Do trauma symptoms mediate the relationship between childhood physical abuse and adult child abuse risk?[☆],[☆☆]

Joel S. Milner [a],[*], Cynthia J. Thomsen [a], Julie L. Crouch [a], Mandy M. Rabenhorst [a], Patricia M. Martens [b], Christopher W. Dyslin [c], Jennifer M. Guimond [d], Valerie A. Stander [e], Lex L. Merrill [e]

[a] Center for the Study of Family Violence and Sexual Assault, Northern Illinois University, DeKalb, IL 60115-2854, USA
[b] The Family Center at Kennedy Krieger Institute, Baltimore, MD, USA
[c] Department of Psychology & Counseling, Governors State University, University Park, IL, USA
[d] Uniformed Services University of the Health Sciences, Bethesda, MD, USA
[e] Medical Information Systems and Operations Research Department, Naval Health Research Center, San Diego, CA, USA

ARTICLE INFO

ABSTRACT

Objective: Although the intergenerational transmission of family violence has been well documented, the mechanisms responsible for this effect have not been fully determined. The present study examined whether trauma symptoms mediate the relationship between a childhood history of child physical abuse (CPA) and adult CPA risk, and whether any such mediation was similar for women and men.

Method: Female and male US Navy (USN) recruits ($N = 5,394$) and college students ($N = 716$) completed self-report measures of their history of child abuse (i.e., CPA and child sexual abuse [CSA]), exposure to intimate partner violence (IPV), current trauma symptoms, and adult CPA risk.

Results: As expected, there was a strong association between a childhood history of CPA and adult CPA risk. This association was significant even after controlling for demographic variables and childhood exposure to other forms of violence (CSA and IPV), and the strength of the relationship did not vary depending on demographics or exposure to other forms of violence. However, the association between a history of CPA and adult risk of CPA was stronger for individuals high in defensive avoidance compared to those low in defensive avoidance. The association between a history of CPA and adult CPA risk was largely, although not entirely, mediated by psychological trauma symptoms. Mediation was observed for both women and men in both the USN and college samples.

Conclusions: Trauma symptoms associated with a history of CPA accounted for a substantial part of the relationship between a history of CPA and adult CPA risk in both women and men.

Practice implications: To the extent that trauma symptoms are a mechanism by which the intergenerational transmission of child abuse occurs, intervening to reduce trauma symptoms in CPA victims has the potential of reducing their risk of continuing the cycle of violence.

Introduction

Children who are physically abused by their parents are at risk of numerous short- and long-term consequences. Apart from the possibility of physical injury and death (Brittain, 2006), physically abused children, relative to non-abused children, are more likely to experience a range of psychosocial problems, such as cognitive deficits, poor academic performance, low self-esteem, depression, anxiety, anger, psychological distress, relationship problems, re-victimization, and adult psychopathology, including anti-social behavior and PTSD (e.g., Borger, Cox, & Asmundson, 2005; DiLillo, Perry, & Fortier, 2006; Dube et al., 2001; Farrington, 2005; Feerick, Haugaard, & Hien, 2002; Hetzel & McCanne, 2005; Jaffee et al., 2005; Jaffee, Caspi, Moffitt, Polo-Tomas, & Taylor, 2007; Johnson et al., 2002; Pittman & Buckley, 2006; Springer, Sheridan, Kuo, & Carnes, 2007). Further, abused children are at increased risk of engaging in high-risk behaviors, such as smoking, overeating, using alcohol or illicit drugs, engaging in risky sexual behaviors, and running away (National Clearinghouse on Child Abuse and Neglect Information, 2005; Smith, Davis, & Fricker-Elhai, 2004; Tyler & Johnson, 2006).

Children who experience physical abuse, compared to non-abused children, also are at increased risk of perpetrating violent behaviors. Although there are exceptions (e.g., Neller, Denney, Pietz, & Thomlinson, 2005), child physical abuse (CPA) has been identified as a risk factor for several types of interpersonal violence, including peer aggression (Benda & Corwyn, 2002; Manly, Kim, Rogosch, & Cicchetti, 2001; Yexley, Borowsky, & Ireland, 2002), intimate partner violence (IPV) (Merrill, Hervig, & Milner, 1996; Reitzel-Jaffe & Wolfe, 2001; Riggs, O'Leary, & Breslin, 1990; Smith & Williams, 1992; Wekerle et al., 2001; Wolfe, Scott, Wekerle, & Pittman, 2001), serious juvenile offenses (Crooks, Scott, Wolfe, Chiodo, & Killip, 2007; Stewart, Livingston, & Dennison, 2008), violent crime (Smith, Ireland, & Thornberry, 2005), and adult sexual assault (Merrill, Thomsen, Gold, & Milner, 2001).

In addition, an association between the experience of CPA and adult risk of perpetrating CPA (commonly referred to as the intergenerational transmission of CPA) has been reported. Although there are exceptions (Cadzow, Armstrong, & Fraser, 1999; Haskett, Johnson, & Miller, 1994) and mixed findings (Doumas, Margolin, & John, 1994; Haapasalo & Aaltonen, 1999; Milner & Foody, 1994), most studies have found an association between the childhood experience of CPA and adult CPA risk. This association has been reported in undergraduate samples (e.g., Crouch, Milner, & Caliso, 1995; de Paul, Milner, & Mugica, 1995; de Paul, Perez-Albeniz, Paz, Alday, & Mocoroa, 2002; Litty, Kowalski, & Minor, 1996; Narang & Contreras, 2000; Perez-Albeniz & de Paul, 2003), in a Navy recruit sample (Merrill et al., 1996), in parent samples (e.g., Balge & Milner, 2000; Craig & Sprang, 2007; de Paul & Domenech, 2000; DiLillo, Tremblay, & Peterson, 2000; Hall, Sachs, & Rayens, 1998; Ornduff, Kesley, Bursi, Alpert, & Bada, 2002; Rinehart et al., 2005) and in a mixed non-parent and parent sample (Crouch, Milner, & Thomsen, 2001).

Social learning theory and attachment theory have been used to explain why physically abused children, as adults, are at risk of abusing their own children. Both theories focus on the impact of early social experiences on later interpersonal relationships. According to social learning theory (Bandura, 1973, 1977, 1986; Heider, 1958; Markus & Zajonc, 1985; Mischel, 1973) social behaviors are learned through observing and imitating the behavior of models, such as parents. Thus, children who are exposed to verbally and physically abusive parenting behaviors may learn these behaviors and use similar behaviors when they become parents. In support of the social learning perspective, Bower-Russa (2005) found that parenting attitudes partially mediated the relationship between a childhood history of physical discipline and later acceptance of severe parental physical discipline. Bower-Russa, however, did not examine the childhood experience of CPA or the risk for or perpetration of adult CPA.

Compared to social learning theory, attachment theory focuses less on the learning of specific behaviors than on the formation of cognitive models of relationships that guide the selection of behaviors. According to attachment theory, children form internal working models of the self and others based on early interactions with their parents (e.g., Bowlby, 1973; Hill & Safran, 1994; Main & Kaplan, 1985; Ryle, 1985; Shirk, 1998; Stern, 1985). These internal working models provide expectations about relationships and guide relationship behaviors. From an attachment perspective, the intergenerational transmission of child abuse occurs because children who are abused develop negative models of themselves and/or others, which increase the likelihood that they will display negative or abusive behaviors toward others, including their own children. However, in a test of this hypothesis, Merrill et al. (2005) found no evidence that adult internalized models of self and others mediated the relationship between CPA and adult CPA risk; instead, interpersonal schemata independently predicted adult CPA risk separate from the predictive power of CPA history.

As an alternative to social learning and attachment perspectives, some authors have proposed trauma-based models to explain the intergenerational transmission of violence. Trauma-based models (e.g., Dutton, 1998, 1999; Dutton & Holtzworth-Munroe, 1997; Neller et al., 2005; Pomeroy, 1995) suggest that individuals who experience violence are likely to develop trauma symptoms, and that it is these symptoms that increase the likelihood of later violent behavior by the victim. For example, with respect to spouse abuse, Dutton and Holtzworth-Munroe (1997) argued that psychological sequelae (e.g., poor self-concept, emotion dysregulation) resulting from traumatic childhood experiences may better explain IPV than social learning theory. Supporting this perspective, Wekerle et al. (2001) found that trauma symptoms mediated the relationship between child maltreatment and dating violence for women. For men, however, child maltreatment and trauma symptoms were independent contributors to dating violence. Although this study of dating violence is informative, no study was found that examined whether trauma symptoms mediate the relationship between childhood experience of CPA and adult CPA risk.

