

THE ROLE OF PARENTAL POSTTRAUMATIC STRESS, MARITAL ADJUSTMENT, AND DYADIC SELF- DISCLOSURE IN INTERGENERATIONAL TRANSMISSION OF TRAUMA: A FAMILY SYSTEM APPROACH

Rahel Bachem, Yafit Levin, and Xiao Zhou

University of Tel Aviv

I-Core Research Center for Mass Trauma

Gadi Zerach

Ariel University

Zahava Solomon

University of Tel Aviv

I-Core Research Center for Mass Trauma

Research indicates that posttraumatic stress symptoms (PTSS) induced by war trauma may be transmitted to veterans' wives and offspring (secondary traumatic stress; STS). However, the interplay between family members' characteristics has not been accounted for in such processes. Taking a family systems perspective, we examine the contributions of fathers' PTSS, mothers' STS, marital adjustment, and self-disclosure of both parents to offspring's STS and test whether marital quality applies as a mechanism of parent-child transmission. Combat veterans and former prisoners of war (N = 123), their spouses, and adult offspring were investigated in a multiple-step mediation analysis. The results highlight the mother's crucial role in trauma transmission and suggest that strengthening the marital relationship may buffer the transmission of fathers' PTSS to offspring.

Participation in war and particularly war captivity have consistently been shown to give rise to high rates of posttraumatic stress disorder (PTSD) and other comorbid disorders (King et al., 2011; Meziab et al., 2014). Moreover, studies have demonstrated that significant others of trauma victims are at an increased risk for adverse mental health outcomes themselves (Lambert, Holzer, & Hasbun, 2014), a phenomenon termed secondary traumatic stress (STS; Figley, 1995). The concept of learning about a loved one's traumatic experience has recently been incorporated into the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM 5; American Psychiatric Association, 2013) as likened to a firsthand trauma. Indeed, previous studies have shown that more severe and complex traumatization results in greater distress among veterans' offspring, suggesting a dose-response effect (Dekel & Goldblatt, 2008) and that the risk for trauma transmission is increased when the parent exposed to trauma also develops PTSD (Leen-Feldner et al., 2013). However, little is known about the characteristics and contributions of other family members and the family system as a whole. The present investigation aims to broaden the perspective on

Rahel Bachem, PhD, Bob Shapell School of Social Work, University of Tel Aviv, and the I-Core Research Center for Mass Trauma; Yafit Levin, MSc, Bob Shapell School of Social Work, University of Tel Aviv, and the I-Core Research Center for Mass Trauma; Xiao Zhou, PhD, Bob Shapell School of Social Work, University of Tel Aviv, and the I-Core Research Center for Mass Trauma; Gadi Zerach, PhD, Department of Behavioural Sciences, Ariel University; Zahava Solomon, PhD, Bob Shapell School of Social Work, University of Tel Aviv, and the I-Core Research Center for Mass Trauma.

Address correspondence to Rahel Bachem, Bob Shapell School of Social Work, University of Tel Aviv, Chaim Levanon 30, Tel Aviv 699780, Israel; E-mail: rahel.bachem@gmail.com

intergenerational trauma transmission, taking into account both the primary and secondary traumatized parent.

To date, several mechanisms underlying the intergenerational transmission of trauma from a parent to a child have been previously proposed, such as maladaptive communication of traumatic memories to offspring (Ancharoff, Munroe, & Fisher, 1998), emotional contagion (Figley, 1995), and genetic and epigenetic mechanisms via biological risk factors (Bowers & Yehuda, 2016). However, none of these potential mechanisms have taken into account the family as a holistic system (Nelson-Goff & Smith, 2005). Research on the intergenerational transmission of trauma has traditionally focused on the first-order traumatized parent (the parent who experienced the trauma) and the child, neglecting other actors who may play a role in trauma transmission. This perspective particularly overlooks the role of the second-order traumatized parent (the secondary traumatized parent), which in the context of our study is the mother.

It is imperative, therefore, to consider that mothers themselves may suffer from STS. In this case, the indirect transmission of the fathers' trauma to their children could occur through the impact on his partner's mental health and well-being. Studies conducted with families where both parents suffer from first-order posttraumatic stress symptoms (PTSS) showed that the mothers' psychopathology was a more important predictor of children's health outcomes than the fathers' psychopathology (Al-Turkait & Ohaeri, 2008; Morris, Gabert-Quillen, & Delahanty, 2012; Yehuda, Bell, Bierer, & Schmeidler, 2008). Furthermore, it has been found in an uncontrolled study that a positive relationship with the mother may partially buffer the effect of paternal combat-related PTSS on offspring's STS (Dinshtein, Dekel, & Polliack, 2011). Nonetheless, there is a lack of longitudinal studies regarding the intergenerational transmission of trauma.

One pioneering study, based on the current dataset, found that fathers' and mothers' PTSS/STS predicted offspring's STS. However, the personal and interpersonal characteristics of each partner were not taken into account, rather only their PTSS (Zerach, Levin, et al., 2016). Moreover, whether the underlying mechanisms of intergenerational transmission of trauma are similar in fathers and mothers is still an unresolved question. Thus, the present investigation seeks to further scrutinize the competing mechanisms of both fathers' and mothers' dimensions of marital adjustment and dyadic self-disclosure in intergenerational trauma transmission.

The Cognitive-Behavioral Interpersonal Theory of PTSD (Monson, Fredman, & Dekel, 2010) presents a model focusing on the association between PTSD and relationship problems with significant others (e.g., family members). It postulates that behavioral, cognitive, and emotional factors dynamically interact within each individual but also at the interpersonal level and thus influence the relationship milieu. To accommodate the traumatized family member, significant others may partake in avoidance behaviors, which can result in poorer communication and conflict management in the family system. Consequently, effective processing of the traumatic experience is inhibited (Monson et al., 2010), which may affect not only on the first-order trauma survivor but also secondary traumatized members of the family system. This is in line with the family systems theory (Minuchin, 1974), which understands the family as a holistic relational system in which different subsystems (e.g., parent-child subsystem, marital subsystem) mutually influence each other. The systemic perspective on family functioning assumes that at the core of STS experienced by the offspring of traumatized parents are functional problems of the family unit (Rosenheck & Fontana, 1998). Thus, it seems worthwhile to investigate the mechanisms of how the nature of the marital relationship (i.e., marital adjustment, dyadic self-disclosure), within the parental subsystem, may impact the intergenerational transmission of PTSS.

