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Secondary traumatization and self-rated health among wives of former prisoners of war: The moderating role of marital adjustment

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Abstract

We investigated the relationships between secondary traumatization, marital adjustment, and self-rated health among wives of former prisoners of war. Participants were Israeli wives of former prisoners of war ($N = 116$) and a matched control group of wives of combat veterans ($N = 56$). Wives of former prisoners of war reported worse self-rated health compared to the control group of wives of combat veterans. Wives of former prisoners of war also reported higher levels of secondary traumatization, and marital adjustment moderated the relationship between wives' secondary traumatization and their general health. The experience of living with former prisoners of war who might also suffer from posttraumatic stress disorder is associated with wives' own psychological and self-rated health outcomes.

Keywords

marital adjustment, posttraumatic stress disorder, prisoner of war, secondary traumatization, self-rated health

Introduction

War captivity is one of the most severe human-inflicted traumatic experiences and is recognized as a potent pathogen for psychiatric illness, the most common of which is posttraumatic stress disorder (PTSD; e.g. Solomon et al., 2012). Studies suggest that the effects of war captivity affect not only the veteran himself or herself but also people in his or her close environment (Hunter, 1988). This may be especially true for the wives of ex-prisoners of war (ex-POWs), as they often serve as the central source of support for their husbands on their return home. Indeed, a number of studies have

found that husbands' PTSD symptoms can impact ex-POWs' wives' psychological states in the form of secondary traumatization (ST; e.g. Dekel, 2010). The term "ST" has been used to indicate that people who come into close contact with the traumatized person may

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experience considerable emotional distress and may display PTSD-like responses similar to those exhibited by the primary survivor (Figley, 1995).

A few studies have reported that ST in spouses is correlated with PTSD symptom severity in combat veterans (e.g. Riggs et al., 1998) and ex-POWs (Dekel, 2007). One possible mechanism that might contribute to the above-mentioned association is the partner's cognitions regarding the individual with PTSD. The cognitive theory highlights the importance of interpretations of situations to individuals' actual functioning (e.g. Beck, 1995). In the recent years, a number of studies have shown that spouses' perceptions of veterans' symptom severity were positively associated with spouses' psychological and marital distress (Renshaw, Rodrigues, and Rodrigues, 2010). Furthermore, spouses' perceptions of the burden related to living with someone with PTSD (e.g. Calhoun et al., 2002) or veterans' symptoms severity (Renshaw, Rodebaugh, and Rodrigues, 2008) mediated the effects of veterans' PTSD on spouses' psychological distress.

The literature suggests that war-related ST is not limited to emotional distress and PTSD-like symptoms, but rather includes a broad range of general distress manifestations (e.g. Renshaw et al., 2008). However, there has been only limited exploration of the relationship between war-related ST and physical health. Solomon et al. (1992) found that wives of veterans with PTSD reported a high number of health complaints. Dirkzwager et al. (2005) found that compared to partners of peacekeepers without PTSD, partners of peacekeepers with PTSD reported more sleeping and somatic problems. Hall and Simmons (1973) found psychosomatic symptoms among ex-POWs' wives; however, Dent et al. (1998) found no somatic symptom differences between World War II ex-POWs' wives and non-POWs' wives. These studies have typically been limited in scope and used non-standardized measures among relatively small samples.

While there is inconsistency in the findings regarding the relationships between ST and physical health, the relationship between war-related PTSD and physical health problems has been well documented (e.g. Ohry et al., 1994). Research has also indicated that the relationship between trauma exposure and self-rated health (SRH) may be mediated by PTSD symptoms (e.g. Kimerling et al., 2000). However, to the best of our knowledge, there has been no research examining the direct association between war-related ST and SRH. This study aims to fill this gap by examining various aspects of SRH of ex-POWs' wives in comparison to wives of a matched control group of veterans who were not held in captivity. Furthermore, we explore the possible contribution of wives' ST and their perception of their husbands' PTSD symptoms to their SRH.

