

Coping Self-Efficacy Mediates the Association Between Child Abuse and ADHD in Adulthood

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Abstract

Objective: To investigate whether individual differences in coping self-efficacy mediated the association of child abuse and symptoms of ADHD in young adults. **Method:** Self-reported measures of coping self-efficacy, child abuse, and ADHD were obtained from 66 adults. **Results:** Adults who reported childhood physical or sexual abuse (prior to the age of 17) had significantly higher levels of ADHD than those who did not. Individual differences in coping self-efficacy fully mediated the association between child abuse and ADHD symptoms in adulthood, such that individuals who endorsed child abuse had lower coping self-efficacy, and coping self-efficacy negatively predicted ADHD symptoms. **Discussion:** The findings suggest a potential causal mechanism by which childhood physical and sexual abuse may result in ADHD symptoms later in life. Interventions that improve coping skills may be useful in preventing later ADHD symptoms among adults with a childhood history of physical and sexual abuse. (*J. of Att. Dis.* 2016; 20(8) 695-703)

Keywords

childhood trauma, ADHD, coping self-efficacy, sexual trauma, physical trauma

Child abuse (CA) is a substantial problem, occurring at every socioeconomic level and across all ethnic, cultural, and educational backgrounds (Miller, Sadegh-Nobari, & Lillie-Blanton, 2011; Putnam, 2003; Stoltenborgh, van IJzendoorn, Euser, & Bakermans-Kranenburg, 2011). In the United States, approximately 695,000 children below the age of 18 were victims of maltreatment in 2010 alone, with physical abuse (17.6%) and sexual abuse (9.2%) being the most frequent forms of maltreatment (United States Department of Health & Human Services, 2010). Maltreated children are at risk for immediate physical damage as well as long-term negative physical health outcomes such as neurological and musculoskeletal problems. Furthermore, abused children are at an estimated 74% to 100% higher risk of hospitalization for asthma, cardiorespiratory difficulties, and infectious disease (Lanier, Jonson-Reid, Stahlschmidt, Drake, & Constantino, 2010; Wegman & Stetler, 2009). Along with the substantial physical sequelae associated with early abuse, the psychological consequences secondary to childhood trauma are significant: According to the National Comorbidity Survey, approximately 80% of 21-year-olds who reported abuse as a child meet criteria for at least one mental disorder, and 40% of Americans reported at least one traumatic experience by the age of 13 (National Comorbidity Survey Replication [NCS-R]; Kessler, Chiu, Demier, & Walters, 2005).

Abused children were reported to have greater levels of anxiety and depression (Green, 1993), increased destructive behavior (C. F. Johnson, 2002), and deficits in intellectual and social development (Barahal, Waterman, & Martin, 1981). Thus, CA is a potential risk factor in the development of psychopathology as well as other meaningful indicators of functional impairment, and appears to persist across the life span. CA prospectively predicts adolescent delinquency, adult violence, as well as later peer rejection (Briscoe-Smith & Hinshaw, 2006; Fergusson, Horwood, & Lynskey, 1996; McCabe, Hough, Yeh, Lucchini, & Hazen, 2005). Adults who experienced abuse early in development were more likely to endorse suicidal ideation and suicide attempts (Afifi, Boman, Fleisher, & Sareen, 2009), and to engage in riskier sexual behaviors (van Roode, Dickson, Herbison, & Paul, 2009). Moreover, positive abuse histories are correlated with restlessness, difficulty concentrating, increased aggressive responses, and emotional constraint (van der Kolk & Greenberg, 1987). Indeed, early physical and/or sexual

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abuse is an important risk factor in the development of ADHD (Angold, Erkanli, Costello, & Rutter, 1996). Abused children were significantly more active than nonabused children (Glod & Teicher, 1996), and many of the emotional and cognitive disturbances that occur in response to trauma such as difficulty concentrating, irritability, dysregulated affect, and hyperarousal to stimuli either coincide with or exacerbate symptoms of ADHD (Daud & Rydelius, 2009).