Studies have documented that the marital relationship has a close relation to offspring's psychological adjustment (Braithwaite, Steele, Spjut, Dowdle, & Harper, 2015), and have suggested that high marital satisfaction was associated with fewer negative psychological outcomes for offspring (Fishman & Meyers, 2000; Stoneman & Gavidia-Payne, 2006). Furthermore, it may not only be the marital relationship itself but also marital adjustment and dyadic self-disclosure as indicators of marital quality that might impact the family system. Therefore, these aspects are also important to consider.

Marital adjustment can be conceptualized as a multifaceted construct. In this current study, we defined marital adjustment as perceived satisfaction, consensus, cohesion, and affection within the marital relationship (Spanier, 1976). As marital adjustment and the mental state of both

spouses are interrelated (Proulx, Helms, & Buehler, 2007), dyads where one parent is traumatized are likely to experience decreased relationship quality (Nelson-Goff & Smith, 2005). Specifically, veterans suffering from PTSD experience more outbursts of aggression, have difficulties in intimacy regulation (Miller et al., 2013) and decreased marital communication (Cook, Riggs, Thompson, Coyne, & Sheikh, 2004) than those without PTSD. Considering the family system as a unit, the mental health of the offspring in families of traumatized parents is likely to be affected, thus increasing the risk for intergenerational trauma transmission.

Dyadic self-disclosure reflects a process of sharing thoughts, feelings, and attitudes with others (Finkenauer & Hazam, 2000), in this case the marital partner. This process consists of various modes of sharing, from simple daily details to complex personally meaningful narratives (Purves & Erwin, 2004). This may also include the disclosure of trauma-related memories. However, the literature has revealed that more symptoms of PTSD are associated with decreased dyadic self-disclosure (Ruscio, Weathers, King, & King, 2002). Furthermore, ample studies have documented that dyadic self-disclosure provides partners with the opportunity to maintain intimacy, openness, trust, and communication (Campbell & Renshaw, 2013; Finkenauer & Buyukcan-Tetik, 2015). Thus, it is considered crucial for marital closeness (Vogel, Wester, & Heesacker, 1999) and resolution of marital conflict (Cook et al., 2004). Our studies on veterans and their spouses have indicated that dyadic self-disclosure had a positive effect on marital adjustment (Dekel, Enoch, & Solomon, 2008; Solomon, Dekel, & Zerach, 2008). Consequently, dyadic self-disclosure in the parental subsystem may be implicated in offspring's STS.

The study's aims are to: (a) examine the competing contribution of fathers' PTSS, mothers' STS, and the marital relationship (i.e., marital adjustment, dyadic self-disclosure) of both parents to offspring's STS (H1); and (b) to test the theory-driven hypotheses of trauma transmission via marital quality and to evaluate whether it applies to both parents. Specifically, we hypothesize that both parents' PTSS/STS inversely predicts their own dyadic self-disclosure tendencies (i.e., less PTSS/STS is implicated in more dyadic self-disclosure), which contributes to their marital adjustment (i.e., more dyadic self-disclosure is associated with better marital adjustment), which is implicated in their offspring's lower levels of STS (H2). We will also test whether a parents' higher PTSS/STS is associated with less disclosure and marital adjustment which is associated with more STS among offspring (H3).

METHOD

Participants and Procedure

The present investigation is part of a longitudinal study on the psychological implications of war veterans, some of whom were former prisoners of war (for full details see Solomon, Horesh, Ein-Dor, & Ohry, 2012). A cohort of male Israeli veterans from the 1973 Yom Kippur War, as well as their wives (see Greene, Lahav, Bronstein, & Solomon, 2014) and offspring (see Zerach, Kanat-Maymon, Aloni, & Solomon, 2016) were located via Israel Defense Forces (IDF) files. Potential participants were contacted by telephone and asked to take part in the study. After signing informed consent, questionnaires were administered in their homes or another location of their choice. This study was approved by the Tel Aviv University ethics committee.

Data were collected from veterans at three time points: 1991, 2003, and 2008, and from their wives at two time points: 2003 and 2010. In the current study, we focus on the 2003 (T1) and 2008–2010 (T2) measurements of both spouses. Data were collected from their adult offspring at one time point in 2013–2014 (T3). The final sample included 123 triads of veterans and ex-POWs, their spouses and adult offspring. Among the adult offspring, 42 (35%) were female. The participants' ages ranged from 22 to 53 ($M = 35.19$, $SD = 6.44$). Twenty-five participants (22.8%) were born before the war while the others were born afterward. No significant demographic differences between adult offspring born before or after the war were found. Attrition rates for veterans, wives, and adult offspring are presented elsewhere (for further details see Greene et al., 2014; Solomon et al., 2012; Zerach, Levin, et al., 2016), as well as the demographic characteristics of the father–mother–adult offspring triads (Zhou et al., 2016).

Measures

PTSD Inventory (PTSD-I; Solomon et al., 1993). Fathers' PTSS, mothers', and offspring's STS were assessed using the PTSD-I, a 17-item self-report questionnaire, assessing the DSM-IV-TR criteria (American Psychiatric Association, 1994), which was the standard when the study commenced. The PTSD-I is a well-validated screening tool with strong reliability and validity (Solomon et al., 1993). High convergent validity of the PTSD-I was found when compared with diagnoses based on structured clinical interviews (Solomon et al., 1993). Fathers were asked to indicate symptoms experienced in the previous month in relation to their combat or captivity, whereas mothers and offspring were asked to relate to the frequency in which they experienced the described symptom in the previous month in relation to their partners' or fathers' combat or captivity. (e.g., "I have recurrent pictures or thoughts about my father's captivity"). Respondents rated symptoms 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.' Cronbach's α was .95 for veterans, .92 for mothers, and .87 for offspring.

Self-disclosure Index (SDI; Miller, Berg, & Archer, 1983). Parental dyadic self-disclosure was assessed using the SDI, a 10-item instrument assessing the extent and content of self-disclosure with regard to the partner. In the current study, we asked only about the partner (e.g., "I tell my wife/husband my most horrifying fears"). Responses are rated on a 6-point Likert scale. Satisfying external and internal validity was reported with Cronbach's α ranging from .86 to .93 (Miller et al., 1983). In the present study, Cronbach's α was .93 for husbands and .93 for wives.

