



Traumatic Events and Associated Symptoms amongst Caregiver-Child Dyads: Exploring Caregiver Sex Differences

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Abstract

The psychological consequences of traumatic events for caregivers and their children have been extensively studied, with the majority of literature considering maternal influences. We aimed to compare these associations across caregiver sex in order to provide deeper insight into paternal influences. The indirect association between caregiver exposure to traumatic events (# of types) and child symptomatology (posttraumatic stress symptoms [PTSS] and socioemotional problems) was considered via three pathways: (a) child exposure to traumatic events (# of types), (b) caregiver symptomatology (depressive symptoms and PTSS) and (c) caregiving stress. Participants were caregiver-child dyads referred to an outpatient hospital clinic for treatment of PTSS amongst children aged zero to five ($N = 222$, 28% male caregivers). Male caregivers reported lower scores on all variables ($d = 0.32$ – 0.67) despite there being no caregiver sex differences in number of events experienced by children. Multi-group path analysis revealed that relationships amongst study variables were similar for male and female caregivers, with the exception of caregiver stress and symptoms. There was no relationship between number of events experienced by caregivers and caregiver stress for males, $\beta = -0.07$ ($SE = 0.08$), $p = 0.356$, though there was for females, $\beta = 0.15$ ($SE = 0.07$), $p = 0.021$. Additionally, the relationship between number of events and symptomatology was weaker (though still significant) for male caregivers, $\beta = 0.27$ ($SE = 0.09$), $p = 0.005$, compared to females, $\beta = 0.38$ ($SE = 0.06$), $p < 0.001$. Findings suggest that male and female caregivers may present differently at assessments in terms of risk levels, though the associations amongst clinically relevant variables are mostly similar.

Keywords Early childhood · Trauma · Post-traumatic stress · Depression · Caregiver stress

Highlights

- Examined the relationship between caregiver trauma and child symptomatology, with the inclusion of fathers.
- Number of caregiver traumatic events indirectly influenced child trauma symptoms.
- Male caregivers reported less risk compared to female caregivers.
- Number of traumatic events in children did not differ across caregiver sex.
- Caregiver sex differences in pathways were observed in relation to caregiver stress and symptomatology.

Researchers have long been interested in the associations amongst traumatic events and mental health for caregivers and their children. Most frequently considered for mothers,

the relationship between trauma exposure and mental health symptoms across generations depends on whether or not children are also exposed to traumatic events, caregiver psychological adjustment, and quality of the parent-child relationship (Alink et al. 2019; Madigan et al. 2019; Scheeringa and Zeanah 2001), in addition to genetic processes such as gene-environment correlation (Knafo and Jaffee 2013), and broader forces such as social support versus isolation (Berlin et al. 2011). Children may be most vulnerable to the consequences of traumatic events and parental posttraumatic stress symptomatology (PTSS) during the initial 5 years of life (Briggs-Gowan et al. 2010;

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Chu and Lieberman 2010; Lieberman et al. 2011), in part, simply due to their necessary proximity to caregivers (Fantuzzo and Fusco 2007). The mechanisms linking maternal PTSS and early child mental health have been studied at length (Scheeringa and Zeanah 2001), however, there is a relative dearth of literature on the patterns of association amongst *father* exposure to traumatic events and child outcomes (McHale 2007). Thus, the goal of our study is to examine the intergenerational correlates of caregiver exposure to trauma, where particular consideration is given to the role of caregiver sex.

Indirect Relationships between Caregiver Trauma and Child Outcomes

Twenty years ago, Scheeringa and Zeanah (2001) articulated the importance of considering traumatic events and associated symptoms for both caregivers and children in the “relational model of PTSD in early childhood”. Since this seminal development, it has become clear that the pathways linking caregiver exposure to traumatic events and child outcomes are remarkably complex, characterized by indirect associations, moderation (i.e., effect modification), bidirectionality, and multiple-levels of analysis, spanning from the genome to the social context, all of which may vary as a function of developmental stage (Berlin et al. 2011; Alink et al. 2019). That being said, in its simplest form, the relational perspective continues to provide a bedrock for considering intergenerational transmission of trauma and symptomatology, as is presently the case.

The multiple mechanisms and types of effects initially outlined by Scheeringa and Zeanah (2001) have been distilled into three general pathways (for the purposes of our study), all of which somehow implicate the caregiver-child relational space. First, it is necessary to consider *child exposure to traumatic events*. These may be the same event (s) as the caregiver, different events, or both. Indeed, the multiplicity of trauma exposure highlights the importance of having a comprehensive evaluation of both caregiver and child events in clinical assessment (*mechanism 1*). Second, it could be the case that children do not directly experience events, yet experience a vicarious traumatization effect via the caregiving context. Given the influences of traumatic events on caregiving behaviors during early life (Chu and Lieberman 2010), we considered *caregiving stress* as another putative mechanism of transmission (*mechanism 2*). Notably, the nature of these disruptions in caregiving are, themselves, complex and may involve contribution from processes in the realm of attachment, social learning theory, social information processing, psychodynamic injury, resource dilution, and neurophysiological effects (Alink

et al. 2019). Lastly, it is possible that the vicarious traumatization does not occur through disruptions in caregiver-child interactions and associated challenges, per se. Rather, caregiver traumatic events may relate to child symptoms in a general fashion through caregiver mental health. For example, caregiver adversity and mental health problems have been linked to an “ambient” household emotional climate that predicts child socioemotional difficulties, beyond the level of parenting directly experienced (Boyle et al. 2004; Browne et al 2016; 2018). Thus, we also considered caregiver mental health difficulties in terms of post-traumatic stress, and the closely related area of depressive symptoms, as a third and independent pathway (*mechanism 3*). Consistent with the principles of developmental cascades (Masten and Cicchetti 2010), and models of family stress (Repetti et al. 2002), our theoretical model builds upon extant literature that connects caregiver exposure to traumatic events and child outcomes via these mechanisms, whereby stress in one domain of the developmental ecology “spills over” to cause disturbance in other domains (Browne et al. 2015).

