Psychological Trauma: Theory, Research, Practice, and Policy

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Intergenerational Transmission of Captivity Trauma and Posttraumatic Stress Symptoms: A Twenty Three-Year Longitudinal Triadic Study

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Objectives: The aversive, long-term toll of war captivity and fathers' combat-induced posttraumatic stress disorder symptoms (PTSS) on adult offspring's mental health has been recently exemplified. However, studies that have examined the implication of PTSS of both fathers and mothers in the intergenerational transmission of trauma to offspring are still lacking. This prospective study assessed the unique and combined effects of former prisoners of war (ex-POWs) fathers' and mothers' PTSS in adult offspring's PTSS. ***Method:*** A sample of 123 Israeli father–mother–offspring triads (79 ex-POW triads and a comparable group of 44 veteran triads) completed self-report measures. Following the 1973 Yom Kippur War, fathers participated in 3 waves of measurements (1991, 2003, 2008), mothers participated in 2 waves of measurements (2004, 2011), while offspring took part in 2014. ***Results:*** Both fathers' and mothers' PTSS were positively related to offspring's PTSS. Among ex-POW triads, fathers' PTSS in 2003 and 2008 and mothers' PTSS in 2004 predicted offspring's PTSS in 2014. Interestingly, serial multiple mediation model results showed that mothers' PTSS in 2004 mediated the link between fathers' PTSS in 1991 and offspring's PTSS in 2014. Furthermore, fathers' PTSS in 2008 mediated the link between mothers' PTSS in 2004 and offspring's PTSS in 2014. ***Conclusions:*** Over time, both ex-POWs fathers' and mothers' PTSS are implicated in their offspring's PTSS. However, both direct and indirect effects of both parents' posttraumatic reactions contribute to the intergenerational transmission of captivity related trauma.

Keywords: captivity, PTSS, secondary traumatization, family, triad

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War captivity is one of the most severe human-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 interpersonal human cruelty. As a result, ex-POWs may suffer from higher rates of mortality and deteriorated physical health (e.g., Solomon, Horesh, Ein-Dor, & Ohry, 2012), long-term mental health disorders (e.g., Rintamaki, Weaver, Elbaum, Klama, & Miskevics, 2009) and profound personality changes (e.g., Zerach & Solomon, 2013). 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; Solomon et al., 2012)

Traumatic events may also entail long-term consequences not only for the direct victims, but also for their significant others, as conceptualized in the term *secondary traumatization* (ST; Figley, 1983). Recently, the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–5*; American Psychiatric Association, 2013) included, as part of the A criterion of the PTSD diagnosis, a specification of indirect exposure to repeated or extreme, aversive details of the event(s) that involved actual or threatened violence or accident. Therefore, the *DSM–5* suggests that in specific cases, indirectly exposed individuals may also meet the criteria for potential PTSD. PTSD and posttraumatic stress symptoms (PTSS) experienced by family members of combatants have been studied mainly in veterans' wives (e.g., Renshaw et al., 2011) and ex-POWs' wives (e.g., Zerach, Greene, & Solomon, 2015).

The intergenerational transmission effect of war trauma on veterans' offspring's psychopathology has recently attracted growing interest (e.g., Maršanić, Margetić, Jukić, Matko, & Grgić, 2014). However, only limited scientific attention has been paid to adult offspring of ex-POWs in the existing literature (Zerach & Aloni, 2015). The effects of parental trauma on children have been reported in a number of studies, mainly through the prism of maternal exposure to stress and PTSS (e.g., Bowers & Yehuda, 2016). Specifically, paternal stress responses were examined in case studies (e.g., Rosenheck & Nathan, 1985), empirical studies (e.g., Ahmadzadeh & Malekian, 2004), and meta-analyses (Lambert, Holzer, & Hasbun, 2014), which exemplified the associations between fathers' combat-related PTSS and children's psychological difficulties and behavioral problems. Recently, a prospective

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study's results showed that ex-POWs' current PTSD and PTSD trajectories over time were positively related to their adult offspring's PTSS (Zerach, Kanat-Maymon, Aloni, & Solomon, 2016). Nevertheless, a question remains regarding the unique role of the primary survivor's paternal PTSS, as compared to the secondary maternal PTSS, that might independently and/or additively affect offspring's PTSS.

