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Trajectories of suicidal ideation and posttraumatic stress symptoms among former prisoners of war: A 17-year longitudinal study

Gadi Zerach [a,*], Yossi Levi-Belz [b,1], Zahava Solomon [c]

[a] Department of Behavioral Sciences, Ariel University, Ariel 40700, Israel
[b] Department of Behavioral Sciences, Ruppin Academic Center, Emek-Hefer, Israel
[c] Bob Shapell School of Social Work, Tel Aviv University, Tel Aviv, Israel

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ABSTRACT

War captivity is one of the most severe human-inflicted traumatic experiences with wide and substantial long-term negative effects. However, only one retrospective study examined suicidal ideation (SI) among ex-prisoners of war (ex-POWs). This study aimed to prospectively assess SI among ex-POWs and its associations with posttraumatic stress disorder (PTSD) symptoms over a 17-year period. Two groups of male Israeli veterans from the 1973 Yom Kippur War were examined: ex-POWs and comparable veterans who were not taken captive. Both groups were assessed via self-report measures of SI and PTSD symptoms at three time points: T1 18 (1991), T2 30 (2003), and T3 35 (2008) years after the war. Latent growth curve modeling (LGM) results showed that ex-POWs reported higher levels of SI at T2 and T3 and a pattern of increase in SI levels trajectory over time, compared to control veterans. Furthermore, among ex-POWs, PTSD symptoms at T1 contributed to the increase in rate of change in SI overtime. In addition, PTSD symptoms affected SI at the same measurement, above and beyond above the trajectories of SI. Clinical implications of these findings for the relations between captivity trauma and suicidality are discussed.

1. Introduction

Suicidal behaviors form a significant public health problem (Nock, Borges, & Ono, 2012). One of the known powerful predictors of completed suicide is suicidal ideation (SI; Suominen et al., 2004), which entails the presence of current wishes and sometimes plans to commit suicide. SI are highly prevalent in the community, and a large-scale cross-national study found that lifetime prevalence rates of suicidal ideation, plans, and attempts were 9.2%, 3.1%, and 2.7%, respectively (Nock, 2008). Estimates of prevalence rates were even higher among inpatient samples (Claes et al., 2010). In light of its significance and scope, better understanding of the factors associated with these phenomena is of critical importance.

Only few studies examined the longitudinal course of SI among adults. For example, Ten Have et al. (2009) found that among a representative sample of Dutch adults, 2.7% reported SI and two years later, 31.3% of these still endorsed suicidal thoughts. Another study found that at baseline, 13.3% reported lifetime SI, and of these respondents, 35% also reported SI during the follow-up ten-year period (Borges et al., 2008). Other studies found that several predictors such as psychiatric diagnosis such as depressive, anxiety, personality and substance use disorders increased the risk for both suicidal ideation and behavior in follow up measurements (e.g., Soloff and Chiappetta, 2012). However, most of these studies relied on only two waves of measurement in a relatively short-time period, hence it is difficult to interpret their results with regard to the long-term course of SI and its predictors.

A considerable body of research suggests that previous traumas in general, and specifically war-related trauma, are associated with increased risk of SI (e.g., Jakupcak et al., 2009). However, there is wide variability with regard to veterans' SI across various studies. For example, Lemaire and Graham (2011) reported that 6.5% of the Iraq and Afghanistan war veterans reported SI, while Pietrzak et al. (2010) and Hellmuth et al. (2012) found that 12.5% and 32.3%, respectively, reported SI in these veteran populations. The disparity in SI rates was attributed mostly to time of measurement and severity of exposure. In the current study we address captivity as a unique form of war-related trauma that might be a risk factor for SI over time.

War captivity is one of the most severe human-inflicted traumatic experiences (e.g., Solomon et al., 2012). Specifically, captivity

* Corresponding author.
E-mail address: gadize@ariel.ac.il (G. Zerach).
[1] Gadi Zerach and Yossi Levi-Belz share first authorship of this article.

