



Research paper

Hardiness and sensation seeking as potential predictors of former prisoners of wars' posttraumatic stress symptoms trajectories over a 17-year period



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ABSTRACT

Objective: Little is known about trajectories of posttraumatic stress symptoms (PTSS) among former prisoners of war (ex-POWs) and the predictors of those trajectories. This study aimed to assess long-term PTSS trajectories among ex-POWs and comparable veterans and the role of hardiness and sensation seeking in predicting PTSS trajectory.

Method: A sample of 189 Israeli ex-POWs and 160 comparable combatants participated in a 17 year longitudinal study with three waves of measurements following the 1973 Yom Kippur War (T1: 1991, T2: 2003, T3: 2008). Participants completed validated self-report measures.

Results: Latent growth mixture modeling (LGMM) identified four longitudinal PTSS trajectories. Among ex-POWs, the majority of participants were classified in trajectories with "low-increasing" or "medium-increasing" levels of PTSS. Among the comparable veterans, however, the majority of participants were classified in a trajectory with "low" levels of PTSS. Ex-POWs with high levels of hardiness were less likely to belong to the "high" or "medium-increasing" PTSS trajectories, compared to the low-fluctuating trajectory.

Conclusions: The long-term course of PTSS is heterogeneous among both veterans and ex-POWs, with chronic and increasing symptom patterns being more prevalent amongst ex-POWs. Ex-POWs should be considered an at-risk population for exacerbated PTSS trajectories that is related to hardiness personality construct.

1. Introduction

War captivity is one of the most brutal man-made traumas. Beyond the significant risks of war, prisoners of war (POWs) endure deliberate, repeated, prolonged and inter-personal human cruelty (Herman, 1992). The harsh stressors of captivity are recognized as potent pathogenic agents to long-term mental health disorders, of which the most commonly recognized is posttraumatic stress disorder (PTSD; e.g., Meziab et al., 2014). A considerable body of research, conducted in various armies around the globe, following numerous wars, has consistently documented elevated rates of PTSD among ex-POWs in comparison to war veterans (Engdahl et al., 1998). Some studies have indicated that up to 88% of ex-POWs reported substantial PTSD symptoms as many as five decades after homecoming (e.g., Rintamaki et al., 2009). While the immediate adverse effects of combat and captivity are well-documented, there is a profound lack of knowledge about the long-term course of PTSD among ex-POWs and war veterans over the life-cycle. The present study aims to fill this gap by exploring

PTSD symptom (PTSS) trajectories over 17 years among ex-POWs and comparable veterans and to assess the role of personality resources in predicting long-term PTSS trajectories.

Both the *Diagnostic and Statistical Manual of Mental Disorders-5th edition* (DSM-5; American Psychiatric Association, 2013) and theoretical formulations (e.g., Blank, 1993), point to a heterogeneous and fluctuating course of PTSS over a veterans' lifespan. Unfortunately, most studies of the course of veterans' PTSS either used a retrospective design (e.g., Port et al., 2001) or covered a short period of time post deployment (e.g. Boks et al., 2015). Only few long-term prospective studies have examined the course of PTSS over decades (e.g., Koenen et al., 2003; Solomon and Mikulincer, 2006). To date, there is conflicting empirical evidence regarding the course of combat-induced PTSS. Some prospective (e.g., Zerach et al., 2013) and retrospective (e.g., Zeiss and Dickman, 1989) studies among war veterans point to a general gradual decrease in PTSS. However, other studies have observed heterogeneous trajectories of PTSD with symptoms increasing and decreasing over time (e.g., Solomon and Mikulincer, 2006).