Understandably, longitudinal research that accounts for the effects of stress exposure and PTSS in both fathers and mothers as implicated in their offspring's PTSS is very rare. Most of this research has been carried out among pediatric patients following severe medical conditions (i.e., cancer) and revealed positive associations between parents' PTSS and children's distress (e.g., Landolt, Ystrom, Sennhauser, Gnehm, & Vollrath, 2012). Among war-related samples, Kuwaiti children whose fathers were involved in the First Gulf War were examined. Results showed that although children with two parents suffering from PTSD had significantly higher anxiety/depression scores, the mother's anxiety was the most frequent and important predictor of the child's outcome variables (Al-Turkait & Ohaeri, 2008). Another study among Holocaust survivors' offspring showed that maternal, not paternal, PTSD predicted offspring psychiatric problems, including PTSD. This effect, however, was stronger in the presence of paternal PTSD (e.g., Yehuda, Bell, Bierer, & Schmeidler, 2008). Maternal PTSD has also been more strongly associated with lower cortisol levels and greater glucocorticoid sensitivity in Holocaust offspring, more so than paternal PTSD (Lehrner et al., 2014). Moreover, among offspring of Holocaust survivors, the transmission of PTSD was not only from the mother, but also the father and even the grandfather played a role in the offspring's secondary traumatization (Letzter-Pouw, Shrira, Ben-Ezra, & Palgi, 2014).

Nevertheless, studying the effects of parental PTSS demands an independent assessment of both parents' and offspring's symptoms, as parents' reports on their offspring's PTSS and offspring's reports on their parents' PTSS, may be biased by the reporters own mental health. Moreover, the aforementioned studies considered paternal and maternal traumatic experiences as equal in their magnitude and did not assess the associations between primary victim's and secondary victim's PTSS. Importantly, most of these studies have also failed to take into account the mutual associations and the possible indirect (mediated) paths of intergenerational transmission of war trauma between fathers' and mothers' PTSS and their offspring's PTSS.

In the absence of empirical studies examining these mutual effects, we can refer to the bidirectional cognitive–behavioral interpersonal model (Monson, Fredman, & Dekel, 2010). This model provides a systemic framework for understanding the interactions between veterans' and the wives' reactions to their husbands' trauma by pointing to overlapping behavioral (e.g., classical conditioning processes), cognitive (e.g., disrupted schema of safety), and emotional (e.g., guilt, shame, anger) mechanisms that affect an individual's PTSD and relationship adjustment. These factors were also found to interact at the dyadic level and affect both spouses' psychological distress and their close relationship dimensions (e.g., intimacy, cohesion). The systemic processes of this model potentially leads to outcomes that are, at times, adaptive and promote recovery and, at other times, maladaptive and influence the chronicity of the veterans' PTSD, wives' PTSS and both spouses' marital relations. Thus, this model provides a framework that allows bidirectional influences between veterans' primary PTSS and spouses' secondary PTSS to be examined in the process of intergenerational transmission of war trauma to their offspring.

A few studies among veteran couples have reported that wives' PTSS is correlated with their husband's PTSS (e.g., Riggs, Byrne, Weathers, & Litz, 1998). A meta-analysis showed a moderate effect for survivors' PTSD on their partners' psychological distress, with a stronger effect seen among military samples (Lambert, Engh, Hasbun, & Holzer, 2012). Thus, it can be assumed that paternal stress is transmitted to his offspring both directly and indirectly, through his effects on his spouse (e.g., ex-POWs' offspring's mothers). It is suggested that the primary trauma survivor may inflict his personal and marital distress on his spouse (Zerach & Aloni, 2015), which in turn increases burden and responsibility on the wife, potentially accumulating and impacting her parental functioning (e.g., Dekel, Goldblatt, Keidar, Solomon, & Polliack, 2005). As wives in many families of posttraumatic veterans' families often take a central role as the primary caregivers, more frequently than fathers (Pleck, 1997), the effects of their posttraumatic reaction can have an impact on two indirect paths. Mothers' distress and PTSS may mediate the effect of fathers' PTSS and transfer paternal stress effects to offspring. However, following the bidirectional models (e.g., Monson et al., 2010), mothers' PTSS may hinder the primary traumatized veteran's coping with his PTSS, which might bring more distress to his interactions with his offspring. Thus, fathers' PTSS may mediate the effect of mothers' PTSS on offspring.

This study addresses five main hypotheses: (a) ex-POWs' PTSS at T1, T2, and T3 will be positively related to their adult offspring's PTSS; (b) wives of ex-POWs' PTSS at T1 and T2 will be positively related to their adult offspring's PTSS; (c) wives of ex-POWs' PTSS at T1 and T2 will mediate the link between ex-POWs' PTSS at T1, T2, and T3 and adult offspring's PTSS; (d) Ex-POWs' PTSS at T2 and T3 will mediate the link between mothers' PTSS at T1 and T2 and adult offspring's PTSS.

