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From Child Maltreatment to Violent Offending: An Examination of Mixed-Gender and Gender-Specific Models

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Abstract

Research suggests that child maltreatment predicts later violence, but it is uncertain whether the effects of victimization persist into adulthood or differ across gender. Further, mechanisms underlying the victim-perpetrator cycle for males and females are in question. Consequently, this study analyzed relations between child maltreatment and adult/lifetime violent offending within mixed-gender and gender-specific models. Along with main effect models, the study directly tested the moderating effects of gender on the maltreatment-violence link and explored theory-informed gender-specific mediators. Data were derived from the Chicago Longitudinal Study, a panel investigation of 1,539 low-income minority participants born in 1979 or 1980. Child welfare, juvenile court, and criminal court records informed the study's explanatory and outcome measures. Covariate and mediator measures originated from prospectively collected parent-, teacher-, and self-reports along with several administrative sources. Results indicated that child maltreatment, ages 0–11, significantly predicted all indicators of violence in the full sample, and most study outcomes in the male and female subsamples. In no instance did gender moderate the maltreatment-violence association. Childhood environmental instability, child externalizing behaviors, and peer social skills fully mediated the maltreatment-violence nexus among males. Adolescent externalizing behavior partially mediated the relation of interest among females; evidence also indicated that internalizing processes protected females who had been maltreated in childhood against later perpetration of violence. Implications of results are discussed.

Keywords

child abuse; violent offenders; women offenders

Introduction

Nearly five decades ago, C. Henry Kempe and colleagues described the battered child syndrome to raise public awareness of severe child abuse and highlight its medical implications (Kempe, Silverman, Steele, Droegemueller, & Silver, 1962). Soon afterward, George C. Curtis warned that abuse victims were potentially destined for lives of violent crime (Curtis, 1963). Since Curtis's ominous assertion, scholars have tested the cycle of violence theory (Fagan, 2001). Findings reveal that exposure to early physical abuse increases the likelihood of later violent offending (e.g., Herrenkohl, Huang, Tajima, & Whitney, 2003). Moreover, investigators have discovered that other types of child maltreatment (i.e., neglect and sexual abuse) along with global indicators of maltreatment predict violent behavior (English, Widom, & Brandford, 2002). However, most children

who suffer maltreatment do not engage in violence later in life. Therefore, understanding how some children become violent following maltreatment experiences represents an important area of inquiry.

Researchers have evoked a number of theoretical frameworks to explain the mechanisms leading from victimization in childhood to later violence. These include social control, general strain, and social learning theories (Agnew, 2005; Lansford et al., 2007; Teague et al., 2008) along with integrated developmental and clinical models that draw from the above-noted frameworks (Ehrensaft et al., 2003; Perry, 2009). According to the integrated models, child maltreatment promotes violent outcomes through deleterious family and school processes, emotional-behavioral disturbances, and negative peer affiliations.

While research in this area has evolved over the past two decades, several features of this body of literature limit our understanding of the victim-perpetrator cycle. First, few mediation studies have tested theory-generated pathways of effect (Herrenkohl et al., 2003). Second, only a relatively few prospectively designed studies have analyzed the association between early maltreatment and later violence (Maas, Herrenkohl, & Sousa, 2008). Relying primarily on retrospective measures of child maltreatment can bias results. Males, for instance, often underreport early victimization (Lab, Feigenbaum, & De Silva, 2000). Third, violence-related measures are often confined to adolescence, precluding understanding of adult-era maltreatment effects and obscuring discontinuities in the trajectory of antisocial behavior, e.g. desistance or adult onset (Robins, 1978; Farrington, 2008). Fourth, indicators of violence are operationally defined typically with only one or two criterion variables, preventing insight into the varying manifestations of violence with which maltreatment might be associated.

Fifth, studies of gender differences within the maltreatment-violence context are uncommon. To date, many related studies have only investigated males or have been unable to explore gender distinctions due to small sample sizes (Fagan, 2001). Last, relatively few investigations have isolated the relation of interest within low-income, minority samples (Williams, Van Dorn, Bright, Johnson-Reid, & Nebbitt, 2010). While doing so limits the generalizability of results, it also helps to uncover the nature of the maltreatment-violence association within a subgroup that is at high risk for child maltreatment victimization and violent crime perpetration, according to official statistics (Agnew, 2005; Williams et al., 2010).

The current investigation addresses these gaps with the following research questions:

1. Does child maltreatment, ages 0–11, significantly predict a number of adult (ages 18–26) and lifetime (age 12 through age 26) indicators of violent offending?
2. Do observed relations between child maltreatment and violence persist across gender?
3. Do theory-informed mechanisms of maltreatment's untoward effects help explain the association between child maltreatment and later violence for males and females?

Pathways tested include the following: adult relationship disruptions expressed as environmental instability, dysregulation indicated by externalizing and internalizing behaviors, and social impairments manifested as poor peer social skills.

Data originate from the Chicago Longitudinal Study (CLS), a panel investigation of 1,539 economically disadvantaged participants (93% African American, 7% Hispanic) born in 1979 or 1980. Child welfare and court records informed the explanatory measure while

court records alone contributed to the outcome measures. Prospectively administered child, parent, and teacher surveys along with administrative records produced covariate and mediator measures.

