



Low levels of posttraumatic stress symptoms and psychiatric symptomatology among third-generation Holocaust survivors whose fathers were war veterans



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ABSTRACT

There is an ongoing debate regarding the intergenerational transmission of Holocaust trauma to the third generation (TGH). However, due to the rareness of this population, there are no studies that have examined TGH individuals whose fathers were also victims of war-related trauma and captivity. This prospective study aimed to assess the role of parents' Holocaust background, fathers' posttraumatic stress symptoms (PTSS), and adult offspring's anxiety sensitivity (AS) in adult offspring's PTSS and psychiatric symptomatology. A sample of 123 Israeli father-child dyads (42 TGH and 71 non-TGH), that included 80 former prisoners of war (ex-POWs) dyads and a comparison group of 44 veteran dyads, completed AS, PTSS and psychiatric symptomatology self-report measures. Fathers were assessed 17 years following the Yom Kippur War (T1: 2008) while offspring took part in T2 (2013–2014). Surprisingly, results show that TGH participants reported lower levels of PTSS and psychiatric symptomatology than non-TGH participants, regardless of their fathers' captivity status. Interestingly, a moderated mediation analysis indicated that offspring's AS mediated the association between Holocaust background and participants' PTSS and psychiatric symptomatology, only among ex-POWs' offspring. This study provides evidence for relatively lower levels of PTSS and psychiatric symptomatology among TGH individuals whose fathers were war veterans. Ex-POWs' adult offspring who are grandchildren of Holocaust survivors reported lower levels of AS that was related to lower levels of PTSS and psychiatric symptomatology.

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1. Introduction

Research on the intergenerational transmission of trauma from Holocaust survivors (HS) to their second-generation offspring (SGH) has gained increased attention over the two last decades (e.g., Van Ijzendoorn et al., 2003). However, only a limited number of empirical studies have examined whether the intergenerational transmission of trauma spills over to the third generation of Holocaust survivors (TGH; e.g., Letzter-Pouw et al., 2014). Beyond the catastrophic implication of the Holocaust to its survivors, this is a world-wide relevant question as a number of populations around the globe continue to suffer from massive genocides that may

potentially affect their children and grandchildren through a continuous cycle of fear and pain.

The literature regarding TGH has shown various, and somewhat contradictory, findings. On the one hand, some studies indicated that TGH adults endorsed disordered eating (Zohar et al., 2007), depression and psychosomatic symptoms (Ullmann et al., 2013) and secondary traumatization symptoms (Giladi and Bell, 2013), more so than comparison groups. On the other hand, some studies have found no significant differences in various psychopathology outcomes between TGH and comparison groups (e.g., Perlstein and Motta, 2013). Moreover, a comprehensive meta-analysis revealed no evidence of intergenerational transmission of Holocaust trauma to TGH in terms of psychological functioning and attachment patterns (Sagi-Schwartz et al., 2008). This may be considered, among other explanations, as a sign of resilience.

Resilience may be nominally defined as a dynamic process encompassing positive adaptation within the context of significant

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adversity (Luthar and Cicchetti, 2000). Alternatively, it may be defined as the ability to maintain a stable equilibrium in the face of adversity (Bonanno, 2012). While such definitions may be acceptable by many researchers, a formulation of an operational definition still poses a significant challenge (e.g., Hoge et al., 2007). Some scholars assess resilience directly, as a construct comprised of various perceptions, cognitions, and emotions (e.g., Connor and Davidson, 2003). Personal qualities associated with resilience include optimism, positive affect, self-efficacy and self-esteem (Lee et al., 2013). Other scholars, however, identify resilience indirectly, by examining traumatized populations and singling out those who did not succumb to the trauma and reported no posttraumatic stress symptoms (PTSS; e.g., Bonanno and Mancini, 2008). In line with this perspective, this study will operationally define resilience as the lower levels of PTSS and psychiatric symptomatology among TGH as compared to non-TGHs.

Understandably, most studies among TGH individuals have referred to the Holocaust as an index traumatic event and relate it to various outcomes. Nevertheless, even if there is a latent vulnerability due to a family history of the Holocaust, a question remains regarding the contribution of their fathers (SGHs), who possibly underwent traumatic events of their own, such as war and/or captivity. War captivity is one of the most severe man-made traumatic events to which an individual can be subjected. Beyond the significant risks of war, prisoners of war (POWs) endure deliberate repeated, prolonged and inter-personal human cruelty. As a result, ex-POWs are at an increased risk of mortality, deteriorated physical health, long-term mental health disorders and profound personality changes (Zerach and Solomon, 2014). The most common and conspicuous outcome of war and captivity is posttraumatic stress disorder (PTSD; e.g., Meziab et al., 2014). Indeed, high rates of PTSD, ranging from 16% to 88%, have been observed in ex-POW samples (e.g., Rintamaki et al., 2009). However, the intersection between the Holocaust and war-related trauma has remained relatively unexplored.

A limited number of studies have suggested that the intergenerational effect of Holocaust trauma is manifested in the context of other adversities, such as war. For example, in a follow-up study of war veterans who had no indication of psychopathology prior to combat, Solomon et al. (1988) documented higher rates of PTSD and slower recovery in SGH, compared to controls. Interestingly, a recent prospective study has shown that this trend might have changed over the years as, in the initial post-war years, Israeli SGH veterans endorsed higher PTSS and psychiatric symptoms than non-SGH veterans, however, lower rates were evident among SGH in the later years following the war (Dekel et al., 2013). In the present study we aim to explore the unique role of war captivity and fathers' PTSS in the intergenerational transmission of Holocaust trauma to TGH individuals.

