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Child Maltreatment Victimization and Subsequent Perpetration of Young Adult Intimate Partner Violence: An Exploration of Mediating Factors

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Abstract

This study examined whether young adults with documented histories of child maltreatment had higher records of documented severe intimate partner violence (IPV) perpetration than an income-matched control group. It also examined whether this association was mediated by juvenile violent delinquency, problematic substance use, or mental health problems. Study data came from one state's administrative public sector records of child welfare, juvenile court, mental health, income maintenance, and birth records. The study employed a prospective longitudinal design to follow children for 16 years ($N = 5,377$). The IPV was measured by police arrests and temporary restraining order petitions. Multiple group path analysis was used to examine mediation hypotheses and determine whether they differed by gender. The study found that IPV perpetration rates were higher among maltreated than control participants and higher in maltreated men than in women. For men, maltreatment had both direct and mediated effects on IPV perpetration through violent delinquency. For women, maltreatment did not directly or indirectly predict IPV perpetration, though low power makes these findings tentative. The study highlights the importance of child maltreatment prevention as a way to reduce violence later in life and suggests that the juvenile justice system may also provide a point of intervention for the maltreated youth.

Keywords

adult offenders; child maltreatment; domestic/intimate partner violence; longitudinal research; path analysis

Introduction

Intimate partner violence (IPV) is a serious public health concern (Campbell, 2002; Coker et al., 2002) affecting millions of families each year in the United States (Centers for Disease Control and Prevention [CDC], 2003; Rand, 2009). The perpetration of IPV results in 2 million injuries and 1,300 deaths among women victims alone (CDC, 2003; Max, Rice,

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Finkelstein, Bardwell, & Leadbetter, 2004). The sequelae of IPV include higher lifetime prevalence of poor physical and mental health, increased substance abuse, and suicide attempts, among others (CDC, 2003; Campbell, 2002; Gilbert et al., 2009). Given the high human and monetary toll resulting from IPV perpetration, preventative efforts require a thorough knowledge of modifiable risk factors and pathways that can lead to IPV perpetration.

Prior attempts to study antecedents to offending behavior have implicated child abuse and neglect (CAN) as a risk factor for violence perpetration, including IPV, later in life (Ehrensaft et al., 2003; Fang & Corso, 2008; Magdol, Moffitt, Caspi, & Silva, 1998; Maxfield & Widom, 1996; Stith et al., 2000). However, little is known about adult violence among former child welfare system users. Although CAN is a strong predictor of subsequent violent behaviors, involvement in the system itself may present the users with unique contextual factors (e.g., access to services, increased stress) that may exert their influences on succeeding behavioral trajectories (Jonson-Reid, 2002 & 2004). Most studies have focused on the relationship of abuse to later IPV as compared to neglect, which comprises the vast majority of cases in official reports and estimates of incidence (Sedlak et al, 2010; U.S. Department of Health and Human Services, 2011). Further, despite a number of proposed theoretical explanations as to why childhood victimization may lead to subsequent adult aggressive behavior, there is no overwhelming empirical support for one particular pathway (Fang & Corso, 2008). Finally, there is some evidence that propensity to victimize may differ by gender; however, previous studies have produced inconsistent results (Douglas, Margolin, & John, 1994; Herrenkohl, et al., 2004; Magdol et al., 1998; Moffitt, Caspi, Rutter, & Silva, 2001; White & Widom, 2003). In sum, several issues remain to be explored in order to understand better the etiology of IPV and be better able to target interventions.

The present study builds on a study by White and Widom (2003) who also examined the prospective association between childhood victimization and young adult IPV perpetration. This study uses a similar cohort design, offering the first replication of White and Widom's work. However, the current study differs from the former in several important aspects. The current sample is 20 to 30 years more recent and is demographically different, with a larger African American population. The prior study sampled based on court documentation of maltreatment, while our sample was drawn from Child Protective Services (CPS) investigations without regard to court involvement. Due to sampling and changes in child welfare policy, very few of the current participants entered foster care when compared to the prior study. Further, the present study was able to cross-reference the data from multiple agencies during childhood, while the prior study was limited to juvenile court data and death records until they began interviews in adulthood. Finally, IPV is measured through administrative data (arrests and temporary restraining orders) rather than self-report in a cohort that was approximately 7 years younger than the White and Widom's study. The importance of understanding the antecedents of violence in early young adulthood is highlighted by recent evidence from the National Intimate Partner and Sexual Violence Survey, which suggests that more than half of IPV victimizations occur prior to age 25 (Black et al., 2011). Administrative data sources tend to emphasize the most serious cases of IPV perpetration compared to self-report data (Bonomi, Holt, Martin, & Thompson, 2006).

Although this limits the exploration of the outcome, the availability of data from a number of agencies across the life course allows for the possible identification of earlier system contacts that can inform prevention efforts for individuals at risk of severe IPV perpetration.

Direct Linkages Between Child Maltreatment Victimization and IPV Perpetration

Prior studies have linked all forms of child maltreatment to IPV perpetration (Bevan & Higgins, 2002; Fang & Corso, 2008; Herrenkohl et al., 2004). A direct link between childhood victimization and later IPV perpetration is most clearly supported by the family roles hypothesis grounded in social learning principles (Simmons, Wu, Johnson, & Conger, 1995). This perspective suggests that violence can be learned through exposure to violence at home. Parental modeling of violence may demonstrate that aggression is an acceptable and legitimate way of solving conflicts within the family. Although social learning theory has been primarily used to link child physical abuse to adult IPV perpetration, Fang and Corso (2008) suggest that learning theory may also be extended to explain how exposure to sexual abuse may be associated with later intimate partner violence perpetration. Boys exposed to sexual abuse may learn that “violence toward an intimate is legitimate” (p.310) and be more likely to be aggressors within their families in adulthood. There have not, to date, been clear theoretical mechanisms forwarded, which can account for the observed relationship between child neglect and later commission of IPV (Bevan & Higgins, 2002). We remain in need of more comprehensive theory accounting for observed relationships between maltreatment in general, particularly neglect, and aggression in adulthood, including IPV (Ehrensaft et al., 2003; Fang & Corso, 2008; Maxfield & Widom, 1996; Stith et al., 2000).

