
Child Maltreatment, Youth Violence, and Intimate Partner Violence

Developmental Relationships

Xiangming Fang, PhD, Phaedra S. Corso, PhD

Background: Understanding the cycle of violence, from victimization to perpetration across the life span, is critical for designing successful prevention interventions. This study uses a nationally representative sample to examine the developmental relationships among three forms of child maltreatment, youth violence perpetration or victimization, and young adult intimate partner violence (IPV) perpetration or victimization.

Methods: Data describing self-reported youth violence perpetration (or victimization) from Wave I of the National Longitudinal Study of Adolescent Health (1994–1995) were matched with self-reported IPV perpetration (or victimization) in young adult sexual relationships and retrospective reports of child maltreatment collected during Wave III (2001–2002). Bivariate probit regression models were used to analyze the developmental relationships between child maltreatment, youth violence, and IPV. Analyses were completed in September 2006.

Results: Compared to nonvictims of child maltreatment, victims of child maltreatment are more likely to perpetrate youth violence (a likelihood increase ranging from -1.2% to 6.6% for females and 3.7% to 11.9% for males) and young adult IPV (an increase from 8.7% to 10.4% for females and from 1.3% to 17.2% for males), although the direct and indirect effects vary by type of child maltreatment experienced. Gender differences exist in the links between child maltreatment, youth violence and IPV, and in the effects of socioeconomic factors on youth violence and IPV.

Conclusions: Results suggest that it may be important to account for gender differences when designing violence prevention programs, and an integrative approach is critical for stopping the developmental trajectory of violence.

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Introduction

The incidence and economic burden of violence is a national problem affecting millions of people each year in the United States.^{1,2} Violence can occur during childhood or adulthood and can be perpetrated by oneself, acquaintances, or strangers. Understanding the cycle of violence, from victimization to perpetration across the life span, is critical for designing successful prevention interventions. Research in this area has suggested that the victims of child maltreatment are at increased risk of perpetrating violence as well as being victims of violence as

youths and during adulthood.^{3–13} However, while connections among child maltreatment, youth violence, and intimate partner violence (IPV) have been documented, there are a number of issues requiring further examination.

First, a majority of studies examining the developmental trajectories of violence have failed to adequately control for confounding individual socioeconomic, family background, and contextual factors. Evidence has suggested that child maltreatment, youth violence, and IPV are not uniformly distributed across the population and are more likely to occur in families characterized by social and economic disadvantage, parental separation and divorce, and families living in disadvantaged neighborhoods.^{12,14–18} Without controlling for these factors, it is not clear whether the link among child maltreatment, youth violence, and IPV arises because of the socioeconomic and family context within which the violence occurs, or due to a cause-and-effect relationship in which experiencing child maltreatment increases the risk for later youth violence

From the National Center for Injury Prevention and Control, Centers for Disease Control and Prevention (Fang), Atlanta, Georgia; and Department of Health Policy and Management, College of Public Health, University of Georgia (Corso), Athens, Georgia

Address correspondence and reprint requests to: Xiangming Fang, PhD, 4770 Buford Highway, MS K-60, Atlanta GA 30341. E-mail: ddz6@cdc.gov.

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perpetration or victimization and/or IPV perpetration or victimization. Second, many studies in this field, especially in the area of IPV, have been based on relatively small or selected samples such as clinical and agency samples rather than general population samples. This limits the generalizability of their findings.

Third, researchers have suggested that developmental trajectories of violence may operate differently for males and females.^{10,13,19,20} However, for the few studies that have investigated gender differences, especially those studying the gender differences in the link between child maltreatment and IPV, the findings are inconsistent. For example, Magdol et al.¹⁰ found that the link between abusive discipline experienced as a child and IPV perpetration was stronger for females, while Dumas et al.¹⁹ and Langhinrichsen-Rohling et al.²⁰ found that abused boys are at higher risk for perpetrating partner violence as adults. The differences in findings could be due to different specificities of the samples used in the studies. The samples used in both of the latter studies were small and selected in the U.S., which may suffer from sample selection biases. The sample for the study by Magdol et al.¹⁰ was an unselected birth cohort born in Dunedin, New Zealand. Besides sample differences, research design and measurement problems are common in studies on the relationship between child maltreatment and later violent behaviors, and these problems may also explain, in part, why results differ.^{21,22}