Method

Participants

The sample consisted of 123 Israeli father–mother–adult offspring triads in which the father was a veteran from the Israeli Defense Forces land-forces during the 1973 Yom Kippur War. The sample was divided into the following two groups: (a) 79 triads of ex-POWs, spouses, and adult offspring; and (b) 44 comparable triads in which the father fought on the same fronts as the ex-POWs but were not held captive and their spouses and adult offspring. Comparable participants were selected on the basis of their similarity to the ex-POWs on relevant military and personal variables such as age, combat exposure and rank, at each point of measurement. Data were collected from fathers at three time points: 1991 (Ft1: Father Time 1), 2003 (Ft2: Father Time 2), and 2008 (Ft3: Father Time 3). As can be seen in the supplemental table 1, ex-POWs and comparable veterans did not differ at T3 in age, education, religiosity or fathers' country of birth. Furthermore, the ex-POWs and prior combatants did not differ in participation in previous wars, combat exposure and number of negative life events after the war.

Data were collected from mothers at two time points: 2004 (Mt1: Mother Time 1) and 2010–2011 (Mt2: Mother Time 2). Data were collected from their adult offspring at one time point (2013–2014) as detailed below (the offspring's time point will be referred to as T4). The flowchart in the supplemental figure 1 demonstrates attrition and addition among mothers and fathers across the assessment points.

In addition, ex-POWs' wives and comparable wives did not differ at T2 in age, education, religiosity, or income. In addition, the groups did not differ in country of origin, negative life events after the war and military service.

POWs' adult offspring. This group consisted of 79 adult offspring, of whom 37 (47%) were male and 42 (53%) were female, whose ages ranged from 22 to 53 ($M = 35.19$, $SD = 6.44$). Twenty-five participants (22.8%) were born before the war and captivity while the rest were born after the war. No differences were found among the adult offspring in the context of their birth before or after the war. We contacted 92 adult offspring and the response rate in this group was 87%, meaning that 79 participated and 12 declined to participate.

Comparable adult offspring. This group consisted of 44 participants, of whom 24 (54.5%) were male and 20 (45.5%) were female. Ages ranged from 21 to 47 ($M = 34.84$, $SD = 5.44$). Twelve participants (18.5%) were born before the war, while the rest were born afterward. We contacted 68 adult offspring, of which 14 declined to participate. The other 10 who were not part of this study were offspring of combatants who did not participate in any of the waves of measurement; hence, they were omitted from the analyses. Response rate in this group was 76% (44 of 58).

As can be seen in the supplemental table 1, the two adult offspring groups did not differ in age, gender, birth order, marital status, military service, level of religiosity, place of birth, employment, and income. The groups did differ in the years of education, with comparable adult offspring reporting more years of education than POWs' adult offspring.

Handling Missing Data

Triads were included in the sample only if both veterans and their wives participated in at least one wave of measurement, with complete participation of their offspring in the fourth wave. The valid data for offspring was $n = 122$ (one missing, 0.8%); for fathers $n = 121$ (two missing, 1%), $n = 91$ (32 missing, 26%), $n = 114$ (nine missing, 7%), at Ft1, Ft2, and Ft3, respectively; and for mothers $n = 61$ (62 missing, 50%), $n = 72$ (51 missing, 41%), at Mt1 and Mt2, respectively. To decide whether the data was missing at random, we conducted analyses of differences between these groups in all of the variables, in and between partners, using Little's Missing Completely at Random test. The analysis revealed that the data were missing at random, $\chi^2(52) = 67.6$, $p = .13$. However, one cannot negate that there is no specific missingness that should be revealed. Moreover, missingness due to the variable with missing values itself cannot be proved (e.g., missing values in PTSS that correlate to high PTSS). The first can be tracked with supplementary t tests that indicated that the missingness was related to the observed data. The only pattern found was that mothers with high PTSS at Mt1 tended to participate at Mt2. Hence, we assumed that the data were missing at random, which is the pattern where the data is not missing completely at random as there is a specific pattern revealed however missingness in the variable itself cannot be proven (Collins, Schafer, & Kam, 2001).