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Indeed, most of the recent long-term studies among veterans have found several distinct PTSS trajectories, with a predominant trajectory of resilience. For example, [Bonanno et al. \(2012\)](#) found that among US military service members, 83.1% with a single deployment and 84.9% with multiple deployments could be classified as having a trajectory of resilience. In addition to the resilient trajectory, patterns of recovery, delayed onset, and chronicity have also commonly been found (e.g., [Karstoft et al., 2013](#)). For example, [Magruder et al. \(2016\)](#) examined PTSD among Vietnam veterans over 20-year period and found five trajectories; the majority of theater service veterans remained unaffected by PTSD (79.05%), hence resilient, while other identified PTSD trajectories were early recovery or late recovery (10.45%), late onset (6.55%), and chronicity (3.95%).

Concerning ex-POWs, a recent study by our team showed that over a 17-year period, compared to war veterans, 67% of ex-POWs were classified as suffering from 'delayed PTSD', 26.6% were classified as 'resilient', only 1.3% had recovered from PTSD, and 5.1% had 'chronic PTSD' ([Solomon et al., 2012](#)). Although providing important insight regarding veterans' and ex-POWs' long-term course of PTSD, both [Solomon et al. \(2012\)](#) and [Magruder et al. \(2016\)](#) have classified individuals using dichotomous PTSD diagnostic categories. Over the recent decades, a number of statistical methods such as Latent Growth Mixture Modeling (LGMM; [Muthen, 2004](#)) and other data-driven approaches have gained popularity as a means for investigating individual trajectories of PTSS. In LGMM and related approaches, individuals are grouped together in multiple trajectories of change over time under the assumption that multiple distributions exist within the sample. By estimating a previously explored sample of veterans' and ex-POWs' PTSS trajectories using a more sophisticated analysis we will be able to gain further insight into the individual variability of PTSS over the years and to also identify predictors of this variability.

Identification of psychological markers for risk and resiliency over a veteran's life-cycle is an important task, as the markers might identify those in need for early interventions ([Karstoft Armour et al., 2013](#)). While much empirical effort has been invested in the study of risk or vulnerability predictors of PTSD (e.g., [Ozer Best et al., 2003](#)), fewer research efforts have examined resilience factors that may protect trauma-exposed individuals from developing PTSD and, specifically, to maintain their psychological and mental health over the years (e.g., [Eisen et al., 2014](#)). In this study, we aim to examine the association of two personality characteristics – hardiness and sensation seeking – with long-term PTSS trajectories.

Hardiness is defined as a stable personality construct that encompasses three basic components: commitment, control and challenge. Commitment is described as the belief in the value and meaningfulness of one's activities; control is the feeling that life experiences are predictable and controllable; and challenge is the willingness to accept changes in life as challenges and opportunities for growth ([Kobasa, 1979](#)). It comes as no surprise that hardiness has been found to help individuals adapt successfully to a variety of potentially stressful events, including the military arena (e.g., [Maddi, 2007](#)). Empirical studies have suggested that hardy individuals are more confident, appraise stressful conditions as less threatening and more manageable and use more effective coping skills than their less hardy peers (e.g. [Williams et al., 1992](#)). Indeed, some scholars have referred to hardiness as "dispositional resilience" ([Bartone, 2007](#)).

The effects of hardiness on mental health in general (e.g., [Pietrzak et al., 2009](#)), and particularly PTSD (e.g., [King et al., 1999](#)), have been examined in a limited number of military samples. To date, most studies have found hardiness to be a significant negative predictor of PTSS among Vietnam veterans ([King et al., 1998](#)), Persian Gulf War combatants ([Sutker et al., 1995](#)), American military personnel recruited from various locations ([Escolas et al., 2013](#)), and Australian army reservists ([Orme and Kehoe, 2014](#)). Specifically among ex-POWs, hardiness has also been found to be inversely related to PTSD and psychiatric symptomatology ([Zakin et al., 2003](#)). An exception to this

pattern is a prospective study among Operation Enduring Freedom/Operation Iraqi Freedom returnees which found that hardiness did not predict subsequent PTSS in the year post deployment ([Eisen et al., 2014](#)).