The present study tested a trauma-based model, similar to the one proposed by Dutton and Holtzworth-Munroe (1997), in the context of adult CPA risk. As is required for mediation to exist, previous studies have documented that trauma symptoms are associated with both childhood CPA and adult CPA risk (for reviews, see Milner & Crouch, 1999; Milner & Dopke, 1997). The proposed mediational model was tested in two convenience samples of young adults, one consisting of incoming US Navy (USN) recruits and the other consisting of students at a Midwestern university. To further assess the reliability of the model, we varied whether USN participants completed surveys under anonymous or identified conditions. Because different forms of childhood maltreatment tend to co-occur (Zolotor, Theodore, Coyne-Beasley, & Runyan, 2007), all analyses controlled for childhood sexual abuse (CSA) and childhood exposure to IPV, as well as for demographic characteristics.

In addition to examining whether trauma symptoms mediate the association between CPA victimization and adult CPA risk in general, we examined several factors that might moderate this association. First, we examined whether exposure to other types of childhood violence moderates the impact of CPA history on adult CPA risk. That is, is CPA victimization more likely to increase adult CPA risk for individuals who also were exposed to CSA or observed parental IPV? Second, we investigated whether the impact of CPA history on adult CPA risk is exacerbated or diminished as a function of the level of trauma symptoms. In addition, we examined several demographic characteristics (i.e., gender, race, age, marital status, and parenting status) as possible moderators. This addresses the question of whether the association between CPA history and adult CPA risk is equally strong across demographic groups. The study of possible gender differences is of particular interest because of the paucity of data on CPA risk factors for men (most research on CPA has studied women) and because of questions about the similarity of CPA risk factors for women and men (e.g., Gutterman & Yookyong, 2005). Finally, we examined whether the meditational model held for both women and men. This comparison was of interest because one previous study (Wekerle et al., 2001) found that trauma symptoms mediated the relationship between child maltreatment and adult violence for women but not for men (albeit in the context of adult IPV rather than adult CPA risk).

Method

Participants

USN sample. The USN study sample consisted of 5,394 incoming recruits at the Recruit Training Command (RTC) in Great Lakes, Illinois, which is the only Navy recruit training center in the US. To control for possible seasonal differences, incoming recruits were sampled each week across a 12-month period. A sample of 11,195 recruits (5,969 men, 5,226 women) agreed to complete a survey package. Overall, 96% of women and men invited to participate did so. The final study sample consisted of participants who provided complete data on measures of CPA history, trauma symptoms, and adult CPA risk, and who did not have an invalid response profile on either of two validity indices (described below). Following these exclusions, the final study sample consisted of 3,393 women and 2,001 men. Most cases (77%, $n = 4,469$) were excluded due to missing data rather than invalid response profiles, and most of the missing data were from the CPA risk measure (the last measure in the survey package). The large amount of missing risk data appeared due to the limited time allotted by the Navy for survey completion. Respondents in the USN study sample were generally young ($M = 19.70$, $SD = 2.54$), single (88%), and had no children (92%). Approximately two-thirds (67%) were White; the remainder were African American (16%), Hispanic (10%), Asian American (4%) or "other" (3%). Four percent of the USN sample had less than a high school education, 87% had a high school education, and 9% had more than a high school education.

College sample. College students (503 men, 507 women) at a Midwestern university completed surveys. The study sample consisted of 716 students (341 men, 375 women) who provided complete data on measures of CPA history, trauma symptoms, and adult CPA risk, and who did not have an invalid response profile on either of two validity indices (described below). Most cases (67%, $n = 197$) were excluded due to missing data rather than invalid response profiles. Participants in the college sample, like those in the USN sample, were generally young ($M = 19.19$, $SD = 2.34$), single (98%), and had no children (98%). Nearly two-thirds (65%) were White; the remainder were African American (19%), Hispanic (5%), Asian American (9%), or "other" (2%). Five percent of the college sample had less than a high school education, 89% had a high school education, and 6% had more than a high school education.

Excluded versus retained participants. Comparisons of the characteristics of those retained in the final study samples and those excluded due to missing or invalid data revealed that women were more likely than men to be retained in both samples [USN, 65% vs. 34%, $p < .001$, $\chi^2(1, 11,195) = 1,100.53$, $p < .001$; college sample, 74% vs. 68%, $p < .05$, $\chi^2(1, 1,010) = 4.66$, $p < .05$]. In addition, White participants were more likely than non-White participants to be retained [USN, 53% vs. 41%, $\chi^2(1, 10,951) = 144.85$, $p < .001$; college sample, 77% vs. 62%, $\chi^2(1, 992) = 24.66$, $p < .001$]. Retained participants were significantly younger than excluded participants in the USN sample [$M = 19.70$ vs. $M = 19.83$, $t(10,729) = -2.73$, $p < .01$] but not in the college sample [$M = 19.19$ vs. $M = 19.51$, $t(448.4) = -1.68$, $p > .09$]. Marital status was unrelated to retention in both samples [USN, $\chi^2(1, 11,138) = 3.11$, $p > .08$; college sample, $\chi^2(1, 1,006) = 0.12$, $p > .70$]. Respondents with children were less likely to be retained in the USN sample [42% vs. 49%, $\chi^2(1, 11,024) = 19.20$, $p < .001$], but not in the college sample [67% vs. 71%, $\chi^2(1, 1,001) = 0.25$, $p > .60$]. Likewise, respondents with lower levels of education were less likely to be retained in the USN sample [$\chi^2(2, 11,164) = 6.76$, $p < .05$], but not in the college sample [$\chi^2(2, 1,008) = 3.52$, $p > .10$].

Test instruments

Child Abuse Potential (CAP) Inventory. The CAP Inventory is a 160-item, forced-choice (agree/disagree) questionnaire designed to screen for child physical abuse risk (Milner, 1986, 1994, 2004, 2008). In addition to the abuse scale, the CAP Inventory contains six factor scales (Distress, Unhappiness, Rigidity, Problems with Child and Self, Problems with Family, and Problems from Others). Abuse scale scores are computed as a weighted sum of 77 items. Participants with invalid profiles on any of the three CAP Inventory response distortion indexes (faking good, faking bad, and random response) were excluded from analyses. All analyses involving the CAP Inventory were conducted using continuous abuse scores. However, some descriptive data are provided using dichotomous risk classifications based on the CAP. As recommended in the scale manual, a score of 215 was the cutoff for defining the group at high risk of adult CPA (Milner, 1986).

Extensive construct validity data have demonstrated the expected relationships between CAP Inventory abuse scores and CPA risk factors (a list of more than 600 articles, papers, chapters, theses, dissertations, etc. on the uses and psychometric characteristics of the CPA Inventory is available, Milner, 2010). For example, scores on the abuse scale are related in the expected manner to history of observation and receipt of childhood abuse, and childhood exposure to IPV. Elevated CAP abuse scores are related to physiological reactivity, neuropsychological problems, social isolation/lack of social support, negative family interactions/family problems, adult attachment problems, poor self-esteem/ego strength, and stress/distress. In addition elevated abuse scores are related to belief in corporal punishment, negative perceptions of child behaviors, negative evaluations of child behaviors, negative expectations of child compliance, negative child-related attributions (e.g., hostile intent), authoritarianism, depression, anxiety, anger/hostility, aggression, lack of empathy, mental health problems/psychopathology, alcohol/drug use, problems in parent–child interactions, use of harsh discipline strategies, and lack of positive parenting behaviors (for reviews see Milner, 1986, 1994, 2004, 2010).

Concurrent predictive validity studies document that the CAP abuse scale correctly classifies physically abusive and non-abusive adults with 80–90% accuracy (e.g., Milner, 1986, 1994; Milner, Gold, & Wimberley, 1986). Prospective validity data indicate that elevated abuse scores (where parents were tested before interventions) are related to later incidences of CPA (Chaffin & Valle, 2003; Milner, Gold, Ayoub, & Jacewitz, 1984). In addition, prospective studies have reported that elevated parental abuse scores are predictive of neonatal morbidity, even after controlling for obstetric risk factors (Zelenko et al., 2001), and are predictive (across time) of children's intelligence and adaptive behaviors, even after controlling for initial problematic parenting orientations (Dukewich, Brokowski, & Whitman, 1999).

Internal consistency estimates for the CAP Inventory abuse scale range from .92 to .98 (Milner, 1986). Temporal stability (test–retest) estimates for the abuse sale are .91 and .75 for 1-day and 3-month intervals respectively (Milner, 1986). In the present study, the internal consistency of the CAP Inventory abuse scale was .89 in the USN sample and .91 in the college sample.

Conflict Tactics Scale (CTS)—Parent–Child (PC) Version. The CTS-PC (Form R; Straus, 1990) assesses respondents' recall of the techniques their parents used to solve parent–child conflicts. The CTS-PC version contains 19 items, each representing a conflict resolution technique. Respondents rate the frequency with which each tactic was used by their parents or stepparents during the worst year of their life before the age of 18 years, on a 7-point scale (0 = *never*; 6 = *more than 20 times*). The present study focused on 7 items that assess the use of severe or very severe physical violence (i.e., kicking, biting, hitting with a fist or object, beating, choking, burning, and threatening with or using a knife or gun) in resolving parent–child conflicts. Spanking was not one of the items used to define severe or very severe physical violence. Respondents were classified as having experienced CPA if they reported that they had experienced any of the severe or very severe forms of violence. The no-CPA group consisted of those who reported never having experienced any of the severe or very severe forms of parental violence. The CTS has been used successfully to demonstrate relationships between a childhood experience of abusive parenting behavior and later adult risk of CPA (e.g., Caliso & Milner, 1992; Merrill et al., 1996).

