Published in final edited form as:

J Psychiatr Res. 2015 October ; 69: 42–49. doi:10.1016/j.jpsychires.2015.07.026.

Childhood maltreatment and risk of intimate partner violence: a national study

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Abstract

Objective—Prior research indicates that different types of childhood maltreatment frequently co-occur and confer risk for adulthood intimate partner violence (IPV). However, it is unknown whether the risk of IPV is due to specific type(s) of maltreatment or to their shared association or both. Although these competing explanations have different implications for intervention, they have never been evaluated empirically.

Method—Data were drawn from a nationally representative survey of 34,653 US adults, the 2004–2005 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). Structural equation modeling was used to simultaneously examine the shared and specific effects of five types of childhood maltreatment (i.e., sexual abuse, physical and emotional abuse and neglect) on the risk of different IPV behaviors (i.e., perpetration, victimization and reciprocal violence). Analyses were stratified by sex and adjusted for sociodemographic characteristics (i.e., age, personal income, educational background and race/ethnicity).

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Contributors

All authors take responsibility for the contents of this manuscript and contributed materially to the work. Authors Kibby McMahon and Nicolas Hoertel designed the study, conducted the statistical analyses, and wrote the manuscript. Authors Carlos Blanco, Melanie Wall, Mayumi Okuda, and Frédéric Limosin revised all parts of the manuscript text. All authors approved the final manuscript.

Results—Most types of childhood maltreatment increased the risk of victimization, perpetration and reciprocal violence. Effects of maltreatment types on each IPV behavior were exerted mostly through a latent factor representing the shared effect across all different types of maltreatment in both sexes (CFI=0.990, TLI=0.990, RMSEA=0.023), although sexual abuse had an additional effect on victimization.

Conclusions—Because childhood maltreatment types increase the risk of each intimate partner violence behavior mainly through a general maltreatment dimension, underlying biological and developmental-ecological mechanisms should be considered important targets of prevention for both victimization and perpetration of abuse in adult relationships.

Keywords

childhood maltreatment; intimate partner violence; victimization; perpetration; childhood adversity; national

Introduction

Intimate partner violence (IPV) is a serious public health problem that affects more than 1 in 4 women and 1 in 7 men in the United States (U.S.) (Breiding et al. 2008). IPV is defined as physical, sexual, or psychological harm by a current or former partner or spouse and has devastating long-term psychological, physical and social consequences on the victims (Campbell 2002; Coker et al. 2002). Prior research has conceptualized a “cycle of violence” in which individuals are frequently both victims and perpetrators of IPV and the two behaviors are linked to being a victim of childhood abuse or neglect (Caspi et al., 2002; Widom, 1989). The associations of IPV with different types of childhood maltreatment, including sexual abuse (DiLillo et al. 2001; Dube et al. 2005; Cyr et al. 2006), physical abuse (Ehrensaft et al. 2003; Whitfield et al. 2003), and neglect (Renner and Slack 2006), suggest that childhood maltreatment confers a greater risk for adulthood IPV. A better understanding of the relationship among the different types childhood maltreatment would lead to more effective prevention of these abusive relationships in adulthood.

Most published research on the relationship between IPV and childhood maltreatment has focused on specific types of childhood maltreatment and specific IPV behaviors, such as victimization (Afifi et al. 2006; Renner and Slack 2006) or perpetration (Whitfield et al. 2003; Roberts et al. 2011). This approach often implicitly assumes that child neglect and abuse are independent phenomena with differential long-term effects (Gauthier et al. 1996). However, there is ample evidence that victims of childhood maltreatment commonly experience multiple forms of maltreatment (Dong et al. 2004; Green et al. 2010; Hoertel et al. 2015a). Furthermore, different types of maltreatment share the same predictors, such as stress from poverty (Coulton et al. 2007; Zuravin, 1989), suggesting that different childhood maltreatment types may be manifestations of a common underlying phenomenon (Belsky 1993; Freisthler et al. 2006). An important question is whether the risk of IPV is increased by the shared aspects of all types of child abuse and neglect (that we can conceptualize as a general maltreatment factor), specific types of maltreatment, or both (Humphreys and Zeanah 2014). This question is crucial because if the risk of IPV is specific to the type of maltreatment, interventions that target specific types of maltreatment may be needed for risk

reduction. By contrast, if IPV risk is mostly mediated through a general maltreatment factor, interventions that address this factor may have greater impact on IPV risk reduction. In addition, because prior research suggests the population of victims and perpetrators of IPV partially overlap (Dodge et al. 1989; Widom 1989; Krug et al. 2002), a second important question is whether the pattern of these associations is the same for different adulthood IPV behaviors, i.e., victimization, perpetration, and reciprocal violence.