Potential Mediating Constructs: Youth Violence, Mental Health, and Juvenile Substance Abuse

Child maltreatment has been found to be a strong predictor of general delinquency (Bright & Jonson-Reid, 2008; Herrera & McClosky, 2001) and violence in adolescence (Fergusson & Lynskey, 1997; Herrera & McClosky, 2001; Hussey, Chang, & Kotch, 2006). Juvenile aggressive behavior has been shown to be a strong predictor of IPV perpetration, even controlling for prior victimization (e.g., maltreatment) as well as individual and family factors (Ehrensaft et al., 2003; Fang & Corso, 2008; Magdol et al., 1998). Drawing on social learning principles, Simmons, Wu, Johnson, and Conger (1995) suggest that childhood victimization promotes aggression in adolescence, which in turn increases the likelihood for abusive behavior in adulthood. Thus, this view suggests that child maltreatment may increase the risk of adult IPV perpetration indirectly through youth violent behaviors. Empirical studies testing the mediational role of youth violence relative to child maltreatment and adult IPV perpetration have shown mixed results. For example, although a number of studies found that the pathway between child maltreatment and IPV perpetration was mediated by youth violent behaviors (Capaldi & Clark, 1998; Fang & Corso, 2008; Simmons, et al., 1995), two other studies did not find that juvenile aggressive behavior played a mediating role for the pathway between CAN and IPV (Herrenkohl et al., 2004; White & Widom, 2003).

Child maltreatment has been linked to psychological and behavioral problems in adolescence, which have, in turn, been linked to IPV perpetration (Egeland, Yates, Appleyard, & Dulmen, 2002; Fergusson, Boden, & Horwood, 2008; Lansford, Miller-Johnson, Berlin, Bates, & Pettit, 2007; McCabe, Lucchini, Hough, Yeh, & Hazen, 2005). Additionally, behaviors associated with conduct disorder, antisocial personality disorder, and hostility in adolescence have been linked to violence perpetration in adulthood independent of prior victimization (Capaldi & Clark, 1998; Ehrensaft et al., 2003; Magdol et al., 1998). White and Widom (2003) in their examination of the pathways linking CAN and IPV perpetration found that antisocial personality disorder fully mediated the relationship between child maltreatment and IPV perpetration for both men and women. While mental health behavioral symptoms are closely related to youth violence, some suggest that internalized disorders may also play a key role in IPV perpetration (Fang & Corso, 2008; Lipsky, Caetano, Field, & Bazargan, 2005; Stuart, Moore, Gordon, Ramsey, & Kahler, 2006). These studies found that those who perpetrated IPV had higher rates of depression, anxiety, and posttraumatic stress disorder, suggesting that it is important to assess the role of broader mental health symptomatology in the link between CAN and IPV.

Child maltreatment has generally been linked to increased risk of problematic substance use, including alcohol and illegal drugs, in adolescence and adulthood (Fergusson et al., 2008; Hussey et al., 2006; Widom, White, Czaja, & Marmorstein, 2007). Studies also suggest a link between juvenile substance use and violent behavior in adolescence (Resnick, Ireland, & Borowsky, 2004) while in a New Zealand sample adolescent substance use was linked to self-reported young adult physical IPV (Magdol et al., 1997; White & Chen, 2002). Most studies have focused on the link between concurrent and lifetime substance use measured in adulthood and IPV (Stuart et al., 2008; White & Chen, 2002; White & Widom, 2003). Although an association between substance use and violence seems well established, it is unclear whether early problematic substance use is a mediator in the development of later IPV perpetration.

Gender Differences—Some suggest that the etiology of violence perpetration may differ by gender (Chen & White, 2004; Dasgupta, 2002). For example, Dasgupta (2002) suggests that female violence perpetration may be a result of adult violence victimization, that is, women perpetrate in order to protect themselves and their children, while the feminist perspective suggests that traditional gender role ideology may explain male violence perpetration. Additionally, a number of empirical studies have found gender differences in regard to the development of substance use problems and violent behaviors. Women have been found to have a higher risk of IPV perpetration as a result of early problems in family relations (Magdol et al., 1998), and adult alcohol use and hostility mediated the relationship between CAN and IPV for women in White and Widom's (2003) study. Fang and Corso (2008) found that the effects of CAN on IPV perpetration were mediated by youth violence for men, while women showed direct effects of CAN on later IPV. Child maltreatment has been linked to substance use problems for women (Widom, Ireland, & Glynn, 1995), while the link for men is less clear (Widom & Hiller-Sturmhofel, 2001). It is possible that inconsistency in findings may be due to methodological and conceptual differences in prior studies (Fang & Corso, 2008; Herrera & McCloskey, 2001; Johnson, 1995). Alternatively,

these findings suggest that gender may moderate the link between childhood victimization and adult IPV perpetration, with preliminary evidence suggesting that the roles of juvenile violence (Herrenkohl et al., 2004) and substance use (White & Widom, 2003; Widom et al., 1995) as well as direct link between CAN and IPV, may differ by gender.

Additionally, because mental health is an important link between CAN and adult IPV perpetration and there are substantial gender differences in mental health disorder prevalence, it is important that we better determine whether linkages between CAN and IPV are the same or differ by gender.

Control Factors

In addition to the hypothesized main and indirect effects of child maltreatment on IPV perpetration, the study controlled for factors that may explain relations among child maltreatment, mediators, and IPV. Disability has been found to be linked to child maltreatment (Kendall-Tackett, Lyon, Taliaferro, & Little, 2005), juvenile delinquency (JD; Bright & Jonson-Reid, 2008), and adult violence (Morris & Morris, 2006; Oshima, Huang, Jonson-Reid, & Drake, 2010). Parental mental health and substance abuse (Connors-Burrow, Johnson, & Whiteside-Mansell, 2009; Lyons-Ruth, Wolfe, & Lyubchik, 2000), low parental education (Fang & Corso, 2008; Fergusson & Lynskey, 1997), and individual poverty (Fergusson & Lynskey, 1997; Jonson-Reid, Drake, & Kohl, 2009) and neighborhood poverty (Coulton, Crampton, Irwin, Spilsbury, & Korbin, 2007; Wikstrom & Loeber, 2000) have been linked to all forms of violent behaviors, including IPV, JD, and CAN.

The Current Study

Few prior studies operationalize IPV in terms of police reports or temporary restraining orders, which may involve a higher severity threshold than can be found in community studies or other approaches (Bonomi et al., 2006; Capaldi et al., 2009; Duncan, Stayton, & Hall, 1999; Johnson, 1995). This is particularly true in states that do not have mandatory arrest policies as in the case of the present study (Hirschel, 2008). It is not clear whether child maltreatment predicts adult IPV perpetration that leads to police or court involvement when compared to self-reported incidents. While official accounts have been found to under represent female perpetrators (Capaldi et al., 2009), this may be less true in areas with mandatory arrest policies. Further, the ability to identify pathways to judicial service system involvement due to IPV has direct applicability in informing long-term cost analyses as well as targeting of earlier intervention.