One important factor that may also be related to the health outcomes of ex-POWs' wives is their marital adjustment. Decades of studies on both objective health problems and subjective SRH suggest that a stable, high-quality marriage protects adult partners against morbidity and mortality (for review, see Kiecolt-Glaser and Newton, 2001). In their seminal review, Burman and Margolin (1992) concluded that although marital variables affect health, these effects are indirect and non-specific (e.g. Karademas, 2013). First, for example, in some cases, married couples tend to monitor each other's health and risk behaviors which may lead to them living healthier lifestyles (Waite and Gallagher, 2000). In other cases, married spouses can undermine her husband disease management (Henry et al., 2013). Second, unhealthy marital interaction can increase the likelihood of psychiatric symptomatology (e.g. depression) and health-risk behaviors (e.g. smoking) that can impact physical health (Whisman, 1999). Third, marital interaction can impact health outcomes through the effects of biological pathways. For example, poor-quality marriages are associated with cardiovascular reactivity (CVR) amplification and oxytocin and cortisol increase, which in turn

can negatively affect cardiovascular and immune functioning (Troxel et al., 2005).

As married partners reach middle age, it appears that the relationship between marriage and adult health strengthens (Umberson et al., 2006). A growing body of research also suggests that negative aspects of marriage are more predictive of health outcomes than positive aspects (Robles and Kiecolt-Glaser, 2003). Furthermore, women's health is more negatively affected by marital conflict (Bloor et al., 2004), and there is more marital conflict among couples where one partner is a war veteran (Klaric et al., 2011) or an ex-POW (Dekel and Monson, 2010). As some studies found that marital quality buffered the relationship between one partner's PTSD symptoms and the spouse's ST symptoms (Brosseau et al., 2011), it is important to examine the possible direct and indirect roles of marital quality among ex-POWs' wives.

Only a handful of studies have been carried out on the effects of trauma on ex-POWs' wives' marital relations, and these have mostly focused on emotions, ST, and marital functioning. For example, Hall and Simmons (1973) found that ex-POWs' wives experienced feelings of abandonment, role ambiguity, and suppressed anger after their husbands' return. Using a clinical sample, Bernstein (1998) reported that World War II ex-POWs and their wives experienced emotional distance. Dekel and Solomon (2006) found that Israeli wives of ex-POWs with PTSD reported significantly poorer marital adjustment than ex-POWs' wives without PTSD and wives of non-POWs controls. Dent et al. (1998), however, found no difference between the marital intimacy of wives of Vietnam ex-POWs and non-POWs.

Apart from the aforementioned negative direct effects of ST, husbands' PTSD, and marital relations on health outcomes, the stress-buffering model suggests that marital relations may have a moderating effect on the relationship between stress and health (Cohen and Wills, 1985). Hence, a positive marital relationship may serve to buffer the negative

effects of stress, but a negative relationship may not provide this source of functional support. For example, being in stressful relationship in which the partner is feeling alone and socially isolated might produce physiological arousal and changes, which if prolonged, can produce serious morbidity (Berkman and Glass, 2000). Experimental studies also show that maintaining physical contact with a spouse under stressful experimental conditions lowered blood pressure and heart rate and increased the hormone oxytocin (Light et al., 2005). However, the moderating effects of marital adjustment on the relations between ST and health outcomes in the context of a real-life continuous stressful condition, such as among wives of ex-POWs, are yet to be explored.

Following the literature review, this study addressed three main questions: (1) Are there differences in physical diseases, SRH dimensions, and somatization between ex-POWs' wives and control wives? (2) What are the relative contributions of group (ex-POWs' and control wives) on ST, perceptions of husbands' PTSD symptoms, and marital adjustment to health dimensions? (3) Does marital adjustment moderate the relations between wives' ST and health dimensions?