Childhood history of child sexual abuse (CSA) survey questions. A number of survey questions asked about CSA, which was defined as sexual contact before the age of 14 by someone who was 5 or more years older than the respondent. The specific questions used in the present study asked about the experience of oral, anal, and vaginal intercourse (with vaginal intercourse excluded for males) as well as kissing in a sexual way, being touched in a sexual way or being made to touch another in a sexual way. Respondents were classified as having experienced CSA if they reported experiencing any form of CSA. The non-CSA group consisted of those who reported never having experienced any form of CSA.

Childhood observation of intimate partner violence (IPV) survey questions. Six survey questions inquired about the respondent's observation of IPV before the age of 18 years. The stems asked about "hitting, kicking, throwing someone down, biting, or choking between parents" (two questions, i.e., father or stepfather IPV directed towards mother or stepmother and mother or stepmother directed towards father or stepfather) or between "parents and their boyfriends and girlfriends" (four questions, i.e., father to girlfriend, mother to boyfriend, father's girlfriend to father, and mother's boyfriend to mother). Respondents were classified as having observed IPV if they reported witnessing any one of these six forms of IPV. The no-IPV group consisted of those who reported never having witnessed any of the six forms of IPV.

Trauma Symptom Inventory (TSI). The TSI (Briere, 1995) consists of 100 items, each describing a trauma-related symptom. Respondents were asked to rate how frequently they had experienced each symptom in the last 6 months (0 = *never*; 3 = *often*). The TSI yields scores on 10 clinical scales, each computed by summing 8- or 9-scale items. Briere presented a 3-factor model to explain the underlying structure of the TSI scales. According to this model, the trauma factor (tapped by the Intrusive Experiences [e.g., flashbacks, nightmares], Defensive Avoidance [e.g., suppressing painful memories], Dissociation [e.g., depersonalization], and Impaired Self-Reference [e.g., identify confusion] scales) represents posttraumatic stress symptoms; the self-dysfunction factor (tapped by the Sexual Concerns [e.g., sexual dissatisfaction], Dysfunctional Sexual Behavior [e.g., using sex to accomplish nonsexual goals], and Tension Reduction Behavior [e.g., angry outbursts to reduce distress] scales) represents difficulties in self- and affect-regulation; and the dysphoria factor (tapped by the Anger/Irritability [e.g., angry cognitions and behavior], Depression [e.g., sadness, hopelessness], and Anxious Arousal [e.g., jumpiness, tension] scales) represents negative mood states. Because the dysphoria factor has a high level of conceptual overlap with some of the CAP Inventory subscales (e.g., Distress, Unhappiness), we excluded the dysphoria scales and considered only the 7 TSI symptom scales representing the trauma and self-dysfunction factors as potential mediators. The TSI also includes three validity scales (atypical response, response level, and inconsistent response). In the present study, participants with invalid profiles on any of these validity scales were excluded from all analyses.

Briere (1995) and colleagues (Briere, Elliott, Harris, & Cotman, 1995) reported data demonstrating that clinical scale scores significantly differentiate individuals who have experienced trauma from those who have not. Additional validity evidence exists in the form of correlations between scores on the TSI clinical scales and scores on other symptom measures (Briere, 1995). Internal consistency for the 10 TSI clinical scales ranges from .74 to .91 (Briere, 1995). In the present study, the internal consistency of the 10 TSI clinical scales ranged from .74 to .89 (*Mdn* = .85) in the USN sample and from .70 to .92 (*Mdn* = .85) in the college sample.

Procedure

The USN sample consisted of convenience groups of female and male recruits who were offered participation in the study during their first week of basic training. Data used in the present study were collected as part of a more extensive battery of questionnaires offered to the recruits. Nonmilitary personnel of the same gender as participants administered the survey to groups of female or male recruits. Participation was voluntary. Before agreeing to participate, recruits were provided with a description of the study, a Privacy Act Statement, and an informed consent form. Because some of the participants were recruited for participation in a longitudinal study, approximately one half of all respondents were asked to provide identifying information and were informed that their responses would be confidential; the other half of the sample completed the survey under anonymous conditions.

Participants in the college sample were a convenience group of undergraduates obtained from Introductory Psychology classes at a large Midwestern university who self-selected into the study. The college students completed the identical battery of questionnaires as the USN sample in single-sex groups in a classroom setting. As was the case for the USN sample, the survey administrator was the same gender as the participants. Responses were anonymous, and participants received course credit for their participation.

Analytic strategy

To establish mediation, it is necessary to first demonstrate three sets of associations: a relationship between CPA history and the proposed mediator (trauma symptoms), a relationship between CPA history and the outcome of interest (adult CPA risk), and a relationship between the proposed mediator and the outcome. In the present study, these hypothesized associations were evaluated in a series of multiple regression analyses. Because the USN and college student samples were expected to differ in numerous respects, all analyses were conducted separately for each of the two samples. Although analyses were conducted on continuous CAP abuse scale scores, supplementary descriptive data are provided based on dichotomous risk classifications.

To allow for a determination of the effects of the predictor after controlling for possible confounding variables, prior to entering the predictor of interest (CPA history or trauma symptoms), control variables were entered into the model on the first step of the analysis. The control variables included demographic characteristics (gender, race, age, marital status, parenting status), anonymity condition (USN sample only), and variables assessing childhood exposure to family violence other than CPA (CSA and observed IPV). (Education was not included as a variable, given that it was essentially a constant within the college sample. A parallel set of analyses in which education was included as an additional control variable did not alter the observed pattern of effects.) To test whether symptoms mediated the association between CPA history and adult CPA risk, we compared the effect of CPA on CAP abuse scores in models that included or did not include trauma symptoms. Mediation is indicated by a reduction in the impact of CPA once the mediators (trauma symptoms) have been controlled. We also directly tested the mediational role of specific trauma symptoms using the Sobel test (Sobel, 1982). We tested whether the impact of CPA history on adult CPA risk was moderated by demographic characteristics, exposure to other forms of childhood violence, or trauma symptom levels by testing the significance of two-way interactions between CPA history and each of the other predictor variables. Finally, the meditational model was tested separately for women and men to determine whether trauma symptoms significantly mediated the intergenerational transmission of violence risk in both groups.

Table 1
Regression weights (*SE*) predicting trauma symptoms from child physical abuse history: USN sample.

Predictor	Symptom						
	IE	DA	DIS	SC	DSB	ISR	TRB
Step 1 R^2	.08***	.10***	.06***	.06***	.04***	.05***	.05***
Anonymous	0.36*	0.47*	0.28	0.49**	0.31	0.53**	0.32**
	(0.17)	(0.19)	(0.16)	(0.15)	(0.16)	(0.17)	(0.11)
Female	1.43***	2.41***	1.50***	0.61***	−0.00	1.28***	0.25*
	(0.18)	(0.20)	(0.17)	(0.16)	(0.17)	(0.18)	(0.12)
White	−0.58**	−0.88***	0.20	−0.02	0.10	0.20	0.25*
	(0.18)	(0.20)	(0.17)	(0.17)	(0.18)	(0.18)	(0.12)
Age	−0.09*	0.01	−0.05	0.02	−0.03	−0.05	−0.10***
	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)
Single	−0.27	0.02	0.21	0.80**	0.64*	0.68*	−0.11
	(0.29)	(0.32)	(0.27)	(0.26)	(0.27)	(0.29)	(0.20)
Parent	0.45	0.51	−0.20	0.15	0.53	−0.25	0.30
	(0.35)	(0.38)	(0.33)	(0.32)	(0.33)	(0.35)	(0.24)
CSA history	2.10***	2.25***	1.62***	2.19***	2.39***	1.41***	1.48***
	(0.22)	(0.24)	(0.21)	(0.20)	(0.21)	(0.22)	(0.15)
Observed IPV	1.19***	1.34***	0.91***	0.87***	0.76***	1.10***	0.81***
	(0.18)	(0.20)	(0.17)	(0.17)	(0.17)	(0.18)	(0.12)
Step 2 R^2_Δ	.03***	.03***	.03***	.02***	.02***	.02***	.03***
CPA history	2.00***	2.22***	1.88***	1.41***	1.46***	1.75***	1.29***
	(0.18)	(0.20)	(0.17)	(0.17)	(0.18)	(0.18)	(0.12)

Note. Regression coefficients are provided for the step on which the predictor was entered. USN = United States Navy; CSA = child sexual abuse; IPV = intimate partner violence; CPA = child physical abuse; IE = Intrusive Experiences; DA = Defensive Avoidance; DIS = Dissociation; SC = Sexual Concerns; DSB = Dysfunctional Sexual Behavior; ISR = Impaired Self-Reference; TRB = Tension Reduction Behavior.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Results

In the USN sample, 36% reported a history of CPA, 20% reported a history of CSA, and 34% reported observation of IPV. In the college sample, 28% reported CPA, 8% reported CSA, and 25% reported observed IPV. As expected, all forms of childhood violence exposure were positively associated within both samples ($p < .002$). The mean score on the CAP Inventory was 163.98 ($SD = 94.02$) in the USN sample and 147.71 ($SD = 99.36$) in the college sample. Using a CAP Inventory cut-score of 215 (Milner, 1986), 28% of the USN sample and 25% of the college sample had elevated CAP abuse scores.