In this report, we examined these issues using a latent variable approach (Hoertel et al. 2015b, 2015c) to disentangle the effects shared by all types of childhood maltreatment (i.e., childhood maltreatment factor) and those specific to types of maltreatment per se (e.g., physical abuse). Because prior research suggests there are sex differences in IPV behavior (Carney et al. 2007) and that socioeconomic factors (e.g., poverty, low educational background)(Widom, 1989) are predictors of IPV, all analyses were stratified on sex and adjusted for age, personal income, educational background and race/ethnicity.

Methods

Sample

Data were drawn from the 2004–2005 NESARC, the second wave of the NESARC. The Wave 1 NESARC was a nationally representative face-to-face survey of 43,093 civilian non-institutionalized U.S. residents aged 18 years and older, conducted in 2001–2002 by the National Institute on Alcoholism and Alcohol Abuse (NIAAA) and described in detail elsewhere (Grant et al. 2009). The overall survey response rate was 70.2%, reflecting 34,653 completed interviews (Grant et al. 2009). The Wave 2 NESARC data were weighted to reflect design characteristics of the NESARC survey and to account for oversampling and be representative of the U.S. civilian population based on the 2000 census (Blanco et al. 2013). The research protocol, including written informed consent procedures, received full human subjects review and approval from the U.S. Census bureau and the Office of Management and Budget (Grant et al. 2009). The present study analyses are based on the 11,850 male and 13,928 female participants who had been, at any time during the past year, married, dating, or involved in a romantic relationship in Wave 2.

Measures

Childhood Maltreatment—Participants responded to 19 questions concerning their exposure to 5 types of childhood maltreatment before the age of 17. In line with prior work using these data (Hoertel et al., 2015a; Keyes et al., 2012), physical abuse and emotional abuse were measured by questions adapted from the Conflict Tactics Scale (CTS) (Straus and Gelles, 1990) and physical neglect, sexual abuse, and emotional neglect were measured by questions adapted from the Childhood Trauma Questionnaire (CTQ) (Bernstein, et al., 1994; Keyes et al., 2012; Wyatt, 1985). All response options ranged from “never” (1) to “very often” (5), with the exception of emotional neglect, which ranged from ‘never’ to ‘always’ and was reverse coded for the purposes of analysis. A test–retest study of these items indicated excellent intraclass test–retest reliability coefficients ranging from 0.79 for physical abuse to 0.88 for emotional abuse (Ruan et al. 2008).

Since experiences of maltreatment may range in severity, context, salience and effect on the individual (Keyes et al., 2012), we operationalized each type of maltreatment construct as representing continuous dimensions of maltreatment measured by ordered categorical indicators (i.e., each of the 19 maltreatment items was modeled as ordered categorical variable).

Keyes et al (2012) found that a 5-factor confirmatory factor analysis (CFA) model fit the 19 childhood maltreatment items very well. Building upon this 5-factor CFA model, we performed a second-order CFA model to determine whether a shared childhood maltreatment factor fit the underlying structure of childhood maltreatment (Hoertel et al. 2015a).

History of Intimate Partner Violence (IPV) in the past year—The three IPV outcomes included victimization, perpetration, and reciprocal violence within the year prior to the NESARC Wave 2 interview. Consistent with prior research (Okuda et al. 2011; Smith et al. 2012), history of IPV was assessed with selected items from the revised Conflict Tactics Scale, focusing specifically on past-year IPV. It is a widely used, valid and reliable measure of family violence (Straus and Douglas 2004). Cronbach α coefficients range from 0.69 to 0.88 for items on physical aggression. Participants responded to six perpetration questions concerning the frequency of their abusive or sexually abusive behavior toward their partner (e.g., “How often did you push, grab, or shove your spouse/partner?”) and six victimization questions concerning the frequency of the abusive or sexually abusive behavior towards the participant (e.g., “How often did your spouse/partner push, grab, or shove you?”). All response options ranged from 1 (“never”) to 5 (“more than once a month”). A history of *IPV victimization* was assessed by the participants’ response to any of the victimization questions with at least “once” during the year and to all perpetration questions with “never”. A history of *IPV perpetration* was assessed by the participants’ response to any of the perpetration questions with at least “once” during the year and to all of the victimization questions with “never” (Okuda et al. 2011). Finally, in line with previous literature demonstrating that people can simultaneously be victims and perpetrators of abuse within their relationship (Straus, 2004; Whitaker, et al., 2007), a history of *reciprocal violence* was assessed by the participants’ response to at least one victimization question and at least one perpetration question with at least “once.”