Dyadic adjustment scale. Dyadic adjustment scale (DAS; Spanier, 1976) is a 32-item measure of marital quality. The scale is comprised of four subscales assessing marital consensus, expression of affection, marital satisfaction, and marital cohesion. Spouses were asked to indicate the extent to which each item described their current marital interaction (e.g., "Do you engage in outside interests together?"). The scale has high convergent and discriminant validity (Heyman, Sayers, & Bellack, 1994). Reported internal consistency (alpha) coefficient is above .90 (Riggs, Byrne, Weathers, & Litz, 1998)". In the current study, internal consistency was high among both spouses at T2 (Cronbach's $\alpha = .95, .95$, respectively).

Life events questionnaire. Mothers and offspring reported from a list of 13 items (e.g., divorce, major disease, accident) which events they had experienced (yes/no) and the year it occurred, adapted from the questionnaire of Solomon, Mikulincer, & Waysman (1991). The total number of reported negative life events was used for the analysis.

Missing Values Analysis

Missing values occurred across variables and participants. Little's Missing Completely at Random (MCAR) revealed that the data were missing at random, chi-square (76) = 72.2, $p = .60$. Missing data were replaced with full information maximum likelihood (FIML) estimations when running models in Mplus 6.1 (Muthén & Muthén, 2010). This study utilized data measured for partners and offspring as well as information across waves to increase the likelihood for optimal estimations (Collins, Schafer, & Kam, 2001).

Data Analyses Procedures

Structural equation modeling (SEM), combining several principals of the actor-partner interdependence modeling (APIM; Kenny, Kashy, Cook, & Simpson, 2006), was conducted to assess: (a) whether fathers' and/or mothers' PTSS/STS, dyadic self-disclosure, and marital adjustment contributed significantly to offspring's STS; and (b) to examine each parents' marital adjustment and dyadic self-disclosure as potential mechanisms of trauma transmission to offspring. We used longitudinal triadic data, ensuring that all paths found to be significant were controlled for each of the parent's contributions to the other spouse, and to their offspring. This provides separate and statistically independent tests of actor and partner paths, where relevant, while controlling for the other paths (Kenny et al., 2006). In the model, a mini APIM for bidirectional effects from one spouse's self-disclosure to the other spouse's marital adjustment is included. Since we chose a longitudinal approach but have only one measurement of offspring STS, the model is not a full APIM. However, since we focused on intraparental processes that may be correlated over time with offspring's STS, it was the most adequate solution. We calculated the sample size needed for the SEM

analysis and corrected our sample size according to the number of pairs of actor and partner effects where relevant. The sample size required to detect medium effects of 0.35 is 103 (power of 0.8, 0.5 p value) (Soper, 2017). As we have 123 triads, this is satisfactory.

We used multiple-step mediation methodology (Hayes, Preacher, & Myers, 2011). Specifically, we used SEM to examine whether: (a) fathers' and/or mothers' PTSS/STS directly affected offspring's STS at T3, controlling for both parents' PTSS/STS, dyadic self-disclosure at T1 and marital adjustment at T2 (path c); (b) fathers' and/or mothers' PTSS/STS indirectly affected offspring's PTSS via their own self-disclosure at T1 or via marital adjustment at T2; (c) fathers' and/or mothers' PTSS/STS indirectly affected offspring's STS via a two-step mediation process (i.e., via self-disclosure at T1 and marital adjustment at T2); and (d) if these indirect paths were significant, by employing accelerated bias-corrected bootstrap analyses.

To estimate the model we used MPlus, Version 7 (Muthén & Muthén, 2010). A model has a high fit to the observed data if the Comparative Fit Index (CFI) and the Tucker–Lewis Index (TLI) are greater than 0.95 and adequate fit if greater than 0.90 (Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999). RMSEA and SRMR values up to 0.05 indicate good fit, and between 0.06 and 0.10 are considered adequate fit. $RMSEA \geq 0.10$ indicates poor model fit (Hooper et al., 2008).

Two separate analyses were conducted in order to assess the role of mothers' and offspring's prior negative life events on the mothers' and offspring's STS. The power analysis conducted for the main model indicated that there was not enough power to account for the role of life events in the same model. Thus, we conducted two separate sequential mediation models (Hayes et al., 2011): one for the transmission of the fathers' traumatic symptoms to offspring's STS, and the second for the transmission of mothers' STS to offspring's STS, both via self-disclosure and marital adjustment. Both models controlled for the offspring's life events, and in the second (mother–child dyads) the mothers' life events were also controlled for.

RESULTS

Descriptive Statistics

Table 1 presents the means, standard deviations, and intercorrelations between the main study measures, as well as the skewness and kurtosis tests of normality of the study variables. Pearson correlations yielded significant relations among the research variables, both cross-sectionally and between time points. The higher the fathers' PTSS, the lower their self-disclosure and both spouses' marital adjustment and the higher their wives' and offspring's STS. Fathers' PTSS was not correlated with the mothers' self-disclosure at T1. Mothers' STS was negatively correlated only with their husbands' marital adjustment and positively correlated with their offspring's STS. There were positive correlations between mothers' and fathers' self-disclosure and marital adjustment as well as between these variables and the offspring's STS. Fathers' marital adjustment at T2 was negatively correlated with their offspring's STS. Steiger's (1980) test for equality of dependent correlations revealed no difference in the magnitude of the association between the fathers' and mothers' self-disclosure and offspring's STS, $z = -.6, p = .24$. Similarly, the associations between mothers' and fathers' marital adjustment at T2 and offspring's STS did not differ, $z = -.4, p = .3$. Distributions for all variables in the current study were found to be approximately normal (i.e., skew < 2 and kurtosis < 7).

The analysis revealed that the multiple-step mediation model had adequate fit to the observed data, $\chi^2(4, N = 122) = 8.76$, CFI = 0.97, TLI = 0.88, RMSEA = 0.099, 90% confidence interval [0.00, 0.19], SRMR = 0.05.