Childhood history of abuse and trauma symptoms

To examine whether a childhood history of CPA was associated with heightened trauma symptom levels, separate regression analyses were conducted predicting scores on each TSI symptom scale. In each case, the control variables were entered on the first step, and CPA history was entered on the second step. Results for the USN and college samples are provided in Tables 1 and 2, respectively. In both samples and for each of the seven symptom variables, the control variables entered on the first step of the regression analyses accounted for significant variance ($.02 < R^2 < .10$, $p < .05$). Several control variables emerged as significant predictors of symptom scores; these are provided in Tables 1 and 2. However, because of space constraints, the significant control variables are not discussed here. Instead, we focus on the results relevant to our mediational hypothesis. Consistent with that hypothesis, CPA accounted for significant incremental variance in all types of symptoms and in both samples after controlling for demographics and exposure to other forms of childhood violence ($.01 < R^2_\Delta < .04$, $p < .002$). The interaction of Gender × CPA history, entered on the final step of the analysis, was not significant for any symptom variable in either sample ($R^2_\Delta < .005$, $p > .07$), indicating that the impact of CPA history on symptoms did not significantly differ for women and men.

Childhood history of abuse and adult CPA risk

The second set of analyses examined whether a history of CPA was predictive of increased adult CPA risk. The zero-order association was significant ($p < .001$) in both samples. Hierarchical regression analysis was used to examine the association between a childhood history of CPA and adult CPA risk after controlling for demographics and other forms of childhood violence exposure. Results for both samples are provided in Table 3, in the columns marked "Base model." Together, the control variables entered on the first step of the analysis accounted for significant variance in adult CPA risk in both samples. Of primary importance is the finding that CPA history, entered on the second step of the regression analysis, added significantly

Table 2
Regression weights (*SE*) predicting trauma symptoms from child physical abuse history: college sample.

Predictor	Symptom						
	IE	DA	DIS	SC	DSB	ISR	TRB
Step 1 R^2	.06***	.07***	.02*	.09***	.10***	.05***	.08***
Female	0.78	1.07*	−0.43	−0.75*	−0.27	0.43	0.19
	(0.41)	(0.48)	(0.38)	(0.36)	(0.33)	(0.44)	(0.25)
White	−0.32	−1.10*	0.00	−0.92*	−0.31	−0.44	0.27
	(0.44)	(0.52)	(0.41)	(0.39)	(0.36)	(0.48)	(0.27)
Age	0.00	−0.02	−0.20*	−0.15	−0.06	−0.16	−0.16*
	(0.10)	(0.12)	(0.10)	(0.09)	(0.08)	(0.11)	(0.06)
Single	2.53	2.32	−1.49	1.52	3.72**	0.60	1.05
	(1.63)	(1.92)	(1.54)	(1.46)	(1.33)	(1.76)	(1.01)
Parent	3.41*	3.03	1.54	5.03***	6.16***	4.10**	4.59***
	(1.46)	(1.73)	(1.38)	(1.31)	(1.20)	(1.59)	(0.91)
CSA history	1.50*	1.67*	1.34*	1.73**	1.71**	1.15	0.94*
	(0.72)	(0.85)	(0.68)	(0.64)	(0.59)	(0.78)	(0.45)
Observed IPV	1.64***	1.97***	0.89	1.60***	1.28**	2.04***	1.08***
	(0.49)	(0.57)	(0.46)	(0.44)	(0.40)	(0.53)	(0.30)
Step 2 R^2_Δ	.03***	.03***	.04***	.02***	.01**	.04***	.02***
CPA history	2.22***	2.29***	2.13***	1.42***	1.22**	2.47***	1.06***
	(0.47)	(0.55)	(0.44)	(0.42)	(0.39)	(0.50)	(0.29)

Note. Regression coefficients are provided for the step on which the predictor was entered. CSA = child sexual abuse; IPV = intimate partner violence; CPA = child physical abuse; IE = Intrusive Experiences; DA = Defensive Avoidance; DIS = Dissociation; SC = Sexual Concerns; DSB = Dysfunctional Sexual Behavior; ISR = Impaired Self-Reference; TRB = Tension Reduction Behavior.

  * $p < .05$.
 ** $p < .01$.
*** $p < .001$.

to the prediction of adult CPA risk in both samples (R^2 = .03 and .06 for the USN and college samples, respectively, $p < .001$). To test whether the strength of the association between CPA history and adult CPA risk varied across demographic groups, interactions between CPA history and each of the control variables were allowed to enter on the final step of the analysis using a stepwise algorithm. None of these interactions was statistically significant.

Table 3
Regression weights (*SE*) predicting CAP abuse scores from child physical abuse history USN and college samples.

Predictor	USN		College	
	Base model	Mediation	Base model	Mediation
Step 1 R^2	.05***	+	.08***	+
Anonymous	10.48 (2.89)***		–	–
Female	6.89 (3.10)*		−1.83 (7.87)	
White	−10.84 (3.14)***		−30.99 (8.49)***	
Age	−2.47 (0.60)***		−2.83 (1.95)	
Single	2.67 (4.93)		12.10 (31.45)	
Parent	−17.51 (5.97)**		55.38 (28.30)	
CSA history	18.47 (3.75)***		17.52 (13.84)	
Observed IPV	25.22 (3.12)***		36.11 (9.38)***	
Step 2 R^2_Δ		.43***		.46***
IE		1.22 (0.33)***		1.04 (1.01)
DA		1.57 (0.28)***		2.25 (0.86)**
DIS		1.39 (0.33)***		1.56 (0.96)
SC		1.17 (0.31)***		1.42 (0.90)
DSB		−3.33 (0.36)***		−3.94 (1.12)***
ISR		6.41 (0.34)***		7.39 (0.96)***
TRB		6.14 (0.54)***		5.30 (1.66)**
Step 3 R^2_Δ	.027***	.002***	.061***	.013***
CPA history	34.14 (3.12)***	10.11 (2.40)***	57.52 (8.88)***	27.06 (6.64)***

Note. Regression coefficients are provided for the step on which the predictor was entered. USN = United States Navy; CAP = child abuse potential; CSA = child sexual abuse; IPV = intimate partner violence; CPA = child physical abuse; IE = Intrusive Experiences; DA = Defensive Avoidance; DIS = Dissociation; SC = Sexual Concerns; DSB = Dysfunctional Sexual Behavior; ISR = Impaired Self-Reference; TRB = Tension Reduction Behavior.

  * $p < .05$.
 ** $p < .01$.
*** $p < .001$.
  + Values (R^2, beta weights, and error terms) for Step 1 are identical for the base and mediation models; therefore, they are not repeated.

Trauma symptoms and adult CPA risk

The next set of analyses examined whether elevated trauma symptom levels were associated with adult CPA risk. At the zero-order level, all TSI scales were positively and significantly correlated with CAP abuse scores ($.34 < r < .69$, $p < .001$). Results of the regression analysis for both samples are provided in Table 3, in the columns marked "Mediation." The addition of the seven TSI symptom scales to the model significantly increased the percentage of variance accounted for in CAP abuse scores in both the USN and college samples, $R^2_\Delta = .43$ and $.46$, respectively, $p < .001$. In the USN sample, all symptom scales contributed significantly to the prediction of CAP abuse scores, whereas in the college sample only four of the symptom scales were significant predictors of CAP abuse scores after controlling for demographics, CSA and observed IPV histories, and the other symptom scales (see Table 3). In both samples, the partial regression weight for the Dysfunctional Sexual Behavior scale was negative. This suggests that the Dysfunctional Sexual Behavior scale is serving as a suppressor variable in the context of the other, highly intercorrelated ($.37 < r < .82$) symptom scale predictors. On the final step of the analyses, two-way interactions of gender with each of the symptom scale scores were allowed to enter the model using a stepwise algorithm. None of these interactions was significant in either sample, indicating that effects of trauma symptoms on CAP abuse scores were similar for women and men.