Finally, it is important that research on developmental trajectories of violence from child maltreatment victimization to the victimization or perpetration of IPV, should explore whether youth violence perpetration mediates the effect of child maltreatment on IPV perpetration, or whether youth violence victimization mediates the effect of child maltreatment on IPV victimization. Studies linking child maltreatment and IPV have typically not included measures of youth violence, so it is unclear whether risk for IPV perpetration or victimization is a direct consequence of a history of child maltreatment or whether child maltreatment is really a marker for some other, more direct causal variable such as youth violence perpetration or victimization. Antisocial behavior theory proposes that child maltreatment might increase the risk for IPV perpetration through first promoting violent behavior in adolescence, with the aggressive behavior being carried through to adulthood and used against intimate partners.^{4,11,23} When applied to the link between child maltreatment and IPV victimization, learned helplessness theory suggests that exposure to child maltreatment may leave children with a sense of learned helplessness so that they do not develop appropriate skills to escape the violence in adolescence, which, in turn, increases the risk for later IPV victimization.^{24,25} These theories suggest that, for the connection between child maltreatment and IPV perpetration or

victimization, it is important to consider whether youth violence perpetration or victimization plays a role in mediating the impact of child maltreatment on IPV perpetration or victimization.

This study used a U.S. longitudinal and nationally representative sample to examine the direct relationships among three forms of child maltreatment (neglect, physical abuse, and sexual abuse), youth violence perpetration or victimization, and young adult IPV perpetration or victimization. This study expanded the authors' previous work that examined the link between child maltreatment and IPV perpetration with different outcome measures of IPV perpetration.²⁶ This study further examined the indirect effects that child maltreatment has on future IPV perpetration or victimization through the presence of youth violence perpetration or victimization. Finally, this study assessed the impact of gender on these direct and indirect effects, and the role that socioeconomic factors play in the occurrence of violence.

Methods

Conceptual Framework

This study examined two relationships: the relationship among child maltreatment, youth violence perpetration, and IPV perpetration (perpetration link), and the relationship between child maltreatment, youth violence victimization, and IPV victimization (victimization link). Based on previous literature, this study posited that three types of child maltreatment (neglect, physical abuse, and sexual abuse), family background factors, adolescent individual demographic factors, and adolescent community factors could affect the risk of youth violence perpetration. For the relationship between child maltreatment and IPV perpetration, child maltreatment could affect the risk of IPV perpetration directly and/or affect the risk of IPV perpetration indirectly through its effect on youth violence perpetration. Family background factors and young adult individual demographic factors could also directly affect the risk of IPV perpetration. It is posited that the pattern of relationship in the victimization link is similar to that in the perpetration link except that the intervening variable is youth violence victimization instead of youth violence perpetration, and the outcome variable is IPV victimization instead of IPV perpetration.

Participants

Data for this study came from the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative study examining the health-related behaviors and outcomes of adolescents in grades 7 through 12, with follow-up outcomes collected in young adulthood.²⁷ Individual-, family-, school-, and community-level information was collected in two waves between 1994 (Wave I) and 1996 (Wave II). A third wave (Wave III) was conducted among Wave-I respondents in 2001 and 2002 to examine the effects of adolescent experiences and factors on subsequent adult outcomes. Details regarding sampling methods and interviewing techniques are described elsewhere.^{27,28} Wave-III data collection involved

14,322 original Wave-I respondents, aged 18 to 26 at the time of the Wave-III interview. This study used data only for respondents included in both Waves I and III, and who reported being involved in at least one sexual relationship in the 2 years preceding the Wave-III survey. Nonsexual romantic relationships were excluded because the Add Health data do not include information on the ending dates of nonsexual relationships. This reduced the sample for analyses to 10,320 participants. An additional 952 respondents were excluded because they were missing information on outcome variables or covariates, resulting in a final study sample of 9368 participants. Of the study participants, 5179 (55.2%) were female. Data describing self-reported youth violence perpetration or victimization from Wave I of the Add Health study were matched with self-reported IPV perpetration or victimization within young adult sexual relationships and retrospective reports of child maltreatment collected during Wave III.