Another limitation of prior studies in linking maltreatment to adult IPV perpetration relates to the measurement of CAN and other childhood events. There is a common reliance on retrospective recall of child maltreatment, that is known to suffer from problems with memory as well as desirability bias (Widom, Raphael, & DuMont, 2004). Studies that sample in adolescence or adulthood cannot assess whether the timing of CAN matters. They are also unable to establish the exact timing of system contacts from childhood to adulthood that might help identify optimum time periods or systems to mount interventions. Additionally, child maltreatment has often been measured by physical abuse only

(Herrenkohl et al., 2004; Heyman & Sleps, 2002), has included limited measures of other forms of maltreatment (Ehrensaft et al., 2003; Fang & Corso, 2008), or has been limited to a single measurement. This latter problem is a serious limitation, given that most children involved in CPS often experience recurring and different forms of maltreatment (Jonson-Reid, Drake, Chung, & Way, 2003; Manly, Kim, Rogosch, & Cicchetti, 2001). Lastly, few prior studies control for a wide range of family background and contextual characteristics that are linked to both CAN and IPV as well as hypothesized mediators between the two (Fang & Corso, 2008) (e.g., youth violence, problematic substance use, and mental health). This makes it difficult to know whether maltreatment plays a distinctive role apart from other family risks or involvement in service systems. This study uses administrative public sector service involvement data in a Midwestern metropolitan region to examine the relationships among child maltreatment, youth violence, juvenile substance use, juvenile mental health, and young adult IPV perpetration as well as to determine whether mediational pathways will differ by gender.

Our conceptual model can be seen in Figure 1. Under this model, child abuse and neglect may either lead to IPV directly (top horizontal line) or may, instead or in addition, lead to mediating constructs (violent delinquency, mental health issues, and substance abuse issues) that then predispose participants to later IPV perpetration. At the level of a general theoretical model, these mediating constructs may be overlapping (e.g., mental health diagnoses are associated with delinquent behavior), but we feel that this set of constructs provides a useful overview of prior findings and theory and lays clear groundwork for the variables that were selected for the current study. We also control for covariates (individual, family and neighborhood factors) when examining the mechanisms connecting CAN to IPV, and test whether the proposed model differs by gender.

Method

Sample

Data for this study came from a larger longitudinal study tracking violence and victimization outcomes and public sector service involvement for children in a Midwestern metropolitan region. Data sources included vital statistics (birth and death), child welfare (maltreatment reports), income maintenance (Aid to Families with Dependent Children [AFDC] and Temporary Assistance to Needy Families [TANF]); Department of Mental Health, Medicaid, emergency room (ER) records, and special education eligibility records; highway patrol, juvenile court, Department of Youth Services records, and adult court data. The sample for the original study included children born between 1982 and 1994 who at the time of initial sampling (1993 or 1994) had a current or recent (within 24 months) history with AFDC ($N = 10,139$). The sample for the current article was limited to children born before 1991 in order to ensure that all participants turned 18 years by 2009 ($N = 6,318$). The sample was comprised of two groups: (1) a group of children with a first investigated child abuse or neglect report during the sampling period (CAN/AFDC); and (2) a group of children with no record of child maltreatment reports (AFDC-only) matched by birth year and area of residence. The CAN/AFDC group included children whose first maltreatment report occurred prior to the age of 12 in order to match the age range of the only prior U.S. study

with a comparison group (White & Widom, 2003). The racial segregation in housing among the lower income population in the study region essentially resulted in matching on race as well. To ensure independence of observations, the sample was limited to a random selection of one child per family in cases where more than one child in a family was under 12.

Following the sampling period, the participants were followed through multiple service systems, meaning that over time it was possible for a child who started in the AFDC-only group to later be reported for CAN. In order to have a pure comparison group and depict the unique effects of maltreatment on young adult violence, we further restricted our sample by excluding cases in the AFDC-only group that experienced CAN after the sampling period ($n = 982$). The final sample for this study included a total of 5,377 children in the CAN/AFDC ($n = 3,153$) and the AFDC-only ($n = 2,224$) groups. The current study followed participants through the end of 2009. This allowed for a follow-up period after 18 years of age to be from 1 to 9 years.

Procedures

The study received approval from the Washington University Hilltop Human Subjects Institutional Review Board Committee. All data sets employed in this study were statewide, and most were linked by a common state-level case identifier. The other data sets were matched according to a combination of identifying information, including the first four letters of the first and last name as well as the date of birth. Addresses at the time of entry to the study were geocoded and linked to the 1990 Census data. All identifying information was removed following linkage, and results were aggregated to ensure confidentiality of the participants. Childhood variables included child maltreatment and the majority of control variables; variables measured up through age 18 included juvenile delinquency, problematic substance use, and mental health; intimate partner violence perpetration was measured beginning at age 18. One control variable, disability, spans through childhood and adolescence, while several parental characteristics (e.g., parent education, age of subject's birth, mental health, and substance abuse records) existed prior to the sampling.

Measures

The IPV perpetration was a binary variable measured by a combination of police arrests for IPV and temporary restraining order (TRO) petitions for IPV issued for 18-year olds or older by civil and criminal courts (1 = *TRO filed or IPV arrest made*, 0 = *no TRO or IPV arrest made*). A TRO is a court order issued to a person older than 18 years in an attempt to stop violent and harassing behavior (assault, battery, coercion, unlawful imprisonment, and sexual assaults) and protect a family member or intimate partner from the abuser. The TROs are filed by victims or their advocates and provide a unique perspective often not captured by the police engagement. The study included all filed IPV TROs for adults, regardless of whether or not they were later enacted. Likewise, police arrests included all IPV arrests, regardless of whether or not charges were later dismissed. In the study region at this time, arrests for IPV were at the officer's discretion.

Child maltreatment was the main independent variable in this study. It was measured by the presence (1 = *yes*, 0 = *no*) of CPS screened-in reports. Screened-in reports included both

substantiated and unsubstantiated cases, given little difference between the two in several studies (Hussey et al., 2005; Kohl, Jonson-Reid, & Drake, 2009). Major types of maltreatment allegations (e.g., sexual abuse, physical abuse, or neglect) that met the state's legal definition of CAN categories were collapsed from over 50 specific reasons for referral (e.g., burns, failure to give medication, sexual intercourse, etc.). The CPS policy in the study region allows up to five reasons to be listed on each report. All children in the maltreated group had a first report of maltreatment prior to age 12. Subsequent maltreatment report data were collected through age 17. For the present study, information about maltreatment type was categorized as any physical abuse over time, any sexual abuse over time, and any neglect over time.