Method

Participants

Data were collected in 2011 from two groups of wives (including cohabiting girlfriends) of veterans of the 1973 Yom Kippur War: (1) wives of former Yom Kippur War POWs (ex-POWs' wives) and (2) wives of a matched group of Yom Kippur War veterans who were not captured. The veterans had all previously taken part in a larger longitudinal study 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. POWs were subjected to isolation and systemic torture, consisting of the infliction of severe physical pain and great mental pressure. 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 (forming the control group). These veterans were drawn from a pool of combat soldiers who fought in the same units as the ex-POWs. These land-forces combat veterans were exposed to combat 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 sociodemographic status. 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).

Ex-POWs and controls did not differ in current age ($t(283) = -0.03, p = .98$), education ($t(283) = 0.71, p = .44$), 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 years (standard deviation (SD) = 4.56 years), and mean years of schooling was 13.97 ($SD = 3.93$). Over 60 per cent of the participants in both groups (62%) defined themselves as secular; 16.3 per cent assessed their income as lower than average, 25 per cent as average, 27 per cent as a bit higher than average, and 30 per cent 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 names of ex-POWs were passed on by IDF authorities as part of the periodic examination of veterans after their military service.

Ex-POWs' wives. This group consisted of 115 wives of IDF land-forces veterans who had been captured during the Yom Kippur War. A total of 170 ex-POWs took part in the third wave of assessment in 2008 (Dekel et al., 2012). Of the 147 married ex-POWs, 115 wives participated in the current study (78%). In all, 30 per cent ($n = 35$) were married during captivity, while the remaining were married after 1973. We do not have any information about the percentage of ex-POWs' wives who were dating their husbands while they were captured.

Control wives. This group consisted of 56 wives of control veterans. A total of 117 control veterans took part in the third wave of assessment in 2008. Of the 100 married veterans, 56 wives participated in the current study (56% of the married veterans in the third wave of assessment).

No significant group differences were found in age, country of birth, years of marriage/cohabitation, number of children, work status, and income status. The women's ages ranged from 36 to 79 years ($M = 57.90, SD = 5.87$). They had been married/living together from 3 to 53 years ($M = 27.82, SD = 6.54$) and had a mean of 3.13 children ($SD = 1.18$). Of these women, 52 per cent in both groups were working in full-time jobs, 26 per cent had part-time jobs, and 22 per cent were not working. The two groups differed in their religiosity and years of education. More ex-POWs' wives defined themselves as religious (30.2% vs 12.5% among control wives) and less as secular (56% vs 71.4%; $\chi^2(2) = 6.41, p < .05$). In addition, ex-POWs' wives' mean years of education were 14.16 ($SD = 3.20$) as compared to control wives ($M = 15.50, SD = 2.92; t(1) = 2.62; p < .01$).

Measures

PTSD inventory (Solomon et al., 1993). Both wives' ST and perception of husbands' PTSD symptoms were assessed with the PTSD inventory that taps the 17 symptoms listed in the *Diagnostic and Statistical Manual of Mental*

Disorders (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association (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." Women were asked about their reactions to their husbands' experiences of combat or captivity. (e.g. "I have recurrent pictures or thoughts about my husband's captivity"). As for the perception of husbands' PTSD symptoms, wives were asked about their husbands' symptoms in the previous month. The inventory has proven psychometric properties (Solomon et al., 1993). The PTSD inventory reliability value for wives' ST was Cronbach's $\alpha = .90$, and for husbands' PTSD symptoms it was Cronbach's $\alpha = .95$.

Dyadic adjustment scale (Spanier, 1976). Marital adjustment was assessed by the dyadic adjustment scale (DAS) which consists of 32 items divided to four subscales: consensus, cohesion, satisfaction, and affection expression. Participants were asked to indicate the extent to which each item described their current marital relationship. The dyadic adjustment score is the sum rating of the 32 items, in which high scores reflect better adjustment. Heyman et al. (1994) reported that the scale has very good convergent validity and discriminant validity. The scale has been widely used among both clinical and normative populations all over the world (e.g. Horesh and Fennig, 2000). In this study, Cronbach's α was 0.80.