Literature Review

Research Question 1: Main Effect

Although somewhat limited in number, longitudinal studies published within the last few decades have supported hypotheses born of the cycle of violence theory. Investigators, for instance, have found child physical abuse in particular and child maltreatment in general to significantly predict violent juvenile offending (English et al., 2002; Herrenkohl, Egolf, & Herrenkohl, 1997; Herrenkohl, Huang, Tajima, & Whitney, 2003; Lansford et al., 2007; Maxfield & Widom, 1996; Smith & Thornberry, 1995). Fewer longitudinal, prospectively designed studies have extended the outcome of interest to violent adult crime.

One such study analyzed 5 waves of data obtained over a 24-year period to identify predictors of violence, specifically intimate partner violence (Ehrensaft et al., 2003). The authors sampled 543 participants, approximately 7 years of age, randomly selected from two upstate New York counties. They combined retrospective self-reports of physical and sexual abuse with official maltreatment data to construct a child abuse measure, ages 0–17. The researchers also triangulated retrospective self-reports of exposure to parental partner violence with maternal reports of partner intimate violence to create a measure of violence between parents. Violence to partner, the outcome measure, emerged from a subset of items from the Conflict Tactics Scale collected when participants averaged 31 years of age. According to well controlled analyses, experiencing physical abuse, sexual abuse, or exposure to partner violence as a child increased the risk for committing partner violence as an adult.

Using data collected at two distinct time periods from geographically diverse samples, Cathy Spatz Widom and colleagues tested longitudinal relations between verified child maltreatment and official adult violent crime. Analyses of a sample (N=1,575) from a large Midwest city revealed that global maltreatment (ages 0–11) among the study's African American subgroup significantly predicted adult violent arrest (Maxfield & Widom, 1996). Replicating and extending these findings with a Pacific Northwest sample (N=1,754), English et al. (2002) found that global maltreatment (ages 0–11) was significantly associated with adult violent crime not only among African Americans but also among the full sample. In both studies, investigators matched maltreatment cases with non-maltreatment cases on factors such as age, race, gender and family socioeconomic status to constitute the control groups.

In follow-up analyses to earlier investigations of the Rochester Youth Development Study (N=907), Thornberry, Henry, Ireland, and Smith (2010) tested the influence of childhood-limited maltreatment (ages 0–11) and any adolescent maltreatment (ages 12–17) on young adult outcomes such as self-reported violent crime. Using propensity scoring procedures to enhance causal inference, the authors found that any official adolescent maltreatment but not childhood-limited maltreatment exerted a significant effect on self-reports of young adult violent crime.

Mersky and Reynolds (2007) analyzed data from the CLS to test links not only between child maltreatment and violent delinquency, but also between maltreatment (ages 0–11) and lifetime violence (ages 12–24), inclusive of juvenile and early adult violent crime. Results unearthed significant relations between child maltreatment and both violent juvenile delinquency and lifetime violent arrest. By focusing primarily on adult violence, analyzing

multiple indicators of adult violent crime, and updating outcomes with age 26 data, our main effect question will build on and extend previous analyses within the CLS and other studies.

Research Question 2: Gender Effect

Scholars have generated relevant hypotheses to explain how the cycle of violence manifests within each gender. Based on a feminist interpretation of the etiology of violence, for instance, James Howell (2003) suggested that child abuse and neglect represents one of several risk factors for violent offending that is more salient for females than males. A small number of empirical studies have tested Howell's assertion, providing mixed support. Herrera and McCloskey (2001) revealed that child physical abuse measured via child and parent interviews in middle childhood predicted court-documented violence 5 years later for girls but not boys (N=299). Additionally, in a secondary analysis of English et al.'s data (2002), Makarios (2007) found that while child maltreatment increased the likelihood of lifetime (juvenile or adult) violence for both genders, tests of moderation indicated that the effect was significantly greater for females. Contrary to Howell's proposition, Johansson and Kempf-Leonard (2009) discovered that a history of prospectively reported abuse and neglect did not significantly elevate the risk of violent juvenile arrest among a court-referred sample of girls (n=3,422) or boys (n=6,983).

Using a representative sample from the National Longitudinal Study of Adolescent Health (N=9,368), Fang and Corso (2007) discovered that retrospectively self-reported child physical abuse and neglect *were* significantly related to self-reports of adolescent violence among *both* genders. Lansford and colleagues (2007) tested whether gender moderated the significant relation between maternal reports of child physical abuse and violent juvenile offending; the gender-abuse interaction term produced a non-significant estimate. Mersky and Reynolds (2007), using CLS data, also found no significant moderating effects of gender on the relation between official, verified reports of child maltreatment and lifetime (juvenile or adult) violent arrest. Again, we will extend these CLS analyses by focusing on adult violence, analyzing multiple indicators of adult violent crime, and updating outcomes with age 26 data.