Considering the Role of Caregiver Sex

In recent years, there has been an increased interest in *paternal* contributions to infant and child mental health (Belsky et al. 2006; McHale 2007; McHale and Phares 2015; Panter-Brick et al. 2014). This includes the association between fathers’ traumatic experiences, posttraumatic stress responses, and child functioning (Snyder et al. 2016). To date, the majority of this research has been conducted amongst male veteran populations returning from armed conflict (Dekel and Goldblatt 2010; Hisle-Gorman et al. 2015; Lieberman and Van Horn 2013; Osofsky and Chartrand 2013) and families of holocaust survivors or prisoners of war (Shrira 2019; Zerach and Solomon 2018). Although informative, this is a limitation given the multifaceted nature of chronic trauma exposure (Van der Kolk et al. 2005), in addition to sex differences in the types of traumatic events to which males and females are exposed and in rates of PTSS (Tolin and Foa 2006). Males are more often exposed to traumatic events in the context of witnessing violence or death, criminality, gang involvement, incarceration, and non-sexual abuse (Singer et al. 1995; Stimmel et al. 2014). Moreover, males’ involvement in violent crime is predicted by child maltreatment (Fagan 2005; Topitzes et al. 2012), and predicts perpetration of intimate partner violence and child maltreatment in later life (Augustyn et al. 2014; Fagan 2005; Menard et al. 2014). Despite this knowledge, the associations amongst trauma exposure and associated symptoms in male caregivers and their children remain under studied.

Caregiver sex differences can be defined in terms of (a) mean levels and (b) patterns of association amongst study variables. Though male caregivers are more likely to report *any* potentially traumatic event, females tend to report a greater *number* of events, different *types* of events (i.e., sexual violence), and are more likely to report PTSS in response to any event (Dube et al. 2001; Tolin and Foa 2006). Also, females report higher levels of depression diagnoses and symptoms compared to males, in general (Nolen-Hoeksema 2001; Johnson and Whisman 2013), which may convey susceptibility to PTSS (O'Donnell et al. 2004). Findings for sex differences in caregiver stress have been equivocal (McBride et al. 2002; Weijers et al. 2018), though females are disproportionately affected by systemic challenges that influence caregiver stress, such as low income and single parenting (Denton et al. 2004). Moreover, informant discrepancy research has demonstrated that psychological distress in caregivers is associated with higher reported levels of child symptomatology (De Los Reyes and Kazdin 2004).

Though females report a greater number of events and PTSS, studies have certainly demonstrated a significant link between traumatic events and PTSS and depression for males (Chapman et al. 2004; Tolin and Foa 2006). Moreover, male caregivers often report significant levels of caregiving stress, especially in settings of social disadvantage (McKelvey et al. 2009). Additionally, a recent meta-analysis demonstrated a significant relationship between parental PTSS and child symptoms (PTSS, socioemotional problems) for fathers and mothers (Lambert et al. 2014), though this association may be more robust for mothers (Connell and Goodman 2002; Yehuda et al. 2008). Nevertheless, the extant literature provides theoretical grounds to consider patterns of association amongst caregiver/child traumatic events and symptomatology as a function of caregiver sex, in addition to the intermediary variables that may be responsible for these associations.

Before proceeding to the present study, it is prudent to remark on the differences between caregiver sex (which is a biological construct related to chromosomes and differences at the physiological level) and gender (which includes a broad range of psychosocial factors related to one's personal identity) (Clayton and Tannenbaum 2016). Given our methodology, we have been careful to limit our discussions to caregiver "sex" (i.e., males versus females), as our measures do not capture the complexity of gender expression (e.g., men, women, transgender, gender non-conforming, two-spirited) in contemporary society (APA 2018a, b, c). That being said, "sex and gender are not mutually exclusive" (p. 1; Clayton and Tannenbaum 2016), and some of the sex-related phenomenon presently reviewed and empirically demonstrated may actually be reflective of gender differences. The reader is encouraged to exercise discernment

when considering sex differences, as related to clinical presentations in the context of trauma, bearing in mind complexities inherent in the construct of gender identity.

The Present Study

The overarching goal of our study is to explore the patterning of traumatic events and mental health symptomatology amongst a sample of male and female caregivers and their children (aged 0–5 years) who were referred to a community clinic for child exposure to traumatic events. Additionally, given the ongoing need to enhance the scope of infant and child mental health to include fathers (McHale and Phares 2015), the secondary goal of our study was to examine caregiver sex differences in the relationship between traumatic events and symptomatology for both caregivers and children.

Consistent with Scheeringa and Zeanah 2001 relational model of PTSD in early childhood, we consider child exposure to traumatic events (# of types), caregiver symptoms (depression and PTSS), and caregiving stress as indirect pathways linking caregiver exposure to traumatic events (# of types) and child symptoms (PTSS and socioemotional problems) (Scheeringa et al. 2015). First, we hypothesized that caregiver exposure to traumatic events would predict child symptoms via caregiver symptoms, caregiving stress, and child exposure to traumatic events for both male and female caregivers (hypothesis 1). Second, we hypothesized that females would report higher levels of risk for themselves (# of events, caregiver symptoms, and caregiving stress), and for their children (# of traumatic events and symptoms) (hypothesis 2). Finally, we expected that the pathways linking caregiver traumatic events and child symptoms would be stronger for females, though statistically significant for both males and females (hypothesis 3).