Mediational analyses

The final step in establishing mediation is to show that the association between CPA history and adult CPA risk is eliminated (full mediation) or attenuated (partial mediation) when the effect of trauma symptoms on adult CPA risk is statistically controlled. To this end, we compared the percentage of variance in CAP abuse scores accounted for by CPA history with and without first controlling for trauma symptoms. Relevant R^2 values and regression weights are provided in the last two rows of Table 3. In the USN sample, controlling for trauma symptoms reduced the R^2_Δ value for predicting CAP abuse scores from CPA history by over 90% (from .027 to .002); in the college student sample, the reduction was 79% (.061 to .013). Sobel (1982) tests revealed significant indirect effects of CPA history on adult CPA risk mediated through each of the symptom variables that was significant in the regression analysis ($z > 2.22$, $p < .05$) but not for the symptom variables that were not significant in the regression analysis (i.e., for the college sample, Intrusive Experiences, Dissociation, and Sexual Concerns, $z < 1.54$, $p > .1$).

Despite the evidence of significant mediation, CPA history remained a significant predictor of CAP abuse scores even after controlling for trauma symptoms (see the last two rows of Table 3). Thus, although trauma symptoms explained the majority of the association between CPA history and adult CPA risk, they did not completely account for the association.

For descriptive purposes, we also computed odds ratios (ORs) predicting dichotomous adult CPA risk classifications from CPA history. The extent of mediation is evident in the comparison of ORs computed with versus without first controlling for trauma symptoms (demographic factors, CSA, and observed IPV were controlled in both cases). In the USN sample, before controlling for trauma symptoms, the odds of being at high risk for adult CPA perpetration were nearly twice as high among those with a history of CPA than among those with no history of CPA (OR = 1.83, $CI_{95\%}$: 1.58, 2.13). After controlling for trauma symptoms, the odds of adult CPA perpetration were only 1.25 times higher among those with a history of CPA compared to those with no history of CPA ($CI_{95\%}$: 1.04, 1.50). Likewise, mediation was evident in the college sample. Before controlling for trauma symptoms, the odds of being at high risk of adult CPA were nearly three times higher among those with a CPA history, compared to those with no such history (OR = 2.94, $CI_{95\%}$: 1.92, 4.50). After controlling for trauma symptoms, the OR was reduced to 1.92 ($CI_{95\%}$: 1.11, 3.33).

Moderation analyses

The analyses described above tested for significant differences in the strength of the association between CPA history and adult CPA risk (i.e., moderation) across demographic groups, and revealed no evidence of such differences. Similarly, previous analyses have tested for gender differences in the impact of CPA history on adult CPA risk, and the impact of CPA history on trauma symptoms, and found no support for moderation. The final step in testing moderation of the model involves the association between trauma symptoms and CAP abuse scores. To test for moderation of this association, we conducted additional regression analyses. After entering all of the predictor variables (i.e., demographics, CPA history, other childhood violence, trauma symptoms) on the first step of a regression analysis predicting CAP abuse scores, two-way interactions between each of the symptom variables and both CPA history and gender were allowed to enter the equation in a stepwise fashion. For the USN sample, one interaction entered the equation as a significant predictor of adult CPA risk: CPA history × Defensive Avoidance, b (SE) = 0.96 (0.36), $p < .01$, $R^2_\Delta = .001$. The direction of this effect indicates that CPA history had a greater impact on adult CPA risk among individuals high in Defensive Avoidance than among those low in Defensive Avoidance. In the USN sample, the effects of symptoms on adult CPA risk were not moderated by any other symptom variable, nor did the impact of any symptom variable on adult CPA risk vary by gender. In the college student sample, no interactions between CPA history or gender and trauma symptoms entered the model as significant predictors of CAP abuse scores.

Although the analyses reported above revealed no significant impact of gender on the pair-wise associations comprising our meditational model (i.e., the associations between CPA history and adult CPA risk, between CPA history and trauma symptoms, and between trauma symptoms and adult CPA risk), they do not directly test whether trauma symptoms mediate the association between CPA history and adult CPA risk for both women and men. Therefore, we conducted a final set of

Table 4
Regression weights (SE) for predicting CAP abuse scale scores separately for women and men: USN sample.

Predictor	Women		Men	
	Base model	Mediation	Base model	Mediation
Step 1 R^2	.04***	+	.04***	+
Anonymous	8.86 (3.76)*		12.10 (4.53)**	
White	−9.06 (3.90)*		−14.75 (5.35)**	
Age	−3.97 (0.79)***		−0.31 (0.92)	
Single	−1.27 (6.36)		8.42 (7.81)	
Parent	−11.72 (8.36)		−22.80 (8.50)**	
CSA history	18.66 (4.24)***		16.26 (8.53)	
Observed IPV	23.08 (3.95)***		29.08 (5.12)***	
Step 2 R^2_Δ		.45***		.41***
IE		1.62 (0.39)***		0.24 (0.61)
DA		1.66 (0.35)***		1.49 (0.50)**
DIS		0.92 (0.40)*		2.38 (0.57)***
SC		0.46 (0.38)		2.50 (0.57)***
DSB		−2.60 (0.46)***		−4.42 (0.60)***
ISR		6.52 (0.42)***		6.18 (0.60)***
TRB		6.07 (0.66)***		6.24 (0.94)***
Step 3 R^2_Δ	.03***	.003***	.02***	.002*
CPA history	36.41 (3.98)***	11.06 (3.01)***	30.17 (5.06)***	8.28 (3.98)*

Note. Regression coefficients are provided for the step on which the predictor was entered. USN = United States Navy; CAP = child abuse potential; CSA = child sexual abuse; IPV = intimate partner violence; CPA = child physical abuse; IE = Intrusive Experiences; DA = Defensive Avoidance; DIS = Dissociation; SC = Sexual Concerns; DSB = Dysfunctional Sexual Behavior; ISR = Impaired Self-Reference; TRB = Tension Reduction Behavior.

* $p < .05$.
** $p < .01$.
*** $p < .001$.
+ Values (R^2, beta weights, and error terms) for Step 1 are identical for the base and mediation models; therefore, they are not repeated.

regression analyses that examined the meditational model separately for women and men. Results are provided in Table 4 (USN sample) and Table 5 (college sample). The critical values for establishing mediation are in the last two rows of each table. In both the USN and college samples, there was evidence that trauma symptoms significantly mediated the association between CPA history and adult CPA risk for both women and men. That is, the percentage of variance in adult CPA risk that was accounted for by CPA history was reduced when the effects of trauma symptoms on adult CPA risk were statistically controlled. Trauma symptoms accounted for approximately 90% of the association between CPA history and adult CPA risk

Table 5
Regression weights (SE) predicting CAP abuse scale scores separately for women and men: college sample.

Predictor	Women		Men	
	Base model	Mediation	Base model	Mediation
Step 1 R^2	.06***	+	.12***	+
White	−37.72 (11.54)***		−21.43 (12.53)	
Age	1.70 (4.29)		−4.14 (2.13)	
Single	37.34 (63.90)		0.92 (35.36)	
Parent	10.16 (50.44)		65.96 (33.99)	
CSA history	−10.42 (18.18)		59.82 (21.48)**	
Observed IPV	30.93 (13.00)*		41.07 (13.56)**	
Step 2 R^2_Δ		.52***		.39***
IE		1.24 (1.31)		0.98 (1.57)
DA		2.73 (1.15)*		2.05 (1.32)
DIS		1.17 (1.33)		1.78 (1.41)
SC		0.45 (1.35)		1.82 (1.29)
DSB		−2.06 (1.74)		−5.21 (1.53)***
ISR		7.49 (1.23)***		7.07 (1.55)***
TRB		4.57 (2.24)*		5.66 (2.50)*
Step 3 R^2_Δ	.10***	.02***	.03**	.005
CPA history	76.52 (12.54)***	38.42 (9.13)***	37.83 (12.48)**	17.18 (9.19)

Note. Regression coefficients are provided for the step on which the predictor was entered. CAP = child abuse potential; CSA = child sexual abuse; IPV = intimate partner violence; CPA = child physical abuse; IE = Intrusive Experiences; DA = Defensive Avoidance; DIS = Dissociation; SC = Sexual Concerns; DSB = Dysfunctional Sexual Behavior; ISR = Impaired Self-Reference; TRB = Tension Reduction Behavior.

* $p < .05$.
** $p < .01$.
*** $p < .001$.
+ Values (R^2, beta weights, and error terms) for Step 1 are identical for the base and mediation models; therefore, they are not repeated.

in the USN sample (women, .003 vs. .030; men, .002 vs. .020). In the college sample, trauma symptoms accounted for 80% of the variance for women (.020 vs. .100) and 83% for men (.005 vs. .030). Thus, trauma symptoms were significant mediators of the intergenerational transmission of CPA risk for both women and men, and in both the USN and college samples.