The intergenerational transmission effect of war trauma and parents' combat-related PTSS on veterans' offspring's psychopathology has been exemplified in a number of studies (e.g., Lambert et al., 2014). Specifically, a recent study has reported that Israeli ex-POWs' adult offspring reported higher levels of PTSS compared to adult offspring of combatants who were not held captive (Zerach and Aloni, 2015) and their PTSS were positively related to their fathers' PTSS (Zerach et al., 2015). However, the question remains, what are the possible paths from the fathers' PTSS to the offspring's psychopathology when the offspring are also TGH?

Among others, SGHs may undergo epigenetic changes that might put them at risk for PTSD and may be transmitted to TGH (Yehuda et al., 2015). Moreover, HS that were still occupied with their traumatic losses may have exhibited a disruption in their parenting practices (Schuengel et al., 1999), which formed a problematic parenting model for posttraumatic SGH. In addition, a

number of studies have focused on the unique familial characteristics of TGH, such as parental over-involvement and over-protection (Scharf, 2007), emotional neglect and the urge to please the parents (Scharf and Maysel, 2011), high family involvement (Palgi et al., 2015), and high perceived parental burden (Letzter-Pouw et al., 2014). It is thus plausible that both problematic parenting and a stressful family environment of SGH posttraumatic veterans, as two mutual and related paths, might increase TGH's vulnerability for anxiety sensitivity, which could be another possible mediator in this chain.

Anxiety sensitivity (AS) is defined as cognitive individual differences characterized by a fear of anxiety-related symptoms, based on the belief that they will have harmful consequences (Reiss, 1991). It is accepted that AS is comprised of three components, corresponding to fear of physical catastrophe (e.g., heart attack), fear of mental incapacitation (e.g., becoming insane), and fear of social concerns (e.g., embarrassment; Zinbarg et al., 1997). Etiologic factors contributing to AS dimensions might include both genetic origins and environmental events, such as early learning experiences about the dangerousness of arousal-related sensations or the experience of unpredictable stressful life events (e.g., McLaughlin and Hatzenbuehler, 2009). There is evidence that AS is an important factor in the maintenance and exacerbation of PTSD (e.g., Fetzner et al., 2012). Specifically, a recent study found that fear of physical catastrophe is the strongest AS dimension in the prediction of PTSD (Fetzner et al., 2012). However, to our knowledge, no study has examined the role of offspring's AS in the intergenerational transmission of Holocaust trauma.

For this study we hypothesize that: (a) TGH will report higher levels of PTSS, psychiatric symptomatology and anxiety sensitivity than non-TGH; (b) TGH ex-POWs' offspring will report higher levels of PTSS, psychiatric symptomatology and anxiety sensitivity than non-TGH ex-POWs' offspring; (c) fathers' PTSS will be positively related to offspring's PTSS, psychiatric symptomatology, and AS; (d) offspring's AS will mediate the relation between Holocaust background (TGH vs. non-TGH groups) and offspring's PTSS and global psychiatric symptomatology index (GSI); (e) the indirect relations between Holocaust background and PTSS and GSI will be moderated by group (ex-POWs' vs. veterans' offspring) and offspring's fathers' PTSS.

2. Method

2.1. Participants

This study constitutes part of a larger longitudinal study assessing the psycho-social impact of war captivity (for more details see Solomon et al., 2012). The sample consisted of 123 Israeli father-adult offspring dyads in which the father was a veteran from the Israeli Defense Forces (IDF) land-forces during the 1973 Yom Kippur War. The sample was divided into the following two groups: (a) 79 dyads of ex-POWs and their adult offspring; and (b) 44 control dyads in which the fathers fought on the same fronts as the ex-POWs but were not held captive, and their adult offspring. Control participants were selected on the basis of their similarity to the ex-POWs in regards to relevant military service and personal variables and were sampled from IDF computerized data banks. Data of the present study were collected from the fathers in 2008 (T1), and from the adult offspring in 2013–2014 (T2).

Thirty-seven percent ($n = 46$) of the offspring participants self-identified as TGH (i.e., having a background of at least one grandparent who was a Holocaust survivor under Nazi or pro-Nazi domination during the Second World War); 31.1% ($n = 14$) reported having a paternal grandparent who was a Holocaust survivor, 46.7% ($n = 21$) a maternal grandparent, and 22.2% ($n = 10$) both

paternal and maternal grandparents. Sixty-three percent ($n = 77$) were classified as non-third-generation Holocaust survivors.

As can be seen in Table 1, SGH and non-SGH fathers did not differ in T1 in terms of age, education, fathers' country of birth, and birth order. Furthermore, the groups did not differ in participation in previous wars, combat exposure or negative life events after the war. The groups did differ in religiosity status, with higher rates of traditional religiosity among non-SGH compared to SGHs.

The TGH and non-TGH adult offspring groups did not differ in age, gender, birth order, marital status, military service, place of birth, employment, and income. The groups did differ in years of education, with TGH adult offspring reporting more years of education compared to non-TGH offspring. The groups also differed in level of religiosity, with higher rates of traditional religiosity among non-TGH compared to TGH.