Somatization. This subscale is one of the nine subscales of the Symptoms Checklist-90-R (SCL-90-R; Derogatis, 1977). Somatization subscale composed of 12 items tapping physical symptoms (e.g. headaches, chest pains, and lower back pains). The respondents are asked to indicate on a 5-point scale the degree to which they endorsed each symptom during the preceding fortnight. The mean score reflects the respondent's level of somatization symptoms,

as a higher score reflects a higher level of somatization. A score of 0.73 is considered a threshold for a clinical level of somatization. The SCL-90-R was found to have good validity and reliability (Derogatis, 1977; Peveler and Fairburn, 1990). In this study, Cronbach's α for the somatization subscale was 0.86.

Physical diseases and health-risk behaviors. Participants were presented with a checklist of 12 physical diseases: allergies, hypertension, heart disease, diabetes, malignant disease, neurological disease, strokes, asthma or bronchitis, teeth or gum problems, joint pain, and surgeries. Participants were also presented with a checklist of four health-risk behaviors of alcohol consumption, smoking, drugs usage, and regular use of medications. Participants were requested to indicate for each problem whether they have suffered from it, when the problem began and until when they suffered. The number of health problems list was based on common health problems covering the central body systems that were suggested by experienced general physicians and was previously used in our study of war veterans (Ohry et al., 1994).

SRH dimensions. Short-Form Health Survey (SF-36; Ware and Sherbourne, 1992). This questionnaire comprises eight health scales, referring to the previous 4 weeks. Participants in this study filled two subscales of (1) general health (5 items) and (2) social functioning (2 items) on a scale ranging from 1 (definitely not true) to 5 (definitely true). The raw scores on each subscale were recoded and transformed according to the scoring manual resulting in 0–100 total scores (Ware and Sherbourne, 1992). The higher the scores, the better the perceived health and stronger the impact of health condition on social functioning. The questionnaire was translated into Hebrew and demonstrated good construct validity (Lewin-Epstein et al., 1998). Cronbach's α reliability coefficients are 0.78 for the general health subscale and 0.89 for the social functioning subscale.

Procedure

Both groups were located through their husbands, who were veterans of the 1973 Yom Kippur War and had participated in a previous study conducted by our research group (Dekel et al., 2012). We used our former contact information records of those participants in order to contact their spouses. We sent the potential participants a letter in which we introduced this study and informed them that research assistants (licensed social workers in their graduate studies) would contact them in the following days. After receiving an explanation of the aim of this study, the wives who agreed to participate were offered the option of filling out research questionnaires either in their homes or at a location of their choice. Before filling out the questionnaires, each participant signed an informed consent form. Approval for this study was given by Tel Aviv University ethics committee.

Results

Do ex-POWs' wives and control wives differ in physical diseases, SRH dimensions, and somatization measures?

Physical diseases. To examine whether the groups differed in physical diseases rates we ran a series of χ^2 tests for independence of measures. Contrary to our hypothesis, we did not find significant differences between the ex-POWs' wives and control wives regarding rates of physical diseases. Furthermore, as can be seen in Table 1, the two groups did not differ in their total number of physical diseases and the total number of health-risk behaviors.

Health dimensions and somatization. We ran a series of *t*-tests for independent samples to examine whether ex-POWs' wives differed in their SRH dimensions from control wives. As can be seen in Table 1, ex-POWs' wives reported worse general health than control wives. No significant difference was found regarding social

functioning between the groups. Furthermore, ex-POWs' wives reported higher levels of somatization than control wives. In addition, in order to examine whether the groups differed in rates of participants reporting above the clinical cut-off score somatization, we run a χ^2 test for independence of measures. The result showed a significant association between group and clinical somatization ($\chi^2(1) = 6.29, p < .00$). More ex-POWs' wives (63.2%, $n = 72$) cross the clinical cut-off for the somatization subscale than control wives (42.9%, $n = 24$).