Discussion

Consistent with previous research, the present study provides support for the intergenerational transmission of violence, and specifically the intergenerational transmission of CPA risk. Among both Navy recruits and college students, the odds of being at risk for CPA as an adult were two to three times higher among those who had experienced CPA than among those who had not. This effect previously has been documented in adolescent and undergraduate samples (e.g., Crouch et al., 1995; de Paul & Domenech, 2000; de Paul et al., 1995; de Paul et al., 2002; DiLillo et al., 2000; Litty et al., 1996; Merrill et al., 1996; Milner, Robertson, & Rogers, 1990; Narang & Contreras, 2000; Perez-Albeniz & de Paul, 2003) and in adult samples of non-parents and parents (e.g., Balge & Milner, 2000; Craig & Sprang, 2007; Crouch et al., 2001; de Paul & Domenech, 2000; de Paul et al., 2002; DiLillo et al., 2000; Hall et al., 1998; Ornduff et al., 2002; Rinehart et al., 2005). By replicating the intergenerational transmission of CPA risk in a large and demographically diverse military sample (in addition to an undergraduate sample), the present study provides additional evidence of the generality of this effect. Importantly, the magnitude of the association between a history of CPA and adult CPA risk was similar across gender, race/ethnicity, age, and marital and parenting status. Thus, a history of CPA was found to be associated with increased adult CPA risk in all demographic groups.

Like CPA, a history of CSA and observation of parental IPV as a child were associated with both increased levels of trauma symptoms and increased adult CPA risk. Importantly, however, after controlling for the impact of CSA and IPV exposure, CPA remained a significant predictor. The impact of the three types of childhood violence on adult CPA risk was additive. That is, each type of violence independently increased abuse risk, regardless of whether the other types of violence also had occurred.

Although previous studies have documented the individual links between CPA history and trauma symptoms (e.g., Barnett, Miller-Perrin, & Perrin, 2005; Borger et al., 2005), and between trauma symptoms and adult CPA risk (for reviews, see Milner & Crouch, 1999; Milner & Dopke, 1997), no previous research has examined trauma symptoms as a mediator of the intergenerational transmission of CPA risk. The present results provided substantial support for the hypothesis that trauma symptoms mediate this relationship. After controlling for trauma symptoms, the association between CPA history and adult CPA risk was reduced substantially; trauma symptoms accounted for 90% of the association between CPA history and adult CPA risk in the USN sample, and 79% in the college sample.

In a previous study examining whether trauma symptoms mediate the intergenerational transmission of violence in the context of dating violence, Wekerle et al. (2001) found that trauma symptoms mediated the association for women but not for men. In contrast, in the present study, significant mediation of the association between CPA history and adult CPA risk was found for both women and men. Given that the present study investigated adult CPA risk whereas Wekerle and colleagues investigated dating violence, the divergent results of these two studies suggest that patterns of mediation may differ when different forms of adult violence are considered. A more complete exploration of this issue awaits further research.

The symptoms that most strongly predicted adult CPA risk in both samples were Impaired Self-Reference and Tension Reduction Behavior. Defensive Avoidance also was a significant positive predictor of CAP abuse scores in both samples. In contrast, Dissociation, Intrusive Experiences, and Sexual Concerns scores were significant positive predictors of adult CPA risk in the USN sample but not in the college sample. This likely reflects the greater statistical power in the USN sample, which included more than seven times as many participants as the college sample. Interestingly, an examination of the regression coefficients reveals nearly identical rank-orderings of symptoms in terms of the strength of their relationships with CAP abuse scores across the two samples. Although Dysfunctional Sexual Behavior was a significant predictor in both samples, it was negatively associated with adult CPA risk after controlling for the other types of symptoms. Because this symptom was positively associated with CAP abuse scores at the zero-order level, its negative regression coefficient in the context of the other symptom scales indicates that it served as a suppressor variable in the final model. The importance of this suppressor variable is largely mitigated by the findings of other significant and larger positive mediation effects (e.g., see MacKinnon, Krull, & Lockwood, 2000, for a more complete discussion of suppressor effects).

Previous theory has not addressed which specific trauma symptoms should be most strongly implicated in the intergenerational transmission of violence. The symptoms that played the largest role in predicting CAP abuse scores in the final model were not drawn from the same underlying factor according to Briere's (1995) model. Two of the three symptom scales that most strongly predicted increased adult CPA risk (Impaired Self-Reference and Defensive Avoidance) were drawn from the trauma factor, whereas the other symptom (Tension Reduction Behavior) was from the self-dysfunction factor. Although the same pattern of results was replicated across two samples, it is important to replicate this finding in future research by using different types of samples as well as different measures of symptomatology.

Despite strong evidence for mediation via trauma symptoms, the association between an individual's CPA history and adult CPA risk remained statistically significant even after controlling for symptom levels. It is not surprising that a complex phenomenon such as the intergenerational transmission of violence would not be fully explained by a single type of mediator. Future models should build on the present results by including additional mediators, along with trauma symptoms, in a single model. In addition to psychological and environmental factors, potential genetic and biological moderators should be considered. For example, Binder et al. (2008) found that genetic polymorphisms at the stress-related gene (*FKBP5*) interact with the severity of child abuse history to predict trauma symptoms. This gene by environment interaction was significant

after the authors controlled for age, gender, genetic history, non-child-abuse trauma, and depression. Thus the initial pathway from CPA to trauma symptoms appears to vary depending on the victim's genetic makeup, a finding that should be included in a more comprehensive trauma model of CPA.

There were a number of significant associations between demographic characteristics such as gender and race/ethnicity and scores on measures of both symptomatology and adult CPA risk. These differences may reflect either actual group differences or group differences in willingness to disclose potentially negative experiences and characteristics. Because the present study relied on self-report measures to assess the variables of interest, it is not possible to eliminate the possibility that response sets such as social desirability impacted the results. In an attempt to minimize this problem, participants with invalid profiles on either the CAP Inventory or the TSI were excluded. In addition, in the USN sample the survey was administered under two different conditions (anonymous and identified) as an additional way of examining response biases. As expected, respondents in the anonymous condition reported slightly, but significantly, higher levels of several trauma symptoms as well as adult CPA risk. Importantly, however, the association between CPA history and adult CPA risk did not vary across the anonymous and identified conditions.

Together, the set of predictor variables (demographic factors; childhood history of CPA, CSA, and observed parental violence; trauma symptoms) examined in the present study accounted for approximately half of the variance in adult CPA risk in both the USN sample ($R^2 = .48$) and college sample ($R^2 = .54$). The results suggested that the contribution of each of these predictors to adult CPA risk generally is additive. There was, however, one exception to this. In the USN sample only, the effects of CPA history on adult CPA risk varied depending on levels of Defensive Avoidance. Specifically, among CPA victims, individuals high in Defensive Avoidance were at heightened risk of adult CPA, relative to those low in Defensive Avoidance. This suggests that individuals who have more thoroughly processed their childhood abuse may have reduced risk of continuing the cycle of violence. However, confirmation of this finding is necessary before strong conclusions can be reached.

A strength of the present study is the replication of the models tested across two different samples of young adults, as well as across women and men within the two samples. The lack of moderating effects of demographic factors or anonymity condition indicates that the present results are quite robust. Nonetheless, it will be important to replicate these effects in other types of samples (to enhance external validity) and with other types of measures (to avoid the limitations inherent in self-report measures). Further, the order of presentation of the study measures in the present study was fixed; a randomized order of presentation should be considered in future research. In addition, although psychometric data indicate that CAP abuse scores are predictive of concurrent and future adult CPA perpetration actual abuse was not measured in the present study; therefore, replication of the present trauma meditation effects using observed CPA as the outcome is needed. Of course, self-reports and behavioral measures have complementary strengths and weaknesses. For example, although self-report measures are susceptible to response biases, official abuse reports may miss many CPA cases, particularly those that are less extreme.

A limitation of this study is the high percentage of participants who failed to provide complete data on the primary study measures, particularly in the USN sample. Moreover, across both samples, participants who failed to complete the measures were more likely to be male than female, and more likely to be non-White than White. Differences between participants who were retained in the study samples and those who were excluded raise concerns about the generalizability of the present findings. However, given the lack of evidence for differences in patterns of effects across demographic groups, demographic differences between the included and excluded participants are unlikely to have compromised the external validity of the present results. Another limitation is that although childhood experiences of CSA and observed IPV were controlled in the statistical analyses, other forms of childhood trauma including emotional abuse and neglect were not controlled.

In interpreting the present results, it is important to note that the present study was cross-sectional. Although the childhood experience of CPA precedes current symptom levels and current CPA risk, the observed associations are based on correlations and other unknown "third" or common variables, which were not studied, may be responsible for the observed associations. Further, it is not possible to determine the temporal or causal ordering of trauma symptoms and adult CPA risk. Thus, based on the present findings, it would be inappropriate to conclude that the experience of childhood-related CPA trauma symptoms caused elevated adult CPA risk. To the extent that such causal relations do exist, however, there are interesting and potentially important clinical implications. Specifically, if trauma symptoms are a mechanism by which the intergenerational transmission of CPA occurs, it is possible that intervening to reduce trauma symptoms in abuse survivors will reduce their risk of continuing the cycle of violence. Given the benefits of disrupting the intergenerational transmission of violence, this possibility merits additional research.