Among TGH, 54.3% ($n = 25$) were ex-POWs' offspring and 45.7% ($n = 21$) were control veterans' offspring. Among the non-TGH, 64.9% ($n = 50$) were ex-POWs' offspring and 35.1% ($n = 27$) were control veterans' offspring. The ratio of the ex-POWs and control veteran dyads did not significantly differ between TGH and non-TGH ($\chi^2_{(1)} = 1.35, p = .24$). Comparisons between ex-POWs' adult offspring and control veterans' offspring are presented thoroughly in a previous study (Zerach et al., 2015).

2.2. Measures

PTSD Inventory (Solomon et al., 1994). Fathers' PTSS (T1) and adult offspring's PTSS (T2) were assessed using a self-report scale corresponding to the PTSD symptom criteria listed in the DSM-IV-TR (American Psychiatric Association, 2000). Subjects were asked

Table 1
Socio-Demographic characteristics of TGH and non-TGH dyads.

Fathers' variables (T1)	TGH dyads (n = 78)	Non-TGH dyads (n = 42)		
Age	$M=57.82$ ($SD = 6.32$)	$M=57.27$ ($SD = 5.37$)	$t(104) = -1.14$	
Education	$M=14.95$ ($SD = 4.01$)	$M=13.78$ ($SD = 4.02$)	$t(104) = -.45$	
Participation in previous wars	$M=.38$ ($SD = .73$)	$M=.44$ ($SD = .94$)	$t(110) = .36$	
Combat exposure	$M = 1.45$ ($SD = .68$)	$M = 1.46$ ($SD = .61$)	$t(55) = .73$	
Negative life events since war	$M = 6.64$ ($SD = 4.76$)	$M = 7.04$ ($SD = 5.23$)	$t(110) = -.40$	
Father's country of origin	Israel America Europe	29 (72.5%) 5 (12.5%) 6 (15%)	48 (75%) 12 (18.8%) 4 (6.3%)	$\chi^2_{(2)} = 2.56$
Level of religiosity	Secular Traditional Religious	32 (78%) 5 (12.2%) 4 (9.8%)	32 (49.2%) 26 (40%) 7 (10.8%)	$\chi^2_{(2)} = 10.12^{**}$
Offspring's variables (T2)				
Age	$M = 35.50$ ($SD = 5.64$)	$M = 34.94$ ($SD = 6.24$)	$t(121) = -.50$	
Education (years)	$M = 16.12$ ($SD = 2.87$)	$M = 15$ ($SD = 2.81$)	$t(121) = -2.12^*$	
Gender	Female Male	21 (45.7%) 25 (54.3%)	40 (51.9%) 37 (48.1%)	$\chi^2_{(1)} = .45$
Marital status	Single Married Divorced Other	18 (39.1%) 24 (52.2%) 3 (6.5%) 1 (2.2%)	23 (29.9%) 48 (62.3%) 6 (7.8%) 0 (0%)	$\chi^2_{(3)} = 2.98$
Military service	Complete Partial National Other	41 (89.1%) 2 (4.3%) 2 (4.3%) 1 (2.2%)	60 (79.9%) 5 (6.5%) 2 (2.6%) 10 (13%)	$\chi^2_{(3)} = 4.71$
Level of religiosity	Secular Traditional Religious Orthodox Other	36 (78.3%) 3 (6.5%) 6 (13%) 0 (0%) 1 (2.2%)	44 (57.9%) 24 (31.6%) 7 (9.2%) 1 (1.3%) 0 (0%)	$\chi^2_{(4)} = 12.59^*$
Place of birth	Israel America Europe	41 (89.1%) 1 (2.2%) 3 (8.7%)	74 (96.1%) 0 (0%) 3 (3.9%)	$\chi^2_{(2)} = 7.46$
Employment	Not working Part time job Full time job	2(4.5%) 11 (25%) 31 (70.5%)	0 (0%) 2 (2.6%) 61 (80.3%)	$\chi^2_{(2)} = 1.52$
Income	Well below average Below average Average Above average Well above average	3 (6.7%) 8 (17.8%) 8 (17.8%) 16 (35.6%) 10 (22.2%)	6 (8%) 18 (24%) 20 (26.7%) 19 (25.3%) 12 (16%)	$\chi^2_{(4)} = 3.12$
Birth order	Firstborn Second born Third born Fourth born Fifth born	30(65.2%) 11 (23.9%) 2 (4.3%) 2 (4.3%) 1 (2.2%)	46(59.7%) 19 (24.7%) 6 (7.8%) 5 (6.5%) 1 (1.3%)	$\chi^2_{(4)} = 1.04$

Note. * = $p < .05$, ** = $p < .01$.

to indicate, on a 4-point scale ranging from (1) “never” to (4) “almost always”, the frequency with which they experienced the described symptom in the previous month. Fathers referred to their experiences in combat or captivity while offspring referred to their fathers' experience of combat or captivity (e.g., “I have recurrent pictures or thoughts about my fathers' captivity”). The intensity of their PTSS was assessed by the number of positively endorsed symptoms calculated by the items in which the respondents answered “3” or “4”. In the absence of a clinical cut-off for this scale we examined PTSS differences relatively between the two study groups. The scale was found to have good psychometric properties, including high convergent validity, compared to clinical interviews based on the SCID (Solomon et al., 1994). Reliability values for fathers' total score was high (Cronbach's α : .96). The PTSD inventory reliability value for offspring's PTSS was Cronbach's α = .86.