The balance of these gender-specific results suggests that maltreatment confers risk for later violent offending across gender. More empirical evidence is needed to illuminate the role of maltreatment in the etiology of male and female violence, particularly violence committed in adulthood. That is, few if any prospective studies examine the potential differential effects of gender on the maltreatment-violence link with adult outcomes only.

Research Question 3: Mediation Effect

No studies from the CLS have explored mediating pathways from maltreatment to violence with the general or gender-specific samples. This current study, therefore, represents an initial attempt within the CLS to understand pathways from early victimization to later perpetration. Outside the CLS, only a small number of extant studies have examined intervening processes that could help explain the maltreatment-violence nexus while accounting for gender.

Wall and colleagues (2005) analyzed predictors of antisocial behavior among 739 adolescents who experienced verified maltreatment before age 15. During adolescence, study participants and their caregivers completed multiple survey instruments including a self report scale of aggressive and delinquent behavior ($r = .92$). For both males and females, caregiver relatedness and youth social skills significantly predicted aggression and delinquency. In a related finding, Salzinger, Rosario, and Feldman (2007) discovered that positive relationships with parents and peers mitigated the risk for self-reported violent

juvenile offending for both male and female victims of child abuse. For this study, the authors identified a sample of children (n=100) with verified reports of physical abuse prior to age 13 and compared their developmental trajectories through adolescence with a matched comparison group (n=100).

Relying on data from Widom's Midwest sample, Widom, Schuck, and White (2006) tested just two hypothesized mediators of the maltreatment-adult violence link and found that aggression for boys but not girls helped explain the relation of interest. Pullman et al. (2008) showed that discontinuity in school placements for both genders partially accounted for a main effect relation between self-reported child abuse and self-reported adult violent crime. For this cross-sectional study, the authors surveyed 484 men and women receiving criminal justice services in Australia, measured abuse with five items from Strauss's Conflict Tactics Scale ($r \approx .83$), and assessed violent offending with a subscale of the National Youth Survey ($r = .68$).

Building on these results, our gender-specific models test environmental instability (a proxy for relationship disruption comprised of out-of-home placements plus school mobility), externalizing behaviors, internalizing behaviors, and peer social skills as potential mediators of the relation of interest. We chose these constructs for several reasons. Not only do they reflect domains tested previously in the limited number of mediation studies reviewed above, but they also represent salient theoretically-identified processes that may help explain the cycle of violence. For instance, social control theory implicates maltreatment-related disruptions in family and school bonds as precursors to antisocial behavior (Teague et al., 2008). According to general strain theory, behavioral dysregulation expresses and dissipates the negative emotionality associated with maltreatment. Ultimately, these poorly regulated behaviors can result in violence (Agnew, 2005). Social learning theory highlights antisocial patterns of peer interactions as a common outcome of abusive and neglectful parenting (Teague, 2008). Finally, integrated developmental and clinical theories identify all of these factors as self-reinforcing dynamics that undermine children's post-maltreatment development (Ehrensaft et al., 2003; Perry, 2009).

Unique Contributions

This paper provides several unique contributions. First, relatively few studies assess the child maltreatment-violent offending association with prospectively collected measures spanning 26 years and extending into adulthood. Second, gender-specific main effect and moderation analyses enable us to probe potential differences or similarities in the maltreatment-violence relation across gender, a most critical demographic variable in the study of violence. Third, gender-specific mediation analyses facilitate a rare comparison across gender of theory-informed pathways leading from childhood victimization to violent offending. Fourth, few studies assay the relation of interest within a homogeneous sample of low-income, minority participants.

Method

Study and Sample

The original Chicago Longitudinal Study (CLS) sample included all children who enrolled in the Chicago Child-Parent Center (CPC) preschool program in 1983 or 1984 and completed a CPC kindergarten program in 1986 (n=989). A matched comparison group consisted of children who did not attend a CPC preschool program but did graduate from one of eleven Chicago Public School kindergarten classes in 1986 (n=550). The CPC and comparison groups were matched on neighborhood poverty and school racial composition. Previously completed analyses confirmed that the CPC preschool group and the matched

comparison group had a very similar socio-demographic composition. For instance, there were no significant differences across groups with regard race, free lunch eligibility, parent employment status, and family structure (Reynolds, Chang, & Temple, 1998). One primary aim of the CLS is to evaluate the effects of the CPC program (Reynolds, 2000), a high quality early intervention delivering educational, health, and social services to disadvantaged Chicago-area families. Assessing the psychosocial development of children at risk for pervasive maladjustment represents a second CLS aim to which our current study contributes.

Searches of official juvenile court and child protective service records for all participants living in the Chicago area after age 10 yielded information about participants' official maltreatment experiences (Reynolds & Robertson, 2003). Adult retrospective self-reports of child maltreatment supplemented administrative data for 63 cases. The maltreatment (n=130) and non-maltreatment (n=1,321) groups function as the experimental and control conditions, respectively. They resemble each other on factors such as race, gender, and early intellectual abilities but differ on a cumulative risk index. Delinquency and crime measures, the study outcome variables, emerged from official court data. The effective sample for this study included cases for whom the CLS could determine whether participants had or had not experienced verified child maltreatment *and* whether they had or had not incurred any official arrest (N=1,451 or 94.3% of the original sample). Analyses with a similar sample found few significant differences between study and attrition groups (Mersky & Topitzes, 2010).