Statistical Analysis: We used a multiple-group structural equation model (SEM) (Hoertel et al. 2015a, 2015b, 2015c) stratified by sex to assess shared and specific associations of the different types of childhood maltreatment with each IPV outcome. Specifically, while adjusting for sociodemographic characteristics (i.e., age, personal income, race/ethnicity (White vs. non-White), and education level), we examined (1) the association of the shared childhood maltreatment factor with each IPV outcome and (2) the associations of the five types of childhood maltreatment above and beyond the latent childhood maltreatment factor with each IPV outcome. Response options (scores from one to five) for each of the 19 maltreatment items were modeled as ordered categorical indicators of the childhood maltreatment factors, which were analyzed as latent variables. IPV outcomes were allowed to have correlated residuals in the model.

The relationship between the shared childhood maltreatment factor and each IPV outcome is interpreted as the association of the overall shared childhood maltreatment liability predictor with each IPV outcome. By contrast, the relationships examined between each specific maltreatment factor and each IPV outcome are interpreted as direct effect, because it indicates effect of the specific maltreatment type that is not mediated through the shared maltreatment factor. Standardized estimates of the relationship between each IPV outcome and each latent factor indicate how many standard deviations higher (or lower) the mean of the latent variable underlying the binary outcome are expected to be for each increase in an additional unit of that latent factor while adjusting for the other factors and covariates. Modification indices (i.e. chisquare tests with 1 d.f.) were examined to test if any residuals associated with specific type of childhood maltreatment were significantly correlated with any IPV outcome, above and beyond the effect of the shared maltreatment factor. To avoid including associations that could be significant due to multiple testing and because of the large sample size, we evaluated statistical significance using a two-sided design with alpha set a priori at .01. and considered significant direct effects of factors with modification index greater or equal to 6.64 ($p < .01$) (Muthen and Muthen 2010).

Last, we used chi-square difference tests to compare the magnitude of the associations between each type of childhood maltreatment and each IPV outcome in women and men, and to examine whether there were significant sex differences in the magnitude of effect of the childhood maltreatment factor and direct effects of each maltreatment type above and beyond the effect of the childhood maltreatment factor on each IPV outcome in the multiple-group SEM model while adjusting for sociodemographic characteristics.

Model fit indices examined included comparative fit index (CFI), the Tucker-Lewis index (TLI) and the root mean squared error of approximation (RMSEA). CFI and TLI values above 0.95 and RMSEA values below 0.06 represent a good model fit (Hu and Bentler 1999). All analyses were conducted in Mplus Version 7.2 (Muthen and Muthen 2010) using the Mplus defaults of delta parameterization and the variance-adjusted weighted least squares (WLSMV) estimator. WLSMV is a robust estimator appropriate for ordered categorical and dichotomous observed variables such as the ones used in this study and allows us to use the NESARC's weighting, clustering, and stratification variables.

Results

Prevalence of intimate partner violence types

Within all respondents who reported having a romantic relationship in the past year, the prevalence of intimate partner violence (IPV) victimization, perpetration and reciprocal violence in women were respectively 1.6% (SE=0.1), 3.1% (SE=0.2) and 3.9% (SE=0.2). In men, these prevalence rates were respectively 2.7% (SE=0.2), 1.1% (SE=0.1) and 3.1% (SE=0.2). The prevalence of IPV perpetration (Wald $F=79.8$, $p < 0.001$) and reciprocal IPV (Wald $F=12.3$, $p < 0.001$) were significantly higher in women than in men, whereas IPV victimization was significantly more prevalent in men than in women (Wald $F=26.6$, $p < 0.001$).