Potential Mediators—In addition to records on violent JD petitions (robbery, rape, murder, assault, manslaughter, or kidnapping), our data included records of nonviolent JD and status offenses. Nonviolent delinquency included all other allegations such as property offenses, public order offenses, excluding charges related to substances (see problematic substance use measure below). Status offense petitions included curfew violations, running away, beyond parental control, and truancy. For the purposes of this study, we coded individuals according to the most serious type of petition present (1 = *event occurred*, 0 = *event did not occur*): violent (participant may also have had nonviolent and status offense petitions), nonviolent (participant may also have had a status offense but not a violent offense petition), or status offense (no other type of delinquent petition). Although neither theory nor research specifically predicts the importance of nonviolent and status JD petitions in the relationship between CAN and adult IPV perpetration, we included these data for exploratory purposes. Since the oldest children in the sample could have had a JD petition prior to a first maltreatment report, the existence of dates on all records allowed us to control for this possibility.

The problematic substance use variable came from juvenile court records indicating whether a participant had a nonstatus offense petition related to substances (substances which are illegal for both juveniles and adults) or substance-related highway patrol arrests prior to age 18 (1 = *event occurred*, 0 = *event did not occur*). More specifically, it included use, possession, and dealing of a controlled substance as well as alcohol use when driving under influence. Participants' mental health was measured by juvenile mental health service use records (1 = *record of juvenile service use*, 0 = *no record of juvenile service use*) from billing information obtained from the State Department of Mental Health or another health provider that billed Medicaid or ER data. These services are based on *International Classification of Diseases Ninth Revision (ICD-9)* codes that mirror the *Diagnostic and Statistical Manual of Mental Disorders* diagnoses used by health care providers. Although specific diagnoses were available, because of the rare nature of the event it was not possible to break out the types of mental health disorder. Although the proposed mediators (violent delinquency, problematic substance use, and mental health service use) may have occurred prior or after the first maltreatment report, for the purpose of the mediational analyses those that occurred prior to the first CAN report were excluded. In other words, all mediators occurred following the first maltreatment report and prior to age 18.

Control Variables—All participants included in this sample were poor at the start of the study. At the time of initial sampling, cash assistance was limited to AFDC, which due to federal policy change shifted to TANF during the study period. Control variables included individual-, family-, and neighborhood-level characteristics that were theoretically or empirically linked to being maltreated and/or to the mediators or dependent variable. Participants' demographic characteristics included race (1 = *African American*, 0 = *White*, given that 99.2% of our sample were coded as either African American or White by the State Department of Social Services; we dropped the few remaining individuals from the analysis), gender (1 = *male*, 0 = *female*), and age at end of study (19–27). Participants' disability status data were obtained from Special Education records identifying eligibility for a specific Individuals with Disabilities Education Act disability, thereafter collapsed into a binary variable (1 = *yes, eligible*, 0 = *not eligible or not assessed*). Family background variables included parental or primary caretaker's education (1 = *high school or more*, 0 = *less than high school*), parental mental health and/or substance abuse (one variable due to sample size limitations) as indicated by treatment services records (1 = *service received*, 0 = *no service received*), mother's age at the participant's birth (given the evidence that young parents are more likely to be in CPS caseloads), parental arrest history (1 = *event occurred*, 0 = *event did not occur*), and number of children in the participant's family of origin. Neighborhood characteristics included percentages of census tract-level child poverty and residential mobility in the past 5 years. Child poverty was derived by dividing the total number of children under the age of 18 in a tract that fell behind the official poverty line into the total number of children under the age of 18 in the tract (Drake & Rank, 2009). Table 1 provides more information about the variables included in the analyses.

Data Analysis

Data management and analyses were conducted in SAS 9.2 and Mplus 6.11. Data were missing for 124 (2.30%) participants. As most were missing data on four control variables included in the final multivariate model, these participants were deleted from the final analyses. Descriptive and bivariate analyses were used to examine sample characteristics and the relationship between the outcome variable and all independent and control variables and to rule out multicollinearity. Multiple group path analysis was used to examine mediation hypotheses and compare the hypothesized pathways by gender. Path analysis tests a theoretical path model against the empirical data to determine how well the model fits the actual data, as determined by model fit statistics (Bryan, Schmiede, & Broaddus, 2007; Schumacker & Lomax, 2010). This type of analysis allows models to be fit separately for different groups to determine whether group membership moderates the relationships specified in the model (Schumacker & Lomax, 2010). Path analysis also simultaneously estimates direct, indirect (total and specific), and total effects, a clear advantage over the Baron and Kenny approach to testing for mediation (Bryan et al., 2007). For path analyses with dichotomous outcome variables, Mplus conducts probit regression models using weighted least squares with robust standard errors estimator (WLSMV), well suited for categorical data (Muthén & Muthén, 1998–2010). Confidence intervals for path estimates were generated via bootstrapping with 5,000 iterations due to the nonnormal distribution of a mediated effect (Preacher & Hayes, 2008). Because Mplus cannot currently correct for clustering with bootstrapping, cluster-corrected models were also run using the standard

normal distribution (e.g., Sobel method). Parameter estimates were not appreciably different between the cluster-corrected normal and bootstrapped methods. Given their superiority using nonnormal sampling distributions, we report results from the bootstrapped models. Good model fit was determined by a root mean square error of approximation (RMSEA) < .06 and weighted root mean square residual (WRMR) < 1.0 (Hu & Bentler, 1999). Each of the hypothesized mediators was first examined within a single mediator model. As all were significant, each was included in the full multiple mediator model. The exploratory mediators (juvenile nonviolent and status offenses) were not significant in single mediator models and were not included in the full model. In the interest of parsimony, control variables that were not significant in single mediator models (parental arrest history, number of children in the family at the start of the study, and census tract residential mobility and child poverty) were also removed from the final multivariate model after checking that they did not change the signs or values of estimates for other variables. Residuals for hypothesized mediators were allowed to correlate, as they were all theoretically related to CAN and were inter correlated. Unlike logistic model estimates, probit model estimates cannot be interpreted as odds ratios. Instead, statistically significant coefficients are interpreted as probabilities of the outcome of interest occurring. Conversions of estimates to

probabilities are given by: $P=1 - \text{probability} \left(\frac{\text{threshold} - z}{\sqrt{\theta}} \right)$, where probabilities are from the standard normal distribution, threshold = - (intercept for the outcome), $z = b_1 \cdot x_1 + b_2 \cdot x_2 + \dots + b_i \cdot x_i$, and θ = the residual variance obtained from the standardized solution (Muthén, 2005).