Measures

The measures used to define the outcomes of interest are described in Table 1. Both IPV and youth violence measures were dichotomized for two reasons. First, the majority of the items used to define IPV and youth violence had a low base rate of occurrence resulting in highly skewed distributions. Second, they allowed for the use of bivariate probit regression that can decompose the effects of child maltreatment on IPV into direct effects and indirect effects in the multivariate setting. IPV perpetration was defined by a respondent answer-

ing "Yes" to any one of three questions in Wave III reflecting physical and sexual violence toward a partner during the preceding 2 years. IPV victimization was defined by a respondent answering "Yes" to any one of three items in Wave III reflecting experience of physical or sexual violence from a partner during the preceding 2 years. Youth violence perpetration was defined by a respondent answering "Yes" to any one of five questions in Wave I reflecting violence committed during the preceding year. Youth violence victimization was defined by a respondent answering "Yes" to any one of four questions in Wave I reflecting violence experienced during the preceding year.

The measures of the three types of child maltreatment were also dichotomized on the basis of respondents' retrospective reports on the time before starting 6th grade (Table 1). The measure of neglect was constructed using two questions from Wave III. Following the work of Leeb et al.,²⁹ neglect was defined by a respondent reporting that care-givers had left him/her home alone as a child more than five times when an adult should have been with the child, or care-givers had not taken care of his/her basic needs at least once. Physical abuse was defined by a report that caregivers had slapped, hit, or kicked respondent more than 5 times.²⁹ Sexual abuse was defined by a report that caregivers had touched respondent in a sexual way, forced the respondent to touch him/her in a sexual way, or forced the respondent to have sexual relations at least once.

Table 1. Measures used to define outcomes

Outcome	Measures	Survey wave
IPV	<p>Perpetration</p> <ol style="list-style-type: none"> 1. Threatened partner with violence, pushed, shoved, or threw something at partner that could hurt. 2. Slapped, hit, or kicked partner. 3. Insisted on or made partner have sexual relations with me when [he/she] didn't want to. <p>Victimization</p> <ol style="list-style-type: none"> 1. Partner threatened me with violence, pushed, shoved, or threw something at me that could hurt. 2. Partner slapped, hit, or kicked me. 3. Partner insisted on or made me have sexual relations with him/her when I didn't want to. 	III
Youth violence	<p>Perpetration</p> <ol style="list-style-type: none"> 1. Took part in a group fight. 2. Hurt someone badly enough to need bandages or care from a doctor or nurse. 3. Used or threatened to use a weapon to get something from someone. 4. Pulled a knife or gun on someone. 5. Shot or stabbed someone. <p>Victimization</p> <ol style="list-style-type: none"> 1. I was jumped. 2. Someone pulled a knife or gun on me. 3. Someone shot me. 4. Someone cut or stabbed me. 	I
Child maltreatment—neglect	<ol style="list-style-type: none"> 1. How often had your parents or other adult care-givers left you home alone when an adult should have been with you? 2. How often had your parents or other adult care-givers not taken care of your basic needs, such as keeping you clean or providing food or clothing? 	III
Child maltreatment—physical abuse	<ol style="list-style-type: none"> 1. How often had your parents or other adult care-givers slapped, hit, or kicked you? 	III
Child maltreatment—sexual abuse	<ol style="list-style-type: none"> 1. How often had one of your parents or other adult care-givers touched you in a sexual way, forced you to touch him or her in a sexual way, or forced you to have sexual relations? 	III

IPV, intimate partner violence.

To study the link between child maltreatment and youth violence perpetration or victimization, other control variables included adolescent individual demographic factors (age, age squared, gender, and race/ethnicity), community factors, and family background characteristics found to be related to child maltreatment and/or later violent behaviors in previous research.^{16,17,30–32} Family background characteristics included parent (mother or the main care-giver) education, family poverty, and whether the participant was from a two-parent family.

Previous research suggests that neighborhood characteristics, measured independently of the characteristics of the individuals, contribute to the explanation of individual youth violence behavior.^{16,17,30} Two community variables were included as covariates in the study. First, an index of community economic disadvantage (CED) was constructed using the following three county-level items drawn from the 1990 U.S. Census: proportion of people with income below poverty level in 1989, proportion aged >25 without high school diploma or equivalency, and unemployment rate. Each item was standardized individually and then the mean was used to construct the CED index. The overall Cronbach alpha for this scale is 0.79. Second, following Levitt's work,³³ the study also included the total number of crimes in the county per 100,000 population to control for the impact of omitted factors that may influence youth violence.

To examine the link between child maltreatment and IPV perpetration or victimization, in addition to controlling for youth violence perpetration or victimization, other covariates included individual demographic characteristics during young adulthood (age, age squared, gender, race/ethnicity, marital status, school enrollment, and employment status) and family background characteristics.