Structure of childhood maltreatment

The second-order multiple-group CFA of the five childhood maltreatment factors measured by a single shared maltreatment factor in the subpopulation of participants involved in a romantic relationship at any time during the past year provided an excellent fit to the data (CFI=0.990, TLI=0.990, RMSEA=0.023).

Associations of childhood maltreatment types with the risk of IPV

After adjusting for age, personal income, race/ethnicity and educational level, most childhood maltreatment forms increased the risk of IPV victimization, perpetration, and reciprocal violence in both sexes (Table 1) and these associations occurred mostly through a latent variable representing the shared association of the five childhood maltreatment types (Figure 1 and Figure 2). Furthermore, beyond the effect of the shared maltreatment factor, childhood sexual abuse had an additional positive direct effect on the risk of victimization in both sexes. By contrast, after adjusting for the shared maltreatment factor, physical neglect had a negative association with reciprocal violence in women, suggesting that this type of maltreatment increased the risk of reciprocal violence to a lesser extent than other maltreatment types in women only.

Among women, the latent childhood maltreatment factor and the sexual abuse and emotional neglect factors were more strongly related to victimization than perpetration ($p<0.01$). Among men, there were no significant differences in the associations of each maltreatment type with each IPV outcome (Table 1).

Sex differences in effects of childhood maltreatment on IPV

After adjusting for covariates, the effect of the childhood maltreatment factor on victimization only was significantly stronger in women compared to men. There were no other significant sex differences in effect of the childhood maltreatment or direct effects of each maltreatment type above and beyond the effect of the maltreatment factor on each IPV outcome (Table 2).

Discussion

In this large nationally representative sample of US adults, most types of childhood maltreatment increased the risk of victimization, perpetration and reciprocal intimate partner violence (IPV), and this association occurred mostly through a general maltreatment factor representing the shared effects of all types of maltreatment. Furthermore, sexual abuse had an additional effect on the risk of victimization above and beyond the effect of this factor in both sexes. Our results also indicate that specific types of maltreatment had sex-specific patterns of association with IPV victimization, perpetration, and reciprocal violence. These findings lend support to the cycle of violence hypothesis (Widom 1989) and advance our knowledge of the relationship between childhood maltreatment and IPV in several important ways.

While numerous previous studies have demonstrated that a history of childhood maltreatment increases the risk for each form of IPV, this study, to our knowledge, is the

first to show that this risk is mediated in both sexes mainly through a latent factor underlying the shared associations of the different types of maltreatment. Although the exact mechanisms underlying this broad dimension are unknown, prior research suggests that childhood maltreatment is a result of an ecology of many factors (family dysfunction, low community support, maladaptive parent-child interactions) within the parenting context of a child (Bronfenbrenner 1979; Belsky 1980; Cicchetti and Rizley 1981b). Various forms of abuse or neglect of a child can occur in circumstances in which the stressors outweigh the supportive, protective factors in this ecology (Belsky 1993). Thus, multiple types of maltreatment may share many common predictors that are involved in this detrimental ecology, including poverty (Coulton et al. 2007; Zuravin 1989), housing stress (Freisthler et al. 2006), and other social conditions that fail to support effective parenting (Garbarino 1977). Our results suggest that IPV is associated with a mechanism shared by all manifestations of childhood maltreatment that may be related to this etiology. These findings suggest that while interventions on individual form of maltreatment (e.g., physical abuse) are likely to decrease IPV risk, interventions targeting this broad general maltreatment factor are likely to have greater effect. Several primary prevention programs have provided evidence of their effectiveness in reducing rates of childhood maltreatment (Prinz et al. 2009). If the latent childhood maltreatment factor is related to the developmental-ecological etiology, improved integration and coordination of social work, mental health, and policy services could be crucial for improving intervention (Cicchetti and Rogosch 2002).