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trauma occurs in circumstances under which the prisoners of war cannot escape and are deliberately traumatized and often tortured by his or her captors. Moreover, unlike many other traumatic events, the trauma of war captivity is experienced over a prolonged period and is intentionally inflicted by another human so it may be particularly toxic (Herman, 1992).

The physical conditions and emotional distress during captivity seem to contribute to long-term adverse outcomes and are recognized as a potent pathogen for psychiatric illness. Studies of the psychosocial impact of war captivity, as severe type of intentional trauma (Santiago et al., 2013), show elevated rates of psychological distress, anxiety and depression (e.g., Rintamaki et al., 2009) and most commonly- posttraumatic stress disorder (PTSD; Solomon et al., 2012). PTSD is a highly debilitating anxiety disorder that can negatively impact an individual's wellbeing and functioning (Walser et al., 2012).

High rates of PTSD, ranging from 16% to 88%, were observed in ex-POWs samples (e.g., Rintamaki et al., 2009). A prospective study among Israeli ex-POWs found that 34.7% of ex-POWs and only 2.5% of the matched veterans group met PTSD criteria 35 years after the war. Furthermore, the ex-POWs also reported an increase in PTSD rates over a 17-year period (Zerach, Greene, Ein-Dor, & Solomon, 2012).

From the diversity of risk factors, PTSD diagnosis was repeatedly documented to significantly increase the risk of SI in veterans (e.g., Guerra and Calhoun, 2011). Given the severe psychological and physiological impairments of ex-POWs in terms of PTSD symptoms (Cook et al., 2004), it is important to assess the levels and course of SI among this group, as they represent an important high-risk group for eventual suicide.

However, only a few empirical studies have assessed the contribution of both war captivity and PTSD to SI (Hunt et al., 2008). A study of WWII ex-POWs found that 7% and 57% of those who were imprisoned by the Germans and the Japanese, respectively, had attempted suicide (Miller et al., 1989). Hunt et al. (2008) found that 7.5%–45.5% of the Vietnam war ex-POWs reported SI 30–40 years after the war ended. Unfortunately, these studies relied on low number of participants and lack appropriate control groups. Furthermore, while these studies were cross-sectional, they cannot tell us about the longitudinal courses of SI over time.

We aim to investigate the course of SI over a 17-year period among ex-POWs and the role of PTSD in the long-term SI trajectories. To the best of our knowledge, such a long-term evaluation has not been conducted among war veterans, and specifically among ex-POWs. We hypothesized that ex-POWS would report higher levels of SI at all-time points, compared to control veterans. Furthermore, ex-POWs would exhibit progressive increases in SI from Time 1 to Time 3. In addition, PTSD assessed at Time 1 should predict the trajectory of SI over the subsequent assessments and that beyond the effect of PTSD at time 1, PTSD at time 2 and 3 may erupt and spark temporally increases in SI.

2. Methods

2.1. Participants

The present study uses data from a longitudinal study on the psychological implications of war (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 assessment 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-POWs 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. 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 sam procedure used here ensured that soldiers 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 males. Ex-POWs and controls did not differ in T3 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 with regard to rank, age, education, and the level of PTSD in 1991.

The full sample comprised of 222 participants (ex-POWs' N = 118, controls' N = 104). Participants were included in the sample if they participated in all three waves of measurements (N = 150; ex-POWs' N = 87, controls' N = 63). Missing values analysis (MVA) indicated that there were missing data in the variables SI at T1 and T3 and PTSD at T3. The data completion ($N = 72$; ex-POWs' $N = 31$, controls' $N = 41$) for this study was conducted in the following steps: First, our analyses show that there were no indications of missing data at T2 in the relevant variables. Thus, in this study, the T2 measurement serves as an anchor for further data completion. Second, Data were completed for participants that were missing data in the variable SI at T1 (Total missing values $N = 18$ (8.1%); ex-POWs' $N = 18$ (15.3%), controls' $N = 0$ (0%)). Third, data were completed for participants that were missing data in the variables PTSD and SI at T3 (for SI total missing values N = 54 (24.3%); ex-POWs' $N = 13$ (11%), controls' $N = 41$ (39.4%). For PTSD total missing values N = 53 (23.9%); ex-POWs' N = 12 (10.1%), controls' $N = 41$ (39.4%)).