Statistical Analyses

Following Greene's work,^{34,35} bivariate probit regression models were used to analyze the developmental relationships among child maltreatment, youth violence, and IPV. In these models, youth violence perpetration (or youth violence victimization) was not only a dependent variable on its own, but also an independent variable for IPV perpetration (or IPV victimization), which allowed testing for indirect effects. The recursive simultaneous equation models were estimated by maximum likelihood methods. Direct effects and/or indirect effects of a variable which might be a determinant of youth violence and/or IPV perpetration or victimization were calculated based on the formulas appearing in Greene.³⁴ In Greene's paper,³⁴ full details are provided on how the coefficients are scaled to produce the marginal effects (direct and indirect effects) for both continuous and binary variables. The direct and indirect effects of a given variable were evaluated at sample means. Bootstrapping techniques were used to estimate the standard errors for all indirect effects. All analyses were conducted with STATA SE, version 9 (Stata Corp, College Station TX, 2005).

To test the significance of gender, this study included the interaction terms between the gender dummy and each predictor variable for IPV and youth violence perpetration (or victimization) in the pooled regressions, and then tested

the hypothesis that these interactions were jointly significantly different from zero.³⁵

Results

Rates (in proportion forms) with 95% confidence intervals for all dichotomous variables and means with standard deviations for all continuous variables are presented in Table 2. All statistics listed in Table 2 and all of the following analyses used sample weights to adjust for stratification and over-sampling of under-represented groups. After the adjustment of sample weights, the study sample had very similar gender and racial/ethnic distributions to the nation. Table 2 shows a larger percentage of females than males reported both IPV perpetration and victimization, while a larger percentage of males than females reported both youth violence perpetration and victimization. These numbers are consistent with evidence suggesting that females perpetrate some forms of violence at rates proportional or higher to males.^{10,36–39} In terms of child maltreatment, 21.1% and 15.3% of males and females, respectively, reported having experienced neglect during childhood. For both genders, approximately 8% reported being physically abused and 4% reported sexual abuse during their childhood.

Bivariate Probit Models

First, the significance of a gender effect in the perpetration link and victimization link was tested. Results indicated that the regression models (results not shown) for males and females were systematically different for both the perpetration link ($\chi^2=28$, $df=15$, $p<0.05$) and the victimization link ($\chi^2=25.9$, $df=15$, $p<0.05$). Therefore, subsequent regressions were estimated separately for males and females. This study also considered the possibility that the variables used in the models might interact with each other. Because regression results revealed that none of the interactions among these factors were significant for either the perpetration link or the victimization link (results available upon request), the subsequent regression models did not include any interaction terms.

The estimated marginal effects (direct effects and indirect effects) of the main predictor variables for IPV and youth violence perpetration or victimization are presented in Tables 3 and 4. The marginal effects of a predictor variable refer to changes in probabilities of an outcome event given a unit change in a continuous predictor variable, or change of state in a categorical variable under consideration. For example, for females, the direct effect of neglect on IPV perpetration 0.08 indicates that being neglected as a child directly increases the likelihood of IPV perpetration by 8%, and the indirect effect 0.007 indicates that being neglected as a child indirectly increases the likelihood of IPV

Table 2. Descriptive statistics for sample

Variable		Female		Male	
		Rate/mean	CI/SD	Rate/mean	CI/SD
Independent variables	IPV perpetration (%)	31.8	30.5–33.1	17.6	16.4–18.7
	IPV victimization (%)	27.8	26.6–29.1	25.7	24.4–27.1
	Youth violence perpetration (%)	23.4	22.2–24.5	37.8	36.3–39.3
	Youth violence victimization (%)	10.6	9.8–11.5	27.5	26.2–28.9
Child maltreatment	Neglected (%)	15.3	14.3–16.3	21.1	19.8–22.4
	Physically abused (%)	8.3	7.5–9.0	8.0	7.1–8.8
	Sexually abused (%)	4.3	3.7–4.8	4.5	3.8–5.1
Demographic characteristics	White (%)	71.6	70.4–72.9	70.5	69.1–72.0
	Black (%)	14.2	13.2–15.2	13.4	12.3–14.4
	Asian (%)	2.5	2.0–2.9	2.4	1.9–2.9
	Native (%)	0.5	0.3–0.6	1.0	0.7–1.3
	Hispanic (%)	10.5	9.7–11.4	12.0	11.0–13.0
	Adolescent demographic variables				
Age in Wave 1	15.29	1.75	15.50	1.82	
Young adult demographic variables					
Age in Wave 3	21.67	1.78	21.89	1.86	
Married (%)	23.1	21.9–24.2	16.1	15.0–17.3	
School enrollment (%)	39.3	37.9–40.6	33.2	31.7–34.6	
Employed (%)	68.6	67.3–69.9	74.3	72.9–75.7	
Community factors during adolescence	Economic disadvantage index ^a	–0.029	0.911	–0.049	0.897
	County crime rate (per 100,000 population)	5585.88	2661.99	5568.87	2596.27
Family background factors	Parent education ^b	3.61	1.22	3.66	1.24
	Family poverty (%) ^c	21.6	20.4–22.7	21.5	20.2–22.8
	Two-parent family (%)	73.8	72.6–75.0	75.2	73.9–76.6