There is evidence that children with ADHD show more frequent histories of sexual and physical abuse than their non-ADHD counterparts (Ford, 2000). Relatedly, sexual abuse was overrepresented among girls with ADHD relative to demographically comparable female youth without ADHD (14.3% vs. 4.5%; Briscoe-Smith & Hinshaw, 2006). In a sample of adopted children, preadoption neglect and abuse levels positively predicted a diagnosis of ADHD with an odds ratio of 2.3 ($p < .01$; Simmel, Brooks, Barth, & Hinshaw, 2001). Furthermore, another study assessed 39 participants aged 7 to 13 for ADHD symptoms prior to (using retrospective report) and following the experience of abuse (Endo, Sugiyama, & Someya, 2006). Significantly higher levels of ADHD were reported subsequent to CA than prior to abuse experiences, suggesting that ADHD is overrepresented in children with an abuse history and that CA is also prevalent among children with ADHD. Although individual differences in ADHD are substantially heritable (Faraone et al., 2005), environmental factors remain salient, perhaps through gene \times environment interaction potentiating latent genetic vulnerability (Li & Lee, 2012). Thus, it is plausible that CA precedes, and potentially contributes to, the development of ADHD symptoms.

There are important individual differences in the response to trauma, including CA (Fremont, 2004; Mulvihill, 2005; Putnam, 2003), although a key consideration is that traumatic experiences are likely to affect coping (Muslow, O'Neal, & Murry, 2001; Rayburn et al., 2005). CA, in particular, may represent a failure of the caregiving environment to provide opportunities for successful coping development, especially given that the majority of childhood physical and sexual abuse offenders are caregivers. Abuse experiences are theorized to be accompanied by a perceived loss of cognitive and emotional control (Aldwin, Yancura, & Boeninger, 2010), and generally require an extended coping process relative to more general life hassles and events (Horowitz, 1987). Traumatic situations are typically beyond individuals' normative experiences, and most individuals, especially children, are ill prepared to cope adaptively with victimization (Aldwin & Park, 2004). In fact, how an individual copes with a traumatic event may be more important than the traumatic event itself (Aldwin, 1999; Mikulincer & Florian, 1996). The extinction of negative emotions (e.g., anxiety, fear, and physiological arousal) through the use of maladaptive coping strategies (e.g., dissociation, avoidance) is negatively reinforced, thus maintaining the use of poor

coping behaviors. Although maladaptive coping strategies provide temporary relief of anxiety and physiological arousal, they may increase risk for the development of later depression (Thompson et al., 2010), higher substance abuse (Chiong, Bry, & Johnson, 2010), and posttraumatic stress disorder (PTSD; Meiser-Stedman, Dalgleish, Glucksman, Yule, & Smith, 2009). As such, individual differences in coping, particularly following CA, may be an important contributing factor to the development of psychopathology.

Self-perceptions of efficacy influence thought patterns, actions, and emotional arousal as well as directly influence one's choice of activities and environmental settings (Bandura, 1977, 1982). Coping self-efficacy is defined as the belief that one can successfully perform a specific behavior to achieve a specific outcome in coping situations (Bandura, 1977). Levels of coping self-efficacy positively predict the use of adaptive, active coping styles (e.g., positive cognitive restructuring, emotion-focused or problem-focused coping, proactive coping; Thompson et al., 2010), and perceived coping self-efficacy regulates anxiety arousal and avoidance behaviors (Bandura, 1993). As the perception of coping ability increases, potential stressors are seen or experienced as less taxing or threatening (Bandura, 1988). In fact, individual differences in coping self-efficacy may significantly mediate the association between traumatic events and general distress, social support, and optimism. For example, low levels of coping self-efficacy predicted higher general and trauma-related distress in a sample of adults following Hurricane Opal in 1995 (Benight, Swift, Sanger, Smith, & Zeppelin, 1999).

The effective use of adaptive coping strategies is a protective factor in the development and exacerbation of psychopathology (Losel & Bliesener, 1994). Children with ADHD generally use poorer coping strategies, including dissociative and escape-avoidant coping methods as well as less planful problem solving, reappraisal of situations, and self-removal from angry situations relative to their typically developing counterparts (Ghanizadeh & Haghghi, 2010; Young, 2005). Regardless of age, children with ADHD are less flexible in their coping and use more antisocial coping strategies (e.g., physical and verbal aggression) compared with children without ADHD (Babb, Levine, & Arseneault, 2010). In addition, children with ADHD report more stress than children without ADHD (Hirvikoski, Lindholm, Nordenstrom, Nordstrom, & Lajic, 2009). In one study, children with ADHD characteristics perceived less overall social support relative to children without ADHD (Demaray & Elliott, 2001), which may impede effective coping. Therefore, it is plausible that poor coping may contribute to individual differences in ADHD symptoms. Thus, children with ADHD are at an increased risk for the development and reinforcement of more negative coping strategies when coping with traumatic experiences such as physical or sexual abuse.