Outcome Measures

County-level data from Cook County's Circuit Court, state-level records from over twenty states in which CLS participants were arrested, and federal arrest data informed the study's adult violent crime measures. These include *any nonviolent weapons conviction*, *any violent weapons conviction*, *any violent arrest*, and *any violent conviction*. All adult crime measures covered ages 18–26. The CLS accessed Cook County Circuit Court information through an official data sharing agreement. State and federal records were available primarily through public portals. Delinquency data originated from official juvenile court records of Cook County in Illinois and Milwaukee and Dane counties in Wisconsin. The latter two jurisdictions represented destinations to which some CLS families migrated. With the exception of one male participant arrested at age 7 and seven arrested at age 11, all other participants were first arrested from ages 12 through 17. Collecting delinquency information required official agreement.

Combining adult and juvenile sources of data, a dichotomous measure of lifetime violent offending was created, i.e., *any violent petition or conviction*. This criterion variable identifies adolescents who were arrested for any violent offense and officially processed by the juvenile courts along with adults who were arrested through age 26 and found guilty of a violent offense. A multinomial outcome was constructed indicating *no violent offending*, *any violent petition only*, *any violent conviction only*, and *any violent petition and conviction*. A standard taxonomy guided classification of violent crime (Federal Bureau of Investigation, 2007).

Mediator Measures

A measure of *environmental instability, grades 4–8*, reflected total number of out-of-home placements and school moves within the indicated time frame. Data originated from two sources: official child welfare service records and official school records.

Two variables constituted the study indicators of externalizing behavior, *troublemaking behavior, grades 3–6* and *acting out, grades 6–7*. Troublemaking behavior measured student self-reports on four items (“I get in trouble at school”, “I get in trouble at home”, “I follow class rules”, and “I fight at school”). Three-item response options were presented in grades 3 and 4 and four in grades 5 and 6. A total score per year was calculated by summing the scale ratings after reverse coding the item denoting obedient behavior. Annual total scores were transformed into Z-scores and averaged across grades. The alpha reliability coefficient was a moderate .61. The acting out measure, derived from a 6-item subscale of the Teacher-Child Rating Scale (T-CRS; Perkins & Hightower, 2002), indicated teachers’ ratings (1 to 5) of the following student behaviors in both grades 6 and 7: disruptive, fidgety, disturbing, attention seeking, aggressive, and deviant. Items were summed within and averaged across years. Alpha reliability equaled .94.

The T-CRS subscale, *shy-anxious behavior, grades 6–7*, captured internalizing behaviors and included the following 6-items from each grade: withdrawn; shy or timid; anxious or worried; nervous, frightened, or tense; does not express feelings; unhappy or sad. Teacher ratings for these items were again summed within and averaged across years. The alpha reliability coefficient was .84. We created a measure of *peer social skills, grades 6–7*, from a 5-item T-CRS subscale reflecting friendliness, sociability and peer popularity. We again summed scores within and averaged totals across years (Cronbach’s $\alpha = .90$).

Explanatory Measure and Covariates

Child welfare service records aggregated data from Cook County Juvenile Courts and the Illinois Department of Child Services (DCFS). Along with details on out-of-home placement, these data contained information on child maltreatment, from which we created a dichotomous variable denoting one or more substantiated reports of *child maltreatment, ages 0–11*.

Covariate measures came from multiple data sources such as the Chicago Public Schools, the Illinois Longitudinal Public Assistance Research Database and parent surveys, and included *sex* (0=boys, 1=girls), *race/ethnicity* (0=Hispanic, 1=African American), and two measures of early environmental risks: *parent substance abuse, ages 0–5* and a 7-item *risk index, ages 0–3*. To create the former risk measure, we referenced retrospective self-reports from a young adult CLS participant survey (Mersky & Topitzes, 2010). To construct the risk index, we summed the following 7 dichotomous indicators of early childhood experience: (a) mother ever a teen parent, (b) mother not employed, (c) mother did not complete high school, (d) four or more children in the household, (e) single-parent household, (f) high neighborhood poverty (> 40% below poverty level, 1980 Census), and (g) household AFDC receipt (Reynolds, 2000).

We also controlled for *CPC preschool participation* (1=participation, 0=no participation) given previously supported negative associations with maltreatment and crime (Reynolds & Robertson, 2003; Reynolds et al., 2007). *Kindergarten word analysis*, a proxy for early intellectual abilities, reflected scores on a subtest of the Iowa Test of Basic Skills and indicated pre-reading skills. Last, considering our parent-level covariates assessed maternal factors, we included a measure of *parent involvement, grades 1–3* in child’s schooling as a covariate in sensitivity analyses to capture paternal contributions to child’s development. The measure reflects the three year average of annual teacher ratings of “parent’s participation in school activities,” scored on a scale from 1 (poor/not at all) to 5 (excellent/much).