H1: The role of fathers'/mothers' PTSS/STS, self-disclosure, and marital adjustment to offspring's STS

Mothers' higher STS was positively related to their offspring's STS, but the fathers' PTSS did not directly relate to their offspring's STS (H1). Similarly, mothers' higher self-disclosure, but not the fathers', contributed significantly to higher levels of the offspring's STS (H1). Both parents' lower marital adjustment was correlated with lower levels of their offspring's STS (H1).

Measure	M (SD)	Skewness (SD)	Kurtosis (SD)	1	2	3	4	5	6
1 Fathers' PTSS T1	6.90 (5.20)	0.18 (0.25)	-1.4 (0.50)	1					
2 Mothers' STS T1	3.94 (2.80)	0.25 (0.40)	-0.97 (0.50)	.43**	1				
3 Fathers' self-disclosure T1	3.76 (1.20)	-0.41 (0.27)	-0.74 (0.53)	-.43**	-.13	1			
4 Mothers' self-disclosure T1	4.20 (0.93)	-.38 (0.31)	.87 (0.62)	-.05	.01	.41**	1		
5 Fathers' marital adjustment T2	95.80 (31.80)	-0.47 (0.23)	-0.57 (0.46)	-.60**	-.20*	.58**	.34**	1	
6 Mothers' marital adjustment T2	100.70 (22.70)	-0.56 (0.27)	-0.32 (0.53)	-.31**	-.10	.30**	.41**	.60**	1
7 Offspring's STS	2.61 (2.90)	1.42 (0.22)	1.5 (0.40)	.28**	.31**	.30**	.38**	-.22*	-.17

Note. * $p < .05$; ** $p < .001$.

Table 2

Unstandardized Regression Coefficients and Bootstrap 95% Confidence Intervals for Predicting Offspring' PTSS by Both Parents' PTSS Through the Fathers' and Mothers' Self-Disclosure at T1 and Marital Adjustment at T2

T3 offspring' PTSS	Fathers		Mothers	
	Bootstrap, 95% CI	Standardized, β (SE)	Bootstrap, 95% CI	Standardized, β (SE)
T1 PTSS	-0.123, 0.158	-.00 (0.07)	0.120, 0.457	.27 (0.08)**
One-step mediation				
T1 disclosure	-0.148, 0.000	-.07 (0.03)	-0.113, 0.148	.02 (0.07)
T2 marital adjustment	0.001, 0.122	.05 (0.03)*	-0.009, 0.108	.03 (0.03)
Two-step mediation				
T1 disclosure and T2 marital adjustment	0.003, 0.057	.04 (0.02)*	-0.058, 0.457	-.01 (0.02)

Note. * $p < .05$, ** $p < .001$

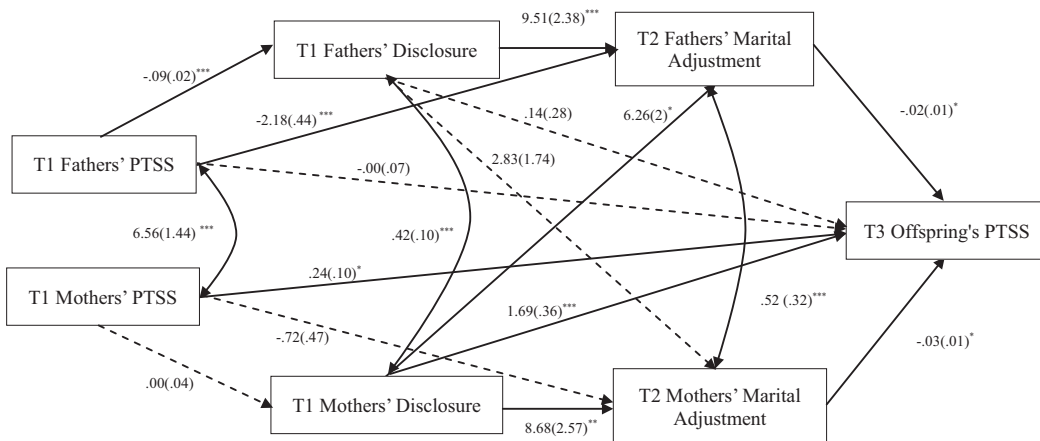


Figure 1. Mediation model predicting adult offspring's STS from fathers' and mothers' PTSS/STS via their self-disclosure and marital adjustment—Unstandardized maximum likelihood parameters. Solid arrows are statistically significant (dashed lines represent nonsignificant paths). * $p < .05$, ** $p < .01$, *** $p < .001$.

H2–H3: The mediating role of fathers' and mothers' self-disclosure and marital adjustment in the path from parents' PTSS/STS to offspring's STS

It was revealed that the bidirectional relations between both spouses' self-disclosure and marital adjustment are unidirectional (Table 2; Figure 1). Mothers' self-disclosure at T1 was related to the fathers' marital adjustment, but the fathers' self-disclosure did not relate to the mothers' marital adjustment at T2.

Fathers' T1 PTSS had an indirect effect on offspring's STS at T3 via two paths. The first indirect path was a one-step mediation, via fathers' marital adjustment at T2 (H3). Fathers' higher PTSS at T1 predicted lower marital adjustment at T2, which predicted offspring's higher STS at T3. The second path was a two-step mediation, via fathers' self-disclosure at T1 and their marital adjustment at T2 (H2). Fathers' higher T1 PTSS was associated with their lower self-disclosure at

T1, which was related to lower marital adjustment, which by its own merit was associated with offspring's higher STS at T3. Indirect effects of the mothers' STS at T1 on offspring's T3 STS via T1 disclosure or T2 marital adjustment were not significant (H2–H3).

To assess whether the indirect effects are affected by prior negative life events of the mothers and offspring, two separate sequential mediation models were conducted. The father–child dyads model was significant, $F(5, 117) = 5.38, p < .001$ with 19% variance explained. While controlling for mothers' and offspring's life events, the indirect effect from fathers' PTSS to offspring's STS via self-disclosure ($b = -.05, SE = 0.03$ CI 95% $-0.1393, -0.0058$), marital adjustment ($b = .07, SE = 0.03$ CI 95% $0.0169, 0.1355$), and the two-step mediation via both self-disclosure and marital adjustment ($b = .01, SE = 0.06$ CI 95% $0.0072, 0.0593$) were all significant; however, the direct effect was not significant ($b = .11, SE = 0.1$ CI 95% $-0.0130, 0.2280$). The life events of the offspring were not correlated with their STS ($b = .15, SE = 0.2, t = .91, p = .36$); however, the mothers' life events were correlated with their offspring's STS ($b = .57, SE = 0.22, t = 2.5, p = .01$), with a higher number of mothers' life events correlated with higher offspring's STS.