To assess whether the attrition was missing completely at random (MCAR) we conducted Little's MCAR test. The analysis revealed that the data were not missing completely at random, χ^2 (11) = 57.56, $p < .00$. Supplementary analyses revealed that veterans with missing data at T1 endorsed significantly less PTSD symptoms at T3 and more PTSD symptoms at T1 and T2, than veterans without missing data (all $p < .001$). Furthermore, veterans with missing data at T3 endorsed significantly more PTSD symptoms and lower levels of SI at T2, than veterans without missing data (all $p < .001$). Other differences were not significant.

Because the mechanism of missingness was not known to us and there were indications that the missingness was related to the observed data, we assumed that the data were missing at random (MAR). If there is no serious proof of non-randomness, erroneous assumption of MAR often has minor impact (Collins et al., 2001). Missing data were handled with the case-wise direct maximum likelihood estimation when running AMOS models. Compared to conventional methods such as listwise or pairwise deletion,

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maximum likelihood methods in SEM were recommended as the optimal method for handling missing data (e.g., Allison, 2003).

2.2. Measures

2.2.1. PTSD Inventory

PTSD Inventory (Solomon et al., 1994) 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 both as a continuous variable of number of posttraumatic symptoms. The PTSD inventory showed high convergent validity with outcomes of structural clinical interviews (Solomon et al., 1994). Reliability values for total scores were high at all assessments (Cronbach's α: .78–.96).

2.2.2. Suicidal ideation symptoms

Suicidal ideation symptoms were assessed using two items out of the Symptom Checklist-90, which is known as one of the most widely used measures of multiple aspects of psychological distress in clinical practice and research (SCL-90, Derogatis, 1977). In general, SCL-90 is a self-report inventory designed to assess current levels of psychological symptoms. In our study, participants were asked to indicate how frequently they experienced each symptom during the last 2 weeks on a 6-point distress scale (0 = not at all and 5 = very much). The two items that we used were: a) 'thoughts about ending your life'; b) 'thoughts about death'. Due to the strong correlations between the two items at each measurement time ($r = .46$ to $r = .57$), we calculated the mean score of the two items as a suicidal ideation index, with a range of 0–5. Based on norms for psychiatric outpatients (Derogatis, 1977) scores above .73 was considered as an indication for a pass of the clinical cut-off score. The SCL-90 has high concurrent validity and the specific subscales display high empirical agreement across various samples (Derogatis et al., 1976). In this study, suicidal ideation indexes reliability values were moderate (Cronbach's α: .58–.69).

2.3. Procedure

Approval for this study was given by both Israel Defense Forces (IDF) and Tel Aviv University human subjects 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 participants by telephone and, after explaining the purpose of our study, asked them to take part. Questionnaires were administered in participants' homes or in other locations of their choice. Before filling out the questionnaire, participants signed an informed consent agreement.

2.4. Data analyses

To test our hypotheses, we created a series of latent trajectory models (LTMs). LT modeling extends latent variable analysis within a structural equation modeling framework (McArdle, 1998). We first estimated LTMs to examine the trajectory of ex-POWs' and controls' SI over time. The basic LT model begins with the premise that a set of repeated measures are related to the passage of time. These kinds of models are known as *unconditional* LTMs. To examine whether ex-POWs and controls groups differ in the extent of change in SI over time, we used structural equation modeling's multi-group technique.