Psychiatric symptomatology was assessed with the widely used Self-Report Checklist–90 (SCL–90; Derogatis, 1977) targeting 90 symptoms and their symptom clusters. This was administered only to offspring, at T2, who were asked to indicate how frequently they experienced each symptom during the last 2 weeks on a 5-point distress scale. In the present study, symptom clusters of depression, anxiety, paranoid ideation, obsessive-compulsive, somatization, and hostility were assessed. The subscales have high concurrent and convergent validity with similar scales in established psychiatric measurements (Dinning and Evans, 1977), such as Minnesota Multiphasic Personality Inventory (MMPI) (e.g., Derogatis et al., 1976). The SCL-90 has shown good test-retest reliability (e.g., Horowitz et al., 1988) and in this study reliability values were high (Cronbach's α for subscales ranged between .83 and .90).

Anxiety Sensitivity Index (ASI; Peterson and Reiss, 1987). This is a 16-item measure in which respondents indicate the degree to which they are concerned about possible negative consequences of physical anxiety symptoms. The ASI comprises of 3 lower-order components corresponding to fear of physical catastrophe, fear of mental incapacitation, and fear of social concerns. Offspring at T2 were asked to rate themselves on a 5-point scale ranging from (0) “very little” to (4) “very much”, with respect to feelings and emotions related to anxiety (e.g., “It scares me when I get out of breath”). The score is calculated by summing the scores of the items in each of the three factors, where the total is the sum of all of the items' scores. This questionnaire is the most commonly used measurement for anxiety sensitivity (Marshall et al., 2010), and has proved to have good validity and reliability (Rector et al., 2007). In our sample the Cronbach's α was .92.

Socio-demographic measurements included country of origin, location of residence in Israel, family status, religious orientation, age, gender, birth order, and level of education. The offspring participants were also asked about their family Holocaust background and whether the HS grandparent was paternal or maternal.

2.3. Procedure

The procedure for research conducted with the fathers was described thoroughly in a previous study (Solomon et al., 2012). Offspring groups were located through the contact information records of their fathers. We sent the potential participants a letter in which we introduced the present study and informed them that research assistants (graduate psychology students) would contact them in the following days. After receiving an explanation of the aim of the present study, the offspring who agreed to participate were offered the option of filling out research questionnaires either in their homes or at a location of their choice. Our first referral was made to the oldest child, and if he or she could not or did not want to participate, we turned to the next oldest child who agreed to

participate. If more than one child agreed to participate, they all filled out the questionnaires and we then randomly chose only one child from each family to include in the analysis. Before filling out the questionnaires, each participant signed an informed consent form. Approval for this study was given by both Tel-Aviv University and Ariel University Ethics Committee.

3. Results

3.1. Differences between TGH and non-TGH offspring of ex-POWs and veterans in PTSS, psychiatric symptomatology and anxiety sensitivity

The first aim of the current study was to examine whether TGH and non-TGH individuals, who are offspring of ex-POWs and controls, differ in PTSS, psychiatric symptomatology and AS. In the absence of a clinical cut-off for this scale we examined relative PTSS differences between the two study groups. In order to study this, we first performed a multivariate analysis of variance (MANOVA) analysis for the PTSS and its three clusters (intrusion, avoidance, hyperarousal), with Holocaust background (yes/no) and group (ex-POWs vs. veterans' offspring) as independent variables. We found a marginal significant difference between the groups with respect to offspring's PTSS general factor (*Pillai's Trace* $F(3,116) = 2.59$, $p = .056$, Partial $\eta^2 = .06$). Contrary to our first hypothesis (see Table 2), separate analysis of variance (ANOVA) analyses revealed that TGH individuals reported lower levels of total number of PTSS, intrusion, and avoidance symptoms, as compared to non-TGH. Furthermore, contrary to our second hypothesis, we did not find a significant interaction between participants' Holocaust background and fathers' captivity (*Pillai's Trace* $F(3,116) = .94$, $p = .42$, Partial $\eta^2 = .02$). Thus, TGH ex-POWs' offspring did not report higher levels of PTSS than non-TGH ex-POWs' offspring.

Next, we did not find a significant difference between the groups with respect to offspring's psychiatric symptomatology general factor (*Pillai's Trace* $F(11,109) = .99$, $p = .45$, Partial $\eta^2 = .01$). However, contrary to our first hypothesis (see Table 2), ANOVA analyses revealed that TGH reported lower levels of general psychiatric symptoms, somatization, phobic and additional symptoms, as compared to non-TGH. Furthermore, contrary to our second hypothesis, we did not find a significant interaction between Holocaust background and fathers' captivity (*Pillai's Trace* $F(3,116) = .64$, $p = .78$, Partial $\eta^2 = .01$). Thus, TGH ex-POWs' offspring did not report higher levels of psychiatric symptomatology than non-TGH ex-POWs' offspring.

Lastly, we did not find a significant difference between the groups with respect to offspring's AS general factor (*Pillai's Trace* $F(3,116) = 1.23$, $p = .30$, Partial $\eta^2 = .03$). However, as can be seen in Table 2 and Fig. 1, separate ANOVA revealed a significant interaction between Holocaust background and group in general AS ($F(1,121) = 4.25$, $p = .04$, Partial $\eta^2 = .04$) and AS cognitive dimension ($F(1,121) = 5.83$, $p = .01$, Partial $\eta^2 = .05$). Thus, while non-TGH ex-POWs' offspring reported higher levels of AS than non-TGH controls' offspring, TGH ex-POWs' offspring reported lower levels of AS than TGH controls' offspring (Fig. 2).