Do ex-POWs' wives and control wives differ in wives' ST, perception of husbands' PTSD symptoms, and marital adjustment?

We performed three multivariate analyses of variance (MANOVAs) for the three main explanatory study variables and their dimensions. In the first analysis, we found a significant difference between the two groups with respect to wives' ST: *Pillai's trace* $F(3, 151) = 6.25, p < .001, \eta_p^2 = .11$. As can be seen in Table 1, ex-POWs' wives reported a higher total number of posttraumatic stress syndromes (PTSS), intrusion, and avoidance symptoms as compared to control wives. However, we did not find group differences in the hyperarousal symptoms.

In the second analysis, we also found significant differences between the groups in the perceptions of their husbands' PTSD: *Pillai's trace* $F(3, 148) = 22.67, p < .001, \eta_p^2 = .32$. Specifically, ex-POWs' wives perceived their husbands as suffering from higher total number of PTSD symptoms and all its symptoms clusters as compared to control wives. It is worth noting that the effect sizes for all of the perception of husbands' PTSD were stronger than the wives' own PTSS.

In the third analysis, we found significant differences between the groups in the domains of marital adjustment, *Pillai's trace* $F(5, 146) = 2.33, p < .05, \eta_p^2 = .08$. As can be seen in Table 1,

Table 1. Means, SD, and statistics of physical diseases, health dimensions (SF-36), somatization, ST, perceptions of husbands' PTSS, and marital adjustment by research group.

	Ex-POWs' wives (n = 105)		Control wives (n = 50)		t(153)	Cohen's d
	M	SD	M	SD		
Total number of physical diseases	2.88	2.11	2.80	2.69	-0.21	0.03
Total number of health-risk behaviors	0.89	0.97	0.92	1.06	0.14	-0.03
Level of somatization (SCL-90-R)	1.15	0.81	0.77	0.64	-3.31**	0.48
General health—(SF-36 subscale)	64.75	21.77	76.94	17.16	3.67***	0.61
Social functioning—(SF-36 subscale)	49.56	10.06	51.33	10.57	1.06	0.24
					F	η_p^2
Total number of wives' PTSS	4.82	4.38	2.70	3.10	F(1, 155) = 9.30**	.06
Intrusion symptoms	1.36	1.63	0.34	0.74	17.71***	.10
Avoidance symptoms	1.47	1.74	0.84	1.29	5.25*	.03
Hyperarousal symptoms	1.99	1.80	1.54	1.75	2.14	.02
Total number of husbands' PTSS ^a	8.91	5.16	2.44	2.94	F(1, 152) = 67.55***	.31
Intrusion symptoms	2.71	1.99	0.52	1.14	51.93***	.25
Avoidance symptoms	3.06	2.23	0.64	1.15	52.25***	.25
Hyperarousal symptoms	3.12	1.80	1.28	1.48	39.45***	.20
Marital adjustment—total score	3.59	0.80	3.95	0.73	F(1, 152) = 7.17**	.05
Marital adjustment—satisfaction	4.37	0.80	4.64	0.86	2.45 [^]	.02
Marital adjustment—cohesion	3.61	1.24	4.26	1.93	10.42**	.06
Marital adjustment—consensus	3.44	0.95	3.85	0.89	6.34**	.04
Marital adjustment—affect	2.06	0.77	2.16	0.76	0.52	.01

ex-POWs: ex-prisoners of war; SD: standard deviation; SF-36: Short-Form Health Survey; ST: secondary traumatization; PTSS: posttraumatic stress syndrome; SCL-90-R: Symptoms Checklist-90-R.

Cohen's d indicates effect size. As a rule of a thumb, $d > 0.2$ indicates low effect size, $d > 0.5$ indicates moderate effect size, and $d > 0.8$ indicates high effect size.

^aHusbands' PTSS as reported by their wives.