The present study adds to the literature in a number of important ways. First, there continues to be a paucity of clinical research considering the role of fathers in children's mental health treatment, in general (Panter-Brick et al. 2014). Second, there are even fewer studies concerning paternal involvement in infant and early childhood mental health care, especially for children under the age of 5 years and in trauma-informed settings (McHale and Phares 2015). Third, the majority of research considering the association between caregiver posttraumatic stress and child adjustment has either not considered different patterns as a function of caregiver sex or included males. For example, in Lambert et al. 2014 meta-analysis of caregiver PTSD and child outcomes ($n \approx 12,000$), only $n \approx 3000$ cases were available for caregiver sex comparisons (of which, $n \approx 700$ were fathers). Fourth, most research on paternal PTSD has considered the role of children's vicarious traumatization

(versus direct exposure), for example, in the case in holocaust survivorship or veterans' combat-related trauma (e.g., Lieberman and Van Horn 2013; Shrira 2019). Lastly, the existing paternal research has not necessarily considered multiple intermediary mechanisms through which caregiver trauma may inform child symptomatology. Thus, there is a need for research that considers the complex and multifaceted nature of trauma in male caregivers from diverse backgrounds and in community settings, making comparisons with female caregivers, and considering mechanisms of transmission within the dyadic relationship. Collectively, these efforts will help inform services that involve male caregivers in a manner that strengthens family relationships and promotes mental health for children and adults, alike.

Method

Participants

Caregiver-child dyads were referred for mental health services at a university-affiliated clinic in a major metropolitan hospital ($N = 222$). The primary reason for referral was child trauma, including exposure to community and domestic violence, caregiver separation/death, loss of a loved one, and child maltreatment (physical, sexual, emotional abuse and neglect). All children involved in this study experienced at least one traumatic event. Across the entire sample, 63 (27.9%) caregivers were males. Of the 63 male caregivers, 52 (82.5%) were biological fathers, two (3.2%) were adopted fathers, six (9.5%) were foster fathers, two (3.2%) were uncles, and one (1.6%) was a brother. In terms of ethnicity, 35 (55.6%) self-reported to be Latinx, 21 (30.9%) White, six (9.5%) African American, one (1.6%) Native American, six (9.5%) Asian American, and one (1.6%) Other. Average male caregiver age was 38.6 ($SD = 10.5$). Of the 159 female caregivers, 142 (89.3%) were biological mothers, one (0.6%) was an adopted mother, five (3.1%) were foster mothers, ten (6.3%) were grandmothers, and one (0.6%) identified as "other female caregiver". In terms of ethnicity, 94 (59.1%) self-reported to be Latinx, 28 (17.6%) White, 25 (15.7%) African American, one (0.6%) Native American, 10 (6.3%) Asian American, and six (3.8%) Other. Average female caregiver age was 33.4 ($SD = 8.9$). Average child age was 47.18 months ($SD = 15.70$, range: 24–72 months) and 107 (48.2%) of children were male.

Measures

Caregiver sex

Caregivers self-identified using provided response categories during clinic intake: biological father, adopted father, foster

father, grandfather, uncle, brother, other male family member/caregiver (coded male = 1); biological mother, adopted mother, foster mother, grandmother, aunt, sister, other female family member/caregiver (coded female = 2); and family member/caregiver of other or unspecified sex/gender (no participants reported this category, see Participants).

Caregiver events

Caregiver events were assessed using the Life Stressor Checklist-Revised (LSC-R), which is a self-report scale that measures traumatic and stressful events experienced by the respondent (National Center for PTSD 2007a, b, c; Norris and Hamblen 2004). The LSC-R contains 30 possible life events and follows a yes/no response format. When events are endorsed by a respondent, there are follow-up questions, including: age at time of event, age at end of event, and questions pertaining to beliefs and feelings about the event. In our sample, the LSC-R is used to assess life stressors and the associated impact to caregivers. Caregiver events were indexed by a count of the categorical items that were endorsed yes (1) or no (0).

Caregiver symptoms

Caregiver Posttraumatic Stress Symptoms (PTSS) were evaluated using one of two measures: the Posttraumatic Stress Scale Interview (PSSI; Foa et al. 1993) or the Davidson Trauma Scale (DTS; Davidson et al. 1997). Both measures include 17 similarly-worded items assessing the frequency and severity of 17 trauma symptoms associated with Criteria B, C, and D of the PTSD diagnostic criteria in the 4th Edition Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association. 1994). The PSSI scale ranges from 0 (not at all) to 3 (5 or more times per week), whereas the DTS scale ranges from 0 (not at all) to 4 (every day). Both instruments have demonstrated psychometric properties, and had acceptable internal consistency in our sample (PSSI Cronbach's $\alpha = 0.88$; DTS, Cronbach's $\alpha = 0.82$).

The DTS was initially used in the early phases of the study but was replaced by the PSSI part-way through the study (as a clinic-wide decision pertaining to improved validity and clinical utility). Participants completed the same instrument pre- and post-treatment to assess trauma symptoms in the past 2 weeks. For the present study, in order to harmonize the scoring of the two instruments, summed scores on each scale were separately converted into z -scores and the two measures were combined into a single variable. Given that each tool is on a different scale, we could not simply combine them. Thus, the DTS responses were converted to a z -score. Separately, the PSSI responses were converted to a z -score. Subsequently, these two

variables were combined into a single variable so that there was coverage on posttraumatic stress symptoms in caregivers across the sample. The resultant scale represents DSM PTSS in standard deviation units. It is noted that this measure of caregiver trauma assessed both life-threatening and non-life-threatening events.

Caregiver depressive symptoms were assessed using the Center for Epidemiological Studies—Depression (CES-D) scale (American Psychological Association 2018a, b, c; Radloff 1977). Items described common symptoms of depression, and participants provided responses ranging from 0 to 3 (0 = *rarely or none of the time*, 1 = *some or little of the time*, 2 = *moderately or much of the time*, and 3 = *most or all of the time*). The CES-D is well documented in both epidemiological surveys and clinical samples, and the total depression scale had good internal consistency in the present study (Cronbach's $\alpha = 0.90$).