In addition, we examined in-group differences between TGH who had one grandparent who was a HS ($n = 39$) and TGH who had two HS grandparents ($n = 10$) in the three above mentioned study variables. Our results showed that the two groups did not differ with respect to offspring's PTSS general factor (*Pillai's Trace* $F(3, 45) = 1.81$, $p = .15$, Partial $\eta^2 = .11$). However, TGH who had two HS grandparents reported higher levels of avoidance posttraumatic symptoms ($M = 1.30$, $SD = 1.63$) as compared to TGH who had one HS grandparent ($M = .43$, $SD = .99$; $F(1, 48) = 4.52$, $p = .04$, Partial $\eta^2 = .09$). Our results also showed no significant difference

Table 2

Means and SD differences in PTSS, psychiatric symptom and AS between TGH and non-TGH, ex-POWs and veterans' adult offspring.

Offspring variables	TGH (n = 46)				Non-TGH (n = 76)				F(1,121) ^a	Eta ²
	Ex-POWs' offspring (n = 25)		Veterans' offspring (n = 21)		Ex-POWs' offspring (n = 50)		Veterans' offspring (n = 26)			
	M	SD	M	SD	M	SD	M	SD		
Total number of PTSS	2.00	2.41	1.19	1.63	3.42	3.27	2.53	2.83	6.74**	.05
Intrusion symptoms	.08	.27	.00	.00	.42	.90	.11	.43	3.58†	.03
Avoidance symptoms	.88	1.45	.33	.79	1.32	1.54	1.23	1.55	6.00**	.05
Hyper-arousal symptoms	1.04	1.24	.85	1.35	1.68	1.65	1.19	1.57	2.84	.02
SCL-90 GSI	.54	.46	.48	.37	.83	.64	.60	.45	4.27*	.04
Somatization	.36	.41	.17	.22	.50	.55	.41	.41	4.73*	.04
Obsessive	.87	.68	.84	.72	1.08	.76	.90	.75	1.27	.01
Sensitivity	.63	.74	.70	.67	1.01	.84	.68	.64	1.58	.02
Depressive	.63	.61	.59	.52	.93	.79	.73	.69	2.67	.03
Anxiety	.72	.53	.61	.45	1.09	.83	.71	.62	3.30	.03
Hostility	.46	.44	.38	.35	.79	.80	.42	.39	2.58	.02
Phobic	.24	.33	.29	.35	.51	.57	.42	.38	5.08*	.04
Paranoid	.61	.81	.49	.41	.96	.91	.57	.64	2.12	.02
Psychotic	.40	.51	.39	.42	.72	.74	.47	.49	3.19	.03
Additional	.48	.64	.33	.50	.80	.79	.68	.77	6.02**	.05
ASI-general	15.12	9.70	18.09	10.62	22.81	13.25	16.74	10.20	2.08	.02
Physical	6.88	6.98	8.23	7.06	10.77	7.65	7.48	6.17	1.34	.01
Cognitive	2.08	2.11	3.33	2.45	4.87	4.28	3.00	3.13	3.61†	.03
Social	6.16	2.57	6.52	2.31	7.16	2.77	6.25	2.19	.58	.01

Note. † = $p < .06$, ** = $p < .01$; ^a = Holocaust background (yes/no) main effect; TGH = Third-generation of Holocaust survivors, non-TGH = Not third-generation of Holocaust survivors; ASI = Anxiety sensitivity index.

between the groups with respect to offspring's psychiatric symptomatology general factor (*Pillai's Trace* $F(11, 37) = 2.01, p = .06$, Partial $\eta^2 = .37$). However, TGH who had two HS grandparents reported higher levels of obsessive symptoms ($M = 1.31, SD = .84$), depressive symptoms ($M = .95, SD = .71$), and additional symptoms ($M = .80, SD = .80$), as compared to TGH who had one HS grandparent ($M = .70, SD = .58, F(1, 48) = 7.06, p = .01$ Partial $\eta^2 = .11$; ($M = .47, SD = .49$), $F(1, 48) = 5.95, p = .02$ Partial $\eta^2 = .11$; ($M = .30, SD = .45$), $F(1, 48) = 6.83, p = .01$ Partial $\eta^2 = .13$, respectively). Lastly, we did not find significant differences between the groups in general AS and its three dimensions.

3.2. Associations between fathers' T1 PTSS and offspring's anxiety sensitivity, global psychiatric symptoms, and PTSS in T2

In this section we examined Pearson correlations between the fathers' PTSS in T1 and offspring's AS, GSI, and PTSS in T2. As seen in Table 3, results revealed significant positive relations between fathers' PTSS and offspring's AS dimensions, GSI and PTSS. Furthermore, offspring's AS dimensions were positively related to

offspring's PTSS and GSI. It is also worth noting the positive relations between offspring's PTSS and GSI.

Of importance are the correlations between the study variables, separately for the study groups. Among TGH group, we found a significant positive correlation between fathers' PTSS and offspring's PTSS ($r = .37, p < .01$), and offspring's AS ($r = .33, p < .05$), but not with offspring's GSI ($r = .29, p < .07$). Among non-TGH group, we found the same pattern of results; we found a significant positive correlation between fathers' PTSS and offspring's PTSS ($r = .26, p < .01$), and offspring's AS ($r = .47, p < .00$), but not with offspring's GSI ($r = .07, p = .58$).