Results

Descriptive Findings

Descriptive characteristics of the study sample are presented in Table 1. The sample included equal proportions of men and women and was largely African American. Most maltreated individuals had at least one report of neglect over time, while less than half experienced physical abuse and one in six had reports of sexual abuse. Participants in the CAN/AFDC group experienced significantly higher mental health service use, $\chi^2(1) = 470.91, p < .001$, disability, $\chi^2(1) = 125.15, p < .001$, violent JD, $\chi^2(1) = 116.41, p < .001$, nonviolent JD, $\chi^2(1) = 26.13, p < .001$, status offense-only petitions, $\chi^2(1) = 11.79, p < .001$, and problematic substance use, $\chi^2(1) = 10.34, p < .01$, than those in the AFDC-only group. Maltreated subjects were slightly younger than the comparison group, $t(5,375) = 2.74, p < .01$. More CAN/AFDC than AFDC-only caregivers did not finish high school, $\chi^2(1) = 65.33, p < .001$, had a history of arrest, $\chi^2(1) = 56.21, p < .001$, and mental health or substance treatment, $\chi^2(1) = 128.41, p < .001$. The average number of children in the family at study start was higher in the CAN/AFDC than in AFDC-only group, $t(5,118.4) = -7.89, p < .001$. Maltreated subjects were more likely to live in neighborhoods with higher residential mobility than those who were only poor, $t(5,375) = -3.44, p < .001$. Relatively few participants ($n = 156$) perpetrated IPV as evidenced by arrests or TROs, with higher IPV perpetration rates in the CAN/AFDC group, $\chi^2(1) = 15.06, p < .001$. Additionally, more men than women perpetrated IPV: 2.32% ($n = 125$) compared to 0.58% ($n = 31$) respectively, $\chi^2(1) = 56.87, p < .001$; however, no significant differences existed by race.

Multivariate Model Findings

We ran two multivariate models to determine the best fit model. First, we constrained all parameters to be equal for men and women (Model 1); this model failed to converge. An examination of the bivariate relationships between study variables for women revealed near-complete separation for IPV perpetration and each of the hypothesized mediators due to the small number of women who perpetrated IPV ($n = 31$). We hypothesize that this lack of adequate coverage of each cell in the multivariate matrix, in contrast to more generous coverage for men, was responsible for the equality-constrained model's failure to converge. Our second model (Model 2) was run separately by gender and included CAN, the three hypothesized mediators (violent JD, problematic juvenile substance use, and juvenile mental health service use), and IPV perpetration, while controlling for covariates. Model 2 had good fit (RMSEA = 0.00, WRMR = 0.285), suggesting that the data were well predicted by the model. Because the first model did not converge, we were unable to compare the two models. Table 2 presents raw and standardized parameter coefficients, along with standard errors, p values, and confidence intervals for individual paths of all predictors to the mediators and to IPV; total effects, total indirect, and specific indirect effects of CAN on IPV.

As significant pathways differed by gender in Model 2, further results will be presented separately by gender (see Table 2). For women, CAN predicted violent JD and juvenile mental health service use but not problematic juvenile substance use, while controlling for disability, race, parental education, parental mental health or substance abuse treatment services, and the participant's age at the end of the study. None of the hypothesized mediators predicted adult IPV perpetration, nor did CAN directly predict adult IPV perpetration. Thus, child maltreatment did not have any direct or indirect effects on adult IPV perpetration for women.

For men, CAN predicted violent JD, problematic juvenile substance use, and juvenile mental health service use while controlling for disability, race, parental education, parental mental health or substance abuse treatment services, and the participant's age at the end of the study. Only violent juvenile offenses partially mediated the relationship between CAN and adult IPV perpetration while controlling for age at the end of study. However, CAN also directly predicted adult IPV perpetration as did one control variable, participant's age, at the end of the study. Standardized estimates were used to compare direct and indirect effects of CAN on adult IPV perpetration. For men, the direct effects of CAN were a stronger predictor of adult IPV perpetration than were the total indirect effects or the specific indirect effects through violent JD.

Discussion

Using a prospective longitudinal study design with exclusively administrative measures, this study examined mediators and gender-specific mechanisms linking CAN to young adult IPV perpetration while controlling for a range of individual, family, and contextual factors. For both genders, CAN was predictive of violent juvenile offenses and juvenile mental health service use; however, CAN predicted juvenile problematic substance use only among men. For men, we found evidence for a direct effect of CAN upon adult IPV perpetration and a

mediated (indirect) effect through violent JD. For women, we found no evidence of either a direct or an indirect effect of CAN on adult IPV perpetration. We hypothesize that the lack of significant pathways for women may have been due to the small number of women having the outcome of interest. For this reason, our findings of different paths (moderation) by gender must be considered tentative. Further scholarship with bigger cell and sample sizes is warranted to corroborate these findings.

The study findings are somewhat in contrast to those of White and Widom's (2003) study regarding the role of juvenile violence. White and Widom found that antisocial personality disorder in adulthood rather than early aggression in adolescence mediated the CAN-IPV relationship for both genders. They hypothesized that, as the more proximal behavior, a general pattern of recent antisocial behavior rather than earlier aggression constituted the link between CAN and adult IPV perpetration. We offer two explanations for these contrasting findings. First, measures used in our study were all administrative and gathered at the time of the reported incidents or services. White and Widom used self-reports for measuring their proposed mediators and adult IPV perpetration. Therefore, the discrepancy in findings may be due to instrumentation issues such as recall bias for early aggression. Second, we defined IPV as violence severe enough to result in arrest or TRO. It could be that juvenile violence is associated with IPV perpetration that involves law enforcement (as evidenced in our data), while a general pattern of antisocial behavior is more associated with the broader range of violence reported by participants in White and Widom's study.

The second major difference in findings between our study and White and Widom's (2003) is that problematic juvenile substance use was not a significant mediator for participants in our sample. Adolescents' self-reports of substance use are generally much higher (e.g., 48.9% report alcohol use while 10.1% report illicit drug use) than the 3.89% found in our administrative data (Substance Abuse and Mental Health Services Administration, 2011). The lack of a significant mediating path for problematic juvenile substance use between CAN and adult IPV perpetration may be a result of our reliance on documented problematic use.