Caregiving stress

Caregiving stress was assessed using the Parenting Stress Index (PSI) which is a 101-item measure that screens for stressful aspects of parent-child interaction (Abidin 2012; American Psychological Association 2018a, b, c). The PSI focuses on three domains of stress: child characteristics, parent characteristics and situational stress (Abidin 2012; American Psychological Association 2018a, b, c). Responses on the self-report scale provide information about what stress areas of stress exist, are particularly pressing, and should be addressed. The PSI is widely used and the total scale had good internal consistency our sample (Cronbach's $\alpha = 0.88$).

Child events

Number of traumatic events experienced by children was assessed using the Traumatic Events Screening Inventory-Parent Report Form, Revised (TESI-PRR), which consists of a 24-item interview with the parent (Ghosh-Ippen et al. 2002). The items pertain to events such as abuse, violence and injury, and follow a yes/no response format. Child events were indexed by a count of the categorical items that were endorsed yes (1) or no (0). This measure of child trauma assessed both life-threatening and non-life-threatening events.

Child symptoms

Child PTSS were evaluated using the Trauma Symptom Checklist for Young Children (TSCYC), a 90-item report of children's traumatic stress responses and associated symptoms, as reported by caretakers (Briere et al. 2001). The measure is composed of two reporter validity scales

and eight clinical scales, with each measuring a different domains of distress (anxiety, depression, anger, and avoidance). The mean of all clinical scales, which is considered to be an appropriate measure of child symptoms in settings of trauma, was used in our study (Cronbach's $\alpha = 0.90$). Lastly, child socioemotional problems were assessed using the Child Behavior Checklist (CBCL) which is a multidimensional approach to measuring children's behavioral and emotional symptoms (Achenbach 1999). A total clinical score of the CBCL was used (Cronbach's $\alpha = 0.90$ for externalizing and 0.91 for internalizing), providing a global clinical picture of child symptomatology that is not necessarily trauma-specific like the TSCYC.

Data Analysis

Analyses were conducted in three steps. First, descriptive statistics were interpreted and the global model was fit for the entire sample (males and females). Second, we examined caregiver sex differences in descriptive statistics (means). Lastly, we considered caregiver sex differences in terms of the hypothesized mediation model.

Multi-group path analysis was employed in order to test the hypothesized model of associations in the total sample, and to determine if any pathways differed as a function of caregiver sex (male and female, binary grouping variable). Total, direct, and indirect effects were considered in the hypothesized model linking caregiver trauma (# of types) and child symptoms (PTSS, socioemotional problems). Indirect pathways were hypothesized to operate via three indirect mechanisms (a) child trauma (# of types), (b) caregiver symptoms (PTSS and depression), and (c) caregiving stress. The total effect (*c* path) examines the relationship between caregiver trauma and child symptomatology without inclusion of any mediators. The direct effect (*c'* path) is the effect of caregiver trauma on child symptoms after including mediators. The indirect effects (*ab* paths) reflects the relationship of caregiver trauma on child symptoms via each hypothesized mediator. Thus, we were interested in three indirect pathways through the aforementioned mediators. All indirect effects were estimated via the Delta method (Sobel 1982) and standardized estimates are reported, including fully standardized indirect effect sizes (Preacher and Kelley 2011). Analyses were conducted using Mplus 7 (Muthén and Muthén 2015). There was a small amount of missing data (<5%) based on incomplete responses that was handled using the information maximum likelihood (FIML) estimation in Mplus 7, consistent with best-practice recommendations outlined by Graham (2009). Model fit was evaluated based on criteria for a "good" fitting model using the Root Mean Square Error of Approximation (RMSEA < 0.05),

Table 1 Bivariate associations amongst study variables

Variable	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>
Caregiver Variables									
1 Income/month	−0.24**	−0.11	−0.07	−0.14	−0.03	−0.13	0.10	2923.00	4604.05
2 Traumatic events ^a		0.11	0.39**	0.28**	0.46**	0.22**	0.08	12.21	5.13
3 Caregiving stress			0.32**	0.44**	0.20**	0.49**	0.39**	61.32	24.89
4 PTSS				0.70***	0.23**	0.28**	0.43**	−0.01	0.99
5 Depressive symptoms				0.09	0.32**	0.40**	20.73	12.91	
Child Variables									
6 Traumatic events ^a						0.15*	0.26**	5.65	2.96
7 Socioemotional problems						0.51**	54.28	25.77	
8 PTSS								40.45	9.87

PTSS posttraumatic stress symptoms

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

^a# of types of events

Comparative Fit Index (CFI > 0.95) and Standardized Root Mean Square Residual (SRMR < 0.08), (Marsh et al. 2004).

Results

Hypothesis One: Caregiver Events are Indirectly Linked to Child Symptoms

Descriptive statistics and variable correlations for the entire sample are presented in Table 1.

Due to the very high correlation between caregiver PTSS and depressive symptoms ($r = 0.70$, $p < 0.001$), we decided to combine these variables as a standardized mean (z -score units of symptomatology) to be used as a single mediator (caregiver symptoms) in the path analysis. Additionally, as implied by the bivariate correlations, income was not a significant predictor of any outcome variable (though predicted caregiver events). Thus, in order to increase parsimony of the model, and given that the LSC-R includes a measure of caregivers “having a serious money problem... for example, not having enough money for food or a place to live”, we decided to not include income in the path analysis beyond the item that is in the LSC-R.