We selected our covariates, including indicators of the risk index, given their demonstrated ability to predict CLS participant outcomes (Reynolds, 2000) and their known association

with developmental outcomes (Bandersky & Lewis, 1994). Although lacking certain measures assessing parent functioning such as paternal criminality, we controlled for many of the same individual, family and community-level covariate measures found in the RYDS, e.g., family structure, parental alcohol or drug use, family poverty, and neighborhood poverty (Thornberry et al., 2010). These and our other covariates such as large family size correlate with maltreatment and later violence (Farrington, 1998; Tolan, Gormam-Smith, & Henry, 2006).

Missing Data

Mediator measures lacked valid data on select cases ($\approx 10\%$ for troublemaking behavior; $\approx 25\%$ for T-CRS measures). Using an expectation-maximization algorithm (Schafer, 1997), we estimated missing values with multiple imputation in LISREL. This strategy draws on known associations between the target measure and other study variables (du Toit & du Toit, 2001).

Data Analysis

To answer question one, we regressed each study outcome on a prediction model that included the study's explanatory and covariate measures. We employed a probit regression analysis strategy for dichotomous outcomes. Probit uses a maximum likelihood estimator and has been shown to generate reliable estimates for dichotomous outcomes and large samples (Horowitz & Savin, 2001). To analyze models predicting the multinomial outcome, we enlisted a multinomial probit strategy. For research question two, we disaggregated the sample by gender and repeated all operations described above. In addition, we returned to the full sample models and replicated question one analyses after entering a sex-by-maltreatment interaction term, enabling us to directly test the moderating effects of gender on the maltreatment-violence link. We also conducted sensitivity analyses with main effect and moderator models. We first replaced the risk index with individual risk items to ensure that the loss of data associated with aggregating risk measures did not create spurious results. Next, we included parent participation in child's schooling as a covariate to introduce a potential control for paternal influence.

To address research question three, we disaggregated the sample by gender to conduct exploratory and confirmatory mediation analyses. Within gender subgroups, we regressed each proposed mediator on the set of predictors that included child maltreatment and all study covariates. The analysis strategy selected reflected the nature of the outcome. Mediators that demonstrated an adjusted significant (probability $< .05$) or marginally significant (probability $< .10$) association with child maltreatment were entered into the study's main effect predictor model. Onto this new set of predictors, we regressed two chief study outcomes (*any violent conviction* and *any violent petition or conviction*). We expected the block of mediators to attenuate the maltreatment-violence link, and referenced maltreatment's marginal effect coefficient in both main-effect and mediator contexts to calculate the percent reduction associated with the mediator model (Cohen, Cohen, West, & Aiken, 2002). We also assessed the marginal effect associated with each mediator in order to evaluate a final criterion for mediation, i.e., a significant adjusted relation with the outcome. Last, we confirmed all mediator models with structural equation modeling (SEM) in LISREL 8.80 (see Reynolds, Ou & Topitzes, 2004). To account for multicollinearity between measures, we allowed mediators to correlate, operations planned a priori and made possible with SEM.

Results

Table 1 displays results from main-effect analyses, namely adjusted non-maltreatment and maltreatment group rates on violence-related outcomes. Approximate p-values associated with each group rate comparison are indicated. The first two columns of results show estimates for the full sample; the last four reflect output from gender-specific models. The 7 rows correspond to the 6 study outcomes as two rows include results from one multinomial analysis.

According to between-group comparisons with the full sample, the maltreatment group exhibited significantly higher rates of offending across all adult and lifetime indicators of violence. In nearly all cases, maltreatment victims were over twice as likely as their non-maltreated counterparts to have any recorded violent offense. For instance, CLS participants maltreated as children, compared to non-maltreated children, were significantly more likely to be convicted of one or more adult non-violent (4.53% vs. 1.80%; $p=.036$) or violent (7.33% vs. 2.86%; $p=.012$) weapons charges. Adjusted rates of offending were significantly greater for the maltreatment group compared to the non-maltreatment group on three additional adult outcomes: any violent arrest (25.82% vs. 17.86%; $p=.028$), any violent conviction (18.28% vs. 7.16%; $p<.000$), and any violent conviction in adulthood only (12.21% vs. 5.40%; $p=.001$). Regarding lifetime indicators of violence, maltreatment significantly increased the risk of committing any verifiable violent offense in adolescence or adulthood (29.22% vs. 13.58%; $p<.000$) or across both adolescence and adulthood (5.40% vs. 1.44%; $p<.000$).

By disaggregating the sample by gender we found that a significantly greater adjusted percentage of maltreated males, compared to non-maltreated males, had a record of any violent weapons conviction (16.49% vs. 7.68%; $p=.029$), any violent conviction (33.67% vs. 17.59%; $p=.004$), any violent conviction, adult only (19.35% vs. 11.01%; $p=.007$), any violent petition or conviction (49.33% vs. 26.56%; $p<.000$), and any violent petition and conviction (14.52% vs. 6.51%; $p=.003$). A significantly higher adjusted percentage of females maltreated in childhood, versus non-maltreated females, incurred any adult violent arrest (16.64% vs. 7.59%; $p=.017$), any violent conviction (8.61% vs. 2.19%; $p=.008$), any violent conviction, adult only (6.77% vs. 2.04%; $p=.028$), and any violent petition or conviction (12.91% vs. 5.69%; $p=.027$). Several descriptive differences emerged across gender. Maltreatment significantly predicted any violent weapons charges and any violent petition and conviction for males only, and any violent adult arrest for females only. Nonetheless, the gender-by-maltreatment term did not produce a significant parameter estimate in any test of moderation. Sensitivity analyses performed with the risk items and with parent involvement, respectively, generated an identical pattern of findings.