The detrimental long-term effects shared by all multiple types of maltreatment may contribute explanations for the association between the effect of the latent childhood maltreatment factor and IPV. Childhood abuse and neglect affect developmental processes related to the strengthening of interpersonal and emotion regulation (Maughan and Cicchetti 2002) and can make victims more vulnerable to a wide range of psychiatric disorders (Keyes et al. 2012a; Sugaya et al. 2012). Since prior findings indicate that psychiatric disorders tend to share common abnormalities in neurocircuitry across broad liability dimensions (Etkin and Schatzberg 2011; Goldstein and Volkow 2011), victims of childhood maltreatment at high risk for mental illness may be more prone to engage in violence or abuse within their adult relationships. The association between childhood maltreatment and IPV may also result from disruptions the underlying neurobiological structures involved in stress response (Kendler et al. 2004; McGowan et al. 2009), possibly including epigenetic effects (Champagne and Curley 2009; Labonté et al. 2012) that may affect the choice of the partner and the nature of romantic relationships. Maltreated children may also model aggressive conflict resolution strategies of their parents and display similar behavior in other relationships (Cicchetti and Rizley 1981a; Margolin and Gordis 2000). Victims of childhood maltreatment have been associated with insecure attachment styles and impulsivity that moderate their abusive relationships in adulthood (Wekerle and Wolfe 1998). Kundakovic and Champagne (Kundakovic and Champagne 2014) proposed that the different types of maltreatment are all indicators of poor attachment to caregivers, which may be the mechanism of these deleterious effects on biological, psychological and regulatory systems. A history of maltreatment could affect the quality of adult relationships through these individual and social mechanisms common to the different types of childhood maltreatment.

They could also contribute to explain the frequent overlap between victimization and perpetration of IPV.

Sexual abuse had an additional effect on victimization in both sexes beyond its effect through the general maltreatment factor. Childhood sexual abuse may differ from other types of childhood adversity in its greater capacity to disrupt the underlying neurobiological structures involved in stress response and to increase the sensitivity to depressogenic life experiences and the susceptibility to environmental influences (Afifi et al. 2009; Kendler et al. 2004;). It can also increase the risk of adulthood revictimization by distorting critical risk responding skills (Walsh et al. 2012). An important avenue for future research will be to examine whether the effect of sexual abuse is due to a stronger effect on the same pathways affected by other forms of maltreatment or through an additional specific pathway.

Our findings also indicate that the specific types of maltreatment had different patterns of association with each IPV outcome in men and women. In general, women had higher rates of IPV perpetration and reciprocal violence, but lower rates of victimization than men, which is consistent with previous studies (Archer 2000; Carney et al. 2007). Even though the prevalence of perpetration was higher in women than in men, emotional neglect and sexual abuse were more strongly associated with victimization than perpetration in women only. Our results also suggest that the shared effect of childhood maltreatment has a stronger effect on the risk of victimization in women compared to men. These findings converge with prior research that demonstrates a tendency for revictimization in women maltreated in childhood (Desai et al. 2002) and suggest differential long-term effects of childhood maltreatment on cognitive processes (Syal et al. 2014) and coping styles (Femina et al. 1990) in men and women.

This study has several limitations. First, our results rely on retrospective data and self-report measures of childhood maltreatment may be subject to recall bias (Hardt and Rutter 2004; Keyes et al. 2012a). However, longitudinal studies found higher rates of false-negatives than false-positive in self-reports of childhood maltreatment (Widom and Morris 1997; Williams 1994) and there is evidence that rates of self-reported childhood abuse are lower than official records of abuse (Ehrensaft et al. 2003), suggesting that childhood maltreatment is more likely to be underreported. Secondly, the estimates of childhood maltreatment in these data are slightly lower than those reported in other large-scale epidemiological surveys (Green et al. 2010; Kessler et al. 1997). However, our threshold may have been higher than other studies since we estimated prevalence of the frequency rather than the occurrence of maltreatment (except for sexual abuse). Thirdly, our sample only included participants who have had a romantic relationship within year prior to the NESARC wave 2 interview. This limited assessment might have excluded participants who have had previous experiences with IPV or were more recently single due to psychosocial dysfunction. Thus, although we found elevated rates of IPV, our findings might underestimate the actual rates of IPV. Fourthly, the stigmatizing nature of victimization and perpetration of IPV and the frequent denial and minimization of subjects about deviant behavior could lead to underreporting (Hoertel et al. 2012). However, our estimate rates of IPV are consistent with those of prior research (Afifi et al. 2009; Fang and Corso 2007). Finally, our study cannot establish a

causal relationship between childhood maltreatment and the occurrence of intimate partner violence (Le Strat and Hoertel 2011).