If the unconditional models fit the data well, one can include other variables to predict the initial level of a phenomenon and its degree of change. These models are known as *conditional* LTMs. We tested a conditional LTM in which PTSD in T1 served as an exogenous predictor of change over time in ex-POWs' and controls' SI. We also tested a hypothesis using a time-varying covariate LT model in which the repeated measures of PTSD were treated as time-varying covariates. This approach reveals time-specific (i.e., short-term) influences on ex-POWs' and controls' SI.

To assess the appropriateness of the LT models, we used AMOS version 20 Structural Equation Modeling (SEM) software (Arbuckle, 2010) and estimated model fit using the comparative fit index (CFI), the Bentler-Bonett normed fit index (NFI), and the root-mean-square error of approximation (RMSEA). As a rule of thumb, a model is judged to fit a data set well if the CFI and NNFI are greater than .95 and the RMSEA is less than .05 (Bollen and Curran, 2006). Values close to those cutoffs indicate an adequate fit. Missing data were handled with case-wise maximum likelihood estimation of stochastic regression imputation when running AMOS software models.

3. Results

3.1. Trajectories of SI in the ex-POW and control groups

In this section we examine the developmental trajectories of SI that best fit the data, and we determine whether ex-POWs' and controls SI trajectories differ. To examine the change in SI, we estimated unconditional LTMs for the repeated measures of SI in T1, T2 and T3. Two latent factors were estimated: one to define the initial level (intercept) of the developmental trajectories of SI (with all factor loadings fixed to 1.0), and one to define the linear slope of the trajectory (with factor loadings set to 0, 12, and 17 to define a time metric, in years). This model is shown in Fig. 1.

Ex-POWs' unconditional LTMs fit the data adequately [$\chi^2(1) = 3.08$, $p = .07$, $CFI = .93$, $NFI = .91$, $RMSEA = .13$]. The analyses revealed that ex-POWs' SI level at T1 was .19 and that it increased

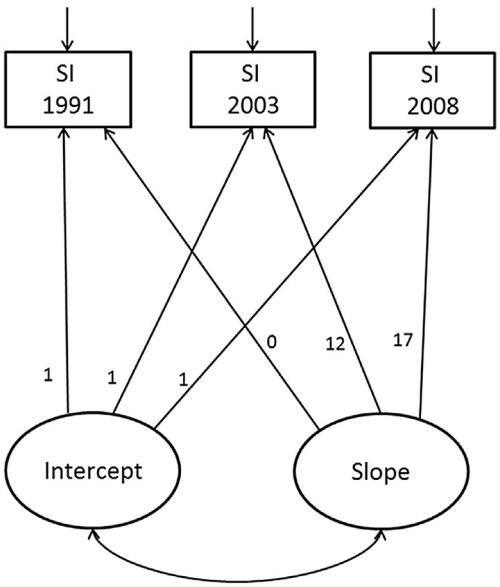

Fig. 1. An example of a latent trajectory model capturing the trajectory of change in suicidal ideation (SI) over time. Two latent factors were estimated: one to define the initial level (intercept) of the developmental trajectory of SI (with all factor loadings fixed to 1.0), and one to define the linear slope of the trajectory (with factor loadings set to 0, 12, and 17 to represent time in years, since first measurement (1991)).

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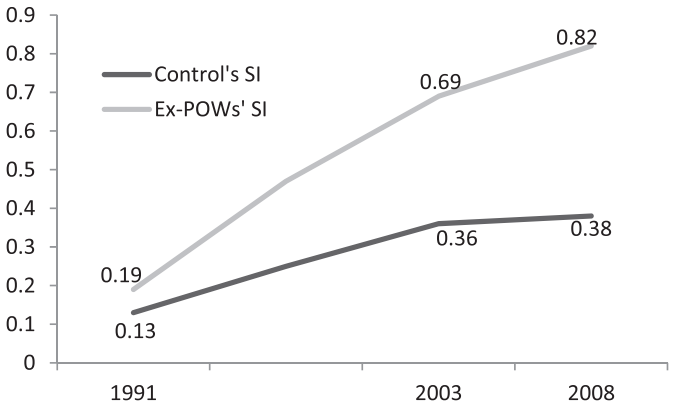

Fig. 2. Trajectories of change in suicidal ideation among ex-POWs and controls.

significantly over time at an annual rate of .04 points ($t = 7.28$, $p < .00$), reaching a level of .82 by T3.