Missing data were handled with maximum likelihood (ML) when running models in AMOS 21. Compared to conventional methods such as arithmetic mean, listwise or pairwise deletion and, as the current data is longitudinal, ML was recommended as an optimal method for computing missing data to avoid biased data (e.g., Schafer & Graham, 2002). This method uses all the available relevant data for each participant as missing information can then be partially recovered from earlier or later waves. Longitudinal modeling by ML of missing responses is very effective if it is conducted for a longitudinal model that borrows information across waves and across partners that can serve as auxiliary variables (Schafer & Graham, 2002). This study used variables measured for both partners and offspring and across waves to increase the likelihood for optimal estimations of missing values. The final sample (after ML was implemented) comprised of 123 Israeli triads.

Measures

PTSD Inventory. Fathers', mothers' and offspring's PTSS were assessed by using a self-report scale, the PTSD Inventory (Solomon et al., 1993), corresponding to the PTSD symptom criteria listed in *DSM–IV–TR* (American Psychiatric Association, 2000). Fathers were asked 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 relation to their experience of combat or captivity. Mothers and offspring were asked, on the same scale, the frequency with which they experienced the described symptom in the previous month, in relation to their partners' or fathers' experience of combat or captivity. (e.g., "I have recurrent pictures or thoughts about my husbands'/fathers' captivity"). The intensity of PTSS was assessed by the number of positively endorsed symptoms, which was calculated by counting the items scored by the respondents as 3 or 4. This symptom count was operationalized both as a continuous variable of number of posttraumatic symptoms (i.e., PTSS) and as a dichotomized DSM diagnosis (i.e., PTSD). Using *DSM–IV* symptom criteria, participants were identified as having PTSD if they endorsed at least one intrusive symptom, three avoidant symptoms and two hyperarousal symptoms. The scale was found to have good psychometric properties, including high convergent validity, compared to clinical interviews based on the SCID (Solomon et al., 1993). The reliability of this questionnaire for total scores were high at all assessments for fathers (Cronbach's alpha = .86, .95, .92 at T1, T2, and T3, respectively), mothers (Cronbach's alpha = .91, .92 at T1 and T2, respectively), and offspring (Cronbach's $\alpha = .86$).

Life Events Checklist. The Life Events Checklist (LEC; Gray, Litz, Hsu, & Lombardo, 2004) is comprised of 17 potential traumatic events over the lifetime of the participant that can lead to posttraumatic stress disorder or psychological distress (e.g., work or car accident, physical or sexual assault, exposure to violent death). The use of this questionnaire was for the purpose of statistical comparison. For each item, the respondent marked whether the event happened to him/her personally (0), was witnessed by him/her (1), heard of it (2), not sure (3), or irrelevant (4). Items that were marked as happened personally (0) were encoded as 1, whereas the other items (1–4) were coded as 0. The sum of

negative life events that participants were personally exposed to was used for analysis. The possible range of LEC index is 0 to 17. The LEC has shown good psychometric properties (Gray et al., 2004). The LEC inventory reliability in the current study was Cronbach's $\alpha = .87$.

Sociodemographic measurements. All family members were assessed regarding the demographic characteristics of age, level of education, number of negative life events, country of origin and religiosity. In addition, mothers and offspring were asked about their marital status, military service and income level. Fathers were also asked about their part in previous wars as well as their combat exposure.

Combat exposure. Fathers were asked about their part in previous wars as well as their combat exposure. The sum of previous wars and number of combat exposures (i.e., military assignment, unit, and duty) that participants were personally exposed to was used for analysis.

Procedure

The procedure for research conducted with the fathers (Solomon et al., 2012), mothers (Greene, Lahav, Bronstein, & Solomon, 2014), and offspring (Zerach et al., 2016) were described thoroughly in previous studies. Offspring were located through the contact information records of their fathers. After receiving an explanation of the aim of the present study, the offspring who agreed to participate were offered the option of filling out the 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. Before filling out the questionnaires (all were in Hebrew), each participant signed an informed consent form. Approval for this study was given by both Tel-Aviv University and Ariel University ethics committees.

Results

Relationship Between Captivity and PTSD

As a preliminary analysis we assessed self-reported PTSD rates according to the dichotomized *DSM–IV–TR* (American Psychiatric Association, 2000) diagnostic criteria among the ex-POW's, their wives and offspring, and in relation to the comparable groups. Chi-square analyses conducted among the fathers and mothers and their offspring are depicted in the supplemental table 3. As can be seen in the supplemental table 2, ex-POWs suffered from higher rates of PTSD than comparable veterans at Ft2 and Ft3, but not at Ft1. Ex-POWs' spouses reported higher rates of PTSD than comparable spouses at Mt1, but not at Mt2. Adult offspring of ex-POWs and comparable offspring did not differ in PTSD according to the *DSM–IV–TR*.