Despite these limitations, our findings demonstrate that the association between childhood maltreatment and IPV behaviors mostly occurs through a broad dimension, representing the shared vulnerabilities triggered by the experience of childhood maltreatment. Our results underscore the importance of adopting dimensional approaches to co-occurrence of maltreatment types in the study of childhood maltreatment and the key role of all types of maltreatment through this broad maltreatment dimension in the risk of adulthood intimate partner violence. A better delineation of biological and developmental-ecological mechanisms underlying this dimension could help refine existing childhood maltreatment prevention programs to reduce not only the suffering of these children and adolescents, but also the burden of the subsequent cycle of violence and adulthood intimate partner violence.

Acknowledgements

The National Epidemiologic Survey on Alcohol and Related Conditions was sponsored by the National Institute on Alcohol Abuse and Alcoholism and funded, in part, by the Intramural Program, NIAAA, National Institutes of Health. Work on this manuscript was supported by grants supported by NIH grants MH076051 and MH082773 and the New York State Psychiatric Institute (Drs. Blanco and Wall) and a fellowship grant from Public Health Expertise (Dr. Hoertel). The sponsors had no additional role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

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Highlights

- We modeled the shared and specific effects of five types of childhood maltreatment on the risk of IPV
- Childhood maltreatment increased the risk by 1.5- to 4 times of intimate partner violence.
- Effects of maltreatment types on IPV were mostly mediated through a latent factor
- Sexual abuse had an additional effect on victimization.

Figure 1.

Shared and specific effects of childhood maltreatment types on victimization, perpetration and reciprocal intimate partner violence (IPV) in a general population sample of women who had been married, dating, or involved in a romantic relationship in the past year ($n = 13,928$).

Ellipses are used to denote latent constructs, rectangles are used to denote the observed variables.

Loadings and regression coefficients are standardized. Values in brackets indicate their standard errors. IPV outcomes were allowed to have correlated residuals. Only significant effects (two-sided $p < .01$) are represented in the model.

Dotted arrow indicates direct effect above and beyond effect of the general childhood maltreatment factor. There is no other specific childhood maltreatment type with modification index greater or equal to 6.64 ($p < .01$) to predict IPV behaviors.

Figure 2.

Shared and specific effects of childhood maltreatment types on victimization, perpetration and reciprocal intimate partner violence (IPV) in a general population sample of men who had been married, dating, or involved in a romantic relationship in the past year ($n = 11,850$).

Ellipses are used to denote latent constructs, rectangles are used to denote the observed variables.

Loadings and regression coefficients are standardized. Values in brackets indicate their standard errors. IPV outcomes were allowed to have correlated residuals. Only significant effects (two-sided $p < .01$) are represented in the model.

Dotted arrow indicates direct effect above and beyond effect of the general childhood maltreatment factor. There is no other specific childhood maltreatment type with modification index greater or equal to 6.64 ($p < .01$) to predict IPV behaviors.

Table 1

Associations of types of childhood maltreatment with 12-month victimization, perpetration and reciprocal violence in participants who had been, at any time during the past year, married, dating, or involved in a romantic relationship in Wave 2 NESARC (N = 25,778)