The mother–child dyads model was significant, $F(5, 117) = 14.1, p < .001$, with 38% variance explained. While controlling for both mothers' and offspring's life events, the indirect effect from mothers' STS to offspring's STS via self-disclosure ($b = .00, SE = 0.06$ CI 95% $-0.1226, 0.1379$), marital adjustment ($b = .03, SE = 0.03$ CI 95% $-0.0149, 0.1006$), and the two-step mediation via both self-disclosure and marital adjustment ($b = -.00, SE = 0.02$ CI 95% $-0.0509, 0.0329$) were not significant. However, the direct effect was significant ($b = .23, SE = 0.07$ CI 95% $0.0781, 0.3786$). Offspring's life events were marginally correlated with their STS ($b = .26, SE = 0.14, t = 1.9, p = .05$) with a higher number of offspring's life events correlated with higher STS. However, the mothers' life events were not correlated with their offspring's STS ($b = .25, SE = 0.2, t = 1.3, p = .2$), their self-disclosure ($b = .14, SE = 0.07, t = 1.8, p = .07$) or marital adjustment ($b = -.02, SE = 0.17, t = -0.01, p = .98$).

DISCUSSION

Taking a systemic perspective, this study assessed and compared the long-term contributions of fathers' PTSS and mothers' STS regarding the transference of trauma to their offspring. It was found that the transmission of the mothers' trauma appears to be directly related to adult offspring's STS, which was not the case for paternal PTSS. Furthermore, we investigated the roles of both parents' marital adjustment and dyadic self-disclosure as direct predictors of offspring's STS and as elements of a mechanism specifying how parental PTSS and STS may affect the next generation in a family system. It was found that the transmission of paternal PTSS was mediated by the fathers' dyadic self-disclosure and marital adjustment, which was not found in the case of the mothers' STS. Marital adjustment of both parents and the mothers' dyadic self-disclosure were directly related to adult offspring's STS.

The novelty of the present investigation lies in the consideration of the competing contributions of both the fathers' PTSS and the mothers' STS. We found that only the mother's distress was directly related to STS in adult offspring. Hence, when considering the family system as a unit, the mother's symptomatology was more strongly implicated in offspring's STS than the father's. This is in line with findings from families with two first-order traumatized parents (Al-Turkait & Ohaeri, 2008; Morris et al., 2012; Yehuda et al., 2008). However, the current study extends these results to mothers who suffer from STS and did not directly experience the trauma.

There are several explanations that could account for this finding. In traditional, family oriented societies, such as Israel during the 1970s and 1980s when veterans of the current sample raised their children, the mother was usually the main caregiver (Moore & Gobi, 1995), so it may be assumed they spent more time with the offspring. Thus, it is probable that over time offspring were more exposed to the mother's STS than to the father's PTSS. Furthermore, studies found that veteran fathers suffering from PTSS often perceived themselves as being unable to satisfactorily fulfill their roles as fathers (Dekel, Goldblatt, Keidar, Solomon, & Polliack, 2005), that those suffering from higher PTSS reported lower levels of investment and involvement in parent–child relationships (Ruscio et al., 2002), and that they received less satisfaction from their role as fathers (Samper, Taft, King, & King, 2004). Thus, it may be assumed that reduced contact with the father

could have resulted in a comparatively stronger impact from the mothers' STS on the offspring's mental health. Furthermore, as the father withdraws, a concentration of effects could begin. The offspring may cling to the mother who, on one hand, is the supporting pillar of the family (Dekel et al., 2005) but, on the other hand, also suffers from STS, which in turn may lead to the offspring's STS. Future studies on intergenerational trauma should examine the frequency of time spent with each parent and take the quality of the parent–child contact into account.

Although not assessed in the current study, the importance of the mother's trauma-related symptomatology in intergenerational trauma may be further explained by biological factors. Studies have found that primary traumatized mothers may confer a risk to offspring through epigenetic mechanisms via biological vulnerability factors. This occurs either prenatally or through variations in maternal care that influence how children respond to events (see Yehuda & Bierer, 2009, for a review). As the majority of offspring in the current study (77.2%) were born after the war, the STS of the mother might have already been present and thus impacted offspring in utero. Future research should evaluate whether biological vulnerability in offspring is the result of maternal STS.

Contrary to expectation, in this study, the transmission of mothers' STS to the offspring's STS was not mediated by aspects of the marital relationship (i.e., marital adjustment, dyadic self-disclosure), suggesting that other mechanisms were at work. One explanation may be related to the spillover effect (Erel & Burman, 1995), suggesting that emotions in the marital system are transferred to the parent–child system. The current finding broadens previous research on this sample, which found that although there was a spillover effect from marital adjustment to parenting in both spouses, this effect was stronger for men than women (Levin, Bachem, & Solomon, 2016). Thus, women appear to more clearly divide their roles as mothers and wives in the family than men. The current finding adds that the spillover is not only implicated in parenting but also in the adult offspring's STS. However, future studies assessing the family system should replicate this finding and evaluate the mechanisms of how maternal STS is transferred to offspring.

Fathers' PTSS, however, was not directly implicated in offspring's STS, rather it was affected via mediational paths, accounting for aspects of the marital relationship quality. Paternal trauma transmission was found to follow two mediational paths: (a) PTSS affected offspring's STS via marital adjustment; and (b) PTSS affected offspring's STS via dyadic self-disclosure and marital adjustment. The importance of the marital relationship regarding paternal trauma transmission could be related to the reports of veterans with PTSS to be highly dependent on their wives in their daily life, be it with regard to coping with PTSS, family finances, or parental responsibilities (Dekel et al., 2005). Thus, it may be assumed that the quality of the spousal relationship would be implied in the relationship with all significant others, especially offspring.