[^] $p < .06$; * $p < .05$; ** $p < .01$; *** $p < .001$.

generally, ex-POWs' wives perceived their marital adjustment as less good, as compared to control wives. Specifically, ex-POWs' wives perceived their marital adjustment as less cohesive and characterized by fewer consensuses. However, ex-POWs' wives and control wives did not differ in their levels of marital satisfaction and affect.

Predicting ex-POWs' wives' health dimensions by wives' ST, perception of their husbands' PTSD, and marital adjustment

A four-step hierarchical regression analysis was conducted. In the first step of the regression, we entered two sociodemographic variables (age and years of marriage) as control variables. In the second step, we entered the group variable (ex-POWs' wives and control wives). In the third step, we entered the wives' ST, perceptions of husbands' PTSD and marital adjustment. In the last step, we entered the possible two-way interactions and one three-way interaction between the variables that were entered at the third step. Because the examination of the moderating role of the marital adjustment is exploratory, we decided to use stepwise criteria for entering variables into the final model in the fourth step. Table 2 presents regression coefficients for the prediction of the health dimensions. The total set of variables explained 39 per cent of the variance of the wives' general health ($F(8, 144) = 10.75, p < .00$), 10 per cent of the variance of the wives' number of physical diseases ($F(7, 138) = 10.23, p < .00$), and 65 per cent of the variance of the wives' levels of somatization ($F(6, 139) = 42.0, p < .00$). As can be seen in Table 2, in the last model, we found that wives' ST was associated with all health dimensions. The more wives suffered from ST, the lower their levels of general health and the higher their levels of somatization and number of health problems. Furthermore, we found that marital adjustment made a significant contribution to wives' general health and somatization. In other words, the higher a wife's reported

levels of marital adjustment, the higher her reported levels of general health and the lower her levels of somatization.

Importantly, we found that the interaction between wives' PTSS and marital adjustment made significant contributions to wives' general health. In order to examine the moderating role of marital adjustment on the relation between wives' PTSS and general health, we followed Aiken and West's (1991) and Holmbeck's (2002) recommendations and conducted post hoc probing for this possible moderator. We separated these variables into two by adding and subtracting one SD from the value for each participant (high and low wives' PTSS, high and low marital adjustment). The results show that for those who reported low levels of marital adjustment, we found a stronger relationship between wives' ST and general health ($\beta = -.53, p < .00$) than among those who reported high levels of marital adjustment ($\beta = -.21, p < .01$). Hence, if a wife reports suffering from high levels of ST and also endorses low levels of marital adjustment, her probability to report low levels of general health increases. It is worth noting that another interaction between perception of husbands' PTSD symptoms and marital adjustment was found. However, this interaction was a result of statistical artifact. When we examined it separately, it showed no significant relationship with the explained variable.

Discussion

Our findings showed that wives of ex-POWs reported worse general health, higher levels of somatization, higher levels of ST, higher levels of perceived PTSD in their husbands, and lower levels of marital adjustment, compared to wives of a matched group of control veterans. We did not find any significant differences between the physical diseases reported by ex-POWs' wives and the control wives. While some previous studies have found no somatic symptom differences between ex-POWs' wives and non-POWs' wives (e.g. Dent et al., 1998), other

Table 2. Summary of hierarchical regression coefficients of general health, number of physical diseases, and somatization by sociodemographics, perception of husbands' PTSS, wives' ST, and marital adjustment.