3.3. Conditional indirect effects of group and fathers' PTSS in the relation between Holocaust background and offspring's PTSS and GSI through AS

In this section we examined our hypothesis that AS will mediate the relation between Holocaust background (TGH vs. non-TGH) and offspring's outcome variables, i.e., PTSS and GSI. Furthermore, the indirect relation between Holocaust background (TGH vs. non-TGH) and offspring's PTSS and GSI will be moderated by group (ex-POWs vs. veterans' offspring) and fathers' PTSS (i.e., conditional indirect effect; see Fig. 1 for hypothetical model). In order to examine our hypotheses, we used Hayes's (2012) PROCESS script for conditional indirect effect model (Model 7). In this analysis 10,000 bootstrapped samples were drawn to estimate an indirect effect of the mediator. We conducted four separate analyses in which bias corrected and accelerated 95% confidence intervals (CIs) were computed to determine statistical significance of the ab (indirect effect of Holocaust background on offspring's PTSS/GSI via AS) and c' (direct effect of Holocaust background on offspring PTSS/GSI) paths. A CI that does not include zero provides evidence of a significant indirect effect, or significant mediation. The point estimates, SEs, 95% bias corrected and accelerated (BCa) CI's are reported in Tables 3 and 4. The first models displays the path coefficients for the mediator model (with AS as the dependent variable); the second model displays the path coefficients for the dependent variable model (with offspring's PTSS/GSI as the

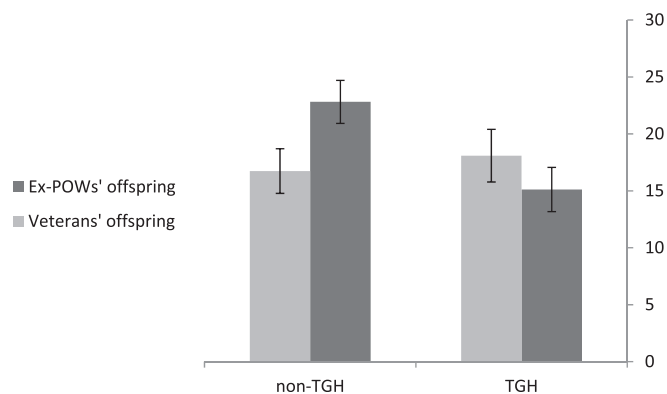


Fig. 1. Means and SEM of anxiety sensitivity general score by Holocaust background (TGH vs. non-TGH) and group (ex-POWs' offspring vs. veterans' offspring).

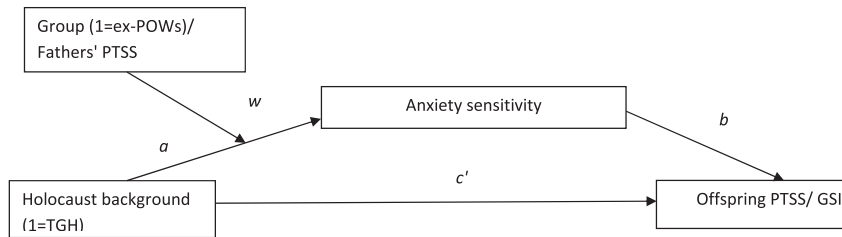


Fig. 2. Hypothesized mediation model and conditional direct and indirect effects.

Table 3 Pearson correlation coefficients of fathers' PTSS (T1) and offspring's AS dimensions, PTSS and GSI (T2).

	1	2	3	4	5	6	7
1. Fathers' total PTSS (T1)	–						
2. Offspring ASI-General (T2)	.32***	–					
3. ASI-Physical (T2)	.29***	.95***	–				
4. ASI-Cognitive (T2)	.27***	.85***	.70***	–			
5. ASI-Social (T2)	.30***	.76***	.60***	.58***	–		
6. Offspring total PTSS (T2)	.34**	.45***	.37***	.57***	.25**	–	
7. Offspring GSI (T2)	.18†	.59***	.52***	.67***	.34***	.53***	–
Mean	6.62	18.56	8.48	3.54	6.53	2.55	.66
Standard deviation	5.79	11.78	7.16	3.48	2.62	2.87	.54

Note. PTSS = posttraumatic stress symptoms, ASI = Anxiety sensitivity index, †p < .07, *p < .05, **p < .01, ***p < .001.

dependent variables); followed by the conditional indirect effects of the values of the moderators. All analyses were conducted with level of education and the sum of negative life events as covariates, for the purpose of statistical control.

As can be seen from Table 4, group (ex-POWs' vs. veterans' offspring), but not Holocaust background, was directly related to the mediator AS. Furthermore, the interaction term (group × Holocaust background) was significantly associated with AS. In addition, Holocaust background was negatively related, and AS was positively related, to the outcome variables of offspring's PTSS and GSI. Table 4 displays the conditional indirect effect of Holocaust background on offspring's PTSS/GSI at the values of group. As can be seen, among control veterans' offspring there was no indirect relationship between Holocaust background and offspring's PTSS/GSI through AS. Among ex-POWs' offspring, however, there was an indirect relationship between Holocaust background

and offspring's PTSS/GSI through AS. Following normal-theory significance tests, because the interval did not contain zero, the indirect relationship (mediation effect) between Holocaust background on offspring's PTSS/GSI through AS was found to be significant. Thus, among TGH ex-POWs' offspring there were lower levels of AS that, in turn, were positively related to lower levels of PTSS.

As can be seen from Table 5, Holocaust background was not directly related to the AS mediator, but fathers' PTSS was positively related to AS. AS, but not Holocaust background, was positively related to the outcome variables of offspring's PTSS and GSI. Furthermore, the interaction term (group × Holocaust background) was not significantly associated with AS. Table 5 displays the conditional indirect effect of Holocaust background on offspring's PTSS/GSI at the values of fathers' PTSS: one standard deviation below the mean (–1), the mean (0), and one standard deviation

Table 4 Conditional indirect effects of group (ex-POWs vs. veterans' offspring) in the relation between Holocaust background and offspring's PTSS and GSI through AS.