One additional personality resource that may predict veterans' PTSS trajectories is sensation seeking. Sensation seeking is defined as a personality characteristic that entails looking for "... varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experiences" ([Zuckerman, 1994](#), p. 27). Thus, people with high levels of sensation seeking need more stimulation and perform better under high levels of arousal ([Cloninger and Svrakic, 1997](#)). Naturally, sensation seeking is manifested in various kinds of risk-taking behaviors such as risky driving (e.g., [Schwebel et al., 2006](#)), or shoplifting ([Hansen and Breivik, 2001](#)). Those with high sensation seeking tendencies have been found to experience lower levels of anxiety ([Zuckerman, 1994](#)), to perceive the world as less threatening and to have experiences that are less likely to lead to negative outcomes as compared to low-sensation seekers ([Franken et al., 1992](#)). The exploration of sensation seeking in the military setting, which is abundant with high levels of stress and arousal, and its role in the long-term adaptation to posttraumatic residues, is only requested.

The empirical and theoretical relation between sensation seeking and PTSS has been inconsistent (e.g., [Weiss et al., 2013](#)). On the one hand, PTSD has been found to be positively associated with sensation seeking ([Wang et al., 1997](#)). Specifically, among nonclinical subjects with a trauma history, PTSS clusters of alterations in arousal and mood/cognition were found to be mostly related to the tendency of impulsivity in sensation seeking ([Contractor et al., 2016](#)). On the other hand, a number of studies among substance user patients ([Weiss et al., 2013](#)), war veterans ([Neria et al., 2000](#)), and ex-POWs ([Solomon et al., 1995](#)) found a negative association between sensation seeking and PTSD. The latter studies' results suggest that individuals high in sensation seeking are better able to adjust to stressful situations and, in the long run, report lower levels of PTSD. It is important to note that it is still unclear as to whether sensation seeking was elevated prior to traumatization or whether it became elevated as a consequence of traumatization, or both.

The above mentioned literature points to a number of gaps in knowledge. First, much more information is needed regarding long-term PTSS trajectories of veterans and, especially, highly exposed groups such as ex-POWs. Moreover, while most research focuses on risk/vulnerability predictors of PTSS, there is a dire need for research that explores the predictive value of resilience factors in PTSS trajectories. Last, the few studies that examined hardiness and sensation seeking were cross sectional or short-term longitudinal and, thus, do not allow for a full understanding of their roles as predictors of PTSS over extensive periods of time.

The current study attempts to fill the gaps in the literature by investigating the relations between hardiness, sensation seeking and long-term trajectories of PTSS among ex-POWs and a comparable group of veterans. We capitalize on a 17-year longitudinal study of Israeli veterans ([Solomon et al., 2012](#)) and aim to: (a) identify the long-term PTSS trajectories differences between groups by application of Latent Growth Mixture Modeling, and (b) investigate the roles of personality resources – hardiness and sensation seeking – in predicting PTSS trajectory.

2. Methods

2.1. Participants

The present study uses data from a longitudinal study on the psychological implications of war (please see [Dekel et al., 2012](#) for full details). A cohort of Israeli veterans who participated in the 1973 Yom Kippur War was followed over 17 years with assessments at three time

points: 1991 (T1), 2003 (T2), and 2008 (T3). According to Israel's Ministry of Defense, 240 soldiers from the Israeli Army land forces were captured during the war (ex-POW group). Participants were either captured by the Egyptians and held for 6 weeks, or imprisoned by the Syrians and held for 8 months. Of these, 159 participated in the first assessment, 123 participated in the second (10 could not be located/refused, 4 had died, and 6 could not participate due to mental deterioration) and 170 took part in the third (29 could not be located/refused, 20 had died, and 6 could not participate due to mental deterioration).