Table 2 reveals exploratory mediation results with the adult outcome *any violent conviction*. We display output from the main effect analysis to compare against results the mediation analysis. For the male subsample, environmental instability, troublemaking behavior, and peer social skills exerted significant adjusted associations with child maltreatment ($p<.000$, $p=.002$, and $p=.019$ respectively) in the expected direction. Acting out and shy-anxious behavior were not related to child maltreatment and therefore excluded from further tests. In the hierarchical mediation model, environmental instability and peer social skills were significantly related to the outcome while troublemaking behavior was marginally related, again with the expected valence. The set of mediators reduced maltreatment's relation to any violent conviction to a statistically non-significant factor ($p=.266$). Altogether, the magnitude of the mediation effect equaled approximately 64%.

For females, we observed the following measures to be positively and at least marginally associated with child maltreatment at the multivariate level: acting out behavior ($p=.058$), shy-anxious behavior ($p=.047$), and environmental instability ($p<.000$). These measures were modeled as mediators in the hierarchical regression analysis with only acting out behavior demonstrating a significant association with the outcome. The mediator model explained roughly 10% of the maltreatment-violence link but did not reduce this relation to non-significance.

These gender-specific mediation analyses were repeated with the measure of lifetime violence: any violent petition or violent conviction (results not shown). The same pattern of findings emerged in the male model; however, the female-only analysis yielded a new insight. Shy-anxious behavior was significantly and negatively associated with the outcome ($p=.028$), counteracting the mediating effects of acting out behavior and enhancing the linkage between maltreatment and violence. Rather than acting as a mediator variable, in this analysis shy-anxious behavior functioned as a suppressor variable (MacKinnon, Krull, & Lockwood, 2000).

Structural equation modeling with both primary outcomes across gender subgroups confirmed above-noted mediation results. To specify, fit statistics indicated good fit, and beta estimates reflected expected valence and magnitude. The male models produced root mean square error of approximation (RMSEA) statistics well below .05 and adjusted goodness of fit indices (AGFI) above .98. Environmental instability, troublemaking behavior, and peer social skills contributed significant direct mediation to these models. With an RMSEA of .62 and an AGFI of .95, the female model predicting any violent conviction in adulthood fit the data moderately well, while the female model predicting lifetime violent offending fit the data well (RMSEA=.00; AGFI=.99). Acting out and shy-anxious behavior functioned predictably as intervening processes (results not shown; tables and figures available upon request).

Discussion

Using prospective data from birth through age 26, we found that child maltreatment was significantly associated with adult and lifetime violent offending. To elaborate, maltreatment significantly increased the chances of being convicted of a non-violent or a violent adult weapons charge, reinforcing findings from Hygiea, Mota, Afifi, Enns, & Sareen (2009). The study also revealed that maltreatment among CLS participants significantly predicted all adult and lifetime measures of general violence, reinforcing confidence in relations found. This finding extends results from several high profile studies that unveiled significant associations between child maltreatment and violent delinquency (e.g. Smith & Thornberry, 1995) and replicates results from just a few important longitudinal studies linking maltreatment to adult violence (English et al., 2002; Maxfield & Widom, 1996).

With regard to our gender-specific analyses, our data suggest that early maltreatment predates later violence for both males and females. Contrary to Howell's prediction and results from Markarios (2007), we did not find that maltreatment enhanced the risk for violence more profoundly for females versus males. Instead, our results showed no significant moderating effect of gender on the maltreatment-violence link.

However, several gender differences did emerge in the data that warrant mention. First, as expected, a higher rate of male versus female study participants committed any criminal act of violence. In fact, the base rate of violent offending for three outcome categories was low for females, resulting in underpowered maltreatment group comparisons with the female

subsample. Few females, for instance, were arrested for a weapons-related charge rendering gender comparisons with weapons-related outcomes hard to interpret.

Also, for one outcome category, any violent arrest, the maltreatment-violence connection was only significant among females thereby reinforcing specific results from Maxfield and Widom (1996). One plausible interpretation of this finding is that for disadvantaged young men, arrest measures alone do not identify significant maladaptation given the somewhat normative nature of arrest, even violent arrest. Conversely, general arrest measures for disadvantaged young women differentiate impaired development versus expected life course trajectories.

The current study also produced empirical support for the conclusion that pathways from early victimization to later violent offending differ across gender. In one of only a very few studies assessing gender-specific mechanisms of the victim-perpetrator cycle, we tested identical theory-informed mediators for both male and female models. We found that environmental instability, childhood externalizing behavior, and adolescent peer social skills fully mediated the association between child maltreatment and violent crime for males. On the other hand, adolescent externalizing behavior partially mediated the maltreatment-violence link among females while adolescent internalizing behavior suppressed the relation of interest.