Women	Victimization			Perpetration			Reciprocal violence			Test of difference in total effect					
										Victimization vs. Perpetration		Victimization vs. Reciprocal violence		Reciprocal violence vs. Perpetration	
	β (SE)			β (SE)			β (SE)			χ^2	p	χ^2	p	χ^2	p
Childhood maltreatment factor	0.33 (0.04)	****		0.16 (0.03)	****		0.26 (0.03)	****		14.15	<0.001	2.78	0.10	5.78	0.02
Sexual Abuse	0.11 (0.04)	*** ^a		0.07 (0.04)	^a		0.07 (0.03)	^a						4.20	0.04
	0.17 (0.03)	**** ^b		0.07 (0.03)	* ^b		0.14 (0.03)	**** ^b		11.99	<0.001	3.13	0.08		
	0.29 (0.03)	**** ^c		0.14 (0.03)	**** ^c		0.22 (0.02)	**** ^c							
Physical Abuse	-0.09 (0.08)	^a		0.05 (0.07)	^a		0.10 (0.06)	^a						0.03	0.86
	1.88 (0.80)	* ^b		0.04 (0.68)	^b		-0.14 (0.60)	^b		3.16	0.08	3.67	0.06		
	1.79 (0.72)	* ^c		0.08 (0.61)	^c		-0.05 (0.54)	^c							
Emotional Abuse	-0.45 (0.30)	^a		-0.15 (0.22)	^a		0.07 (0.20)	^a						0.35	0.55
	55.87 (54.94)	^b		18.78 (29.97)	^b		-5.73 (23.87)	^b		0.55	0.46	0.92	0.34		
	55.43 (54.69)	^c		18.63 (29.76)	^c		-5.66 (23.68)	^c							
Emotional Neglect	-0.01 (0.04)	^a		-0.02 (0.04)	^a		-0.01 (0.03)	^a						5.57	0.02
	0.28 (0.04)	**** ^b		0.15 (0.04)	**** ^b		0.22 (0.03)	**** ^b		12.70	<0.001	2.44	0.12		
	0.27 (0.03)	**** ^c		0.13 (0.03)	**** ^c		0.21 (0.02)	**** ^c							
Physical Neglect	0.01 (0.06)	^a		-0.05 (0.05)	^a		-0.15 (0.04)	*** ^a						6.47	0.01
	0.51 (0.17)	**** ^b		0.42 (0.13)	**** ^b		0.86 (0.14)	**** ^b		1.01	0.32	1.38	0.24		
	0.52 (0.12)	**** ^c		0.36 (0.09)	**** ^c		0.71 (0.10)	**** ^c							
Men	β (SE)			β (SE)			β (SE)			χ^2	p	χ^2	p	χ^2	p

Women	Victimization		Perpetration		Reciprocal violence		Test of difference in total effect			
	β (SE)		β (SE)		β (SE)		Victimization vs. Perpetration		Victimization vs. Perpetration	
	$\chi^2 \psi$	p	$\chi^2 \psi$	p	$\chi^2 \psi$	p	$\chi^2 \psi$	p	$\chi^2 \psi$	p
Childhood maltreatment factor	0.20 (0.03) ****	0.12 (0.03) ***	0.23 (0.03) ****	0.17 (0.06) * ^a	0.23 (0.03) ****	0.13	2.31	0.13	4.49	0.03
Sexual Abuse	0.23 (0.07) *** ^a	0.05 (0.07) ^a	0.05 (0.03) ^b	0.07 (0.03) ** ^b	0.07 (0.03) ** ^b	0.02	5.57	0.02	3.80	0.051
	0.03 (0.03) ^b	0.10 (0.05) ^c	0.24 (0.04) **** ^c							
Physical Abuse	0.26 (0.05) **** ^c									
	−0.05 (0.06) ^a	0.01 (0.10) ^a	0.06 (0.07) ^a	0.19 (0.40) ^b	0.25 (0.34) ^c	0.49	0.48	0.92	0.34	0.01
	0.72 (0.35) * ^b	0.28 (0.60) ^b	0.19 (0.40) ^b			0.52	0.47	0.09	0.77	0.57
Emotional Abuse	0.68 (0.29) * ^c	0.28 (0.50) ^c	0.25 (0.34) ^c			0.52	0.47	0.09	0.77	0.57
	0.07 (0.25) ^a	−0.35 (0.40) ^a	−0.03 (0.24) ^a							
	−3.76 (19.75) ^b	28.52 (37.90) ^b	4.65 (18.79) ^b							
	−3.69 (19.51) ^c	28.17 (37.53) ^c	4.62 (18.55) ^c							
Emotional Neglect	−0.03 (0.03) ^a	0.02 (0.05) ^a	−0.02 (0.04) ^a			0.22	0.64	0.30	0.59	0.37
	0.13 (0.03) **** ^b	0.06 (0.04) ^b	0.15 (0.02) **** ^b							
	0.10 (0.03) **** ^c	0.08 (0.03) * ^c	0.13 (0.03) **** ^c							
Physical Neglect	−0.07 (0.06) ^a	−0.01 (0.09) ^a	−0.10 (0.05) ^a			1.68	0.19	0.62	0.43	0.06
	0.43 (0.12) **** ^b	0.20 (0.20) ^b	0.54 (0.12) **** ^b							
	0.36 (0.07) **** ^c	0.19 (0.11) ^c	0.44 (0.08) **** ^c							

Regression coefficients (β) and their standard error (SE) are unstandardized.