Although studies have documented a positive association between CA and later ADHD symptoms (Endo et al., 2006; Ford, 2000; Simmel et al., 2001), to our knowledge, potential causal mechanisms underlying this association have yet been identified or evaluated. Identifying and testing the putative mechanisms through which CA predicts individual differences in ADHD is likely to provide insight into the etiology of ADHD, which is known to be multifactorial (Jensen, 2000). Moreover, identification of replicated mediators provides logical targets for early intervention or prevention efforts. The present study examined whether retrospectively recalled CA was associated with individual differences in ADHD symptoms in a sample of young adults. If so, given that coping self-efficacy has been implicated as a potential mediator in the development of multiple dimensions of psychopathology and that individuals with ADHD frequently utilize poor coping strategies with actual and perceived stress, we hypothesized that the association between CA and adult ADHD symptoms would be mediated by individual differences in perceived coping self-efficacy, with lower levels of coping self-efficacy predicting higher levels of ADHD symptoms.

Method

Participants

Participants were 66 young adults enrolled at a large research university in the Western United States with complete data on all study measures. They were recruited through an announcement posted on the university's online experiment management system. A total of 27% ($n = 16$) reported CA (defined as abuse prior to age 17), whereas the remaining participants ($n = 50$) denied experiencing physical or sexual abuse during childhood. Participants ranged in age from 18 to 26 years ($M = 20.20$, $SD = 1.73$, 32% male). Participants self-endorsed the following racial-ethnic distribution: 48.0% Asian, 30.7% Caucasian, 4.0% Hispanic, and 9.3% Mixed/Other.

Procedure

Participants completed a two-session experiment assessing the impact of stress on impulsivity and risk taking. Participants received class credit for their participation in the study. All study procedures and consent forms were approved by the university's Institutional Review Board prior to data collection.

Measures

Childhood Traumatic Events Scale. This six-item self-report measure (Pennebaker & Susman, 1988) evaluates childhood trauma prior to age 17. Questions addressed sexual abuse,

physical abuse or assault, parental upheaval, extreme illness/injury, death of friend/family, or any other major disruption that may have occurred during childhood. Participants positively or negatively endorsed the presence of these traumatic experiences. For the current study, we exclusively examined responses to the two items assessing sexual and physical abuse prior to the age of 17 (yes or no). The focus on physical and sexual abuse domains is consistent with other work (Fergusson, Boden, & Horwood, 2008), and due to the modest sample size, endorsement in either category resulted in CA categorization.

Adult ADHD Self-Report Scale—Version 1.1 (ASRS-v1.1). The ASRS-v1.1 (Adler, Kessler, & Spencer, 2003) is an 18-item self-report measure based on the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association [APA], 2000) diagnostic criteria for ADHD. This version was modified to include adult appropriate language to better relate with symptoms experienced by adults. Good internal consistency ($\alpha = .88$) and concurrent validity have been shown in previous studies (Adler et al., 2006; Adler et al., 2012). Participants reported on behaviors during the previous 6 months using 0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*, and 4 = *very often*, with higher scores indicating more severe symptoms.

Coping Self-Efficacy Scale. This 26-item questionnaire measures confidence in implementing coping skills (i.e., problem-focused coping, stopping unpleasant emotions and thoughts, and support from family and friends) when faced with challenges or threats. Items included questions dealing with coping skills (i.e., problem-focused coping, stopping unpleasant emotions and thoughts, and support from family and friends) and were based on an 11-point scale (e.g., 0 = *cannot do at all*, 5 = *moderately can do*, 10 = *certainly can do*) to rate the extent to which they believed they could perform behaviors important to adaptive coping (e.g., stopping unpleasant emotions and thoughts, and support from family and friends) when faced with challenges or threats. Higher scores indicated greater coping self-efficacy. The Coping Self-Efficacy Scale has been shown valid and reliable in previous studies (Chesney, Neilands, Chambers, Taylor, & Folkman, 2006), with good internal consistency ($\alpha = .80-.91$; M. O. Johnson et al., 2007).