Although instability in home and school placements represented a deleterious consequence of child maltreatment for both male and female study participants, only for males did it predict adult and lifetime violent offending. To a degree, this result accords with a report from Degue and Widom (2009), strengthening the message that instability can fuel deviant or violent criminal behavior among male victims of child maltreatment. Surprisingly, instability did not contribute explanatory power to the female mediator models. This null finding does not imply that female victims of child maltreatment in the CLS were immune to the corrosive effects of multiple school and home placements. Among these participants, instability or mobility may have helped to promote other untested outcomes such as impaired mental health (Ball & Links, 2009) and adult victimization (Widom, Czaja, & Dutton, 2008). Future research exploring the deleterious mediating effects of environmental instability for maltreated girls is warranted.

Results also revealed that troublemaking behavior in middle-to-late childhood functioned as a significant mediator of the maltreatment-violence link for males. Meanwhile, adolescent acting out behavior contributed modest mediating effects to the female models. We speculate that boys who were maltreated gravitated toward externalizing behaviors relatively soon after their victimization experience based on proclivities for aggression. Conversely, girls were less inclined toward early externalizing problems. If they exhibited these behaviors as coping mechanisms in the aftermath of maltreatment, they may have done so less apparently, less often or later in life relative to boys. These gender differences may be attributable to social processing dynamics and neurobiological trends (Bennett, Farrington, & Huesmann, 2005; Perry, 2001).

In addition to above-mentioned male mediator results, the emergence of peer social skills as a direct mediator of the relation of interest lends credence to the application of an integrated theory to the experience of maltreated boys who commit adult violence. To explain, boys in the CLS who had at least one verified maltreatment report during childhood faced disruptions in relationships with adults including caregivers, displayed dysregulated or disruptive behavior in various settings, and ultimately developed poor social skills that may have rendered them vulnerable to antisocial peer affiliations later in life. For a number of these males, violent behaviors resulted.

For girls, different dynamics linked early victimization with later violence. For instance, maltreatment did not predict poor adolescent peer social skills for CLS female participants. Furthermore, whereas adolescent externalizing behavior helped propel female victims of child maltreatment toward later violence, adolescent internalizing behaviors protected them against later violence (see Kerr, Tremblay, Pagani, & Vitaro, 1997).

In sum, our findings suggest that child maltreatment extends its violence-inducing effects into adulthood and across gender. Although observed pathways for males from victimization to offending comport to a good degree with theoretical predictions, mediator analyses conducted with the female-only sample produced partial effects and provided a modest understanding of the female-specific mechanisms linking maltreatment to violence. Future research may explore more highly specified explanatory models for the cycle of female violence while also testing more salient maltreatment-related outcomes for women such as mental disorders and re-victimization.

Limitations

A number of strengths bolster confidence in study results, such as naturalistic sampling design, prospective measurement, well-controlled analyses, and exploratory and confirmatory mediation strategies. Several study limitations, however, qualify the findings. First, official maltreatment data undercount actual incidence of child maltreatment (Sedlak et al., 2010). Therefore, employing these data in a maltreatment effects study may generate false negatives in the comparison group which may in turn suppress the relation between maltreatment and the outcome of interest. Second, temporal overlap between child maltreatment (ages 0–11) and several of the study mediators (troublemaking behavior grades 3–6 and environmental instability grades 4–8) may have confounded mediation results. We think this is unlikely, however, based upon theory and prior empirical research. Both support the causal direction of influence modeled in our study. Third, we cannot rule out the potential for omitted variable bias. For instance, we were unable to assess whether girls and boys engaged in early internalizing behaviors as a result of maltreatment experiences. Last, generalizability of results is limited to low-income, urban-dwelling minorities.

Implications

Results from our study yield implications for direct practice intervention. For instance, past victimization among both male and female perpetrators of violent crime requires attention within justice systems (Lewis, 1992). Services for juvenile or adult violent offenders ought to include assessment of adverse childhood experiences such as early victimization. In addition, justice services ought to incorporate interventions aimed at mitigating maltreatment or early trauma-related problems such as post-traumatic stress and substance abuse. Other studies have documented the need for implementing trauma-related programming for both male and female offenders (Kubiak, 2004). Unfortunately, funding realities and public opinion can undermine such efforts (Hooper, 2010), necessitating advocacy on the part of researchers and practitioners.

To optimize effectiveness, however, program designers will likely need to develop distinct intervention models for male and female violent offenders, a suggestion that is not without precedent (Covington & Bloom, 2006). Our mediation results suggest that underlying mechanisms leading from early victimization to later violent offending differ across gender, indicating differential service needs. For instance, males might benefit from emotion and behavior regulation training and social skills development. Delivering such interventions within the context of consistent relationships will likely maximize effects. A programmatic focus on emotion and behavior regulation might also enhance the functioning of female

violent offenders who have experienced early victimization; however, other components might also be required.