Next, the hypothesized model was fit to the data for the entire sample (male and female caregivers). Based on the criteria outlined by Hu and Bentler (1999), this model was a good fit to the data, $\chi^2(1) = 0.02$, $p = 0.876$, RMSEA = 0.001, CFI = 1.00, SRMR = 0.002 (see Fig. 1). Caregiver traumatic events was positively associated with child traumatic events and caregiver symptoms. The relationship between caregiver traumatic events and caregiving stress did not reach statistical significance. Child PTSS was predicted by child traumatic events, caregiving stress, caregiver symptoms, and caregiver traumatic events. The

inverse relationship between caregiver traumatic events and child PTSS when mediators are included (the direct effect) should be considered in the context of a non-significant relationship when mediators are excluded (total effect) and is likely due to a “suppressor effect” (MacKinnon et al. 2000; see Discussion). Child socioemotional problems was predicted by caregiver symptoms, and caregiving stress, but not child traumatic events. Additionally, there was a significant relationship (a direct effect) between caregiver trauma and child socioemotional problems.

Total, direct and indirect effects for the entire sample are summarized in Table 2. In terms associations between variables, there was an indirect effect of caregiver traumatic events on child PTSS via child traumatic events, and caregiver symptoms, but not caregiving stress. In terms of child socioemotional problems, there were no significant indirect effects. The indirect pathways via caregiving stress, and caregiver symptoms were approaching statistical significance, though this was not the case for child traumatic events.

Hypothesis Two: Mean Differences by Caregiver Sex

Descriptive statistics for male and female caregivers are reported in Table 3 and are displayed in z -score units in Fig. 2. As hypothesized, male caregivers report significantly lower levels of risk in all study variables with the exception of number of traumatic events for children. That is, male caregivers report higher monthly income, experiencing a fewer number traumatic events, themselves, and report lower levels of symptoms (PTSS and depression) and caregiving stress, compared to female caregivers. They also report lower levels of symptoms in their children (PTSS and socioemotional problems) compared to female caregivers.

Fig. 1 Path analysis examining associations between caregiver trauma and child symptoms ($N = 222$)

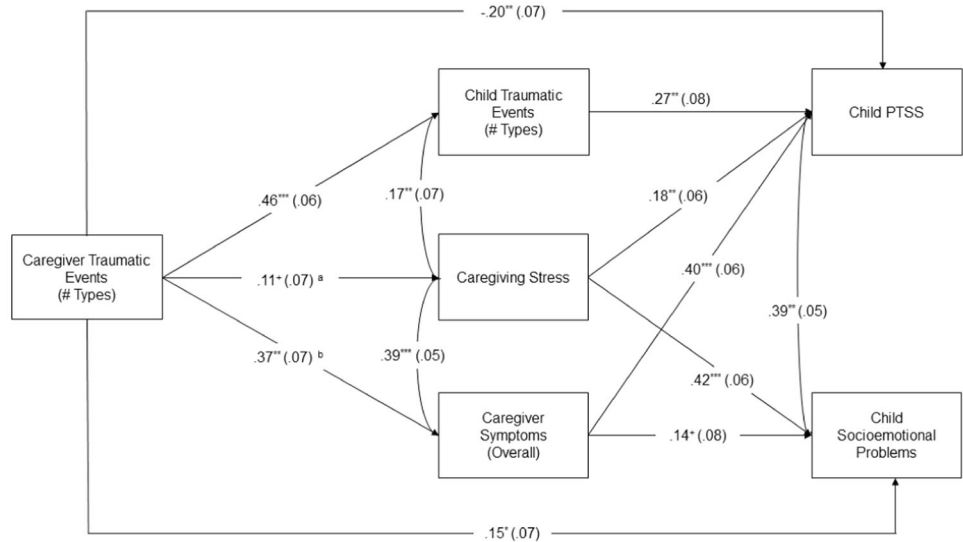


Table 2 Total, direct, and indirect effects for path model overall and by caregiver sex

Effect	Overall ($n = 222$)		Female ($n = 159$)		Male ($n = 63$)	
	PTSS	Socio-emo.	PTSS	Socio-emo.	PTSS	Socio-emo.
Total (β)	0.09	0.25***	0.09+	0.26***	-0.01	0.16*
Direct (β)	-0.19**	0.15*	-0.18***	0.15*	-0.28**	0.15*
Indirect: child events ($\alpha\beta$)	0.12**	0.00	0.11**	0.00	0.17***	0.00
Indirect: care.stress ($\alpha\beta$)	0.02	0.04+	0.02+	0.06*	-0.02	-0.04
Indirect: care.symptoms ($\alpha\beta$)	0.15***	0.05+	0.15***	0.06+	0.13**	0.04

Care caregiving/caregiver, PTSS post-traumatic stress symptoms, Socio-emo socioemotional problems
 *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$

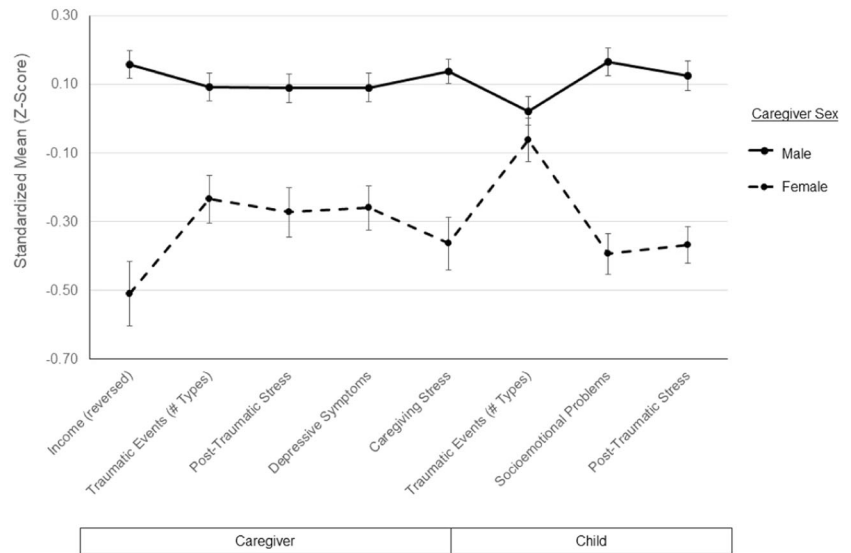
Table 3 Descriptive statistics for female and male caregivers and their children