Moreover, we found that the marital adjustment of both parents was directly related to the STS in adult offspring. The current findings identified dimensions of marital adjustment relevant to understanding the intergenerational transmission of trauma. The association of marital adjustment and the psychological adjustment of the offspring has been established outside of the context of trauma (Fishman & Meyers, 2000; Stoneman & Gavidia-Payne, 2006). Moreover, according to the family systems theory, flexible but distinct boundaries are needed between family subsystems in order to prevent the marital adjustment of the parents from affecting the mental health of the children (Erel & Burman, 1995; Minuchin, 1974). Our results indicated that in the families studied here, such influence, as referred to in the family systems theory, did in fact occur.

A further possible influence could be that of the abovementioned spillover effect. In a previous study, fathers' PTSS predicted lower self-rated parenting skills via reduced marital adjustment (Levin et al., 2016). Consequently, an impaired parent–child relationship may be partly responsible for the higher psychological vulnerability of offspring in traumatized families with high marital discord.

Interestingly, dyadic self-disclosure of the mother, but not of the father, was found to directly predict STS in the offspring. However, contrary to expectations, this association was positive, indicating that more maternal self-disclosure was related to offspring's higher STS. This finding was surprising since self-disclosure in the dyadic relationship is generally considered to be a positive aspect of relationship quality (Campbell & Renshaw, 2013; Finkenauer & Buyukcan-Tetik, 2015). In addition, higher relationship quality has been shown to be associated with less psychopathology in offspring (Fishman & Meyers, 2000; Stoneman & Gavidia-

Payne, 2006). However, more self-disclosure in the marital relationship may also include negative disclosure (e.g., “I disclose to my partner my worst fears”, “I disclose to my partner things I have done which I feel guilty about”). If such disclosure is performed openly in the family system, the offspring might be exposed to their mothers’ weaknesses and vulnerabilities. Wives of veterans with PTSS have been found to perceive the world as less benevolent and predictable than wives of veterans without PTSS (Bronstein, Levin, Lahav, & Solomon, 2016). This may also apply to veterans’ offspring. Under these circumstances, a vulnerable mother may jeopardize her offspring’s sense of safety, causing psychological distress, thus leaving them more vulnerable to STS. This explanation is in line with previous findings among non-traumatized populations wherein parent–child disclosure regarding problems, such as financial concerns, leads to the child’s psychological distress (Koerner, Wallace, Lehman, & Raymond, 2002). Nevertheless, future research on mechanisms of intergenerational trauma transmission should explicitly address whether perceiving the mother as vulnerable versus perceiving her as a source of security is associated with children’s higher STS. Moreover, future studies should also investigate whether higher marital disclosure of parents impacts the mental health of offspring similarly or differently in family systems not affected by PTSS and STS. In addition, it would be valuable to assess the type or content of the disclosures, the tone and the emotional environment it creates in order to better understand the impact of dyadic self-disclosure.

Several limitations of the current findings must be acknowledged. First, couple’s dyadic self-disclosure and marital adjustment are only two of the numerous potential factors that may mediate the relation between PTSS/STS and offspring’s STS. Future studies should explore the roles of other factors besides aspects of the marital relationship to uncover how intergenerational trauma transmission occurs in the family system. Second, the results are interpreted in light of the specific culture, Zeitgeist, and family constellation that characterizes the present sample. For example, traditional gender roles regarding child rearing among the studied population must be considered, as Israeli mothers of the time were expected to take care of the home and children while fathers took responsibility for the family’s finances. Hence, in future studies the impact of changing gender roles over time should be addressed. Furthermore, different cultural norms with regard to the importance of the family and the parent–child relationship should be taken into account. The generalization of the current results to other cultural contexts should be examined. Moreover, we investigated intergenerational trauma transmission at a time the offspring had already reached adulthood and in families where the father was a primary trauma victim of the Yom Kippur war. Whether similar findings would be found in families with young children, families where the mother is the primary trauma survivor, or families of veterans of other wars should be the subject of future studies. Third, our initial measurement took place 30 years after the traumatic experience and hence, we have no information on the study variables in the time before, or in the first years following the trauma. Finally, PTSS and STS were measured according to the DSM-IV definition and thus do not consider the cluster “negative cognitions and mood” that was added to the DSM-5 definition. However, the other symptom clusters of the diagnosis of PTSD (reexperiencing, avoidance, arousal) remained very similar in the DSM-5 revision.

Notwithstanding the limitations, the current study is of high importance, particularly with regard to its clinical implications. Controlling for the role of mothers’ and offspring’s prior negative life events regarding offspring’s STS, replicated the significant paths of the main analysis. Nevertheless, life events of both mother and offspring were related to offspring’s STS and represent a risk factor for the transmission of the fathers’ trauma in the family system. This suggests that life events should be considered when assessing the necessity of mental health support in traumatized families. For example, mothers who suffer from STS and additionally report an accumulation of negative life events should be offered support not only to enhance their own health but also to prevent trauma transmission in the family system. Similarly, when offspring of veterans encounter many stressful life events, they might be in need of mental health support.

As the study considered the impact of war traumatization within the complex systemic network of a family, it was revealed that the mother is the main figure regarding the transmission of trauma to offspring. Despite the mother not being the primary trauma survivor, rather her symptomatology is due to second-order traumatization, she has a more salient impact than the father.

Consequently, the mother should be considered an important recipient of therapeutic interventions, either in an individual setting or in dyadic and family oriented interventions, as a reduction in her STS would likely enable the improved development of her children's psychological health. Interventions that aim to mitigate PTSS of a primary trauma survivor in a systemic setting that includes the secondary traumatized spouse, such as cognitive-behavioral couples therapy (Monson, Schnurr, Stevens, & Guthrie, 2004) or behavioral family therapy (Glynn et al., 1999) should be evaluated for their effectiveness in reducing STS.

The main novelty regarding the father's role in intergenerational trauma is seen in the marital relationship, which appears to be of crucial importance in the intergenerational transference of trauma. Regarding clinical interventions, this finding suggests that, above and beyond individual trauma-focused therapy for PTSD, therapists should consider other interventions, which are not necessarily trauma specific, to strengthen the marital relationship. This may then buffer the extent to which trauma transmission to the child occurs, for example, by strengthening couples communication (Bodenmann & Shantinath, 2004).