In addition, 280 veterans were sampled from Israel Defense Forces (IDF) computerized data banks (control group). These veterans were drawn from a pool of combat soldiers who fought in the same units as the ex-POWs but were not held captive. These land-forces combat veterans had been exposed to battlefield stressors, including encounters with injured people and dead bodies, active fighting and exposure to life-threatening events. The two groups were matched on military background and socio-demographic status. While it is difficult to control for the subjective stressfulness of any combat experience, the sampling procedure used here ensured that veterans in both groups were exposed to a similar level and type of objective combat stress. Among the control veterans, 165 participated at T1, 104 participated at T2 (41 could not be located and 1 had died), and 117 took part at T3 (20 could not be located/refused and 5 had died).

All participants in this study were male. Ex-POWs and controls did not differ at T3 in age [$t(283) = -.03, p = .98$], education [$t(283) = .71, p = .44$], religiosity [$\chi^2(2) = 1.55, p = .46$], or income [$t(283) = -1.69, p = .09$]. The mean age of the participants was 58.62 (SD = 4.56), and mean years of schooling was 13.97 (SD = 3.93). Over sixty percent of the participants in both groups (61.7%) defined themselves as secular; 16.3% assessed their income as lower than average, 25.3% as average, 26.7% as a bit higher than average, and 29.5% as much higher than average. No significant differences were found between those who participated in the follow-up assessments and those who did not with regard to rank, age, education, and the level of PTSD in 1991.

As the Hardiness variable is conceived of as closely related to the working environment, it is important to describe how many of the participants were employed at the different assessment points. The two groups differ in their employment status on the three assessment points. At T1, more controls (24.4% and 51.2%) reported that they progressed well or very well at work since the 1973 war as compared to ex-POWs (16.9% and 41.9, respectively; $\chi^2(5) = 12.83, p = .02$). At T2, more controls (82.9%) reported that they were working in full-time jobs outside their home in the last year, as compared to ex-POWs (59.3; $\chi^2(2) = 15.75, p = .00$). At T3, more controls (67%) reported that they were working in full-time jobs outside their home in the last year, as compared to ex-POWs (50.6; $\chi^2(2) = 7.12, p = .03$).

2.2. Measures

2.2.1. PTSD Inventory

(PTSD-I; Solomon et al., 1993) taps the 17 PTSD symptoms listed in the DSM-IV-TR (APA, 2000). Participants were asked to rate how often they suffered from each symptom in the previous month on a scale ranging from 0 (not at all) to 4 (almost always). The number of positively endorsed symptoms was calculated by counting the items in which the respondents answered '3' or '4'. This symptom count was used to operationalize PTSD as a continuous variable. When compared to diagnoses based on structured clinical interviews, the PTSD-I showed high convergent validity (Solomon, 1988). The PTSD-I was administered in all three waves: 1991, 2003 and 2008. Reliability values for total and subscale scores were high at all assessments (Cronbach's α : .89–.96).

2.2.2. Hardiness

Participants completed the Hebrew version (Drory and Florian,

1991) of the third generation Hardiness Scale (Personal View Scale; Maddi, 1987). This self-report questionnaire is composed of 50 items, measuring the hardiness construct as a composite of three components: commitment (e.g., "I am looking forward to my new job"), control (e.g., "good planning might prevent future problems"), and challenge (e.g., "ordinary work is boring"). Using a 6-point Likert scale ranging from 1 (not at all) to 6 (very much), participants indicated how much they endorsed each item. On this basis, a general hardiness score and specific commitment, control, and challenge scores were computed as the mean of the items corresponding to each scale, with higher scores reflecting higher levels of hardiness. Previous studies have found adequate internal consistency for the total scale and the three hardiness subscales (Drory and Florian, 1991). In the present study, the Hebrew version of this scale had Cronbach's alphas of .74 for the total scale.

2.2.3. Sensation seeking

We used the short version of the Sensation-Seeking Scale (Madsen et al., 1987). This self-report scale comprises 10 pairs of items of opposed attitudes (e.g., "I like to spend time in the familiar surroundings of my home" vs. "I become very restless when I must stay at home for a long time"). Subjects were asked to indicate which of the two statements described their preference, and a total score was calculated. A high score reflects a high tendency for sensation seeking. Madsen et al. (1987) demonstrated satisfying test-retest reliability ($r = .78$) and high correlations with drug and sex related behaviors.