Predicting variables	General health (SF-36; N = 138)			Number of physical diseases (N = 139)			Somatization (SCL-90-R; N = 139)		
	β	SEb	R ² Δ	β	SEb	R ² Δ	β	SEb	R ² Δ
Step I			0.01			0.02			0.01
Age	0.04	0.08		-0.03	0.08		-0.05	0.08	
Years of education	0.08	0.08		-0.17*	0.08		-0.10	0.08	
Step II			0.04*			0.01			0.03*
Age	0.09	0.08		-0.25	0.09		-0.04	0.08	
Years of education	0.06	0.08		-0.17*	0.08		-0.06	0.08	
Group (ex-POWs' wives = 1)	-0.20*	0.18		-0.02	0.18		0.17*	0.18	
Step III			0.27***			0.10			0.61***
Age	0.04	0.07		-0.03	0.08		-0.06	0.05	
Years of education	0.08	0.08		-0.08	0.07		0.10	0.05	
Group (ex-POWs' wives = 1)	-0.09	0.19		-0.12	0.21		0.03	0.06	
Perception of husbands' PTSS	0.04	0.10		-0.18	0.10		-0.14	0.07	
Wives' PTSS	-0.44***	0.08		0.27**	0.10		0.68***	0.06	
Marital adjustment	0.25***	0.08		-0.08	0.08		-0.40***	0.05	
Step IV			0.03*						
Age	0.09	0.07							
Years of education	-0.09	0.07							
Group (ex-POWs' wives = 1)	-0.08	0.18							
Perception of husbands' PTSS	-0.02	0.11111							
Wives' PTSS	-0.44***	0.10							
Marital adjustment	0.23**	0.07							
Wives' PTSS × marital adjustment	0.30**	0.0909							
Husbands' PTSS × marital adjustment	-0.25**	0.10							
Adjusted R ²		0.38***			0.10**				0.65***

ST: secondary traumatization; SF-36: Short-Form Health Survey; SCL-90-R: Symptoms Checklist-90-R; ex-POWs: ex-prisoners of war; PTSS: posttraumatic stress syndrome.

** $p < .01$; *** $p < .001$.

studies have found that ex-POWs' wives report more psychophysiological problems than non-POWs' wives (e.g. Hall and Simmons, 1973). Our study findings are in line with Hall and Simmons' (1973) study and extend this pattern of results to other subjective aspects of health.

These results lend support to the assumption that ex-POWs' wives do not necessarily suffer from worse objective health, but rather that their reports could reflect manifestations of distress as expressed through subjective complaints or worse perception of health. Subjective SRH has been shown consistently to predict future morbidity and even mortality (Benyamini and Idler, 1999). One of the explanations is that SRH not only encompasses the many physical, psychological, and social aspects of one's current health status, but it also takes into account changes in health over time (Idler and Benyamini, 1997). Thus, it is possible that ex-POWs' wives' reports of subjective health are a proxy measure for a general experience of deteriorated health.

Living with an ex-POW who went through the traumatic characteristics of war captivity (i.e. torture and loss of personal autonomy) and might also suffer with PTSD symptoms, potentially for many years, is likely to cause considerable stress to those closest to him (Dekel and Solomon, 2006). We found that wives perceived their ex-POW husbands as suffering from significantly more PTSD symptoms as compared to the control husbands. However, we did not find that perception of husbands' PTSD symptoms contributed to wives' health domains. This finding is not consistent with previous findings that pointed to the effect of perception of husbands' PTSD symptoms on wives' distress (Renshaw et al., 2010). However, to the best of our knowledge, this study is the first to specifically examine the effect of husbands' PTSD symptoms on veterans' wives' health. It is possible that ex-POW symptoms could affect spouses' experience of stress. For example, hyperarousal symptoms can leave the sufferer aggressive and irritable toward his partner (Orcutt et al., 2003). Hence, the effect of perception of husbands' PTSD symptoms on wives' health might be

mediated through its indirect effect on wives' distress. Future studies should examine this hypothesis with regard to SRH domains. The results also show that the adverse SRH outcomes may result from the wives' own ST symptoms. Research has also found that spouses of veterans with PTSD are at risk of ST (Beckham et al., 1996) and may suffer from loneliness (Solomon et al., 1992), stress (Jordan et al., 1992), and psychiatric symptoms (Dirkzwager et al., 2005). Thus, ST stemming from the experience of living with an ex-POW who might suffer from PTSD could also increase the subjective experience of lower levels of general health and higher levels of somatization and number of physical diseases. The experience of "caregiver burden" is one of the challenges that partners of veterans with PTSD need to face (Beckham et al., 1996). It is possible that when ST symptoms are not addressed and treated, the toll of caregiver burden increases, leading to deteriorating health alongside psychological distress. Indeed, an accumulated body of research conducted among chronically ill patients' couples point to a relationship between partners' experience of caregiving burden and the psychological well-being of themselves as well as their sick spouses (Pomaki et al., 2011). For example, spouses whose partners had type 2 diabetes and attempted to exert more control over their partners' dietary behavior experienced greater burden, particularly when their partners exhibited poor dietary adherence and reacted negatively to spouses' involvement (August et al., 2011).