Controls' unconditional LTMs fit the data adequately [$\chi^2(1) = .61$, $p = .43$, $CFI = 1$, $NFI = .98$, $RMSEA = 0$]. The analyses revealed that control veterans' SI level at T1 was .11, and it increased significantly over time at an annual rate of .01 points ($t = 1.72$, $p = .08$), reaching a level of .29 by T3 (see Fig. 2).

To determine whether ex-POWs and controls differed in initial levels of SI or in the rate of change in SI, we examined multi-group unconditional LTMs. To this end, we compared a default model, which allowed effects to vary across groups, with two constrained models that imposed equality of the intercept (initial level) and slope (rate of change) between the groups. The multi-group unconditional LTM default model fit the data adequately [χ^2 (2) = 3.68, $p = .16$, $CFI = .97$, $NFI = .96$, $RMSEA = .06$]. The two groups didn't significantly differ in initial levels of SI at T1 ($\Delta^2 = 1.44$, $df = 1$, $p = .22$). However, ex-POWs' rate of change in SI significantly differed from those for controls by virtue of increasing over time ($\Delta^2 = 36.80$, $df = 1$, $p < .001$).

3.2. PTSD symptoms at T1 predicting trajectories of SI in the ex-POW and control groups

We next estimated conditional LTMs to test the hypothesis that PTSD in T1 would predict greater SI in T1 and a more rapid increase in SI over time. In other words, we looked for possible differences in the magnitude of intercepts and slopes for SI as a function of PTSD in T1. To this end, measurement of PTSD in T1 was included as an exogenous predictor of the intercept and the slope factors that characterized the trajectories of SI over time.

Ex-POWs' LTMs (see Fig. 3) fit the data adequately [χ^2 (2) = 5.50, $p = .06$, $CFI = .90$, $NFI = .87$, $RMSEA = .12$]. The analyses revealed that PTSD symptoms in T1 had no effect on the initial level of SI ($b = .01$, $\beta = .10$, $t = .70$, $p = .48$). However, the analyses also indicated that PTSD in T1 had long-term effect on the rate of change in SI ($b = .003$, $\beta = .28$, $t = 2.02$, $p < .01$).

Controls' launch LTMs (see Fig. 3) also fit the data adequately [χ^2 (2) = 1.25, $p = .53$, $CFI = 1$, $NFI = .98$, $RMSEA = .00$]. The analyses revealed that the higher the PTSD symptoms level in T1, the higher the control veteran initial level of SI ($b = .06$, $\beta = .47$, $t = 4.30$, $p < .001$). However, the analyses also indicated that PTSD in T1 had no long-term effects on the rate of change in SI ($b = .001$, $\beta = .05$, $t = .25$, $p = .80$).

The multi-group conditional LTM default model fits the data adequately [χ^2 (4) = 1.15, $p = .15$, $CFI = .97$, $NFI = .94$, $RMSEA = .06$]. The multi-group analyses revealed that the links between initial PTSD and the initial level of SI differ significantly between ex-POWs and controls, [$\Delta^2 = 7.37$, $df = 1$, $p < .01$]. The analyses also revealed that the links between initial PTSD and the rate of change in the level of SI differ significantly between ex-POWs and controls, [$\Delta^2 = 7.59$, $df = 1$, $p < .01$].