2.3. Procedure

All of the participants took part in a 2008 study by Solomon et al. (2008). Approval for this study was given by both IDF and Tel Aviv University ethical committees. The names of ex-POWs were passed on by IDF authorities as part of the periodic examination of veterans after their military service. We contacted the participants by telephone and, after explaining the purpose of our study, asked them to take part. Questionnaires were administered in the participants' homes or in another location of their choice. Before filling out the questionnaires, the participants signed an informed consent agreement.

2.4. Data analyses

We estimated the latent trajectories of veteran's PTSS by application of Latent Growth Mixture Modeling, an approach that empirically derives latent trajectories from longitudinal data without a priori assumptions about number or characteristics of classes to be derived. In the LGMM we included every participant who provided data on the main measure (i.e., PTSD-I) at least twice (POWs = 189, controls = 160). To account for missing data, we used the Full Information Maximum Likelihood (FIML) procedure, which has been shown to produce unbiased results under the assumption that data are missing at random (MAR). To test for possible bias of this approach, we also conducted the LGMM including only participants with data on all assessments (POWs = 87, controls = 63), and found very similar results (results can be provided upon request). Hence, to maintain power of the post hoc analysis, we included everyone with data for at least two time points.

To aid model estimation, we fixed slope variance to 0 while the intercept was allowed to vary freely. In line with the original study design, we applied the knownclass option to allow for differences in trajectory characteristics (i.e., slope and intercept) across the two study groups (ex-POWs and controls). We estimated models ranging from 1 to 6 classes and evaluated each model for fit of the data. With application of the knownclass option, we only have the Akaike Information Criteria (AIC), the Bayesian Information Criteria (BIC), and the adjusted BIC to evaluate for model selection. Hence, we selected the model that had lower values of these three fit estimates while maintaining parsimony and theoretical soundness. We tested covariates of class membership post hoc outside the model. We chose this approach so the covariates

would not influence class formation, and because the three-step method is not available with the `knownclass` option. Simulation studies suggest that post testing of covariates provides unbiased results when entropy is above .80 (Clark and Muthén, 2009). For the post hoc analyses, we conducted multiple imputation (MI) for data obtained at T1 to avoid listwise deletion. Using MI for the post hoc analysis, we were able to maintain the sample defined for the trajectory analysis. The imputation model included potentially informative variables measured at T1: PTSS, general stress index, attachment style, loneliness, social support, and problems in captivity as well as our predictor variables of interest: sensation seeking and hardiness. Using the MI procedure, we generated five data sets, i.e. values were drawn five times for each missing data point, resulting in five different imputed data sets. Post hoc analysis was conducted on the pooled data set. To ensure that our results were not biased by this approach, we also conducted the post hoc regression analysis including only those who provided data on the variables of interest at T1 ((ex-POW $N=96$; control $N=104$). Results were very similar to the regression model based on the pooled data, with the regression model on pooled data showing slightly more conservative estimates of predictor variables. Results for the model based on the sample that was not input can be obtained upon request.

3. Results

Fit indices for the 1–6 class models can be seen in Table 1. The 6-class model failed to reach convergence, and hence, only the 1–5 class models are evaluated. We saw reductions in AIC, BIC and adjusted BIC with the addition of every extra class, suggesting that the 5 class model is the best fitting model (Table 2).

However, especially for the control group, the addition of a fifth class seemed to split an existing class in two with similar slopes and only marginally different intercepts. Hence, the five class model seemed unparsimonious. Further, the addition of the fifth class resulted in a very small class for both study groups. Hence, we settled on the four-class model as the best representation of our data. The entropy of the four class model was high (.95).