In addition, we analyzed the intensity of PTSS as a continuous variable among the fathers, mothers, and adult offspring. Based on statistical models (Field, 2001; Nakagawa & Cuthill, 2007), we calculated effect sizes for each comparison separately. Effects size value, based on Pearson correlation, ranged between 0 to .01, demonstrating low effect size—r of .03 as medium effect size and .5 above as large effect size (Cohen, 1988). A t tests analysis revealed that the intensity of PTSS among ex-POWs was higher than the comparable veterans at all time points—at Ft1, $M = 1.81$, $SD = 3.26$ compared to $M = 1.02$, $SD = 1.67$, $t(121) = 1.09$ $p = .07$ (medium effect size .1); at Ft2, $M = 9.2$, $SD = 4.7$ compared to $M = 2.01$, $SD = 2.48$, $t(121) = 11.09$, $p < .00$ (large effect size .71); and at Ft3, $M = 9.06$, $SD = 5.18$ compared to $M = 1.72$, $SD = 2.3$, $t(121) = 10.82$, $p = .07$ (large effect size .7). These results were also applicable among wives of ex-POWs, who were shown to have suffered from a higher intensity of PTSS compared to the comparable wives at all time points—at Mt1, $M = 4.94$, $SD = 3.64$ compared to $M = 1.81$, $SD = 1.6$, $t(121) = 6.55$, $p < .00$ (large effect size .5); at Mt2, $M = 5.09$, $SD = 3.77$ compared to $M = 2.69$, $SD = 2.02$, $t(121) = 4.58$, $p < .00$ (medium-large effect size .38)]. Similar to their fathers and mothers, adult offspring of ex-POWs reported a higher intensity of PTSS than the comparable offspring—$M = 3.02$, $SD = 3.09$ compared to $M = 1.73$, $SD = 2.89$, $t(121) = 2.58$, $p = .01$(medium effect size .23).

The Intercorrelations Between Both Parents' PTSS and Their Offspring's PTSS, in Ex-POWs and Comparable Triads

The supplemental table 3 presents the intercorrelations between fathers' and mothers' PTSS at all times of measurement and their offspring's PTSS. Specifically, using a series of Pearson correlations, we assessed the magnitude of associations between fathers' PTSS at Ft1, Ft2 and Ft3 as well as mothers' PTSS at Mt1 and Mt2 as well as their offspring's PTSS, separately for ex-POWs and comparable triads.

The analyses yielded significant relations among captivity triads between fathers' PTSS at Ft2 and Ft3 and mothers' PTSS at Mt1 and Mt2, on one hand, and their offspring's PTSS, on the other hand. Among, ex-POW triads, the higher the fathers' and mothers' PTSS, the higher their offspring's PTSS. For comparable triads, however, significant correlations were found only between both measurements of the mothers' PTSS and their offspring's PTSS. It is important to note, we used a test for equality of dependent correlations (Steiger, 1980) and revealed that the magnitude of the association between fathers' PTSS at Ft3 and offspring's PTSS was significantly different between the groups, $z(122) = 2.76$, $p < .001$ (medium effect size of .24). No differences were found between the groups regarding the effect of both fathers' PTSS at Ft1, $z(122) = 1.08$, $p = .13$, and Ft2, $z(122) = 1.12$, $p = .13$, and both mothers' PTSS at Mt1, $z(122) = 1.13$, $p = .12$, and Mt2, $z(122) = .33$, $p = .37$, and their offspring's PTSS. There was also a significant correlation between offspring's years of education and PTSS, $r = -.31$, $p < .001$. Higher levels of education years were correlated with lower PTSS.

Fathers' PTSS at Ft1, Ft2, and Ft3 and Mothers' PTSS at Mt1 and Mt2 Mediate the Link Between War Captivity and Adult Offspring's PTSS

The final aim of this study was to examine (a) whether fathers' PTSS at Ft1, Ft2, and Ft3 and mothers' PTSS at Mt1 and Mt2 mediated the link between war captivity and offspring's PTSS; and (b) whether fathers' PTSS or mothers' PTSS or both mediated the link between the same or the other parents' PTSS and their offspring's' PTSS. Because offspring' years of education differed

between the groups and was correlated with their PTSS, we inserted it into the model as a covariate.