Predictors	b	SE	t	(LLCI,ULCI)	b	SE	t	(LLCI,ULCI)
Mediator variable model (DV = AS)								
Holocaust	4.17	3.71	1.12	(–3.18, 11.53)	3.79	3.65	1.03	(–3.44, 11.03)
Group	6.55	3.17	2.06*	(.26, 12.84)	6.22	3.12	1.99*	(.03, 12.41)
Group* Holocaust background	12.–11.45	54.4.77	–2.39**	(–20.92,–1.97)	–11.10	4.73	–2.34*	(–20.49,–1.70)
Dependent variable model (DV = Offspring's PTSS)								
Holocaust	–.93	.46	–2.02*	(–1.86, –.01)	–.13	.08	–1.58	(–.30, .03)
AS	.09	.02	3.86***	(.04,.14)	.02	.01	5.73***	(.01,.03)
Conditional indirect effects of Holocaust background on DV at the values of group (1 = ex-POWs)								
Group	b	SE	t	(LLCI,ULCI)	b	SE	t	(LLCI,ULCI)
0 = controls' offspring	.38	.36	1.05	(–.24,1.19)	.10	.09	1.12	(–.08,.29)
1 = ex-POWs' offspring	–.67	.29	–2.22*	(–1.35,–.16)	–.19	.08	–2.37*	(–.38, –.03)
Indirect effect of Holocaust on PTSS through AS				Indirect effect of Holocaust on GSI through AS				
	b	SE	t	(LLCI,ULCI)	b	SE	t	(LLCI,ULCI)
AS	–1.06	.48	2.20*	(–2.18,–.25)	–.29	.13	2.20*	(–.58,–.05)

Note. *p < .05**, p < .01, ***p < .001; group (0 = controls; 1 = ex-POWs children); LLCI = lower level 95% confidence interval; ULCI = upper level 95% confidence interval. DV = Dependent variable; PTSS = Posttraumatic stress symptoms; AS = Anxiety sensitivity.

Table 5

Conditional indirect effects of fathers' PTSS in the relation between Holocaust background and offspring's PTSS and GSI through AS.

Predictors	b	SE	t	(LLCI,ULCI)	b	SE	t	(LLCI,ULCI)
Mediator variable model (DV = AS)								
Holocaust	−3.34	2.49	−1.39	(−8.31, 1.46)	−3.44	2.47	−1.39	(−8.35, 1.46)
Fathers' PTSS	.45	.22	2.05*	(.01, .88)	.45	.21	2.05*	(.01, .88)
Fathers' PTSS* Holocaust background	−50.0	.45	−1.11	(−1.41,.40)	−50.0	.45	−1.10	(−1.40,.40)
Dependent variable model (DV = Offspring's PTSS)								
Holocaust	−.84	.49	−1.73	(−1.82, .12)	−.14	.09	−1.55	(−.32, .03)
AS	.09	.02	3.80***	(.04,.14)	.02	.01	5.50***	(.01,.03)
Dependent variable model (DV = Offspring's GSI)								
Holocaust	−.84	.49	−1.73	(−1.82, .12)	−.14	.09	−1.55	(−.32, .03)
AS	.09	.02	3.80***	(.04,.14)	.02	.01	5.50***	(.01,.03)
Conditional indirect effects of Holocaust background on DV at the values of fathers' PTSS (+1/−1 SD)								
Fathers' PTSS	b	SE	t	(LLCI,ULCI)	b	SE	t	(LLCI,ULCI)
−5.83	−.03	.29	−1.20	(−.64,.53)	−.01	.07	−.01	(−.18,.13)
0	−.31	.23	−1.34	(−.86,.11)	−.09	.06	−1.28	(−.25,.02)
5.83	−.60	.40	−1.50	(−1.49,.11)	−.17	.11	−1.54	(−.43,.03)
Indirect effect of Holocaust on PTSS through AS				Indirect effect of Holocaust on GSI through AS				
	b	SE	t	(LLCI,ULCI)	b	SE	t	(LLCI,ULCI)
AS	−.04	.04	1.00	(−.14,−.03)	−.01	.01	−1.08	(−.04,.01)

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; group (0 = controls; 1 = ex-POWs children); LLCI = lower level 95% confidence interval; ULCI = upper level 95% confidence interval. DV = Dependent variable; PTSS = Posttraumatic stress symptoms; AS = Anxiety sensitivity.

above the mean (1). As can be seen, conditional indirect effects show that there were not any differences at the levels of fathers' PTSS. Following normal-theory significance tests, because the interval contained zero, the indirect relationship (mediation effect) between Holocaust background on offspring's PTSS/GSI through AS was not found to be significant for any value of AS.

4. Discussion

In the current study we examined whether Holocaust background posits a vulnerability factor for PTSS and psychiatric symptomatology among TGH whose fathers experienced war-related trauma and captivity. Contrary to what we expected, TGH participants reported lower levels of PTSS and psychiatric symptomatology than non-TGH participants, regardless of their fathers' captivity status. Moreover, while non-TGH ex-POWs' offspring reported higher levels of AS than non-TGH controls' offspring, TGH ex-POWs' offspring reported lower levels of AS than TGH controls' offspring. Interestingly, a moderated mediation analysis indicated that offspring's anxiety sensitivity mediated the association between Holocaust background and participants' PTSS and psychiatric symptomatology, only among ex-POWs' offspring.

