between Year 1's Intrusion and Avoidance scores made a significant contribution to the number of reported problems in social functioning 20 years after war beyond the level of problems expected from a participant's report of these problems 1 year after war. Using Aiken and West's (1991) procedure for examining the source of the significant interaction, we found that Year 1's Avoidance made a significant contribution to the report of more problems in social functioning 20 years after war when Year 1's Intrusion was low (one standard deviation below the mean;  $b = .37$ ,  $p < .01$ ), but not when Year 1's intrusion was high (one standard deviation above the mean;  $b = -.11$ ). That is, whereas Avoidance 1 year after war significantly predicted more problems in social functioning 2 and 3 years after war regardless of the concurrent level of intrusion responses, this initial Avoidance response significantly predicted more problems in social functioning 20 years after war mainly among CSR veterans who showed relatively low levels of initial Intrusion 1 year after war.

It is important to note that these longitudinal effects of initial Avoidance and Intrusion 1 year after war were circumscribed to CSR veterans. Regression analyses performed in the non-CSR group yielded only a significant contribution of social functioning problems at Year 1 to reports of problems in social functioning at Years 2, 3, and 20 (see Table 2). No significant unique or interactive effect was found for Year 1's Intrusion or Year 1's Avoidance on reports of problems in social functioning 2, 3, and 20 years after war (see Table 2).<sup>2</sup>

## Discussion

The current study traces the longitudinal course of posttraumatic symptoms of intrusion and avoidance following combat. Across the four times of measurement, veterans with antecedent CSR reported higher levels of both Intrusion and Avoidance than did non-CSR veterans. Even 20 years after the war, this difference remained, and CSR casualties suffered higher levels of trauma-related Intrusions compared with non-CSR veterans. Although the

<sup>2</sup> Regression analyses that were conducted separately for the two subgroups of non-CSR veterans revealed similar significant effects to those found in the regression analysis conducted with the entire non-CSR group.

IES is not a diagnostic measure, it is nonetheless an acceptable measure for distress. Our findings provide clear evidence that CSR has consequences in the form of posttraumatic symptoms of intrusion and avoidance. Thus, CSR is by no means a transient condition that quickly subsides after combat but is a marker for emotional problems many years after the war. This finding is in line with previous findings (e.g. Solomon, 1989a). However, the present study is unique because of its long follow-up period. We have also found, like previous studies, that even 20 years after the war CSR was associated with the report of more problems in social functioning. This finding indicates that the long-term implications of CSR spread beyond the relatively narrow prism of posttraumatic symptomatology and into other areas of mental health and psychological well-being. To summarize, our findings reveal that the consequences of CSR are both long lasting and widespread.

As noted by Creamer, Burgess, and Pattison (1992), intrusion and avoidance may also be seen as mechanisms for processing trauma-related information. These authors claimed that intrusion is first used to activate a memory mechanism associated with the trauma, and avoidance is later used to cope with the intrusive thoughts. Viewed from this cognitive, information-processing perspective, our findings indicate that this process is not completely fulfilled in the CSR group. In this group, Intrusion remained elevated relative to the control group even 20 years after the war. According to Creamer, Burgess, and Pattison (1990), an effective processing of the trauma may occur only when Intrusion and Avoidance are not excessively high. It seems that in the CSR group, the level of Intrusion remained somewhat elevated (relative to the control group) throughout the years, and therefore avoidance was less effective as a coping mechanism.

However, the present study also found that with time, there was a decline in both intrusion and avoidance symptoms. This finding is in line with previous studies. However, whereas most studies examined relatively short time intervals—from 1 year (e.g., Eid, 2003) to several years (e.g., Broen, Moum, Bødtker, & Ekeberg, 2004; Solomon, 1989a) posttrauma—the present study is based on a follow-up of 20 years. The finding that intrusion and avoidance continue to change many years after the war contradicts the notion that posttraumatic symptoms remain relatively constant after the 1st year (Koren, Arnon, & Klein, 1999). At the same time, however, our findings indicate that although there is a decline in symptom levels, posttraumatic symptoms endure for many years. Our findings regarding the decline in symptom levels match Sundin and Horowitz's (2003) conclusion, based on a comprehensive review of many studies, that both intrusion and avoidance continue to decrease with time. This pattern is also congruent with Figley's (1978) stress evaporation hypothesis, according to which the initial intense readjustment period to stress is followed by a gradual return to a premorbid level of psychological well-being. In addition, this decline may be attributed to spontaneous recovery with the passage of time.