Acknowledgements

References

Balge, K., & Milner, J. S. (2000). Emotion-recognition ability in mothers at high- and low-risk for child abuse. *Child Abuse & Neglect*, *24*, 1289–1298.
Bandura, A. (1973). *Aggression: A social learning analysis*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1977). *Social learning theory*. New York: General Learning Press.

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.

Barnett, O., Miller-Perrin, C. L., & Perrin, R. D. (2005). *Family violence across the lifespan: An introduction* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Benda, B. B., & Corwyn, R. F. (2002). The effect of abuse in childhood and in adolescence on violence among adolescents. *Youth & Society*, *33*, 339–365.

Binder, E. B., Bradley, R. G., Liu, W., Epstein, M. P., Deveau, T. C., Mercer, K. B., Tang, Y., Gillespie, C. F., Heim, C. M., Nemeroff, C. B., Schwartz, A. C., Cubells, J. F., & Ressler, K. J. (2008). Association of *FKBP5* polymorphisms and childhood abuse with risk of Posttraumatic Stress Disorder symptoms in adults. *Journal of the American Medical Association*, *299*, 1291–1305.

Borger, S. C., Cox, B. J., & Asmundson, G. J. G. (2005). PTSD and other mental health problems in adults who report histories of severe physical abuse and neglect. In T. A. Corales (Ed.), *Trends in posttraumatic stress disorder research* (pp. 249–261). Hauppauge, NY: Nova Science.

Bower-Russa, M. (2005). Attitudes mediate the association between childhood disciplinary history and disciplinary responses. *Child Maltreatment*, *10*, 272–282.

Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation*. New York: Basic Books.

Briere, J. (1995). *Trauma Symptom Inventory professional manual*. Odessa, FL: Psychological Assessment Resources.

Briere, J., Elliott, D. M., Harris, K., & Cotman, A. (1995). Trauma Symptom Inventory: Psychometrics and association with childhood and adult victimization in clinical samples. *Journal of Interpersonal Violence*, *10*, 387–401.

Brittain, C. R. (Ed.). (2006). *Understanding the medical diagnosis of child maltreatment: A guide for nonmedical professionals*. Oxford University Press: New York.

Cadzow, S. P., Armstrong, K. L., & Fraser, J. A. (1999). Stressed parents with infants: Reassessing physical abuse risk factors. *Child Abuse & Neglect*, *23*, 845–853.

Caliso, J. A., & Milner, J. S. (1992). Childhood history of abuse and child abuse screening. *Child Abuse & Neglect*, *16*, 647–659.

Chaffin, M., & Valle, L. A. (2003). Dynamic prediction characteristics of the Child Abuse Potential Inventory. *Child Abuse & Neglect*, *27*, 463–481.

Craig, C. D., & Sprang, G. (2007). Trauma exposure and child abuse potential: Investigating the cycle of violence. *American Journal of Orthopsychiatry*, *77*, 296–305.

Crooks, C. V., Scott, K. L., Wolfe, D. A., Chiodo, D., & Killip, S. (2007). Understanding the link between childhood maltreatment and violent delinquency: What do schools have to add? *Child Maltreatment*, *12*, 269–280.

Crouch, J. L., Milner, J. S., & Caliso, J. A. (1995). Childhood physical abuse, perceived social support, and socio-emotional status in adulthood. *Violence and Victims*, *10*, 273–283.

Crouch, J. L., Milner, J. S., & Thomsen, C. J. (2001). Childhood physical abuse, early support, and risk for child physical abuse: Current support as a mediator of risk for child physical abuse. *Child Abuse & Neglect*, *25*, 93–107.

de Paul, J., & Domenech, L. (2000). Childhood history of abuse and child abuse potential in adolescent mothers: A longitudinal study. *Child Abuse & Neglect*, *24*, 701–713.

de Paul, J., Milner, J. S., & Mugica, P. (1995). Childhood maltreatment, childhood social support, and child abuse potential in a Basque sample. *Child Abuse & Neglect*, *19*, 907–920.

de Paul, J., Perez-Albeniz, A., Paz, P. M., Alday, N., & Mocoroa, I. (2002). Recuerdos de maltrato infantil en maltratadores y potencial de maltrato en victimas de maltrato fisico y abuso sexual. *Psicothema*, *14*, 53–62.

DiLillo, D., Perry, A. R., & Fortier, M. (2006). Child physical abuse and neglect. In R. T. Ammerman (Ed.), *Comprehensive handbook of personality and psychopathology* (3rd ed., Vol. 3, pp. 367–387). Hoboken, NJ: John Wiley & Sons.

DiLillo, D., Tremblay, G. C., & Peterson, L. (2000). Linking childhood sexual abuse and abusive parenting: The mediational role of maternal anger. *Child Abuse & Neglect*, *24*, 767–779.

Doumas, D., Margolin, G., & John, R. S. (1994). The intergenerational transmission of aggression across three generations. *Journal of Family Violence*, *9*, 157–175.

Dube, S. R., Anda, R. F., Felitti, V. J., Chapman, D. P., Williamson, D. F., & Giles, W. H. (2001). Childhood abuse, household dysfunction, and risk of attempted suicide throughout the life span: Findings from the adverse childhood experiences study. *Journal of the American Medical Association*, *286*, 3089–3096.

Dukewich, T. L., Brokowski, J. G., & Whitman, T. L. (1999). A longitudinal analysis of maternal abuse potential and development delays in children of adolescent mothers. *Child Abuse & Neglect*, *23*, 405–420.

Dutton, D. G. (1998). *The abusive personality: Violence and control in intimate relationships*. New York: Guildford Press.

Dutton, D. G. (1999). Limitations of asocial learning models in explaining intimate aggression. In X. M. Arriaga, & S. Oskamp (Eds.), *Violence in intimate relationships* (pp. 73–87). Thousand Oaks, CA: Sage Publications.

Dutton, D. G., & Holtzworth-Munroe, A. (1997). The role of early trauma in males who assault their wives. In D. Cicchetti, & S. L. Toth (Eds.), *Developmental perspectives on trauma: Theory, research, and intervention* (pp. 379–401). Rochester, NY: University of Rochester Press.

Farrington, D. P. (2005). Childhood origins of antisocial behavior. *Clinical Psychology & Psychotherapy*, *12*, 177–190.

Feerick, M. M., Haugaard, J. J., & Hien, D. A. (2002). Child maltreatment and adulthood violence: The contribution of attachment and drug use. *Child Maltreatment*, *7*, 226–240.

Gutterman, N. B., & Yookyong, L. (2005). The role of fathers in risk for physical child abuse and neglect: Possible pathways and unanswered questions. *Child Maltreatment*, *10*, 136–149.

Haapasalo, J., & Aaltonen, T. (1999). Child abuse potential: How persistent? *Journal of Interpersonal Violence*, *14*, 571–585.

Hall, L. A., Sachs, B., & Rayens, M. K. (1998). Mothers' potential for child abuse: The roles of childhood abuse and social resources. *Nursing Research*, *47*, 87–95.

Haskett, M. E., Johnson, C. A., & Miller, J. W. (1994). Individual differences in risk of child abuse by adolescent mothers: Assessment in the perinatal period. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *35*, 461–476.

Heider, F. (1958). *The psychology of interpersonal relations*. New York, NY: John Wiley & Sons.

Hetzel, M. D., & McCanne, T. J. (2005). The roles of peritraumatic dissociation, child physical abuse, and child sexual abuse on the development of Posttraumatic Stress Disorder and adult victimization. *Child Abuse & Neglect*, *29*, 915–930.

Hill, C. R., & Safran, J. D. (1994). Assessing interpersonal schemas: Anticipated responses of significant others. *Journal of Social and Clinical Psychology*, *13*, 366–632.

Jaffee, S. R., Caspi, A., Moffitt, T. E., Dodge, K. A., Rutter, M., Taylor, A., & Tully, L. A. (2005). Nature × nurture: Genetic vulnerabilities interact with physical maltreatment to promote conduct problems. *Development & Psychopathology*, *17*, 67–84.

Jaffee, S. R., Caspi, A., Moffitt, T. E., Polo-Tomas, M., & Taylor, A. (2007). Individual, family, and neighborhood factors distinguish resilient from non-resilient maltreated children: A cumulative stressors model. *Child Abuse & Neglect*, *31*, 231–253.

Johnson, R. M., Kotch, J. B., Catellier, D. J., Winsor, J. R., Dufort, V., Hunter, W., & Amaya-Johnson, L. (2002). Adverse behavioral and emotional outcomes from child abuse and witnessed violence. *Child Maltreatment*, *7*, 179–186.

Litty, C. G., Kowalski, R., & Minor, S. (1996). Moderating effects of physical abuse and perceived social support on the potential to abuse. *Child Abuse & Neglect*, *20*, 305–314.

MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science*, *1*, 173–181.

Main, M., & Kaplan, N. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. In I. Bretherton, & E. Waters (Eds.), *Monographs of the Society for Research in Child Development, 50*, 66–104.