Regarding childhood interventions for children who have experienced early maltreatment, the developmental problems identified in our study that lead from early victimization to later violence are often addressed through discrete, non-overlapping delivery systems. Consequently, coordinating systems such as special education, child welfare, mental health and juvenile justice services could reinforce environmental supports and ongoing therapeutic inputs for children while minimizing disruptions in school and home placements. For boys, this could help prevent future violence. Howell and colleagues (2004) have developed a comprehensive strategy for integrating services across agencies. Their model aims to enhance the effectiveness and efficiency of youth serving systems and to capitalize on research into co-occurring child emotional and behavioral disorders (Malmgren & Meisel, 2004). Evidence suggests that such interagency collaboration can improve program and youth outcomes (Chuang & Wells, 2010; Pullman et al., 2006).

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Table 1

Results from Research Questions 1 and 2: Main Effect Analyses

Outcome	Adjusted Offending Rates for Full Sample Maltreatment Groups, %		Adjusted Offending Rates for Male Maltreatment Groups, %		Adjusted Offending Rates for Female Maltreatment Groups, %	
	No Maltreatment	Maltreatment	No Maltreatment	Maltreatment	No Maltreatment	Maltreatment
<i>Adult Offending (N=1,451)</i>	(n=1,321)	(n=130)	(n=661)	(n=61)	(n=660)	(n=69)
Any nonviolent weapons conviction	1.8	4.55*	9.23	15.8	0.05	0.8
Any violent weapons conviction	2.86	7.33*	7.68	16.49*	0.76	2.02
Any violent arrest	17.56	25.82*	32.83	37.91	7.59	16.64*
Any violent conviction	7.16	18.28***	17.59	33.67**	2.19	8.61**
Any violent conviction, adult only	5.40	12.21**	11.01	19.35**	2.04	6.77*
<i>Juvenile/Adult Offending (N=1,451)</i>	(n=1,321)	(n=130)	(n=661)	(n=61)	(n=660)	(n=69)
Any violent petition or conviction	13.58	29.22***	26.56	49.33***	5.69	12.91*
Any violent petition & conviction	1.44	5.40***	6.51	14.52**	0.3	3.02 [†]

Note: All maltreatment adjusted group rate comparisons were generated via probit, main effect analyses in the StataIC 11 processor with marginal effect commands. The comparisons represent estimated percentage point differences in rates of offending across maltreatment groups. Results for the following two outcomes - any violent conviction, adult only and both violent petition & conviction - derived from one multinomial regression analysis in which the reference category included all participants with no violent petition or conviction. Study covariates were modeled as exogenous control variables in all analyses.

p < .001

**
p < .01

*
p < .05

[†]
p < .10

Table 2
Results from Research Question 3: Mediation of Association between Child Maltreatment & Any Violent Conviction across Gender

Model	Predictor	Main Effect Analyses				Mediation Analyses			
		Coeff.	SE	z	(P> Z)	Coeff.	SE	z	(P> Z)
Males (n=722)	Race	-.219	.198	-1.11	0.268	-.202	.201	-1.01	0.313
	Parent substance abuse	.309	.286	1.08	0.281	.318	.292	1.09	0.275
	Risk index	.035	.032	1.08	0.281	.118	.034	0.35	0.730
	CPC preschool	-.142	.115	-1.24	0.217	-.053	.119	-0.44	0.659
	Kindergarten word analysis	.003	.004	0.78	0.436	.009	.004	2.00	0.045
	Child maltreatment, ages 0-11	.509	.176	2.89	0.004	.209	.167	1.11	0.266
	Environmental instability, grades 4-8					.211	.047	4.50	0.000
	Troublemaking behavior, grades 3-6					.152	.083	1.83	0.067
	Acting out, grades 6-7					--	--	--	--
	Shy-anxious behavior, grades 6-7					--	--	--	--
Peer social skills, grades 6-7					-.031	.015	-2.04	0.042	
Log likelihood								-326.041	
<i>Pseudo R</i> ²								7.44%	
% Reduction of main effect								63.66%	
Females (n=729)	Race	.036	.437	0.08	0.935	.093	.466	0.20	0.841
	Parent substance abuse	.304	.423	0.72	0.472	.256	.429	0.60	0.551
	Risk index	.055	.061	0.89	0.371	.030	.064	0.466	0.646
	CPC preschool	-.228	.205	-1.11	0.265	-.193	.214	-0.91	0.365
	Kindergarten word analysis	.008	.008	1.00	0.315	.008	.008	0.95	0.341
	Child maltreatment, ages 0-11	.650	.245	2.65	0.008	.648	.266	2.44	0.015
	Environmental instability, grades 4-8					.005	.092	0.06	0.956
	Troublemaking behavior, grades 3-6					--	--	--	--
	Acting out behavior, grades 6-7					.048	.017	2.81	0.005
	Shy-anxious behavior, grades 6-7					-.053	.037	-1.42	0.157
Peer social skills, grades 6-7					--	--	--	--	
Log likelihood								-88.823	
<i>Pseudo R</i> ²								9.99%	

Model	Predictor	Main Effect Analyses			Mediation Analyses				
		Coeff.	SE	z	(P> Z)	Coeff.	SE	z	(P> Z)
	% Reduction of main effect				--				9.66%