A clear practical implication of our findings is that effective primary prevention of child maltreatment, as well as remediation of harm following maltreatment, may reduce a range of negative outcomes that include IPV perpetration as well as intermediary problems in adolescence. The fact that the current study replicated prior findings linking CAN to IPV perpetration while using a high-poverty sample reinforces the notion that child maltreatment contributes to later violence beyond the family's socioeconomic context (see Jonson-Reid et al., 2009). Offering juvenile violence prevention programs to both women and men with histories of maltreatment may offset immediate problems in adolescence and for men may also prevent IPV perpetration in young adulthood. While juvenile nonviolent and status offenses were not predictive of adult IPV perpetration in the current study, it should not be concluded that, in the absence of violent juvenile offenses, nonviolent and status offenses are unimportant to adult IPV perpetration. This is because the three types of juvenile offenses were not mutually exclusive. In fact, all but one of the participants with violent juvenile offenses also had at least one other type of delinquency (e.g., status or nonviolent), suggesting that another target for IPV prevention efforts may be first entry into the juvenile

court system. Our findings also add to a growing literature suggesting gender differences in relation to outcomes for maltreated children (Bright & Jonson-Reid, 2008; Fang & Corso, 2008; White & Widom, 2003). While evidence-based approaches to addressing trauma exist (Karp & Butler, 1996; Maddock & Larson, 1995), it may be that gender-specific approaches are warranted.

Specific to child maltreatment prevention, the study results reinforce the findings from prior studies that used self-reports of CAN or defined CAN as physical abuse only, that CAN is a significant predictor for later IPV perpetration (Ehrensaft et al., 2003; Herrenkohl et al., 2004; Magdol et al., 1998; Simmons et al., 1995). By categorizing maltreatment as any type over time, it is clear that many children have mixed forms of maltreatment and nearly all who have repeat reports will experience neglect (Jonson-Reid et al., 2003). While it was not possible to examine paths for specific maltreatment types in this study, given the evidence that other types of CAN (e.g., neglect) may lead to later violence (Weiler & Widom, 1996), it would appear that preventative efforts should be broadly targeted rather than limiting such efforts to physical abuse victims. Although these findings mirror results from other studies, suggesting that all types of CAN may be linked to adult IPV perpetration (Fang & Corso, 2008; White & Widom, 2003), it is less clear why it may be the case. Current theoretical explanations linking physical abuse to IPV (e.g., learning theory) may need to be expanded to account for what may be a broader relationship between child maltreatment in general and IPV. In particular, we still lack compelling theory explaining how childhood neglect leads to IPV perpetration. It may be that neglect over time increases or is comorbid with other types of childhood exposure to violence. Or, it may also be the case that the absence of parental care disrupts the ability to engage in relationships over the long term.

The current study replicates prior findings that CAN is predictive of youth delinquency (Herrera & McClosky, 2001; Hussey et al., 2006) and that violent JD predicts young adult IPV perpetration (Ehrensaft et al., 2003; Fang & Corso, 2008; Magdol et al., 1998)—at least among men. This is consistent with the theory that posits persistent antisocial behavior traits (Simmons et al., 1995). In addition, consistent with a number of prior studies (Egeland et al., 2002; Lansford et al., 2007; McCabe et al., 2005), we found that CAN is predictive of juvenile emotional and behavioral problems, as indicated by juvenile mental health service use. Finally, although the relative rates of adult IPV perpetration by men and women found in our study are consistent with several prior studies (Dougmas et al., 1994; Herrenkohl et al., 2004; Maxfield & Widom, 1996), they differ from those found in other studies (Fang & Corso, 2008; Magdol et al., 1998; Moffitt et al., 2001; White & Widom, 2003). This may be due to our study's conceptual and measurement differences from previous studies. The tentative nature of current and prior findings regarding the moderating effects of gender, if any, on IPV perpetration suggests that theoretical refinements are needed concerning the importance of parent-child gender socialization, exposure to violence, and developmental antisocial behavior patterns (Fang & Corso, 2008; Stith et al., 2000).

Limitations and Strengths

The measures used in this study were limited to public service records. The use of administrative data precludes examination of all maltreatment and violent behaviors that

may have been occurring in the study population (Fallon et al., 2010). For example, some studies suggest that, among women who experience IPV from a male perpetrator, only one fifth to one third seek TROs and about two fifths request police assistance (Bachman & Coker, 1995; Hathaway, Silvermna, & Aynalem, 2000). Even less is known about rates of police involvement and obtaining TROs when the identified perpetrator is a woman. The small number of female IPV perpetrators limited our analytic power and ability to conclusively determine whether gender moderated the relationship between CAN and adult IPV perpetration. Additionally, prior studies suggest that official reports of IPV tend to overidentify male perpetrators compared to female perpetrators, which is often the case in community studies (Capaldi et al., 2009). Given the nature of our data, it was expected that the results would be positively biased toward men. On the other hand, some argue that there are important qualitative differences in the severity of violence perpetrated by women (Houry et al., 2008). If we assume that court involvement tends to be more common for cases involving physical harm, it may be that such gender differences in IPV perpetration in study participants accurately reflect this population.

Another limitation is that the study sample was relatively young and might not have experienced the majority of IPV perpetration events that are likely to occur in their lifetime (Chambers & Krispin, 2011; Hester, 2006). Moreover, our study was not able to distinguish between different types of IPV. It is possible that different etiological factors are responsible for different forms of IPV. Furthermore, our study population was from one geographic region, hence limiting the generalizability of the study findings to CPS-involved children in other regions where policies related to both the handling of child maltreatment allegations and the handling of IPV allegations may be different. Because of the demographic composition of the region at the time (largely African American and White), we were unable to explore possible differences among other racial and ethnic groups. Additionally, we were unable to control for exposure to parental IPV during childhood/adolescence. These are important theoretical constructs that would have served as important controls in this study.

Finally, the use of administrative data confers both advantages and limitations when interpreting our findings. Advantages include the ability to triangulate our findings to studies using fundamentally different samples, measures, and designs, such as survey studies that constitute the vast bulk of existing research. Another advantage is that we are able to identify effects based on observation of data, which already exist in many states, enhancing applicability to practice and policy. This study also showed that administrative measures of CPS reports and juvenile court petitions represent points for potential early intervention to reduce later IPV if appropriate screening measures are implemented. One limitation of administrative data is that, being dependent on data as they exist, we cannot rule out issues such as conceptual overlap between measured constructs. For example, problematic behaviors may result both in mental health services and in juvenile court contact although mental health care was comparatively rare in our study. Further it may be that similar behaviors by juveniles of varying SES or race may result in differential response by systems (Rawal, Romansky, Jenuwine & Lyons, 2004). Although such confounding is inevitable at the conceptual level, understanding which system sees which children and whether that impacts later outcomes is separate from concerns about whether the underlying behaviors are the same. Additionally, this problem is commonly present to a lesser or greater degree in

many forms of measurement. For example, scales measuring different constructs, such as burnout and depression, may share items that are very similar (see e.g., “tiredness” items in Maslach Burnout Inventory, Maslach, Jackson, & Leiter, 1996 and Beck Depression Inventory, Beck, Ward, Mendelson, Mock & Erbaugh, 1961).