3.3. PTSD symptoms at T1, T2 and T3 predicting trajectories of SI in the ex-POW and control groups

We next examined the extent to which PTSD symptoms at T2 and T3 could account for time-specific increases in ex-POWs' and controls' SI, above and beyond what is expected based on the individual-specific trajectory of the measures and the aforementioned effects of PTSD symptoms on ex-POWs' and controls' SI trajectories. To this end, we estimated a time-varying model in which indicators of PTSD at T2 and T3 served as predictors of within-time individual variability in SI accounted for by the underlying trajectories of those measures and the effects of PTSD symptoms at T1.

Ex-POWs' LTMs fit the data adequately [χ^2 (7) = 12.36, $p = .09$, $CFI = .96$, $NFI = .92$, $RMSEA = .08$]. As can be seen in Fig. 4, PTSD

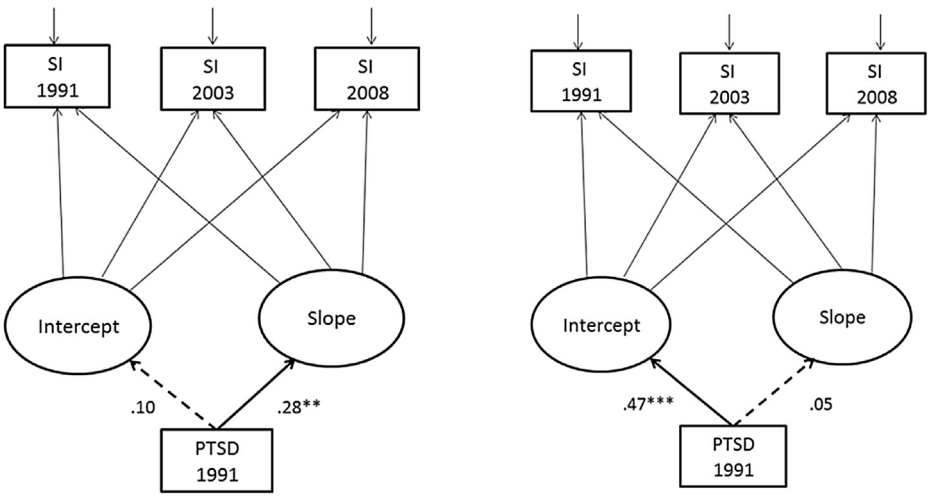

Fig. 3. On the left, ex-POWs' latent trajectory model revealing that the greater the PTSD symptoms in T1 had no effect on the initial level of SI. However, PTSD in T1 had long term effects on the rate of change in SI. On the right, controls latent trajectory model revealing that the greater the PTSD symptoms in T1, the higher the control veteran initial level of SI. However, PTSD in T1 had no long term effects on the rate of change in SI. Dashed line represent non-significant path.

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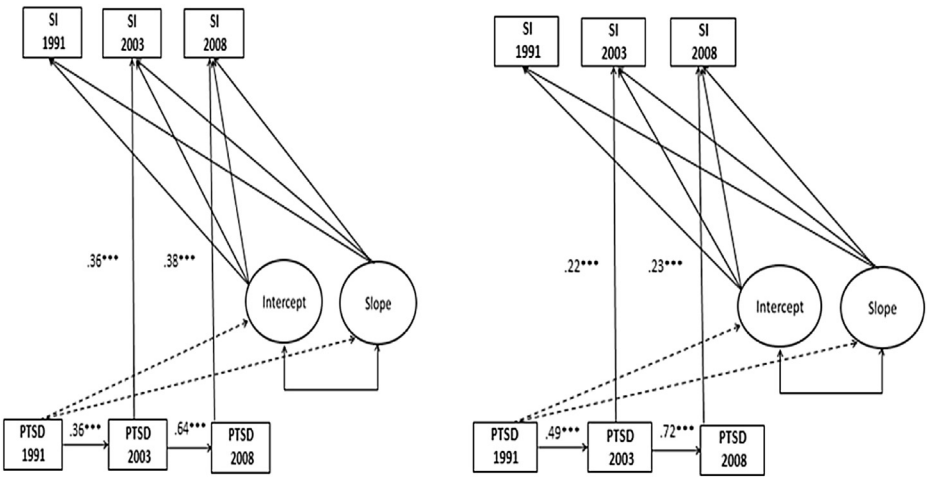