We used structural equation modeling (SEM) to examine the multiple-step mediation analysis (Hayes, Preacher, & Myers, 2011). To estimate the model, we used AMOS 21 (Arbuckle, 2012). A model has an excellent fit to the observed data if the comparative fit index (CFI) and the Tucker-Lewis index (TLI) are greater than .95 and the root mean square error of approximation (RMSEA) are lower than .05. A model had adequate fit to the observed data if the CFI and TLI are greater than .90 and the RMSEA are lower than .10. To estimate the significance of the indirect effect we employed a bootstrapped confidence interval for the *ab* indirect effect using acceptable procedures (Preacher & Hayes, 2008). In this analysis, 5,000 bootstrapped samples were drawn to estimate the indirect effects of each of the mediators. Bias corrected and accelerated 95% confidence intervals (CIs) were computed to determine statistical significance of the *ab* paths of each mediator. A CI that does not include zero provides evidence of a significant indirect effect or significant mediation. Missing data were handled with the case-wise maximum likelihood estimation. Unstandardized coefficients are presented in the supplemental figure 2.

The analysis revealed that the multistep mediation model had an adequate fit to the observed data, $\chi^2(7) = 19.6$, $p = .006$, CFI = 96, TLI = 98, RMSEA = .12. Eliminating all insignificant paths resulted in a similar model fit, $\chi^2(14) = 32.5$, $p = .1$, CFI = 97, TLI = 99, RMSEA = .08. The chi-square difference test evaluates if the degradation of model fit is statistically significant compared to the model in which all paths were estimated. Results of the chi-square difference test revealed that removing the insignificant effects did not significantly change the model fit relative to the baseline model, $\chi^2(7) = 12.9$, $p = .93$. Hence, we continued with the nested model.

The analysis revealed that the multistep mediation model had excellent fit to the observed data. Overall we found four different significant indirect paths. First, the analysis revealed that captivity indirectly effected offspring's PTSS (T4) via fathers' PTSS at Ft2 and Ft3, in a 2-step mediation process, indirect effect $b = 1.38$, $SE = .38$, 95% CI, lower level (LL) = .735, upper level (UL) = 1.974. In other words, among ex-POWs, fathers' higher PTSS at Ft2 predicted an increase in fathers' PTSS at Ft3, which by its own merit predicted an increase in their offspring's PTSS. Second, we found a two-step mediation process in which fathers' PTSS at Ft1 indirectly affected adult offspring's PTSS via mothers' PTSS at Mt1 and fathers' PTSS at Ft3, indirect effect $b = .06$, $SE = .02$, 95% CI, LL = .029, UL = .105. In other words, fathers' higher PTSS at Ft1 predicted an increase in mothers' PTSS at Mt1, which predicted higher fathers' PTSS at Ft3, which by its own merit predicted an increase in their offspring's PTSS. Third, fathers' PTSS at Ft2 indirectly affected adult offspring's PTSS in a 1-step mediation, via fathers' PTSS at Ft3, indirect effect $b = .1$, $SE = .04$, 95% CI, LL = .050, UL = .187. In other words, fathers' PTSS at Ft2 predicted an increase in their PTSS at Ft3, which predicted elevated levels of offspring' PTSS. Fourth, we found a mediation process in which mothers' PTSS at Mt1 indirectly affected adult offspring's PTSS via fathers' PTSS at Ft3, indirect effect $b = .04$, $SE = .03$, 95% CI, LL = .010, UL = .108. In other words, mothers' PTSS at Mt1 predicted an increase in fathers' higher PTSS at Ft3, which by its own merit predicted an increase in their offspring's PTSS symptoms.

All indirect paths found were found by controlling for the other variables in the model, in other words adjusting for both fathers' and mothers' PTSS at all waves of measurement, as well as captivity. Controlling for fathers' PTSS at Ft1–Ft3 and mothers' PTSS at Mt1 and Mt2, the analysis revealed that war captivity had no direct effect on adult offspring's PTSS, $b = .00$, $SE = .00$, 95% CI, LL = .00, UL = .00. Significant direct effects were found for fathers' PTSS at Ft3, direct effect $b = .15$, $SE = .05$ 95% CI, LL = .071, UL = .257. No direct effects were found for fathers' PTSS at Ft1 and Ft2 and mothers' PTSS at Mt1 and Mt2 on their offspring's PTSS (all are $b = .0$, $SE = .0$ 95% CI, LL = .0, UL = .0). Education significantly contributed to offspring' PTSS ($b = -.26$, $SE = .08$, 95% CI, LL = −.405, UL = −.109).