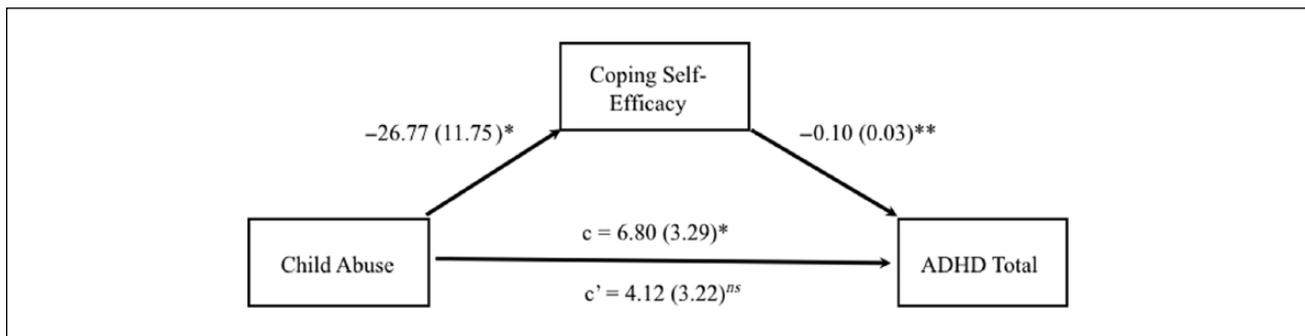
Data Analysis

Following recommendations by MacKinnon, Lockwood, and Williams (2004), a nonparametric resampling approach (bootstrapping procedure; see Preacher & Hayes, 2008) was used to test the indirect (i.e., mediator) effect of coping self-efficacy. We used a bootstrap procedure because it is robust to assumptions of normality in the distribution of the indirect effect and standard error, unlike other common procedures (e.g., the Sobel test; Sobel, 1982). The bootstrapping

Table 1. Descriptive Statistics and Correlation Matrix Among Study Variables.

	Child abuse	Coping self-efficacy	Inattention	Hyperactivity-impulsivity	Total ADHD
Child abuse (1 = yes)	1	-.27*	.29*	0.17	.25*
Coping self-efficacy	—	1	-.40***	-.36**	-.40***
Inattention	—	—	1	.79***	.96***
Hyperactivity-impulsivity	—	—	—	1	.93***
Total ADHD	—	—	—	—	1
M (SD) or %	27%	170.15 (42.20)	16.18 (6.99)	11.67 (5.43)	27.85 (11.75)

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

**Figure 1.** Mediation model of child abuse, coping self-efficacy, and ADHD total.

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

method is particularly robust to sample size and effect size (MacKinnon et al., 2004), and it provides an estimate of the indirect effect and calculates a confidence interval (CI) for the point estimate (Mallinckrodt, Abraham, Wei, & Russell, 2006). The SPSS macro created by Preacher and Hayes (2008) was used to test mediation with 5,000 bootstrap resamples.

Results

Preliminary Analyses

All 66 participants were classified into groups according to their self-reported CA experience(s): 24% ($n = 16$) of the participants were included in the CA group (12 endorsed physical abuse and 6 endorsed sexual abuse) and 76% reported no experience of abuse before the age of 17 ($n = 50$). The means, standard deviations, and bivariate correlations of CA, coping self-efficacy, and ADHD scales (i.e., inattention, hyperactivity-impulsivity, and total score) are in Table 1. As expected, trauma was negatively associated with coping self-efficacy and positively associated with inattention scores and total ADHD scores. However, no significant association was found between trauma and hyperactivity-impulsivity scores. In addition, coping self-efficacy was significantly and negatively related to all three ADHD scores.