Conclusions and Implications

Despite its limitations, this study presents compelling evidence that CAN and subsequent negative sequelae in adolescence are implicated in IPV etiology for young adult men. While on one hand the IPV perpetration rates found here may seem low in comparison to prior studies, on the other the prevalence of court involvement for IPV in a sample that is largely still younger than the common age for family formation in this country is disturbing. Our data lend some support to theory and empirical findings that suggest efforts to prevent violence in boys during the school age years may have benefits for later family functioning. Future studies should determine whether these mechanisms are gender specific. The CAN experiences place children and adolescents on a risk trajectory toward poor adolescent outcomes that sometimes persist into adulthood (Gilbert et al., 2009; Jonson-Reid et al., 2009). The primary means of reducing this risk is, therefore, to reduce maltreatment. Once maltreatment occurs, however, efforts need to be made to strategically locate interventions within child-serving systems to offset the harm associated with abuse or neglect. While a court petition for violence was a sentinel event in our data, arguably the prevention of that behavior would have to be located in a different system. From an economic perspective, preventing violence among populations at risk is an important avenue to reduce the high costs associated with multiple service usage over time and into young adulthood (Fang, Brown, Florence, & Mercy, 2012). Although administrative data have distinct limitations, such linkages could provide an important monitoring function in our efforts to reduce the risk of IPV. Successful prevention of the cycle of violence requires an integrative public health approach that emphasizes the importance of screening and identification of child maltreatment by mandated reporters (e.g., health care and childcare providers, teachers), longitudinal and cross-sector epidemiological measures, and appropriation of funds to provide interventions to groups who have already experienced poor outcomes in adolescence, where the risk for later IPV perpetration is the highest.

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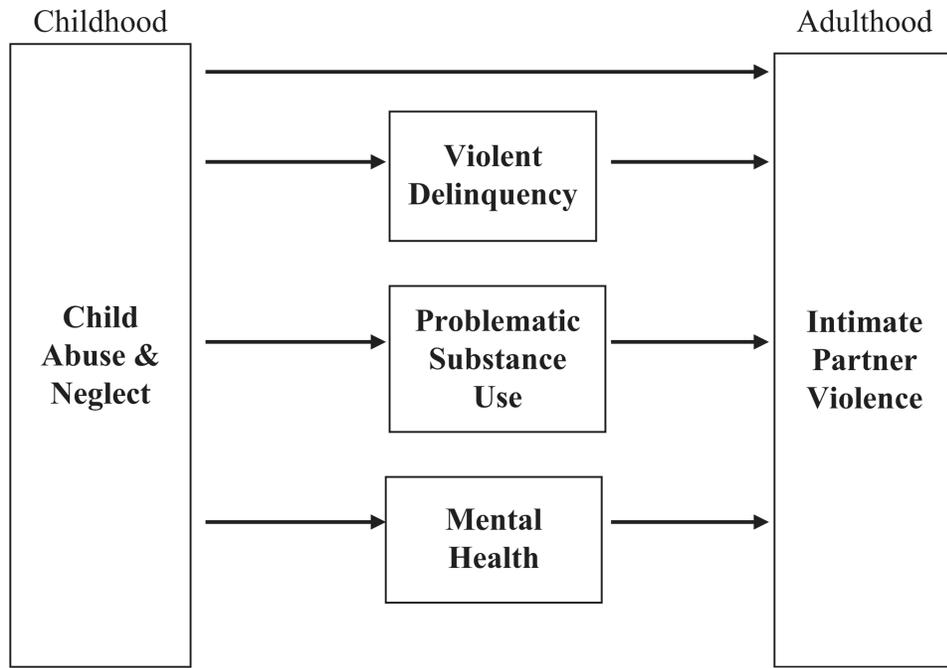


Figure 1. Study's conceptual model

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Table 1

Descriptive Characteristics of the Sample.

Variable	Maltreated group (<i>n</i> = 3,153)% or <i>M</i> (<i>SD</i>)	Comparison group (<i>n</i> = 2,223)% or <i>M</i> (<i>SD</i>)	Full sample (<i>N</i> = 5,377)% or <i>M</i> (<i>SD</i>)
Participant characteristics			
Men	50.27	50.54	50.38
African American ***	75.19	84.33	78.96
Any report of neglect over time	82.02	-	48.09
Any report of physical abuse over time	44.72	-	26.22
Any report of sexual abuse over time	17.09	-	10.02
Juvenile mental health service use ***	44.21	16.05	32.56
Disability ***	26.64	13.94	21.39
Juvenile delinquency (JD) petitions:			
Violent JD petition ***	19.51	8.81	15.08
Nonviolent JD petition ***	19.57	14.21	17.35
Status offense ***	2.85	1.44	2.27
Juvenile substance use offense **	4.60	2.88	3.89
Age at end of study **	22.83 (2.56)	23.02 (2.61)	22.91 (2.58)
Family characteristics			
Caregiver graduated high school ***	63.48	74.01	67.84
Caregiver arrest history ***	8.56	3.46	6.45
Caregiver mental health/substance use treatment ***	12.05	3.33	8.44
Number of children in family ***	3.84 (1.56)	3.52 (1.37)	3.70 (1.49)
Neighborhood characteristics			
Residential mobility in census tract ***	45.51	44.36	45.04
Child poverty in census tract	37.27	37.05	37.18
Outcome variable			
Adult intimate partner violence perpetration ***	3.65	1.84	2.90

p .001,

**
p .01.

Table 2

Results of Multivariate Probit Path Analysis by Gender.