It is imperative to note that in generating the nested model, omitting the path leading from fathers' PTSS at Ft3 to offspring' PTSS enabled a significant effect from mothers' PTSS at Mt1 to offspring' PTSS. This also occurred conversely by omitting the path leading from mothers' PTSS at Mt1 to offspring's PTSS, enabling a significant effect from fathers' PTSS at Ft3 to offspring's PTSS. Ultimately, we continued with the second option (omitting the path leading from mothers' PTSS at Mt1 to offspring's PTSS while maintaining the path from fathers' PTSS to offspring's PTSS) as this model was not significantly different from the full model.

Discussion

In the current study we investigated the role of both father's and mothers' PTSS in their adult offspring's PTSS. We examined our hypotheses by comparing trauma exposed ex-POWs' families and a matched group of war veterans' families, with a multiwave prospective design study, over the time of 23 years. Our results indicated that fathers' and mothers' PTSS over the years were positively related to their offspring's PTSS. Among ex-POW triads, fathers' PTSS in Ft2 and Ft3 and mothers' PTSS in Mt1, predicted offspring's PTSS. Furthermore, fathers' PTSS in Ft3 mediated the link between mothers' PTSS in Mt1 and offspring's PTSS. Interestingly, mothers' PTSS in Mt1 mediated the link between fathers' PTSS in Ft1 and offspring's PTSS. To our knowledge, the current study is one of the first to report the implications concerning the associations between war veterans' and ex-POWs' family members' PTSS, underscoring the prospective, long-term triadic mechanisms of the intergenerational transmission of trauma.

The results, which show that over the years both fathers' and mothers' PTSS are positively related to offspring's PTSS, are consistent with previous empirical studies and meta-analyses (Lambert et al., 2014) exemplifying the associations between fathers' combat-related PTSS and children's general psychological difficulties and behavioral problems. Our results are unique as they specifically relate to parents' PTSS and adult offspring's PTSS, which was operationally defined as PTSD-like symptoms. Furthermore, among ex-POWs' families, the direction of associations between the study variables resemble those of veterans' families. However, the stronger magnitude of associations among ex-POWs' family members, as compared to veterans' families suggests a 'dose-response' effect. The exposure to the prolonged and

continuous interpersonal stressors of captivity is known as a significant pathological agent (Herman, 1992) with higher than normal rates of PTSD (Solomon et al., 2012). Thus, both exposure to stress among fathers' and their stress responses (i.e., PTSS) are risk factors for secondary traumatization of their spouses and, eventually, their offspring.

Beyond the mere associations between parents' stress responses and offspring's PTSS, we explored the unique role of paternal PTSS compared to maternal PTSS, as implicated in offspring's PTSS. Indeed, we found that among ex-POW triads, fathers' PTSS in Ft2 and Ft3, and mothers' PTSS in Mt1, independently predicted offspring's PTSS in T4. Our results are in line with Al-Turkait and Ohaeri's (2008) study, which found that mother's anxiety was the most frequent and important predictor of Kuwaiti veterans' children's depression, anxiety and adaptation. Yehuda and colleagues (2008) found that among Holocaust survivor offspring, maternal and not paternal PTSD predicted offspring psychiatric problems, including PTSD. It is possible that, in comparison to the above mentioned cross-sectional studies (Al-Turkait & Ohaeri, 2008) that relied on offspring's self-report (Yehuda et al., 2008), the long-term nature of our study with parents' personal reports emphasized the differential effects of their stress responses on their offspring's PTSS. Furthermore, the effects might differ as a function of offspring's age at the time of the study in a manner that was related to both paternal and maternal caregiving behavior across time (Bailey, 1994).

Paternal and maternal stress, as it was revealed, is transmitted to offspring not only directly but also indirectly, through its effects of one spouse on the other. Furthermore, following the bidirectional cognitive–behavioral interpersonal model (Monson et al., 2010), we also found that mothers' PTSS mediated the link between fathers' PTSS and offspring's PTSS. This model provides a systemic framework that is, at times, adaptive and promotes recovery and, at other times, maladaptive and influences the chronicity of the veterans' and their wives' PTSS, as well as both spouses' marital relations. We may suggest that the maternal PTSS effect on offspring's PTSS via paternal PTSS can have another mediator chain in this reaction, that is, fathers' low levels of positive parenting (Zerach, Greene, Ein-Dor, & Solomon, 2012). When a mother is troubled by her PTSS she may have less energy to provide caring and supportive parenting to her offspring (Dekel et al., 2005). In addition, she is less minded for the mutual parenting "team work" with her husband (e.g., maintaining uniformity of messages to offspring). When both spouses are less satisfied from their parenting roles, a major component in their self-esteem is negatively impacted and might deepen their distress.