^a Direct effects, i.e., residual effects of each maltreatment type above and beyond effect of the higher-order childhood maltreatment factor on each intimate partner violence outcome, while adjusting for sociodemographic characteristics (age, race/ethnicity, education level and personal income).

^b Indirect effects, i.e., effects of each maltreatment type that are mediated through the higher-order childhood maltreatment factor on each intimate partner violence outcome, while adjusting for sociodemographic characteristics (age, race/ethnicity, education level and personal income).

Total effects representing the sum of direct and indirect effects of each maltreatment type on each intimate partner violence outcome, while adjusting for sociodemographic characteristics (age, race, ethnicity, education level and personal income).

χ^2 Chi-Squared test of differences in total effects of each maltreatment type and the childhood maltreatment factor on each intimate partner violence outcome (d.f. = 1).

Regression coefficients (β) and χ^2 in bold are statistically significant ($p < 0.01$).

* $p < 0.05$;
** $p < 0.01$;
*** $p < 0.005$;
**** $p < 0.001$.

Table 2

Sex differences in the associations of childhood maltreatment with 12-month victimization, perpetration and reciprocal violence in the multiple group structural equation model stratified by sex (see Figures 1 and 2)

	Victimization			Perpetration			Reciprocal violence		
	Women	Men	$\chi^2\psi$ (p-value)	Women	Men	$\chi^2\psi$ (p-value)	Women	Men	$\chi^2\psi$ (p-value)
Childhood maltreatment factor	β (SE)	β (SE)	7.15 (<0.01)	β (SE)	β (SE)	$\chi^2\psi$ (p-value)	β (SE)	β (SE)	$\chi^2\psi$ (p-value)
	0.33 (0.03) ****	0.19 (0.03) ****		0.15 (0.03) ****	0.12 (0.04) ***	0.41 (0.52) ****	0.24 (0.02) ****	0.22 (0.03) ****	0.40 (0.53)
Sexual Abuse	0.14 (0.02) ** ^a	0.13 (0.01) ** ^a	2.15 (0.14)	0.08 (0.03) ^a	0.01 (0.11) ^a	0.10 (0.76)	0.09 (0.02) ** ^a	0.07 (0.02) * ^a	2.12 (0.15)
Physical Abuse	-0.29 (0.63) ^a	-0.11 (0.60) ^a	0.19 (0.66)	0.14 (1.05) ^a	0.01 (5.00) ^a	0.15 (0.70)	0.30 (0.35) ^a	0.11 (0.36) ^a	0.15 (0.70)
Emotional Neglect	-0.01 (0.02) ^a	-0.04 (0.04) ^a	0.16 (0.69)	-0.02 (0.07) ^a	0.01 (0.09) ^a	0.38 (0.54)	-0.01 (0.15) ^a	-0.02 (0.05) ^a	0.11 (0.74)
Physical Neglect	0.02 (0.72) ^a	-0.11 (0.10) ^a	1.09 (0.30)	-0.10 (0.16) ^a	-0.01 (1.50) ^a	0.19 (0.66)	-0.27 (0.02) ** ^a	-0.12 (0.06) ^a	0.48 (0.49)
Emotional Abuse	-4.61 (3.52) ^a	0.59 (13.11) ^a	1.62 (0.20)	-1.42 (9.22) ^a	-1.24 (5.79) ^a	0.03 (0.87)	0.71 (12.46) ^a	-0.16 (32.00) ^a	0.08 (0.78)

Regression coefficients (β) and their standard error (SE) are standardized.

^a Direct effects, i.e., residual effects of each maltreatment type above and beyond effect of the higher-order childhood maltreatment factor on each intimate partner violence outcome, while adjusting for socio demographic characteristics (age, race/ethnicity, education level and personal income).

^{ψ} Chi-Squared (χ^2) test of sex differences in the magnitude of effect of the childhood maltreatment factor and direct effects of each maltreatment types above and beyond effect of the higher-order childhood maltreatment factor on each intimate partner violence outcome (d.f. = 1).

χ^2 in bold are statistically significant ($p < 0.01$).

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.005$;

**** $p < 0.001$.