REFERENCES

- Al-Turkait, F. A., & Ohaeri, J. U. (2008). Psychopathological status, behavior problems, and family adjustment of Kuwaiti children whose fathers were involved in the first Gulf War. *Child and Adolescent Psychiatry and Mental Health, 2*(1), 1–12.
- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: American Psychiatric Publishing.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Ancharoff, M. R., Munroe, J. F., & Fisher, L. M. (1998). The legacy of combat trauma. In Y. Danieli (Ed.), *International handbook of multigenerational legacies of trauma* (pp. 257–276). Boston, MA: Springer US.
- Bodenmann, G., & Shantinath, S. D. (2004). The Couples Coping Enhancement Training (CCET): A new approach to prevention of marital distress based upon stress and coping. *Family Relations, 53*, 477–484.
- Bowers, M. E., & Yehuda, R. (2016). Intergenerational transmission of stress in humans. *Neuropsychopharmacology, 41*(1), 232–244.
- Braithwaite, S. R., Steele, E., Spjut, K., Dowdle, K. K., & Harper, J. (2015). Parent–child connectedness mediates the association between marital conflict and children's internalizing/externalizing outcomes. *Journal of Child and Family Studies, 24*, 3690–3699.
- Bronstein, I., Levin, Y., Lahav, Y., & Solomon, Z. (2016). World assumptions among wives of former prisoners of war. *Journal of Family Issues, 37*, 1746–1767.
- Campbell, S. B., & Renshaw, K. D. (2013). PTSD symptoms, disclosure, and relationship distress: Explorations of mediation and associations over time. *Journal of Anxiety Disorders, 27*, 494–502.
- Cook, J. M., Riggs, D. S., Thompson, R., Coyne, J. C., & Sheikh, J. I. (2004). Posttraumatic stress disorder and current relationship functioning among World War II ex-prisoners of war. *Journal of Family Psychology, 18*(1), 36–45.
- Collins, L.M., Schafer, J.L., & Kam, C.M. (2001). A comparison of inclusive and restrictive strategies in modern missing data procedures. *Psychological Methods, 6*, 330–351.
- Dekel, R., Enoch, G., & Solomon, Z. (2008). The contribution of captivity and post-traumatic stress disorder to marital adjustment of Israeli couples. *Journal of Social and Personal Relationships, 25*, 497–510.
- Dekel, R., & Goldblatt, H. (2008). Is there intergenerational transmission of trauma? The case of combat veterans' children. *American Journal of Orthopsychiatry, 78*, 281–289.
- Dekel, R., Goldblatt, H., Keidar, M., Solomon, Z., & Polliack, M. (2005). Being a wife of a veteran with posttraumatic stress disorder. *Family Relations, 54*(1), 24–36.
- Dinshtein, Y., Dekel, R., & Polliack, M. (2011). Secondary traumatization among adult children of PTSD veterans: The role of mother-child relationships. *Journal of Family Social Work, 14*(2), 109–124.
- Erel, O., & Burman, B. (1995). Interrelatedness of marital relations and parent-child relations: A meta-analytic review. *Psychological Bulletin, 118*(1), 108–132.
- Figley, C. R. (1995). *Compassion fatigue: Coping with secondary traumatic stress disorder in those who treat the traumatized*. New York, NY: Brunner/Mazel.
- Finkenauer, C., & Buyukcan-Tetik, A. (2015). To know you is to feel intimate with you: Felt knowledge is rooted in disclosure, solicitation, and intimacy. *Family Science, 6*(1), 109–118.
- Finkenauer, C., & Hazam, H. (2000). Disclosure and secrecy in marriage: Do both contribute to marital satisfaction? *Journal of Social and Personal Relationships, 17*(2), 245–263.