As depicted in Fig. 1, we found four different trajectories for the two study groups. For the controls, we found a pattern very similar to previous studies of PTSS trajectories in deployed soldiers (Karstoft et al., 2015; Bonanno, 2012). Namely, we found trajectories of: low symptomatology (low: 78.1% with a small but significant increase in symptom level over time ($S = .49$, $p < .001$); low symptomatology with a large symptom increase over time (low-increasing: 5.6%, $S = 5.01$, $p < .001$); medium severity with a small but significant decrease over time (medium-decreasing: 12.5%, $S = -.89$, $p = .007$); and a small trajectory of high-stable severity (high: 3.8%, $S = -.86$, $p = .393$). For the POWs, we found trajectories of: low symptom level at onset followed by a moderate increase over time (low: 31.2%, $S = 1.64$, $p < .001$); low with substantial symptom increase over time, encompassing most of this study group (low-increasing: 52.9%, $S = 6.51$, $p < .001$); medium symptom level at onset followed by a moderate increase (medium-increasing: 10.1%, $S = 3.28$, $p < .001$); and finally, a high-stable trajectory (high = 5.8%, $S = .07$, $p = .89$).

Table 1
Fit indices for the 1–6 class models.

	AIC	BIC	Adj BIC
1 class	5250.825	5285.572	5257.021
2 classes	5004.228	5058.279	5013.866
3 classes	4850.949	4924.304	4864.029
4 classes	4743.914	4836.573	4760.436
5 classes	4674.005	4785.968	4693.969
6 classes	No convergence		

Note: AIC: Akaike Information Criteria, BIC=Bayesian Information Criteria, Adj BIC: Sample-size adjusted Bayesian Information Criteria

In the post hoc multinomial regression analysis of class membership, we found that sensation seeking was not predictive of membership in any of the fluctuating or symptomatic classes. Hardiness, on the other hand, was significantly related to class membership, but for ex-POWs only: membership of the high and medium-increasing trajectories was less likely for individuals who scored higher on hardiness as compared to the low-fluctuating group (OR = .26 (CI = .07–.94) and OR = .21 (CI = .06–.74), respectively).

4. Discussion

The aims of the present study were to assess the long-term trajectories of PTSS over a 17-year period following war and captivity, and to examine the roles of hardiness and sensation seeking in these trajectories. Our main results identified four longitudinal PTSS trajectories but with differences between ex-POWs and comparable veterans who did not experience captivity. While among ex-POWs the majority of participants belonged to the "low-increasing" or "medium-increasing" trajectories, the majority of participants in the control group belonged to the "low" symptom trajectory. Furthermore, while a "high" trajectory was identified for both comparable veterans and ex-POWs, the symptom level among ex-POWs was higher and the prevalence greater, indicating more severe overall psychopathology in this group. Importantly, ex-POWs with high levels of hardiness were less likely to report "high" or "medium-increasing" PTSS trajectories. Hardiness was not a significant predictor of trajectories in the control group. Sensation seeking was not found to predict PTSS trajectories in either of the two groups.

Consistent with existing research (e.g., Karstoft et al., 2013), the current study found four long-term trajectories of PTSS to be the best representation of veterans and ex-POWs' PTSS course over three waves of measurement. However, adding to previous prospective studies by our team (e.g., Solomon et al., 2012), our results also show that ex-POWs and comparable veterans differ both in the shape of their trajectories and the prevalence of each trajectory within the respective groups. By using the data-driven procedure of LGMM, which groups participants on the basis of their change patterns in PTSS scores, we now have provided a more detailed account of individual differences in PTSS' course over time, compared to traditional methods. It is carefully suggested that ex-POWs' 'delayed onset' PTSD (Solomon et al., 2012) is encompassed in two different patterns of "low-increasing" or "medium-increasing" levels of PTSS trajectories. Moreover, it seems that there is no proper 'recovery' from PTSS for the ex-POWs. However, about one third of ex-POWs reported a "low-fluctuating" PTSS trajectory, indicating that a significant subgroup had low, but fluctuating, symptom levels over the 17-year study period. In the comparison group, however, the 'medium' trajectory exemplified a recovery pattern.