Note: Rate (in proportion form) with 95% confidence interval (CI) is presented for a dichotomous variable, while mean with standard deviation (SD) is presented for a continuous variable.

^aThe community economic disadvantage index was constructed using three county-level items drawn from the 1990 U.S. Census. For details, see text.

^bParent education was divided into six categories (coded 1 to 6): 8th grade or less (includes never went to school), more than 8th grade but did not graduate from high school, high school graduate (or equivalent), some post-high school training/college, college graduate, and postgraduate or professional training.

^cA dichotomous family poverty indicator was constructed using the household income measure such that a value of 1 represented annual household income of \leq \$20,000, and zero otherwise.

CI, confidence interval; IPV, intimate partner violence; SD, standard deviation.

perpetration by 0.7% by increasing the likelihood of youth violence perpetration.

For perpetration (Table 3), childhood physical abuse and childhood neglect were significant predictors of youth violence perpetration for both genders; however, they were more significantly predictive of youth violence perpetration for males than for females. Family poverty and low levels of parent education significantly increased the risk of perpetrating youth violence for females, while for males, only low parent education significantly increased the likelihood of youth violence perpetration. Living in a high-crime neighborhood significantly increased the risk of perpetrating youth violence for males, but this effect was not significant for females.

Significant direct predictors of IPV perpetration in males were youth violence perpetration and childhood sexual abuse, while for females, youth violence perpetration, physical abuse, and childhood neglect were significant direct predictors. For both genders, child-

hood neglect had a significant indirect effect on IPV perpetration through the presence of youth violence perpetration. Childhood physical abuse had a significant indirect effect on IPV perpetration for males; however, for females, the indirect effect was only marginally significant ($p < 0.10$). Almost no family background characteristics included in this study were directly and significantly associated with IPV perpetration for either males or females; except that for males, low parent education was directly and significantly associated with IPV perpetration.

For victimization (Table 4), child neglect was a significant predictor of youth violence victimization for males. For females, there were no child maltreatment outcomes that significantly predicted youth violence victimization. No family background characteristics were significantly associated with youth violence victimization for females. For males, however, being from a two-parent household significantly decreased the risk of

Table 3. Estimated direct and indirect effects on IPV and youth violence perpetration by gender

Variables	Youth violence perpetration ^a Marginal effects (robust SE)		IPV perpetration ^b Probit regression coefficient (robust SE)			
	Females	Males	Females		Males	
	Direct (total)	Direct (total)	Direct	Indirect	Direct	Indirect
Youth violence perpetration ^c	—	—	0.0949** (0.0217)	—	0.0772** (0.0213)	—
Neglected ^c	0.0662* (0.0273)	0.1025** (0.0324)	0.0795* (0.0333)	0.0070* (0.0031)	0.0037 (0.0240)	0.0116** (0.0033)
Physically abused ^c	0.0655* (0.0345)	0.1188* (0.0475)	0.0971* (0.0426)	0.0070 (0.0040)	0.0042 (0.0370)	0.0092* (0.0047)
Sexually abused ^c	-0.0120 (0.0443)	0.0370 (0.0694)	0.1025 (0.0588)	-0.0010 (0.0042)	0.1695** (0.0683)	0.0020 (0.0084)
Parent education	-0.0324** (0.0081)	-0.0311** (0.0111)	-0.0152 (0.0094)	-0.0031* (0.0012)	-0.0177* (0.0080)	-0.0024* (0.0011)
Family poverty ^c	0.0743** (0.0298)	-0.0341 (0.0405)	-0.0082 (0.0233)	0.0070* (0.0034)	0.0151 (0.0237)	-0.0029 (0.0031)
Two-parent family ^c	0.0010 (0.0192)	-0.0349 (0.0347)	-0.0290 (0.0257)	-0.0001 (0.0022)	-0.0026 (0.0234)	-0.0027 (0.0028)
Married ^c	—	—	-0.0069 (0.0229)	—	0.0441 (0.0268)	—
School enrollment ^c	—	—	-0.0316 (0.0218)	—	-0.038 (0.0194)	—
Employed ^c	—	—	0.0228 (0.0195)	—	-0.0139 (0.0233)	—
Economic disadvantage index	-0.0138 (0.0093)	0.0043 (0.0107)	—	-0.0013 (0.0010)	—	0.0003 (0.0010)
County crime rate (per 100 population)	0.0027 (0.0042)	0.0109* (0.0047)	—	0.0003 (0.0004)	—	0.0008 (0.0005)