Variable	Females		Males		t	p
	M	SD	M	SD		
Caregiver Variables						
Age	33.35	(8.87)	38.55	(10.54)	-3.51	0.001 ***
Income/month	2344.77	(3627.64)	4811.45	(6883.79)	-2.12	0.040 ***
Traumatic events ^a	12.69	(4.94)	11.00	(5.47)	2.11	0.036 *
PTSS	0.08	(0.98)	-0.28	(0.98)	2.17	0.031 *
Depressive symptoms	0.09	(1.01)	-0.26	(0.93)	2.19	0.029 *
Caregiving stress	64.79	(22.13)	52.26	(29.46)	2.94	0.004 ***
Child Variables						
Traumatic events ^a	5.72	(3.01)	5.47	(2.86)	0.55	0.581
Socioemotional problems	58.59	(25.38)	44.13	(24.16)	3.81	0.000 **
PTSS	41.69	(10.33)	36.82	(7.47)	3.07	0.002 **

PTSS posttraumatic stress symptoms
 *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

^a# of types of events

Fig. 2 Standardized means (Z-Scores) and standard errors of study variables by caregiver sex



As depicted in Fig. 2, these sex differences are of medium effect size (approximately half a standard deviation).

Hypothesis Three: Differences in Pathways by Caregiver Sex

The hypothesized path model (previously fit to the whole sample, Fig. 1) was fit using multi-group modeling, where caregiver sex formed the binary grouping variable. Initially, the simplest model was fit that constrained all pathways to equality. This model provided a moderate fit to the data, $\chi^2(19) = 31.62, p = 0.035, RMSEA = 0.077, CFI = 0.950, SRMR = 0.097$, suggesting that there may be some pathways that differ as a function of caregiver sex. Subsequently, certain pathways were freed based upon modification indices, and the model was re-fit. This iterative process occurred only twice, first resulting in the freeing of the pathway between caregiver trauma (# events) and caregiving stress, and then the pathway between caregiver trauma and caregiver symptoms (which had the largest modification indices, respectively). This model was a good fit to the data, $\chi^2(17) = 16.50, p = 0.350, RMSEA = 0.003, CFI = 0.994, SRMR = 0.056$. Moreover, the Satorra-Bentler scaled chi-square difference test of nested models with maximum likelihood robust (MLR) estimators was statistically significant $TRd (\Delta df = 2) = 13.28, p < 0.001$, indicating that the model with two additional parameters (for caregiver sex differences) was a significant improvement in model fit. There were no additional modification indices. Total, direct and indirect effects as a function of caregiver sex are presented in Table 3. As a final validation, all parameters were freed across caregiver sex and the difference in each pathway was tested for statistical significance. To do this, a new parameter was estimated that

Table 4 Sex differences between pathways (i.e., regression coefficients) in estimated path model

Pathway	Z	p
Caregiver events → Caregiver symptoms	2.28	0.023*
Caregiver events → Caregiving stress	2.97	0.003**
Caregiver events → Child events	-0.32	0.747
Child events → Child PTSS	0.10	0.917
Caregiving stress → Child PTSS	0.58	0.560
Caregiver symptoms → Child PTSS	0.05	0.958
Caregiver events → Child PTSS	0.56	0.574
Child events → Child socioemotional prob.	-0.56	0.575
Caregiving stress → Child socioemotional prob.	1.41	0.157
Caregiver symptoms → Child socioemotional prob.	1.15	0.252
Caregiver events → Child socioemotional prob.	0.56	0.576

Sex differences were calculated as the value of the female pathway minus the value of the male pathway. Positive Z values indicate that the female pathway is larger than the male pathway
 PTSS posttraumatic stress symptoms
 ** $p < 0.01, *p < 0.05$

was equal to the female pathway minus the male pathway (see Table 4). There were only statistically significant differences between the pathways linking caregiver traumatic events and caregiving stress, and caregiver traumatic events and caregiver symptoms (i.e., the new parameters were statistically different than zero). Thus, the order of model building likely did not influence our results.

For female and male caregivers, the pathways between number of caregiver traumatic events and caregiver

symptoms were $\beta = 0.39$ ($SE = 0.06$), $p < 0.001$ and $\beta = 0.28$ ($SE = 0.09$), $p = 0.003$, respectively, and these pathways were significantly different, $Z = 2.28$, $p = 0.023$, and both medium effect size. For the relationship between number of caregiver traumatic events and caregiving stress, the female and male pathways were $\beta = 0.15$ ($SE = 0.07$), $p = 0.021$ (a small effect) and $\beta = -0.08$ ($SE = 0.08$), $p = 0.353$ (no effect), respectively, and these pathways were significantly different, $Z = 2.97$, $p = 0.003$. Despite these differences (and the mean differences, described previously), the pathways linking caregiver traumatic exposure and child symptoms for males and females are mostly similar.

Discussion

Existing research addressing the effects of paternal traumatic events and posttraumatic stress responses on children's mental health has mostly considered male veterans or holocaust survivors (Hisle-Gorman et al. 2015; Yehuda et al. 1998). In accordance with calls to expand the focus of infant mental health (as a field) to include fathers of diverse backgrounds and life histories (McHale and Phares 2015), our study sought to examine the intergenerational relationship between caregiver traumatic events (# of events) and symptomatology in children (PTSS and socioemotional problems) via three putative pathways (# of traumatic events for children, caregiving stress, and caregiver symptomatology [PTSS and depressive symptoms]) and as a function of caregiver sex. Our clinical participants was derived from an ethnically diverse urban clinic in the United States, where families of children who experienced traumatic events were referred for services, thereby expanding the settings and populations whereby this question has been considered.