Mediation Analyses

All continuous variables were centered prior to analysis. In accordance with Baron and Kenny's (1986), regression analyses suggested that coping self-efficacy fully mediated the association of CA and total ADHD and also mediated the association of CA and inattention specifically (see Figure 1 for our hypothesized mediational model). The traditional requirement from the Baron and Kenny approach was satisfied given that CA significantly predicted total ADHD, consistent with results from the correlation table, $F(1, 64) = 4.26, p = .04$. Step 2 was also satisfied given that the predictor (i.e., CA) was significantly associated with the mediator (i.e., coping self-efficacy), $F(1, 64) = 5.19, p = .03$. When the putative mediator, coping self-efficacy, was included in the analyses, the predictive value of CA for total ADHD was reduced to nonsignificance, $t(63) = 1.28, p = .21$. Results suggested that coping self-efficacy fully mediated the association between CA and ADHD; the model was significant, $F(2, 63) = 7.00, p = .002$; and only coping self-efficacy significantly predicted ADHD score, $t(63) = -3.03, p = .004$. These findings suggest that it is primarily through coping self-efficacy that CA predicts individual differences in adult ADHD.

We intended to replicate this model treating ADHD symptom dimensions separately (i.e., inattention and hyperactivity-impulsivity). However, given that there was nonsignificant

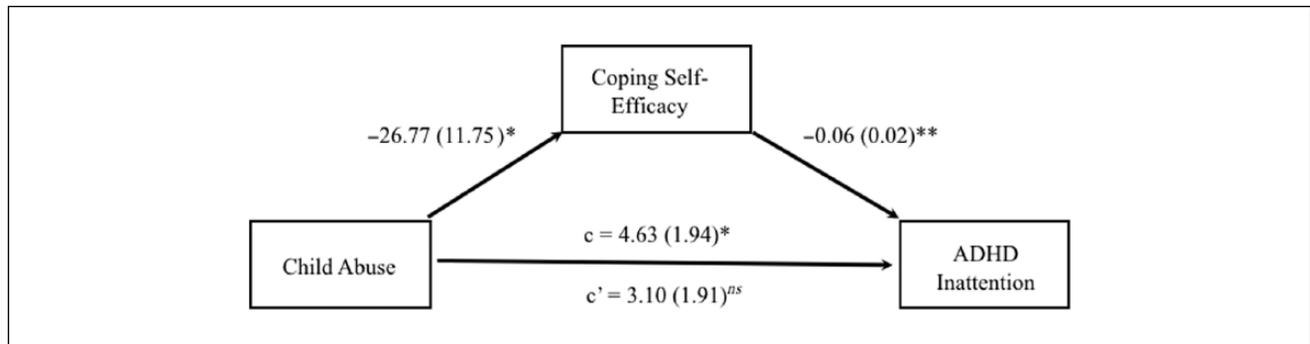


Figure 2. Mediation model of child abuse, coping self-efficacy, and ADHD inattention.

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

correlation between CA and hyperactivity-impulsivity, we focused exclusively on inattention (see Figure 2). Consistent with the analyses based on total ADHD, CA significantly predicted inattention symptoms, $F(1, 64) = 5.69, p = .02$, but this effect was reduced to nonsignificance when the mediator, coping self-efficacy, was entered into the model. The full model of CA and coping self-efficacy predicting inattention scores was significant, $F(2, 63) = 7.46, p = .001$, and only coping self-efficacy significantly predicted ADHD score, $t(63) = -2.92, p = .005$. These findings suggest that it is primarily through coping self-efficacy that CA predicts adult inattention scores.

We used a nonparametric resampling method to derive the 95% CI for the indirect effect of the CA through coping self-efficacy on total ADHD using the SPSS macro provided by Preacher and Hayes (2008), which is similar to the fourth and final step of the Baron and Kenny method. For CA predicting total ADHD symptoms, the true indirect effect was estimated to lie between 0.52 and 6.21 (95% CI). For CA predicting inattention symptoms, the true indirect effect was estimated to lie between 0.33 and 3.57 (95% CI). Because 0 was not within the 95% CI, the indirect effect was interpreted as differing significantly from 0 (i.e., two-tailed $p < .05$).