Our results regarding the lower levels of PTSS and psychiatric symptomatology among TGH participants extends the previous literature which indicated that there is no evidence of intergenerational transmission of Holocaust trauma to TGH in terms of psychological functioning and attachment patterns (Sagi-Schwartz et al., 2008). Although there are positive correlations between fathers' and offspring's PTSS and AS among TGH group, our results suggest that not only do TGH individuals not endorse higher levels of psychopathology (e.g., Giladi and Bell, 2013), adult TGH whose fathers were war veterans and ex-POWs reported lower levels of PTSS and psychiatric symptomatology, as compared to non-TGH individuals.

Three explanations for these intriguing findings are suggested. First, a recent prospective study by our team showed that Israeli SGH veterans endorsed higher PTSS and psychiatric symptoms than non-SGH veterans in the initial post-war years, however, lower rates were evident among SGH in later years following the war (Dekel et al., 2013). These results may reflect longitudinal protective effects, such as adaptive coping used by HS during their

struggle, which might have been conveyed to the next generation (Van Ijzendoorn et al., 2003). It is plausible that those SGH veterans who were less troubled by PTSS and psychiatric symptoms were able to engage in positive parenting (Zerach et al., 2012) that enhanced TGH individuals' resilience.

Second, it is possible that ex-POWs whose parents survived the Holocaust and who themselves survived captivity were genetically stronger than the general population. Even under the adverse conditions of the Holocaust (i.e., enduring psychological, nutritional, and sanitary adversity), survivors managed to cope in a way that safeguarded their subsequent development into old age (e.g., Shanan, 1988). Indeed, recently it was reported that Holocaust survivors have a significantly lower risk for early mortality than comparisons without a Holocaust background, which may be related to their specific genetic, temperamental, physical, or psychological resilience (Sagi-Schwartz et al., 2013). This bio-socio-psychological advantage may genetically transmit to their offspring, making them more resilient.

Third, it is possible that the specific nature of the assessment biased the results. While most studies among TGH have referred to the Holocaust as an index traumatic event, in the present study TGH individuals self-reported about both their PTSS and general psychiatric symptoms with reference to their fathers' experience of combat or captivity. TGH participants who reported about their own adaptation might have presented a resilient 'facade' when considering their perception of the horrors that their parents and grandparents endured. Thus, they may not have disclosed their true psychological condition as they might have considered it to be shameful or disrespectful, in light of their parents and grandparents struggle.

While inclusion in the ex-POWs offspring group did not interact with Holocaust background in terms of PTSS and psychiatric symptoms, it did interact with regard to anxiety sensitivity. TGH ex-POWs' offspring reported lower levels of AS than TGH controls' offspring. Thus, contrary to what we expected, the familial characteristics of TGH, such as parental over-involvement and over-protection (Scharf, 2007), emotional neglect and the urge to please the parents (Scharf and Mayseless, 2011), combined with ex-POWs' offspring's perception of their fathers lack of care (Zerach and Aloni, 2015), did not end with TGH ex-POWs' offspring vulnerability to AS. As previously noted, AS examines cognitive individual differences

characterized by a fear of anxiety-related symptoms, based on the belief that they will have harmful consequences (Reiss, 1991). It is possible that these unique familial environments challenged TGH individuals to not concentrate too much on their bodily sensations, amidst the fearful emotions. In this way they might have presented better adaptation in terms of AS.

Moreover, offspring's AS mediated the association between Holocaust background and participants' PTSS and psychiatric symptomatology, only among ex-POWs' offspring. It is suggested that TGH individuals whose fathers' were ex-POWs grew up to be less sensitive to their bodily sensations and therefore reported lower levels of AS. Lower AS, in turn, provided them with the psychological shield against their fathers' frightening behaviors and cognitions (e.g., Rosenheck and Fontana, 1998). Thus, although TGH ex-POWs' offspring's attitudes toward their fear-related bodily sensations might reflect somewhat self-deceptive or denial coping, it is proof of a powerful coping strategy in the face of the complicated stressors that they have been exposed to since childhood.

This study has several limitations. First, due to the attrition of participants between measurements, the sample may be somewhat selective. Second, we relied on the participants' report about their Holocaust background, without complete information on their grandparents' experiences during those years, which might hinder the specificity of our findings. Moreover, we don't have access to information regarding the origin of the grandparents that might bias the results, as the control group had higher level of religious attitudes which may be related to family origin. Third, the use of self-report measures, although very common in trauma studies, entails the risk of reporting bias. Future studies should make use of objective measures, such as participants' level of cortisol. Fourth, the lack of pre-combat assessment of the fathers' PTSD limits our ability to infer causality. Fifth, our measurements did not cover the entire span of the 40 years since the war, therefore, we were unable to monitor changes in the course of the fathers' PTSS during the gap between the war and later measurements. We also did not assess traumatic life events among the offspring groups over this span which could also possibly confound our results. Sixth, the low number of participants in the TGH group calls for future studies to replicate the proposed model with larger samples. Finally, it is possible that adult offspring's personality and mental health also affects their fathers' PTSD, and not only vice versa. Future studies should examine this assumption in prospective design studies, possibly with the unique contribution of mothers' PTSS and parenting behaviors.

Conflicts of interest

Gadi Zerach 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.

Contributors

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

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