In general, study hypotheses received support: (1) there are intergenerational connections via the outlined pathways for the overall sample, (2) female caregivers reported higher levels of risk on all variables pertaining to their own functioning and their children, with the exception of number of events experienced by children, which was the same across caregiver sex, and (3) there were subtle differences in the proposed pathways, where number of traumatic events male caregivers experienced was *not* related to caregiving stress, and was *less strongly* related to caregiver symptomatology. In terms of hypothesis three, although some differences were observed in the intergenerational pathways, these differences were less striking than initially expected. Our findings highlight the importance of considering caregiver traumatic events and associated symptomatology in relation to child health and development for *both* male and female caregivers who present in clinical settings.

Hypothesis One: Caregiver Exposure to Trauma linked to Child Symptomatology

The general finding that caregiver exposure to traumatic events is linked to child symptomatology via the examined mechanisms adds to an already sizable literature outlining these intergenerational consequences of trauma in families (Alink et al. 2019; Repetti et al. 2002; Scheeringa and Zeanah 2001). The present study aligns with recent clinical commentaries to expand upon trauma-informed models of service delivery in healthcare contexts for entire families (McHale and Phares 2015; Racine et al. 2019). Specifically, Racine et al. 2019 note that it is insufficient to simply consider caregiver or child traumatic events as markers or risk factors for symptomatology. Rather, clinicians must be mindful of the mechanisms through which traumatic stress emanates across the family system, disrupting critical processes in family functioning and child development, including the proximal interactions that children need to thrive. Furthermore, routine or rote “screening” for traumatic events is similarly insufficient and potentially harmful. Instead, trauma-informed clinicians must sensitively and empathically engage with clients so that they feel safe and supported in working through these difficulties. A basic knowledge of *how* traumatic events “get inside the family” to create stressful interactions is imperative in this endeavor, and should reflect a keystone component of clinical training across disciplines that work with children and families. Emotional validation towards caregivers around the stressors begotten by trauma, which includes normalization of traumatic stress responses in the caregiving context, is critical in the practitioner-client alliance (Foroughe 2018). Furthermore, as our study illustrates, consideration of basic differences in clinical presentation as a function of caregiver sex may be helpful in supporting therapist-client rapport.

Hypothesis Two: Male Caregivers Present with Lower Risk, Same Number of Events for Children

Findings revealed that male caregivers reported less risk on all variables, despite there being no difference in number of events experienced by children. This pattern may be reflective of systemic differences in the presentations of female and male caregivers that lead to reporting differences (De Los Reyes and Kazdin 2005). As female caregivers generally report greater economic disadvantage, traumatic events, PTSS, and depression (Denton et al. 2004; Dube et al. 2001; Johnson and Whisman 2013; Tolin and Foa 2006), they may experience greater levels of distress as a function of child symptomatology. Alternatively, the different responses by male and female caregivers may be consistent with the tendency of mental

health systems (including measurement) to focus on mother–child relationships. That is, the differences in responses may be indicative of the kinds of questions that were asked, as males may respond differently (less openly) to questions which press for vulnerability (McHale and Phares 2015).

When interpreting our study findings, it is important to carefully consider “sex” differences in the context of phenomena which may be simultaneously attributable to “gender” variation (Clayton and Tannenbaum 2016). The study design does not allow for the disambiguation of self-identified biological sex (which was measured, in relation to a caregiving role) and gender (a complex psychosocial construct related to self-identity). Nevertheless, frameworks for gender-specific clinical practice may be useful to consider, as sex and gender are not mutually exclusive (Clayton and Tannenbaum 2016).

In 2018, the American Psychological Association released their first ever guidelines for practice with boys and men (APA 2018a, b, c). The workgroup notes that, although men tend to hold a relative position of power and authority in society, it is important to consider the unique ways in which social disadvantage, toxic masculinity, and specific forms of traumatic events and mental illness disproportionately affect boys and men. At the level of clinical practice, it would be easy to see men/males presenting with fewer traumatic events and higher socioeconomic status than women/female caregivers, and are therefore (as a group) less severe (as was the pattern in the current study). However, although not considered in the current investigation, previous research has demonstrated that the qualitative type of traumatic events men/males experience may differ from women/females (e.g., greater likelihood of non-sexual violent assault, victimization in the context of criminality) (Tolin and Foa 2006). Moreover, there are critical custody and access considerations when working with families, where men/males often feel victimized by the child welfare system (Gennari et al. 2018). As is the case with number of traumatic events in screening, it is important to not simply consider the average levels of presenting concerns, which may obfuscate the complexity of clinical problems. Rather, we must uniquely consider the lived experience and trauma narratives of men/males (and women/females) in their own right, paying particular attention to the unique ways in which trauma exposure can disrupt the warm and sensitive caregiving men/males are capable of providing (McHale and Phares 2015). Of course, our findings highlight the clear structural and systemic oppression of women/females in society, as well. Recommendations for the culturally sensitive care of women/females in settings of disadvantage have been outlined at length (World Health Organization 2013).

Hypothesis Three: Subtle Differences in Pathways as a Function of Caregiver Sex

Caregiver sex differences in pathways were observed (i.e., the associations from traumatic events to caregiving stress and symptomatology being not significant or weaker for males versus females, respectively). It is important to avoid over-interpreting the null findings of most pathways being *not* statistically different from one another. That being said, our rigorous multi-group path analytic approach permits us to conclude that sex differences are observed in only two-out-of-nine of the pathways linking caregiver traumatic events and child symptomatology.