As such, heterogeneous trajectories of PTSS, with symptoms waxing and waning over time, have been observed in this study. However, the prevalence of participants in each trajectory within each group tells a different story, mainly about the vulnerability of ex-POWs to PTSS over their life course. First, there is a similarity between the previously found predominant trajectory of resilience among veterans (Karstoft et al., 2013; Magruder et al., 2016) and the predominant trajectory of "low" levels of PTSS among control veterans in our study. Second, two explanations of the vulnerability of ex-POWs may be offered. One being that, during captivity, prisoners of war are usually exposed to severe, repeated and prolonged trauma(s), such as brutal torture and interrogations, humiliation, violence, and continuous torture that may cripple their self-identity and defensive mental system (Rintamaki et al., 2009). Thus, as is well established, the longer a traumatic experience lasts, the more severe the ensuing psychiatric sequelae is likely to be (Hunter, 1993). The next explanation is rooted in the accelerated aging processes among ex-POWs. There is considerable evidence (e.g., Davidson and McFarlane, 2006), regarding the role of aging processes in triggering delayed-onset PTSD, as well as other

Table 2
Odds Ratios (ORs) and 95% CIs for the latent trajectories of the Ex-POW and the control group.

	High ^a OR (95% CI)		Medium-decreasing/Medium-increasing ^a OR (95% CI)		Low-increasing ¹ OR (95% CI)	
	Controls	Ex-POWs	Controls	Ex-POWs	Controls	Ex-POWs
Hardiness	.21 (.03–1.42)	.26 (.07–.94) [†]	.83 (.30–2.18)	.21 (.06–.74) [†]	.26 (.03–1.42)	.57 (.42–1.62)
Sensation seeking	.69 (.43–1.11)	.90 (.61–1.35)	.99 (.77–1.29)	1.03 (.74–1.43)	.94 (.60–1.49)	1.01 (.84–1.21)

^a All ORs are in comparison to the “Low” Group.

[†] < .05.

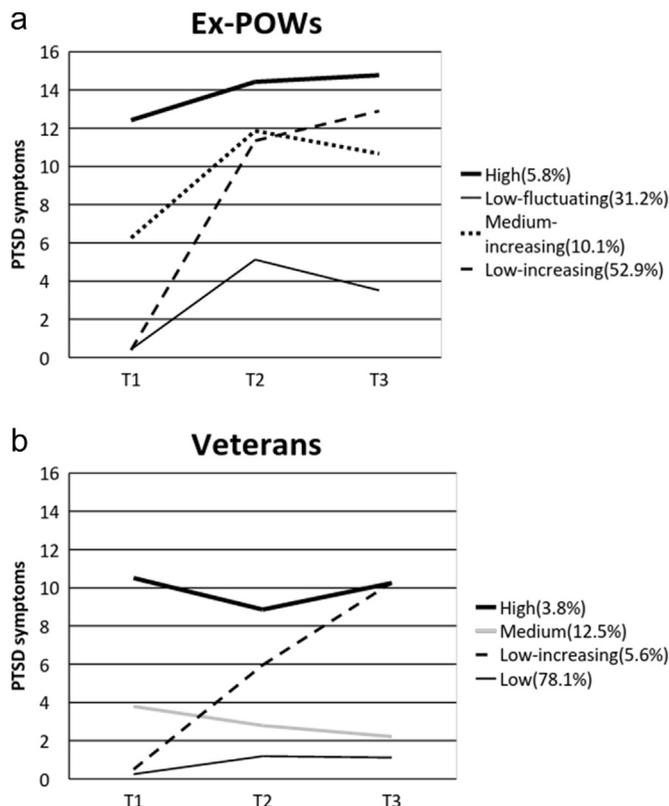


Fig. 1. a and b. Trajectory model of posttraumatic stress symptoms among the veterans' control group (1a) and ex-POWs (1b).

physical maladies and morbidity (Meziab et al., 2014), which is relevant to our sample of veterans who have aged more than 40 years since the war.