- Fishman, E. A., & Meyers, S. A. (2000). Marital satisfaction and child adjustment: Direct and mediated pathways. *Contemporary Family Therapy, 22*, 437–452.
- Glynn, S. M., Eth, S., Randolph, E. T., Foy, D. W., Urbaitis, M., Boxer, L., et al. (1999). A test of behavioral family therapy to augment exposure for combat-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 67*(2), 243–251.
- Greene, T., Lahav, Y., Bronstein, I., & Solomon, Z. (2014). The role of ex-POWs' PTSD symptoms and trajectories in wives' secondary traumatization. *Journal of Family Psychology, 28*, 666–674.
- Hayes, A. F., Preacher, K. J., & Myers, T. A. (2011). Mediation and the estimation of indirect effects in political communication research. In E. P. Bucy & L. R. Holbert (Eds.), *Sourcebook for political communication research: Methods, measures, and analytical techniques* (pp. 434–465). New York, NY: Routledge.
- Heyman, R.E., Sayers, S.L., & Bellack, A.S. (1994). Global marital satisfaction versus marital adjustment: An empirical comparison of three measures. *Journal of Family Psychology, 8*, 432–446.
- Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods, 6*(1), 53–60.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55.
- Kenny, D., Kashy, D., Cook, W., & Simpson, J. (2006). *Dyadic data analysis (Methodology in the social sciences)*. New York, NY: Guilford.
- King, L. A., King, D. W., Schuster, J., Park, C. L., Moore, J. L., Kaloupek, D. G., et al. (2011). Captivity stressors and mental health consequences among repatriated U.S. Navy, Army, and Marine Vietnam-era prisoners of war. *Psychological Trauma: Theory, Research, Practice, and Policy, 3*, 412–420.
- Koerner, S. S., Wallace, S., Lehman, S. J., & Raymond, M. (2002). Mother-to-daughter disclosure after divorce: Are there costs and benefits? *Journal of Child and Family Studies, 11*, 469–483.
- Lambert, J. E., Holzer, J., & Hasbun, A. (2014). Association between parents' PTSD severity and children's psychological distress: A meta-analysis. *Journal of Traumatic Stress, 27*(1), 9–17.
- Leen-Feldner, E. W., Feldner, M. T., Knapp, A., Bunaciu, L., Blumenthal, H., & Amstadter, A. B. (2013). Offspring psychological and biological correlates of parental posttraumatic stress: Review of the literature and research agenda. *Clinical Psychology Review, 33*, 1106–1133.
- Levin, Y., Bachem, R., & Solomon, Z. (2016). Traumatization, marital adjustment, and parenting among veterans and their spouses: A longitudinal study of reciprocal relations. *Family Process, 1*–17.
- Meziab, O., Kirby, K. A., Williams, B., Yaffe, K., Byers, A. L., & Barnes, D. E. (2014). Prisoner of war status, post-traumatic stress disorder, and dementia in older veterans. *Alzheimer's & Dementia, 10*(3), S236–S241.
- Miller, L. C., Berg, J. H., & Archer, R. L. (1983). Openers: Individuals who elicit intimate self-disclosure. *Journal of Personality and Social Psychology, 44*, 1234–1244.
- Miller, M. W., Wolf, E. J., Reardon, A. F., Harrington, K. M., Ryabchenko, K., Castillo, D., et al. (2013). PTSD and conflict behavior between veterans and their intimate partners. *Journal of Anxiety Disorders, 27*(2), 240–251.
- Minuchin, S. (1974). *Families and family therapy*. London: Tavistock.
- Monson, C. M., Fredman, S. J., & Dekel, R. (2010). Posttraumatic stress disorder in an interpersonal context. In J. G. Beck (Ed.), *Interpersonal processes in the anxiety disorders: Implications for understanding psychopathology and treatment* (pp. 179–208). Washington, DC: American Psychological Association.
- Monson, C.M., Schnurr, P.P., Stevens, S.P., & Guthrie, K.A. (2004). Cognitive-behavioral couple's treatment for posttraumatic stress disorder: Initial findings. *Journal of Traumatic Stress, 17*, 341–344.
- Moore, D., & Gobi, A. (1995). Role conflict and perceptions of gender roles (the case of Israel). *Sex Roles, 32*(3–4), 251–270.
- Morris, A., Gabert-Quillen, C., & Delahanty, D. (2012). The association between parent PTSD/depression symptoms and child PTSD symptoms: A meta-analysis. *Journal of Pediatric Psychology, 37*, 1076–1088.
- Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide: Statistical analysis with latent variables*. Los Angeles, CA: Author.
- Nelson-Goff, B. S., & Smith, D. B. (2005). Systemic traumatic stress: The couple adaptation to traumatic stress model. *Journal of Marital and Family Therapy, 31*(2), 145–157.
- Proulx, C. M., Helms, H. M., & Buehler, C. (2007). Marital quality and personal well-being: A meta-analysis. *Journal of Marriage and Family, 69*, 576–593.
- Purves, D. G., & Erwin, P. G. (2004). Post-traumatic stress and self-disclosure. *The Journal of Psychology, 138*(1), 23–34.
- Riggs, D. S., Byrne, C. A., Weathers, F. W., & Litz, B. T. (1998). The quality of the intimate relationships of male Vietnam veterans: Problems associated with posttraumatic stress disorder. *Journal of Traumatic Stress, 11*(1), 87–101.
- Rosenheck, R., & Fontana, A. (1998). Warrior fathers and warrior sons. In J. Danieli (Ed.), *International handbook of multigenerational legacies of trauma* (pp. 225–242). Boston, MA: Springer, US.

- Ruscio, A. M., Weathers, F. W., King, L. A., & King, D. W. (2002). Male war-zone veterans' perceived relationships with their children: The importance of emotional numbing. *Journal of Traumatic Stress, 15*, 351–357.
- Samper, R. E., Taft, C. T., King, D. W., & King, L. A. (2004). Posttraumatic stress disorder symptoms and parenting satisfaction among a national sample of male Vietnam veterans. *Journal of Traumatic Stress, 17*, 311–315.
- Solomon, Z., Benbenishty, R., Neria, Y., Abramowitz, M., Ginzburg, K., & Ohry, A. (1993). Assessment of PTSD: Validation of the revised PTSD Inventory. *Israel Journal of Psychiatry and Related Sciences, 30*(2), 110–115.
- Solomon, Z., Dekel, R., & Zerach, G. (2008). The relationships between posttraumatic stress symptom clusters and marital intimacy among war veterans. *Journal of Family Psychology, 22*, 659–666.
- Solomon, Z., Horesh, D., Ein-Dor, T., & Ohry, A. (2012). Predictors of PTSD trajectories following captivity: A 35-year longitudinal study. *Psychiatry Research, 199*(3), 188–194.
- Solomon, Z., Mikulincer, M., & Waysman, M. (1991). Delayed and immediate onset posttraumatic stress disorder: The role of life events and social resources. *Journal of Community Psychology, 19*(3), 231–236.
- Soper, D. S. (2017). A-priori sample size calculator for structural equation models [software]. Retrieved September 12, 2016, from <http://www.danielsoper.com/statcalc>
- Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and Family, 38*, 15–28. <https://doi.org/10.2307/350547>.
- Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin, 87*(2), 245–251.
- Stoneman, Z., & Gavidia-Payne, S. (2006). Marital adjustment in families of young children with disabilities: Associations with daily hassles and problem-focused coping. *American Journal on Mental Retardation, 111*(1), 1–14.
- Vogel, D. L., Wester, S. R., & Heesacker, M. (1999). Dating relationships and the demand/withdraw pattern of communication. *Sex Roles, 41*(3/4), 297–306.
- Yehuda, R., Bell, A., Bierer, L. M., & Schmeidler, J. (2008). Maternal, not paternal, PTSD is related to increased risk for PTSD in offspring of Holocaust survivors. *Journal of Psychiatric Research, 42*, 1104–1111.
- Yehuda, R., & Bierer, L. M. (2009). The relevance of epigenetics to PTSD: Implications for the DSM-V. *Journal of Traumatic Stress, 22*, 427–434.
- Zerach, G., Kanat-Maymon, Y., Aloni, R., & Solomon, Z. (2016). The role of fathers' psychopathology in the intergenerational transmission of captivity trauma: A twenty-three-year longitudinal study. *Journal of Affective Disorders, 190*, 84–92.
- Zerach, G., Levin, Y., Aloni, R., Solomon, Z., Zerach, G., Levin, Y., et al. (2016). Intergenerational transmission of captivity trauma and posttraumatic stress symptoms: A twenty-three-year longitudinal triadic study. *Psychological Trauma: Theory, Research, Practice, and Policy, 9*, 1–9.
- Zhou, X., Levin, Y., Stein, J. Y., Solomon, Z., Zerach, G., & Solomon, Z. (2016). Couple forgiveness and its moderating role in the intergenerational transmission of veterans' posttraumatic stress symptoms. *Journal of Marital and Family Therapy, 1916*, 1–12.