Manly, J. T., Kim, J. E., Rogosch, F. A., & Cicchetti, D. (2001). Dimensions of child maltreatment and children's adjustment: Contributions of developmental timing and subtype. *Development and Psychopathology*, *13*, 759–782.

Markus, H., & Zajonc, R. B. (1985). The cognitive perspective in social psychology. In G. Lindzey, & E. Aronson (Eds.), *Handbook of social psychology: Vol. 1. Theory and method* (pp. 137–230). New York, NY: Random House.

Merrill, L. L., Hervig, L. K., & Milner, J. S. (1996). Childhood parenting experiences, intimate partner conflict resolution, and adult risk for child physical abuse. *Child Abuse & Neglect*, *20*, 1049–1065.

Merrill, L. L., Thomsen, C. J., Crouch, J. L., May, P., Gold, S. R., & Milner, J. S. (2005). Predicting adult risk of child physical abuse from childhood exposure to violence: Can interpersonal schemata explain the association? *Journal of Social & Clinical Psychology*, *24*, 981–1002.

Merrill, L. L., Thomsen, C., Gold, S. R., & Milner, J. S. (2001). Childhood abuse and premilitary sexual assault in male Navy recruit samples. *Journal of Consulting and Clinical Psychology*, *69*, 251–261.

Milner, J. S. (1986). *The Child Abuse Potential Inventory: Manual* (2nd ed.). Webster, NC: Psytec.

Milner, J. S. (1994). Assessing physical child abuse risk: The Child Abuse Potential Inventory. *Clinical Psychology Review*, *14*, 547–583.

Milner, J. S. (2004). The Child Abuse Potential (CAP) Inventory. In M. L. Hilsenroth, & D. L. Segal (Eds.), *Comprehensive handbook of psychological assessment: Vol. 2. Personality assessment* (pp. 237–246). New York: John Wiley & Sons.

Milner, J. S. (2008). Child Abuse Potential Inventory. In B. L. Cutler (Ed.), *Encyclopedia of psychology and law*. Thousand Oaks, CA: Sage Publications.

Milner, J. S. (2010). *Reading list for the Child Abuse Potential (CAP) Inventory*. Unpublished manuscript. DeKalb: Northern Illinois University.

Milner, J. S., & Crouch, J. L. (1999). Child physical abuse: Theory and research. In R. L. Hampton (Ed.), *Family violence: Prevention and treatment* (pp. 33–65). Thousand, CA: Sage Publications.

Milner, J. S., & Dopke, C. (1997). Child physical abuse: Review of offender characteristics. In D. A. Wolfe, R. J. McMahon, & R. deV. Peters (Eds.), *Child abuse: New directions in prevention and treatment across the life span.* (pp. 25–52). Thousand Oaks, CA: Sage Publications.

Milner, J. S., & Foody, R. (1994). The impact of mitigating information on attributions for positive and negative child behavior by adults at low- and high-risk for child-abusive behavior. *Journal of Social and Clinical Psychology*, *13*, 335–351.

Milner, J. S., Gold, R. G., Ayoub, C. A., & Jacewitz, M. M. (1984). Predictive validity of the Child Abuse Potential Inventory. *Journal of Consulting and Clinical Psychology*, *52*, 879–884.

Milner, J. S., Gold, R. G., & Wimberley, R. C. (1986). Prediction and explanation of child abuse: Cross-validation of the Child Abuse Potential Inventory. *Journal of Consulting and Clinical Psychology*, *54*, 865–866.

Milner, J. S., Robertson, K. R., & Rogers, D. L. (1990). Childhood history of abuse and adult abuse potential. *Journal of Family Violence*, *5*, 15–34.

Mischel, W. (1973). Toward a cognitive social learning reconceptualization of personality. *Psychological Review*, *80*, 252–283.

Narang, D. S., & Contreras, J. M. (2000). Dissociation as a mediator between child abuse history and adult abuse potential. *Child Abuse & Neglect*, *24*, 653–665.

National Clearinghouse on Child Abuse and Neglect Information. (2005). *Long-term consequences of child abuse and neglect*. Washington, DC: Author.

Neller, D. J., Denney, R. L., Pietz, C. A., & Thomlinson, R. P. (2005). Testing the trauma model of violence. *Journal of Family Violence*, *20*, 151–159.

Ornduff, S. R., Kesley, R. M., Bursi, C., Alpert, B. S., & Bada, H. S. (2002). Child abuse potential in at-risk African American mothers: The role of life experience variables. *American Journal of Orthopsychiatry*, *72*, 433–444.

Perez-Albeniz, A., & de Paul, J. (2003). La transmission intergeneracional del maltrato fisico infantil: Estudio en dos generaciones. *Psicothema*, *15*, 452–457.

Pittman, J. F., & Buckley, R. R. (2006). Comparing maltreating fathers and mothers in terms of personal distress, interpersonal functioning, and perceptions of family climate. *Child Abuse & Neglect*, *30*, 481–496.

Pomeroy, W. (1995). A working model for trauma: The relationship between trauma and violence. *Journal of Prenatal & Perinatal Psychology & Health*, *10*, 89–101.

Reitzel-Jaffe, D., & Wolfe, D. A. (2001). Predictors of relationship abuse among young men. *Journal of Interpersonal Violence*, *16*, 99–115.

Riggs, D. S., O'Leary, K. D., & Breslin, F. C. (1990). Multiple correlates of physical aggression in dating couples. *Journal of Interpersonal Violence*, *5*, 61–73.

Rinehart, D. J., Becker, M. A., Buckley, P. R., Dailey, K., Reichardt, C. S., Graeber, C., VanDeMark, N. R., & Brown, E. (2005). The relationship between mothers' child abuse potential and current mental health symptoms: Implications for screening and referral. *Journal of Behavioral Health Services & Research*, *32*, 155–166.

Ryle, A. (1985). Cognitive theory, object relations, and the self. *British Journal of Medical Psychology*, *58*, 1–7.

Shirk, S. T. (1998). Interpersonal schemata in child psychotherapy: A cognitive interpersonal perspective. *Journal of Clinical Child Psychology*, *27*, 4–16.

Smith, C. A., Ireland, T. O., & Thornberry, T. P. (2005). Adolescent maltreatment and its impact on young adult antisocial behavior. *Child Abuse & Neglect*, *29*, 1099–1119.

Smith, D. W., Davis, J. L., & Fricker-Elhai, A. E. (2004). How does trauma beget trauma? Cognitions about risk in women with abuse histories. *Child Maltreatment*, *9*, 292–303.

Smith, J. P., & Williams, J. G. (1992). From abusive households to dating violence. *Journal of Family Violence*, *7*, 153–165.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhart (Ed.), *Sociological methodology 1982* (pp. 290–312). San Francisco: Jossey-Bass.

Springer, K. W., Sheridan, J., Kuo, D., & Carnes, M. (2007). Long-term physical and mental health consequences of childhood physical abuse: Results from a large population-based sample of men and women. *Child Abuse & Neglect*, *31*, 517–530.

Stern, D. N. (1985). *The interpersonal world of the infant*. New York: Basic Books.

Stewart, A., Livingston, M., & Dennison, S. (2008). Transitions and turning points: Examining the links between child maltreatment and juvenile offending. *Child Abuse & Neglect*, *32*, 51–66.

Straus, M. A. (1990). Measuring intrafamily conflict and violence: The Conflict Tactics Scales. In M. A. Straus, & R. Gelles (Eds.), *Physical violence in American families* (pp. 29–47). New Brunswick, NJ: Transaction Publishers.

Tyler, K. A., & Johnson, K. A. (2006). A longitudinal study of the effects of early abuse on later victimization among high-risk adolescents. *Violence and Victims*, *21*, 287–306.

Wekerle, C., Wolfe, D. A., Hawkins, D. L., Pittman, A., Glickman, A., & Lovald, B. E. (2001). Childhood maltreatment, posttraumatic stress symptomatology, and adolescent dating violence: Considering the value of adolescent perceptions of abuse and a trauma meditational model. *Development & Psychopathology*, *13*, 847–871.

Wolfe, D. A., Scott, K., Wekerle, C., & Pittman, A. (2001). Child maltreatment: Risk of adjustment problems and dating violence in adolescence. *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*, 282–289.

Yexley, M., Borowsky, I., & Ireland, M. (2002). Correlations between different experiences of intrafamilial physical violence and violent behavior. *Journal of Interpersonal Violence*, *17*, 707–720.

Zelenko, M. A., Huffman, L. C., Brown, B. W., Jr., Daniels, K., Lock, J., Kennedy, Q., & Steiner, H. (2001). The Child Abuse Potential Inventory and pregnancy outcome in expectant adolescent mothers. *Child Abuse & Neglect*, *25*, 1481–1495.

Zolotor, A. J., Theodore, A. D., Coyne-Beasley, T., & Runyan, D. K. (2007). Intimate partner violence and child maltreatment: Overlapping risk. *Brief Treatment and Crisis Intervention*, *7*, 305–321.