Our study results demonstrate hardiness to only be a significant predictor of PTSS trajectories for ex-POWs. Thus, our results add to the main body of literature that has demonstrated hardiness to be a significant protective factor, buffering against PTSD among ex-POWs (Zakin et al., 2003). As most of the previous studies that found hardiness to be a protective factor in military cohorts were cross-sectional, our results also strengthen the validity of hardiness as a possible buffer against the long-term residues of war captivity over prolonged periods of time. Interestingly, while previous studies have found this relation also for veterans (e.g., Orme and Kehoe, 2014), hardiness was not a significant predictor of PTSS trajectories in the control group of our study. It is possible that, compared to the comparable veterans, the effect of hardiness manifested for ex-POWs only in the most severe levels of PTSS, as their initial levels of PTSS were higher or because their range of variability was broader over the years. Future studies should further examine these issues.

In contrast to hardiness, sensation seeking was not found to predict PTSS trajectories. Although previous studies among war veterans (Neria et al., 2000), and ex-POWs (Solomon et al., 1995) found a negative association between sensation seeking and PTSD, these studies were

cross-sectional. It is possible that sensation seeking can be considered a resilience factor, however, when predicting the long-term course of PTSS simultaneously with another resilience factor such as hardiness, or not in the immediate wake of war, its predicting strength may be reduced. From another angle, a recent study found that PTSS clusters of alterations in arousal and mood/cognition were found to be mostly related to the tendency of impulsivity in sensation seeking (Contractor et al., 2016). As noted, our study measure of PTSS relied on the DSM-IV-TR's (APA, 2000) three-cluster model of PTSD (re-experiencing, avoidance and hyper-arousal) and did not cover the DSM-5's (APA, 2013) 'negative alterations in cognitions and mood' cluster. It is possible that a more sensitive and updated examination of the link between sensation seeking and the DSM-5 four-cluster model of PTSS would have resulted in significant associations between the constructs.

Moreover, many studies treated sensation seeking as a component of an impulsivity construct. It has been suggested that veterans with PTSD may engage in impulsive behaviors in order to decrease their trauma-related distress (e.g., Marshall-Berenz et al., 2011). Another option is that the engagement in sensation seeking behaviors is done as a way to obtain nervous arousal that is similar to the experience during traumatic event (Joseph et al., 1997) and, hence, they re-exposed themselves to scenarios with high risks and possible negative outcomes (Van der Kolk et al., 1985). It is possible that the effect of sensation seeking has two sides; a negative side that drives the comorbidity between PTSS and certain destructive impulsive behaviors, while also having a positive side that provides the veteran with the personal strength to be open to their traumatic experience and explore it in constructive way. These contradictory effects might offset each other in the course of PTSS.

The present study has several limitations. First, we have no information regarding the course of PTSS during the long period between the end of the war and the initiation of this study, as well as between subsequent assessments. Second, we have used self-report questionnaires which are prone to reporting and memory biases. Third, in comparison to other long term-longitudinal trauma studies, our study design did not include pre-deployment data which is particularly relevant to the hardiness construct. We have considered hardiness and sensation seeking as pre-traumatic stable personality constructs. Although this is the common way to treat these constructs, it should be noted that it is also possible for them to change following major life events. Finally, given the expected relation between hardiness and employment, employment status should be included in future studies of hardiness and PTSD in veterans.

Notwithstanding these limitations, our study provides several important contributions to the field. By employing the sophisticated method of LGMM, we were better able to track individual differences in the course of PTSS over time and to demonstrate how ex-POWs and comparable veterans differ in the prevalence and course of prototypical PTSS trajectories. Moreover, our results emphasize the importance of the hardiness personality construct in the long-term adaptation to both war and captivity. These results have clinical implications for the identification and screening of psychological resilience among soldiers and the integration of hardiness training, inclusive of commitment, control and challenge, in combatants' fundamental military education.

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