Gender	Path	B	SE	β	z	p	95% CI
WOMEN	Juv. substance use regressed on						
	Child maltreatment	-0.09	0.16	-0.05	-0.60	.55	[-0.49, 0.31]
	Participant's factors						
	Race (African American)	-0.16	0.18	-0.06	-0.89	.37	[-0.63, 0.30]
	Age	0.02	0.03	0.06	0.71	.48	[-0.06, 0.10]
	Disability	0.18	0.25	0.07	0.73	.46	[-0.45, 0.81]
	Parental factors						
	Parental education (high school or more)	-0.06	0.17	-0.03	-0.36	.72	[-0.49, 0.37]
	Parental mental health/substances	-0.36	1.17	-0.10	-0.31	.76	[-3.38, 2.66]
	Juv. violence regressed on						
	Child maltreatment	0.45	0.08	0.21	5.97	.001***	[0.26, 0.65]
	Participant's factors						
	Race (African American)	0.30	0.09	0.12	2.19	.001***	[0.06, 0.54]
	Age	0.03	0.01	0.07	2.21	.03*	[-0.01, 0.06]
	Disability	0.40	0.08	0.14	4.76	.001***	[0.19, 0.62]
	Parental factors						
	Parental education (high school or more)	-0.02	0.07	-0.01	-0.22	.83	[-0.21, 0.17]
	Parental mental health/substances	0.03	0.12	0.01	0.29	.77	[-0.27, 0.34]
	Juv. mental health regressed on Child maltreatment	0.70	0.06	0.32	11.50	.001***	[0.54, 0.85]
	Participant's factors						
	Race (African American)	-0.22	0.07	-0.08	-3.23	.001***	[-0.40, -0.05]
Age	-0.03	0.01	-0.08	-3.03	.002**	[-0.06, -0.01]	
Disability	0.42	0.07	0.14	5.86	.001***	[0.23, 0.60]	
Parental factors							
Parental education (high school or more)	-0.01	0.06	-0.01	-0.23	.82	[-0.17, 0.14]	
Parental mental health/substances	0.10	0.10	0.02	0.95	.34	[-0.16, 0.35]	
IPV regressed on							

Gender	Path	B	SE	β	z	p	95% CI
	Juv. substance use	0.34	0.49	0.36	0.69	.49	[-0.09, -1.57]
	Juv. violence	-0.04	0.43	-0.04	-0.94	.93	[-1.15, 1.07]
	Juv. mental health	0.12	0.22	0.12	0.53	.60	[-0.45, 0.68]
	Child maltreatment	0.00 ^d	0.26	0.00 ^b	0.01	.99	[-0.66, 0.67]
	Participant's age	0.05	0.03	0.13	1.84	.07	[0.02, 0.13]
	Total effects	0.03	0.15	0.02	0.22	.83	[0.35, 0.41]
	Total indirect effects						
	Maltreatment → IPV	0.03	0.22	0.01	0.13	.90	[0.55, 0.60]
	Specific indirect effects						
	Maltreatment → Juv. Substance → IPV	-0.03	0.14	-0.02	-0.24	.81	[-0.38, 0.32]
MEN	Maltreatment → Juv. Violence → IPV	-0.02	0.21	-0.01	-0.09	.93	[-0.55, 0.51]
	Maltreatment → Juv. Mental Health → IPV	0.08	0.15	0.04	0.53	.60	[-0.31, 0.47]
	Juv. substance use regressed on						
	Child maltreatment	0.27	0.08	0.13	3.25	.001 ^{***}	[0.06, 0.49]
	Participant's factors						
	Race (African American)	0.15	0.10	0.06	1.50	.14	[-0.11, 0.40]
	Age	0.04	0.02	0.11	2.82	.01 ^{**}	[0.004, 0.08]
	Disability	0.17	0.08	0.07	2.02	.04 [*]	[-0.05, 0.38]
	Parental factors						
	Parental education (high school or more)	-0.12	0.08	-0.06	-1.51	.13	[-0.34, 0.09]
Juv. violence regressed on	Parental mental health/substances	0.01	0.13	0.001	0.04	.97	[-0.34, 0.35]
	Child maltreatment	0.57	0.07	.26	8.35	.001 ^{***}	[0.40, 0.75]
	Participant's factors						
	Race (African American)	0.41	0.08	0.16	5.02	.001 ^{***}	[0.20, 0.62]
	Age	0.05	0.01	0.13	4.54	.001 ^{***}	[0.02, 0.09]
	Disability	0.27	0.07	0.11	4.09	.001 ^{***}	[0.10, 0.43]
	Parental factors						
	Parental education (high school or more)	-0.06	0.07	-0.03	-0.96	.34	[-0.23, 0.11]

Gender	Path	B	SE	β	z	p	95% CI
	Parental mental health/substances	0.09	0.10	0.02	0.90	.37	[-0.17, 0.35]
	Child maltreatment	0.62	0.06	0.28	10.58	.001***	[0.47, 0.77]
	Participant's factors						
	Race (African American)	-0.19	0.06	-0.07	-2.82	.01**	[-0.35, -0.02]
	Age	-0.05	0.01	-0.11	-4.28	.001***	[-0.07, -0.02]
	Disability	0.30	0.06	0.12	5.04	.001***	[0.14, 0.45]
	Parental factors						
	Parental education (high school or more)	-0.12	0.06	-0.05	-2.10	.04*	[-0.27, 0.03]
	Parental mental health/substances	0.17	0.09	0.05	1.87	.06	[-0.07, 0.41]
	IPV regressed on						
	Juv. substance use	0.05	0.09	0.04	0.52	.61	[-0.18, 0.27]
	Juv. violence	0.16	0.07	0.17	2.27	.02*	[-0.02, 0.35]
	Juv. mental health	0.05	0.06	0.05	0.83	.41	[-0.11, 0.21]
	Child maltreatment	0.27	0.11	0.13	2.48	.01**	[-0.01, 0.56]
	Participant's age	0.09	0.02	0.22	5.88	.001***	[0.05, 0.13]
	Total effects	0.41	0.10	0.19	4.04	.001***	[0.15, 0.67]
	Total indirect effects						
	Maltreatment → IPV	0.14	0.04	0.07	3.28	<.001***	[0.30, 0.25]
	Specific indirect effects						
	Maltreatment → Juv. Substance → IPV	0.01	0.03	0.01	0.49	.63	[-0.05, 0.08]
	Maltreatment → Juv. Violence → IPV	0.09	0.04	0.04	2.17	.03*	[-0.02, 0.20]
	Maltreatment → Juv. Mental Health → IPV	0.03	0.04	0.02	0.82	.41	[-0.07, 0.13]

Note. B = unstandardized parameter estimate; SE = standard error; β & beta; = standardized parameter estimate; CI = confidence interval; IPV = intimate partner violence; Juv. = juvenile.

^a 0.003.

^b 0.001.

*** p .001.

** p .01.

* p .05.