One of the unique contributions of this study is the focus on the issue of social functioning. For the entire sample, both intrusion and avoidance were associated with more problems in social functioning on a given year. This finding highlights the link between posttraumatic symptoms and problems in functioning. Until recently, problems in functioning were not considered an integral part of the clinical picture of PTSD. However, with the introduction of the F criterion for the diagnosis of PTSD in the

*DSM-IV* (American Psychiatric Association, 1994), the issue of functioning has received greater attention.

Our findings reveal that avoidance 1 year after the war—as opposed to intrusion—was longitudinally associated with social dysfunction 2 and 3 years after the war in the CSR group. Moreover, high levels of avoidance together with low levels of intrusion 1 year after the war longitudinally predicted CSR veterans' social dysfunction 20 years later. This finding is in line with previous studies, in which avoidance and emotional numbing were associated with problems in various areas of psychosocial functioning, such as family functioning and marital relationships (Kuhn, Blanchard, & Hickling, 2003; Riggs et al., 1998; Vogel, Wester, & Heesacker, 1999). It seems that one's tendency to avoid emotionally laden situations and to detach from one's social surroundings has an especially negative effect on one's daily functioning. This tendency prevents the individual from being more involved in a wide variety of activities in the professional, familial, and social fields. The avoidant behavior may become entrenched (Creamer et al., 1992) and may set off a vicious circle of problems in functioning that gradually broadens and spreads into various areas of daily life. This is in line with Manne, Glassman, and Du Hamel's (2000) suggestion that avoidance is particularly detrimental in the long run. That is, avoidant coping may be a prospective predictor of distress.

This study has a number of methodological limitations. First, because of the attrition of participants between measurements, the sample may be somewhat selective. However, this is unavoidable in a longitudinal design such as ours. Second, another limitation is the use of self-report measures that, although very common in trauma studies, may still be somewhat limited. Also, in the 20 years of this study, more updated measures were published. Yet to allow comparability across time, we have used the same measures that were the state of the art 20 years ago. Third, one should take into account that although Avoidance and Intrusion scores in the CSR group were elevated relative to the control group throughout the study period, they still were in the low end of the scale (being experienced *rarely* or *sometimes* by CSR veterans), and then it does not appear likely that these scores reflect clinically significant elevations. These relatively low scores can somewhat explain the lack of improvement in intrusion and avoidance symptoms in the control group (a possible floor effect).

In addition, it should be noted that the social functioning scale was originally developed for the longitudinal study of Israeli veterans of which the present study is a part and therefore is not a commonly used instrument. Unfortunately, we do not have available normative data on this measure, making it impossible to gauge the clinical significance of the social dysfunction scores. Furthermore, our measurements did not cover the entire span of 20 years since the war. Therefore, we were unable to monitor changes in the course of PTSD between 1985 and 2002, and consequently we do not know the course of intrusion and avoidance during those years. Another limitation is the lack of precombat assessment of social functioning, which strongly limits the inference of causality. In addition, it should be noted that the present study did not differentiate between various types of avoidance (i.e., behavioral, cognitive). Future studies should further examine whether certain kinds of avoidance are more detrimental than others.

We also want to acknowledge the fact that our study examined only a few of the many possible sequelae of combat trauma. For

example, we did not assess hyperarousal symptoms, which are an integral part of the PTSD diagnosis and can be a third factor that significantly affects both avoidance and intrusion symptoms over time. In addition, we did not consider avoidance and emotional numbing separately in our study, even though they may represent two different categories of posttraumatic symptoms. Future studies are therefore encouraged to focus on other long-term symptoms and implications of trauma.

Despite its limitations, however, this study yields several important findings. First, it identified CSR and non-CSR populations. The comparison between these two groups revealed highly important differences. Our findings suggest that the detrimental effects of combat are deep, enduring, and varied. They also shed light on the interplay of symptoms of intrusion and avoidance and problems in social functioning in the CSR group. For the non-CSR group, the level of symptoms appears to be too low to examine the dynamic interplay among symptoms in a meaningful way. Furthermore, the findings of this study have important clinical implications. They emphasize the need for identification and treatment of early responses to combat-related trauma. More specifically, our results support previous evidence regarding the role of avoidance in problems in social functioning. As noted by Kuhn et al. (2003), addressing the avoidance symptoms early in treatment may prevent the deterioration of support systems, which play an important role in the recovery process. Therefore, treatment strategies aiming to reduce avoidant behavior may be of special importance and should be studied further in future research. Finally, the questions this study presents regarding CSR may also be relevant to other types of acute reactions to stress, of most note ASD. As noted earlier, it is not yet clear whether CSR is a specific case of ASD and, even more important, whether both have the same long-term implications. Future studies are encouraged to examine this issue.

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