Another possible explanation regards the intergenerational transmission of captivity trauma to offspring's distress as a reflection of complex interpersonal effects. The basis of this process lies within the interpersonal nature of captivity trauma. The trauma of captivity is deeply interpersonal, as it occurs within the distorted relationship between captive and captor (Herman, 1992). Over the years, these significant alternations may spread and affect both wives' secondary PTSS (Ahmadi, Azampoor-Afshar, Karami, & Mokhtari, 2011) and marital adjustment (Dekel, Enoch, & Solomon, 2008). Thus, we suggest that mutual effects between ex-POWs and their spouses are the key process for both partners' mental health and marital functioning and, in turn, might create a possible etiological vulnerability for offspring's development of similar symptoms. On the other hand, a safe, stable and nurturing relationship between ex-POWs and their wives may also break the intergenerational cycle of stress (Jaffee et al., 2013).

This study has several limitations. First, because of the attrition of participants between measurements the sample may be somewhat selective. Although our statistical examinations revealed that the missingness in our sample was random, future studies should further try to avoid such missing values by conforming to rigorous procedures. Second, the use of self-report measures, although very common in trauma studies, entails the risk of reporting bias. A possible effect of social desirability of ex-POWs' wives and offspring should also be kept in mind while interpreting the results. Thus, participants who reported about their own adaptation might have presented a resilient facade when considering their perception of the horrors that their husbands or fathers endured. In other words, they may not have disclosed their true psychological condition as they might have considered it to be shameful or disrespectful, in light of their husbands or fathers struggle. Future studies should make use of objective measures, for example, the offspring's level of stress hormones, such as cortisol. Other possible options are to conduct an "other report," such as offspring reporting about their parents' PTSS or objective observations of father–mother–offspring triads while adaptating to experimentally induced stressful situations. Third, the lack of precombat assessment of fathers' and mothers' PTSS limits our ability to infer causality. Future prospective studies should aim for pre- and postcombat designed studies, preferably with the assessment of all veterans' family members. Fourth, 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. Fifth, as more than four decades have passed since the release of the ex-POWs from imprisonment and time of data gathering, issues of forgetfulness, memory bias, and distortion of perceptions of secondary trauma exposure of veterans' wives and offspring, may have affected results. Sixth, the low number of participants in our study might have hindered the possibility for path significance, despite the actual association. Future studies should replicate the proposed model with larger samples. Seventh, it is possible that adult offspring's personality and mental health also affects their parents' PTSS, and not only vice versa. Using prospective data for both veterans and offspring over the years would shed light on the role of offspring's distress in their fathers and mothers posttraumatic residues.

Although this study was approved by two ethics committees it goes without saying that this kind of study also entails ethical issues. For example, follow-up interviews with veterans and ex-POWs always entails the risk for reactivation of traumatic memories. Veterans were given the opportunity to stop their participation at any point and the option of speaking with a qualified mental health professional about their experiences and to discuss treatment options, was also offered. Another possible issue is the bonds between veterans and their offspring, which is reflected in offspring's concern for the mental health of their fathers. Thus, some offspring were apprehensive as to whether their reports might upset their fathers. To deal with these concerns and for the sake of transparency, we informed the fathers about the offspring study. Moreover, we highlighted the anonymity of the offspring's reports

to assure that none of the fathers would have access to the information provided by their offspring.

In conclusion, the findings of this study suggest that although more than 40 years have passed since the end of the 1973 Yom Kippur War, ex-POWs' adult offspring are at an increased risk for PTSS, which is related to both of their parents' posttraumatic stress responses. Policymakers should consider the screening and treatment of ex-POWs' offspring as they might be effected by the negative impact of war and captivity experiences of their fathers. Furthermore, triads of ex-POW father–mother–offspring PTSS are strongly connected and point to the impact of both severe exposure to stress (i.e., captivity) and its negative mental health residues (i.e., PTSS) on family members. Importantly, over the years, paternal and maternal effects on offspring are both direct and indirect, through spouses' reactions. This understanding could be very significant to family interventions early in the child's life, in an attempt to reduce negative consequences. For example, dyadic interventions such as Cognitive-Behavioral Conjoint Therapy (e.g., Macdonald, Pukay-Martin, Wagner, Fredman, & Monson, 2016), and parenting interventions such as After Deployment Adaptive Parenting Tools (Gewirtz, DeGarmo, & Zamir, 2016), show promising results and might be combined and implanted among ex-POWs family members.

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