Note: All results were adjusted for age and race/ethnicity. Bootstrap estimates of the standard errors for indirect effects came from 1000 bootstrap samples.

* $p < 0.05$; ** $p < 0.01$ (all bolded).

^aThe effects of predictor variables on youth violence perpetration are not only direct but also total effects. For example, for males, the direct (or total) effect of neglect on youth violence perpetration 0.1025 indicates that controlling for other variables, being neglected as a child increases the likelihood of youth violence perpetration by 10.25%.

^bThe total effect of each predictor variable on IPV perpetration is decomposed into direct effect and indirect effect. The direct effect represents the effect of a predictor variable on IPV perpetration, not through the presence of youth violence perpetration. The indirect effect represents the effect of a predictor variable on IPV perpetration through the presence of youth violence perpetration. For example, for females, the direct effect of neglect on IPV perpetration 0.0795 indicates that being neglected as a child directly increases the likelihood of IPV perpetration by 7.95%, and the indirect effect 0.007 indicates that being neglected as a child indirectly increases the likelihood of IPV perpetration by 0.7% by increasing the likelihood of youth violence perpetration.

^cThe reference category for each dichotomous variable is the absence of the condition (e.g., neglected compared to not neglected; married compared to not married).

IPV, intimate partner violence; SE, standard error.

Table 4. Estimated direct and indirect effects on IPV and youth violence victimization by gender

Variables	Youth violence victimization ^a Marginal effects (robust SE)		IPV victimization ^b Marginal effects (robust SE)			
	Females	Males	Females		Males	
	Direct (total)	Direct (total)	Direct	Indirect	Direct	Indirect
Youth violence victimization ^c	—	—	0.0442 (0.0305)	—	0.0706** (0.0254)	—
Neglected ^c	0.0242 (0.0177)	0.0999** (0.0336)	0.0439 (0.0305)	0.0015 (0.0013)	0.0004 (0.0289)	0.0072* (0.0034)
Physically abused ^c	0.0253 (0.0251)	0.0189 (0.0417)	0.0634 (0.0388)	0.0017 (0.0016)	0.0163 (0.0409)	0.0013 (0.0034)
Sexually abused ^c	0.0119 (0.0268)	0.0455 (0.0638)	0.0660 (0.0509)	0.0011 (0.0018)	0.1174 (0.0677)	0.0030 (0.0059)
Parent education	-0.0094 (0.0061)	-0.0177 (0.0102)	-0.0030 (0.0095)	-0.0004 (0.0005)	-0.0115 (0.0091)	-0.0013 (0.0009)
Family poverty ^c	0.0254 (0.0207)	-0.0084 (0.0347)	0.0046 (0.0237)	0.0012 (0.0014)	0.0453 (0.0289)	-0.0010 (0.0024)
Two-parent family ^c	-0.0218 (0.0143)	-0.0634* (0.0289)	-0.0200 (0.0249)	-0.0012 (0.0013)	0.0190 (0.0256)	-0.0046 (0.0027)
Married ^c	—	—	-0.0495* (0.0238)	—	0.0451 (0.0306)	—
School enrollment ^c	—	—	-0.0630** (0.0185)	—	-0.0569* (0.0257)	—
Employed ^c	—	—	0.0009 (0.0186)	—	-0.0471 (0.0276)	—
Economic disadvantage index	-0.0050 (0.0074)	0.0275* (0.0131)	—	-0.0002 (0.0004)	—	0.0020 (0.0012)
County crime rate (per 100 population)	0.0051 (0.0027)	0.0087 (0.0048)	—	0.0002 (0.0002)	—	0.0006 (0.0004)

Note: All results were adjusted for age and race/ethnicity. Bootstrap estimates of the standard errors for indirect effects came from 1000 bootstrap samples.