Fig. 4. On the left, ex-POWs' latent trajectory model revealing that the greater the PTSD symptoms in T2 and T3, the higher the ex-POW's level of SI at the same time, above the trajectories of SI. On the right, controls latent trajectory model revealing that the greater the PTSD symptoms in T2 and T3, the higher the control veteran level of SI at the same time, above the trajectories of SI. The dashed line represents a non-significant path. Hence, for both groups, in the face of PTSD at T2 and T3 contributions to SI, the paths between PTSD symptoms at T1 and SI intercept and the slope becomes non-significant.

symptoms at T2 significantly contributed to SI at T2 ($b = .07$, $\beta = .36$, $t = 4.96$, $p < .001$), and PTSD symptoms at T3 significantly contributed to SI at T3 ($b = .08$, $\beta = .38$, $t = 4.35$, $p < .001$), above the trajectories of SI. The results also indicate that in the face of PTSD at T2 and T3 contributions to SI, the paths between PTSD symptoms at T1 and SI intercept and slope became non-significant.

Controls' LTMs fit the data adequately [χ^2 (7) = 12.78, $p = .08$, $CFI = .96$, $NFI = .93$, $RMSEA = .09$]. As can be seen in Fig. 4, PTSD symptoms at T2 significantly contributed to SI at T2 ($b = .03$, $\beta = .22$, $t = 2.84$, $p < .001$), and PTSD symptoms at T3 significantly contributed to SI at T3 ($b = .03$, $\beta = .23$, $t = 2.61$, $p < .001$), above the trajectories of SI. The results also indicate that in the face of PTSD at T2 and T3 contributions to SI, the paths between PTSD symptoms at T1 and SI slope became non-significant.

4. Discussion

The aims of the present study were to investigate the course of SI over a 17-year period and the role of PTSD in the long term SI trajectories. To the best of our knowledge, this study is the first to assess the longitudinal course of SI among war veterans, and specifically among ex-POWs. Our findings show that ex-POWs report higher levels of SI at T2 and T3 and a pattern of increase in SI levels trajectory over time, compared to match control veterans. Our findings are consistent with the results of Hunt et al. (2008) who found that 7.5%–45.5% of the Vietnam war ex-POWs reported having SI, 30–40 years after the war end. Our results show that 35 years after the end of the war, the detrimental psychological effects of war captivity have lingering effects in the form of SI.

Unlike many other traumatic events, the extreme experiences of war captivity are recurrent and often persist for a long time (Nazarin et al., 2012). Moreover, captivity trauma occurs in an interpersonal context under which a victim lacks control over his life, cannot escape and is deliberately traumatized and controlled by captors (Başoğlu, 2009). It is possible that thoughts of death-possibly also due to mock executions and constant life threats-become the norm for the ex-POWs as a result of 'death imprint' (Lifton, 1967). Hence, the ex-POWs vulnerability to SI increased due to their close bodily and mentally experiences with death while still living. While a previous study of this samples cohort found that those ex-POWs often resort to dissociation in order to mitigate this intolerable situation (Zerach et al., 2013), others are unable to modulate their immense pain and thus may turn to SI as a way to escape from the mental suffering (Orbach et al., 2003).