Discussion

The present study investigated the association of CA and symptoms of ADHD in young adults and its potential mediation by individual differences in coping self-efficacy. Results suggested that the experience of CA significantly predicted individual differences in ADHD symptoms, and specifically the inattention symptom domain. Importantly, the association between CA and ADHD symptoms was completely mediated by coping self-efficacy, such that CA was no longer associated with ADHD once coping self-efficacy was included in the model. Coping self-efficacy has been implicated as a mediator in the association between natural disasters, terrorist attacks, military combat,

as well as sexual and physical assaults, with poor psychological outcomes (Benight & Bandura, 2004; Muris, 2002). In addition, coping self-efficacy may be an important factor in the development of a number of psychological difficulties following trauma or abuse, and the present study is the first to document its potential role in the development of adult ADHD. Specifically, coping self-efficacy may be an important individual difference variable in the development of ADHD symptoms following the experience of abuse.

Participants in this study who had experienced physical or sexual abuse during childhood showed significantly elevated inattention symptoms. These findings parallel previous results where CA was significantly associated with inattention symptoms but not with hyperactivity-impulsivity symptoms (Ouyang, Fang, Mercy, Perou, & Grosse, 2008). However, most studies examined ADHD as a unitary construct (Endo et al., 2006; Ford, 2000; Simmel et al., 2001) and were thus unable to determine whether inattention and hyperactivity-impulsivity are differentially associated with CA. There has been substantial empirical evidence supporting the distinction between the inattention and hyperactivity-impulsivity dimensions of ADHD (*DSM-IV-TR*; APA, 2000; Milich, Balentine, & Lynam, 2001) and their differential ability to predict a number of psychological correlates and long-term outcomes (see Willcutt et al., 2012).

Although efforts to identify the causal factors in ADHD have largely focused on genetic and neurobiological factors (Faraone & Doyle, 2001; Faraone et al., 2005; Thapar, Harrington, & McGuffin, 2001), heritability estimates are population statistics and do not represent heritability for a given individual. Thus, environmental factors in the etiology of ADHD are still likely to be salient. CA has been identified as a potential causal factor in the development of ADHD symptoms (Endo et al., 2006, Ouyang et al., 2008). Hypervigilance, the abnormal increase of arousal, responsiveness to stimuli, and screening for environmental threats, occurs at elevated rates in abused children (McLeer, Callaghan, Henry, & Wallen, 1994). This hypervigilance may result in worse attention across various methods of assessment (Cuffe,

McCullough, & Pumarienga, 1994; Wozniak et al., 1999). Whether inattention symptoms are unique to ADHD or are more closely associated with other dimensions of psychopathology, such as PTSD symptoms, is controversial. The overlap of symptoms between PTSD and ADHD includes concentration difficulties, irritability, and impulsivity (Blank, 1994). Famararo, Kinscherff, and Fenton (1992) postulated that symptoms resulting in the diagnosis of ADHD may actually be due to PTSD.

There are several limitations to this study, including the relatively small sample size. Data were collected through retrospective recall. Recall may be impacted by errors of commission (reporting false incidents or information) or errors of omission (not reporting or forgetting incidents or experiences; Cantor-Graae, Cardenal, Ismail, & McNeil, 1998). However, there is evidence that retrospective reports of serious adverse situations experienced in childhood are valid despite concerns about underreporting and possible bias (Brown, Craig, Haris, Handley, & Harvey, 2007). Future research must investigate the course of ADHD and the level of symptoms assessed before and after the experience of physical or sexual abuse as increased levels of ADHD may have been present before the abuse. Given the growing literature regarding child effects on parent behavior (Rothbaum & Weisz, 1994), higher rates of corporal punishment among families in which a child has ADHD (Alizadeh, Applequist, & Coolidge, 2007), and the link between corporal punishment and CA (Gershoff, 2002), careful longitudinal studies are needed to disentangle cause and effect. In addition, importantly, the sample consisted of college students and thus may constitute a higher functioning sample compared with individuals in this age group not enrolled in college.

In summary, these findings suggest that children who experience CA have higher levels of ADHD symptoms as an adult and that poorer coping self-efficacy may explain this association. The use of coping modules is common in treatments designed for child and adolescent survivors of trauma (e.g., trauma-focused cognitive behavior therapy; Cohen, Mannarino, Berliner, & Deblinger, 2000), and the present findings support the importance of targeted interventions for these individuals, such as the teaching of coping skills and establishing self-efficacy in the implementation of such skills. Such interventions may improve coping self-efficacy, which may in turn result in better psychological outcomes for individuals who experienced abuse in childhood.

Declaration of Conflicting Interests

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