In this study, we also found that lower marital adjustment was associated with lower levels of general health and higher levels of somatization. Our results are consistent with the literature that shows an association between marriage and physical health (see Kiecolt-Glaser and Newton, 2001). For example, research has found that marital distress can lead to health-damaging behaviors that, in turn, can cause changes in immune responses (O'Leary, 1990). Research has also found that low marital adjustment can be a direct source of stress, which may impact allostatic processes, leading to poor health (Burman and Margolin, 1992). Marital

adjustment may impact various factors that affect health perception. For example, good marital adjustment is associated with higher self-esteem and greater well-being (Proulx et al., 2007), both of which have been found to affect health perception (Cott et al., 1999)

Importantly, we found that marital adjustment moderated the relationship between wives' ST and general health such that if a wife suffers from high levels of ST and also has low levels of marital adjustment, her probability to report low general health increases. The stress-buffering model could explain the moderating role of marital adjustment (Cohen and McKay, 1984). Despite the source of the stress lying with the husband, a strong marital relationship could nevertheless buffer the impact of stress in a number of ways. In a strong marriage, the husband can be a source of emotional support (Ross et al., 1990), even when also being a source of stress, which may reduce the effects of the stress. For example, secure attachment was found to be associated with a decrease in state anxiety levels following stress exposure (Ditzen et al., 2008). Additionally, maintaining physical contact with a spouse under stressful experimental conditions was linked to lower blood pressure and heart rate and an increase in the hormone oxytocin (Light et al., 2005).

The husband may even be able to support his wife in developing coping strategies and also provide tangible support, such as cooking meals and sharing the burden of childcare. In a poorly adjusted marriage, a husband will be less sensitive to his wife's needs and may not provide appropriate support. As spouses' perceptions of the burden related to living with someone with PTSD (e.g. Calhoun et al., 2002) or veterans' symptoms severity (Renshaw, Rodebaugh, and Rodrigues, 2008) mediated the effects of veterans' PTSD on spouses' psychological distress, one can assume the negative impact this can have on the outcomes.

There are some limitations to this study. First, the use of self-report measures, although very common in trauma studies, entails the risk of a reporting bias. Future studies should

consider gathering data from multiple informants such as the participant psychiatrist and make use of objective measures, such as observation of ex-POWs' wives actual functioning. Second, as we did not provide objective medical examinations, we cannot distinguish between perceived and actual level of health. Furthermore, we cannot draw any conclusions regarding the extent to which the somatic symptoms reflect real health issues or whether they are more psychosomatic expressions. Taken that, it is worth continuing studying the subjective experience of health of ex-POWs' wives and to extend the investigation to their experience of general well-being (Guido, 2013). Last, the lack of pre-captivity assessment of health limits our ability to infer causality.

To conclude, the findings of this study suggest that wives of ex-POWs are susceptible not only to mental health problems, but also to negative perceived health outcomes. This study found that wives' ST was associated with perceived health outcomes. This may reflect actual lower levels of health, perhaps caused by prolonged exposure to a stressful situation of living with a traumatized husband. However, we found marital adjustment to moderate the relationship between wives' ST and general health. This finding points to a possible area of intervention that addresses both "psycho" and "socio" components of marital relations (De Jong and Kleber, 2007), in order to reduce wives' psychological and physiological burden and to increase the strength of their relationship with their traumatized spouses.

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