The increase in the levels of SI in T2 and T3 might be attributed to the veterans' accelerated aging processes. The suicidality literature informs us that aging adults are at risk for higher levels of SI and are most likely to die as a result of suicidal attempts (Conwell et al., 2002). Conditions of physical and psychiatric morbidity (especially depression symptoms) are also recognized risk factors for SI (e.g., Soloff and Chiappetta, 2012). There have been limited mortality studies on ex-POWs since repatriation, These suggest an early (up to 10 years post-release) excess mortality compared to the mortality rates of their peers, however these differences were equaled in later years (Beebe, 1975; Keehn, 1980; Nefzger, 1970; Page, 1992). However, many studies have found higher rates of morbidity in World War II (Kang et al., 2006), Vietnam War (Nice et al., 1996), and 1973 Yom-Kipur War (Ohry et al., 1994) ex-POWs as compared to combat veterans who were not taken captive. Some of the medical problems, such as heart diseases, began only in later years (Page and Brass, 2001). It seems that the accelerated aging rendered ex-POWs more vulnerable to the adverse psychological implications of their traumatic experience. Aging often entails many losses and exit events (e.g. retirement, disease) that might be particularly distressing for previously traumatized individuals who might be more troubled with thoughts about death.

Another important finding is that among ex-POWs PTSD symptoms at T1 contributed to the increase in rate of change in SI overtime. In addition, PTSD symptoms at measurement time affected SI at the same measurement. This finding is consistent with the body of research (e.g., Sareen et al., 2005) suggesting that the presence of an anxiety disorders serves as a risk factor for subsequent onset of SI and suicidal attempts. Alongside the experience of emotional defeat and the lack of control in captivity, ex-POWs often feel "entrapped' in inescapable situation, which is central to suicidality (Williams, 1997). Entrapment represents ongoing appraisals of a situation, whereby the situation is judged to be inescapable, with no likelihood of rescue through either personal volition or the agency of others (Taylor et al., 2011). However, this results point to the idea those ex-POWs continue to feel entrapped by their PTSD symptoms that tie them to their captivity memories while still experiencing foreshorten future, even years after the war.

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Another possible explanation refers to the unique course of posttraumatic symptoms among ex-POWs. Both longitudinal and retrospective data support a 'U shape' PTSD symptom pattern of immediate onset and gradual decline, followed by increasing PTSD symptom levels among older survivor of WWII ex-POWs (Port et al., 2001). Furthermore, a previous prospective study of this sample found that ex-POWs reported higher PTSD rates than controls and also relatively high rates of delayed-onset PTSD (Solomon et al., 2012). It is very likely that as PTSD and depression symptoms are highly comorbid among traumatized war veterans (e.g., Ginzburg et al., 2010), ex-POWs' PTSD contributed to the SI slope elevation of that represent an outcome of general deteriorated psychological state.

This study has several limitations. First, the use of self-report measures, although very common in trauma studies, may entail reporting bias. The lack of pre-combat assessment of SI clearly undermines our ability to infer causality. In addition, since the first assessment was conducted in 1991, we have no way of knowing exactly what occurred in the first 18 years between the Yom Kippur War and 1991. It is worth noting that our findings can only be generalized to SI and no other suicidal behaviors.

Despite these limitations, this study yielded several important findings. This is the first study to document long-term and enduring SI pattern among ex-POWs that increases when they are in their late fifties. Furthermore, this study points to the contribution of PTSD symptoms to the growth of SI reports among ex-POWs, over the years. Importantly, the findings of this study have significant clinical implications. They reveal that traumatized survivors of man-made intimate trauma, such as war captivity, may be at increased risk not only for mental distress but also for persistent experiences of SI. Furthermore, while anxiety disorders are often not diagnosed and treated accordingly, the current findings suggest that in order to prevent suicidal behavior clinicians should be aware of the close links between PTSD and SI over time among traumatized veterans.

Contribution

Authors Gadi Zerah and Yossi Levi-Belz designed the study and wrote the protocol. They also managed the literature searches and analyses and Z undertook the statistical analysis. Author Zahava Solomon provide the data for this study and wrote with Gadi Zerach and Yossi Levi-Belz the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

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Conflict of interest

Gadi Zerach, Yossi Lev-Belz and Zahava Solomon don't have any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations within three (3) years of beginning the work submitted that could inappropriately influence, or be perceived to influence, their work.

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