* $p < 0.05$; ** $p < 0.01$ (all bolded).

^aThe effects of predictor variables on youth violence victimization are not only direct but also total effects. For example, for males, the direct (or total) effect of neglect on youth violence victimization 0.10 indicates that controlling for other variables, being neglected as a child increases the likelihood of youth violence victimization by 10%.

^bThe total effect of each predictor variable on IPV victimization is decomposed into direct effect and indirect effect. The direct effect represents the effect of a predictor variable on IPV victimization, not through the presence of youth violence victimization. The indirect effect represents the effect of a predictor variable on IPV victimization through the presence of youth violence victimization. For example, for females, the direct effect of neglect on IPV victimization 0.0004 indicates that being neglected as a child directly increases the likelihood of IPV victimization by 0.04%, and the indirect effect 0.0072 indicates that being neglected as a child indirectly increases the likelihood of IPV victimization by 0.72% by increasing the likelihood of youth violence victimization.

^cThe reference category for each dichotomous variable is the absence of the condition (e.g., neglected compared to not neglected; married compared to not married). IPV, intimate partner violence; SE, standard error.

being a victim of youth violence, and living in an economically disadvantaged area increased the risk.

Youth violence victimization was significantly predictive of IPV victimization for males, but not for females. No child maltreatment outcomes were significant direct predictors of IPV victimizations for either gender. There were no child maltreatment outcomes that had significant indirect effects on IPV victimization through the presence of youth violence victimization for females. For males, only childhood neglect had a significant indirect effect on IPV victimization. Being married was significantly associated with the higher risk of IPV victimization for females, but not for males. School enrollment significantly decreased the risk of IPV victimization for both genders.

Discussion

Using a U.S. nationally representative sample, the present results demonstrate that, in general, victims of child maltreatment are more likely to perpetrate future violence in the form of youth violence and IPV, while there is less of an effect of child maltreatment on future victimization of youth violence or IPV. These findings reinforce the commonly held views that preventing child maltreatment may be key to preventing the perpetration of youth violence, and that interventions targeting youth violence may also serve to prevent later IPV perpetration or concurrent dating violence.^{4-8,11,12}

Although child maltreatment was found to be connected to youth violence and IPV perpetration, the direct and indirect effects varied by type of child maltreatment experienced. Childhood neglect and physical abuse were significantly associated with youth violence perpetration for both genders. The indirect effects of neglect/physical abuse on IPV perpetration through their effects on youth violence perpetration were also significant for both genders, supporting the theory that antisocial behavior may partly explain the developmental relationship between child maltreatment and later violent behaviors for both genders.^{4,11} After controlling for youth violence perpetration, neglect/physical abuse remained a strong, direct predictor of IPV perpetration for females but not for males. These results support the findings of Magdol et al.¹⁰ that the link between child maltreatment and IPV perpetration is stronger for females than for males. The effects of childhood sexual abuse on future perpetration of violence differ from those for neglect/physical abuse. Childhood sexual abuse was not significantly associated with youth violence perpetration either for males or females. And while childhood sexual abuse was the strongest predictor of IPV perpetration for males, it was not significant for females at all. Although previous research suggests that prevention of IPV perpetration should begin as early as adolescence,^{10,40} findings from this study suggest that chil-

dren who have been maltreated, especially girls who are victims of physical abuse/neglect and boys who are victims of sexual abuse, may be good candidates for IPV prevention.

The study found less of an effect of child maltreatment on future youth violence or IPV victimization. For example, only males experiencing child neglect were at increased risk for IPV victimization, but only through the effect of increased risk for youth violence victimization which in turn increased the risk for IPV victimization. However, youth violence victimization by itself was found to be a significant independent predictor of IPV victimization for males. Thus, preventing youth violence victimization may be a key to preventing future IPV victimization for males.