These findings are consistent with empirical studies of paternal influences on child symptomatology amongst male veterans (Hisle-Gorman et al. 2015), holocaust survivors (Yehuda et al. 1998), and children of male caregivers that have not necessarily reported a trauma history (Gentile and Fusco 2017). We found that pathways of association looked largely similar across caregiver sex, with the exception of caregiving stress and caregiver symptomatology (PTSS and depressive symptoms). Females appear more likely to experience PTSS in response to traumatic events, though there is certainly a clear and sizable impact on males (Tolin and Foa 2006). As in the current study, this may not necessarily translate in to caregiving stress, *per se*. Nevertheless, indirect associations via caregiver symptoms and child exposure to events still appear important. It is noteworthy that these associations were observed both *within* and *across* caregiver sex. In other words, the significant associations were not simply due to females being higher risk.

As is the case in considering differences in average levels of study variables, it is possible that observed *sex* differences in pathways are somewhat attributable to *gender* differences in the response to traumatic events. It is important for readers to exercise caution and discernment when considering these patterns. Future clinical and epidemiological studies would benefit from unpacking these mechanisms with longitudinal designs and methodologies that account for a more nuanced measurement of sex versus gender. Indeed, the important task of better understanding the intergenerational patterns of adversity in child mental health (Briggs-Gowan et al. 2010; Jaffee 2017) will include high-quality designs that consider the complexity of caregiver sex *and* gender differences in the context of trauma (McHale and Phares 2015).

Clinical Considerations

Clinically speaking, our findings emphasize the continued need to consider paternal influences on child symptomatology, including potential intergenerational consequences

of traumatic events. This truism applies when male caregivers are presenting as (measurably) lower-risk than female caregivers, as it is possible that clinical measures underestimate male difficulties (McHale and Phares 2015), and mechanisms of transmission are still operative *within males* (e.g., men who report more traumatic events have children with greater symptomatology, compared to other male caregivers, and this association operates via the outlined pathways).

Acknowledging the differences between caregiver sex and gender, our findings dovetail with the gender-sensitive APA (2018a, b, c) guidelines for psychological practice with men and boys, and other calls for the inclusion of fathers in trauma-informed infant mental healthcare (McHale and Phares 2015). First, clinicians must understand the multiple factors that influence interpersonal relationships for boys and men (APA 2018a, b, c; Guideline #4). Practitioners should consider the role of male caregivers in shaping whole-family dynamics and caregiver/child symptomatology, which can include the utilization of evidence-based interventions that repair attachment injuries and promote mutuality and attunement (Guideline #5). Indeed, the application of relationship-based psychotherapies in early life (such as *Child-Parent Psychotherapy*; Hagan et al. 2017; Iwaoaka-Scott and Lieberman 2015; Lieberman et al. 2011) can be viewed as prevention initiatives in the effort to attenuate the high rates of problem behaviors faced by boys and men (e.g., violence, substance abuse, suicide; Guideline #7). This would simultaneously promote healthy alternative behaviors and development-enhancing relationships (Guideline #8). Finally, client-centered clinical initiatives must be supported by trauma-informed healthcare systems and policies that adequately provide gender sensitive care (Guideline #9), buttressed by advocacy, education, and clinical training (Guideline #10). Indeed, there have been multi-tiered initiatives to expand upon existing models of care to include fathers, including a renewed emphasis on co-parenting, family systems, and men's health (McHale and Phares 2015). Thus, the ongoing expansion of trauma-informed care to male caregivers of infants and very young children reflects an initiative that cuts across layers of organization, from the clinical space to the health and social service system.

Limitations and Future Directions

Limitations of our study include the cross-sectional, within-informant design, inability to address causality, potential influences of shared genetic associations, and exclusive measurement of caregiver sex versus gender identity. First, given the single-informant design, we did not have the methodology to predict discrepancies on father and mother

reports of the same child. Future clinical studies that include direct assessment, including observation of caregiver-child interaction, will be particularly important in better understanding the role of fathers in trauma-informed clinical settings for young children. Second, our study focused on *number* of types of events, limiting our qualitative interpretations around the types of events male versus female caregiver's experience. Third, due to the lack of longitudinal data, the current study is unable to address causality. A longitudinal, repeated measures design is needed to determine temporal precedence between variables and the intergenerational consequences of caregiver events via the hypothesized mediators. Potential for reverse direction of effects should be considered, and we have been cautious to frame our work in terms of "associations" rather than "effects". Fourth, due to the current study focusing on parent-child associations, there is the potential for results to be influenced by shared genetic associations. Fifth, our paradigm was unable to differences in effect sizes (standardized mean differences or regression weights) that were attributable to caregiver variation in biological sex, versus differential responses which may be attributable to caregiver gender. Studies that extend our paradigm across the range of caregiver gender identity would be extremely valuable.

Finally, a suppressor effect (MacKinnon et al. 2000) was observed in the model, whereby there was a non-significant zero-order correlation between caregiver events and child PTSS, but a negative relationship when all mediators were included in the model. Suppression (or "inconsistent mediation") can occur when the variance in a dependent variable accounted for by mediators *increases* the predictive strength of the independent variable in a direction that is opposite to the indirect pathways. Given the strength of mediators in predicting child PTSS, it appears that the remaining variance in the dependent variable was inversely related to caregiver events, which is obviously opposite to the hypothesized direction. It is possible that caregivers who have had many events but are coping well (i.e., their children have had a fewer number of events, they are not experiencing high caregiving stress and symptomatology) report lower PTSS in their children because they are, in fact, functioning better. This association may describe parents who have many resources and actively seek out trauma-informed services after a single child traumatic event, representing a family constellation that is qualitative different from our outlined cascade model. In situations of suppression effects, MacKinnon et al. (2000) discuss the importance of replication and longitudinal designs to address whether the observed suppression is real or an artifact of a given data set. Future research that includes multi-informant, longitudinal designs amongst samples with complex trauma will be particularly important for expanding knowledge of males and men in infant and child mental health.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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