There are a number of limitations in this study. First, as an analysis of secondary data, this study is limited in the number of survey questions available to define child maltreatment. For example, physical abuse is defined by one question, neglect by two questions, and sexual abuse by one question. As such, there could exist wide exposure variance within each category of child maltreatment that is not accounted for in the model. However, many other surveys and subsequent studies on retrospective reports of child maltreatment are similarly limited,^{6,19,20,41-45} and researchers have argued that using a few questions instead of a large protocol to define child maltreatment is intended to maximize specificity (few false positives) at the expense of possibly low sensitivity (high rates of false negatives).^{6,43,46} Low sensitivity does not significantly bias statistical estimates of rare phenomena in a general population study, although it does reduce statistical power.^{43,46} But the limitation does suggest that caution should be taken in interpreting these results, and that future research is needed to validate these results with a more complete assessment of child maltreatment.

Other definitional concerns include the retrospective nature of the child maltreatment reports, which may underestimate the prevalence of child maltreatment. Individuals may not report child maltreatment due to memory or social desirability biases. Ideally, child maltreatment experiences would be assessed throughout childhood. However, this design faces some insurmountable practical difficulties. For instance, since child maltreatment is generally intrafamilial, there are clear difficulties in assessing abuse on the basis of reports of family members or children. Next, even if such reports could be collected in a valid way, disclosure of child maltreatment during childhood would pose severe ethical problems, since investigators would be obligated to report or intervene to reduce child maltreatment.⁷ Due to these ethical issues, retrospective reports are commonly used to measure child maltreatment. Furthermore, evidence indicates that self-report validity is increased when data are collected anonymously as was done in this survey.⁴⁷ Additionally,

the Add Health study omits any questions about childhood experience of sexual abuse by any people other than the participant's parents or other adult caregivers, thereby excluding a measure of sexual abuse by a stranger.

While this study has controlled the connections between child maltreatment and later violent behaviors for a wide range of confounding factors, the possibility remains that the apparent links between child maltreatment and later violent behaviors may be due to the effects of uncontrolled confounding factors. One factor that the Add Health Study did not ask but which clearly requires further examination is the role of childhood exposure to IPV in these associations, because witnessing IPV may be related to exposure to child maltreatment and later youth violence and IPV.

Another limitation is the inclusion of IPV perpetration or victimization that occurs only in sexual relationships. Excluding nonsexual romantic relationships may alter the results; however, this should be minimal as 86% of romantic relationships were defined as sexual relationships in the Add Health data. There is further potential for selection bias in that the study focuses on young adults who reported sexual relationships in the preceding 2 years. However, the study examined the distribution of child maltreatment and the perpetration or victimization of youth violence between those who reported sexual relationships and those who did not, and found that the percent of those reporting child maltreatment and youth violence perpetration or victimization were approximately equal (no statistically significant difference). Moreover, participants who remained in the sample did not differ substantially from those who were excluded with respect to average age (21.8 years vs 22.0 years), gender (51.7% female vs 51.2% female), and race/ethnicity (71% white vs 68% white).

Despite these limitations, the study presents strong evidence of the relationship between child maltreatment, youth violence perpetration, and IPV perpetration, and to a lesser extent, evidence of a relationship among child maltreatment, youth violence victimization, and IPV victimization. The study results indicate current trends in prevention efforts that focus on perpetration are appropriate given that the developmental association is stronger in that link. The results also suggest that prevention efforts should occur early in life and should focus on multiple types of violence that occur in the developmental trajectory. It is not enough to focus exclusively on preventing (or treating) one form of violence in adolescence, for example, without recognizing that this population may already have increased exposure to violence as a child that will carry through to adulthood if not addressed accordingly.

There are other important public health implications as well. Because there are clear direct and/or indirect

links among child maltreatment, youth violence, and IPV, this suggests that there are even more health benefits for prevention programs and policies aimed at reducing child maltreatment beyond the health benefits of reducing child maltreatment independent of youth violence and IPV. From an economic viewpoint, this means that assessing the lifetime benefits of preventing child maltreatment would necessarily include the decreased costs associated with the reduction in future youth violence and IPV. These study results provide the necessary probabilities that could be used in future models to assess these lifetime benefits.

As well, these study findings indicate that gender differences not only exist for the developmental relationship between child maltreatment and future violence perpetration or victimization, but also exist for the role that socioeconomic factors have on future youth violence and IPV perpetration or victimization. Thus, it may be important to account for gender differences when designing the optimal time and setting for violence prevention programs. Without exception, an integrative approach to preventing violence is critical for stopping the developmental trajectory of violence.

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