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# Adolescent Violence Perpetration: Associations With Multiple Types of Adverse Childhood Experiences



**WHAT'S KNOWN ON THIS SUBJECT:** Extensive research has documented associations between childhood physical and sexual abuse and adolescent delinquency and some types of self-directed violence.



**WHAT THIS STUDY ADDS:** We examined relationships between multiple types of adverse childhood experiences, including abuse and household dysfunction, and a spectrum of adolescent violence-related behaviors. We have documented the co-occurrence of adverse experiences and a cumulative relationship with adolescent violence perpetration.

## abstract

**OBJECTIVE:** Adverse childhood experiences are associated with significant functional impairment and life lost in adolescence and adulthood. This study identified relationships between multiple types of adverse events and distinct categories of adolescent violence perpetration.

**METHODS:** Data are from 136 549 students in the 6th, 9th, and 12th grades who responded to the 2007 Minnesota Student Survey, an anonymous, self-report survey examining youth health behaviors and perceptions, characteristics of primary socializing domains, and youth engagement. Linear and logistic regression models were used to determine if 6 types of adverse experiences including physical abuse, sexual abuse by family and/or other persons, witnessing abuse, and household dysfunction caused by family alcohol and/or drug use were significantly associated with risk of adolescent violence perpetration after adjustment for demographic covariates. An adverse-events score was entered into regression models to test for a dose-response relationship between the event score and violence outcomes. All analyses were stratified according to gender.

**RESULTS:** More than 1 in 4 youth (28.9%) reported at least 1 adverse childhood experience. The most commonly reported adverse experience was alcohol abuse by a household family member that caused problems. Each type of adverse childhood experience was significantly associated with adolescent interpersonal violence perpetration (delinquency, bullying, physical fighting, dating violence, weapon-carrying on school property) and self-directed violence (self-mutilatory behavior, suicidal ideation, and suicide attempt). For each additional type of adverse event reported by youth, the risk of violence perpetration increased 35% to 144%.

**CONCLUSIONS:** Multiple types of adverse childhood experiences should be considered as risk factors for a spectrum of violence-related outcomes during adolescence. Providers and advocates should be aware of the interrelatedness and cumulative impact of adverse-event types. Study findings support broadening the current discourse on types of adverse events when considering pathways from child maltreatment to adolescent perpetration of delinquent and violent outcomes. *Pediatrics* 2010;125:e778–e786

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### KEY WORDS

child adversity, child maltreatment, adolescent, delinquent behavior, violence-related outcomes

### ABBREVIATION

MSS—Minnesota Student Survey

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Youth development within stable, nurturing contexts that facilitate achievement of trust, optimism, and meaning in life are critical for setting the stage for healthy self-awareness and self-care behavior, future orientation and goal achievement, and successful transition into young adulthood. Threats to this process through child maltreatment occur far too often in the United States. In a 2005 national study, just over 1 in 7 youth between the ages of 2 and 17 years had been exposed to adverse experiences including physical, sexual, and emotional abuse, neglect, and/or family abduction/custodial interference.<sup>1</sup>

Studies in the last decade have begun to elucidate the effects of adverse childhood experiences on dysfunctional developmental trajectories and life lost.<sup>2,3</sup> There is an increasing body of evidence that documents the association of youth interpersonal experience and witness of abuse on increasing risk for violence perpetration in adolescence and adulthood.<sup>2-7</sup> The literature offers plausible pathways implicating abusive environments in facilitating alteration of normal development and potentiating development of psychopathology.<sup>8</sup> An ecological perspective identifies a transactional relationship between youth and context in which the overall balance between potentiating and compensatory mechanisms is linked to the probability of a young person displaying behavioral competence or failure of child adaptation.<sup>9</sup> Evidence exists for the contribution of genetic influence on susceptibility to environmental stressors and a propensity to poor mental health or abnormal behavior in the context of child maltreatment.<sup>10-12</sup> Biophysical pathways postulate a common denominator of stress physiology yielding damage to cognitive development, manifesting as global and stable attributions of negative life events to as-

pects of future physical and mental health function.<sup>13</sup> Alternate pathways for brain development and corresponding behavioral trajectories are postulated to result from the stress of adverse experiences that originally served to facilitate survival of physical and/or emotional threats but, later, do not provide for optimal development that makes possible continued existence and success from a general, life-course perspective.<sup>14</sup>

Empiric research has focused on relationships between physical and/or sexual abuse and extreme types of self-directed violence including suicidal ideation and suicide attempts among youth<sup>15-17</sup> as well as adolescent and emerging adult outcomes of violent arrest petitions or composite assessments of delinquent behavior.<sup>18-21</sup> Physical and sexual abuse have also been associated with adolescent weapon-carrying.<sup>22-24</sup> However, the magnitude of independent relationships between multiple types of adverse childhood experiences and risk of perpetration of distinct categories of violence-related behavior, and the combined impact of experiencing multiple types of adverse events and risk of violence perpetration in adolescence, have not been well studied. The recognition and understanding of the relationships between multiple types of adverse events, many of which go unreported, and poor functional outcomes including specific types of violence-related involvement will better inform abuse/neglect and violence-perpetration prevention, screening, and intervention efforts.

We used data from the 2007 Minnesota Student Survey (MSS)\* to evaluate the relationship between 6 different ad-

verse childhood experiences including types of abuse and household dysfunction and risk for a spectrum of violence perpetration in adolescence including interpersonal violence and self-directed violence. We hypothesized that significant relationships would exist between each type of adverse childhood experience and outcomes of adolescent delinquency and violence perpetration and that the relationship between an adverse-event score and risk of violence-related perpetration would be cumulative.

## METHODS

### Study Design and Population

Data are from the 2007 MSS, an anonymous, population-based questionnaire administered every 3 years to 6th-, 9th-, and 12th-graders in regular public schools, charter schools, and tribal schools ( $N = 136\,549$ ). Management of the MSS is a collaboration between Minnesota schools and 4 state agencies (the Minnesota departments of education, human services, health, and public safety). The MSS is a paper-and-pencil survey that examines a broad range of youth concerns, including health promotion and risk behaviors, communication and connections within primary socializing contexts, and academic achievement and future aspirations.

Overall, during the 2007 survey administration, 91% of school districts participated, including 81% of all Minnesota 6th-grade students, 76% of all 9th-grade students, and 58% of all 12th-grade students.<sup>25</sup> School districts maintain discretion as to the use of active versus passive parental consent; most districts use passive consent. Parents are informed of the date of the survey in advance of administration. Participation is voluntary; students provide assent. Survey administration occurs during 1 class period. Additional details concerning survey meth-

\* The MSS was provided by public school students in Minnesota via local public school districts and managed by the 2007 MSS Interagency Team, which consisted of members from the Minnesota departments of education, health, human services, and public safety.

odology have been published elsewhere.<sup>25</sup> Our study was approved by the University of Minnesota Human Subjects Institutional Review Board and the Minnesota Department of Education.

### Measures

The identification of adverse childhood experiences in this study was informed by the Centers for Disease Control and Prevention concept of toxic stress and its potential for cumulative influence resulting in poor physical and mental health

across the life span.<sup>13</sup> Guided by a framework developed through the Adverse Childhood Experiences Study,<sup>2,3,7,26</sup> 6 questions from the MSS were identified as representative of adverse childhood events. The 6 questions were organized into 2 major categories: abuse and household dysfunction (Table 1). An adverse-events score was created to reflect a count of the total number of different types of experiences each youth reported (range: 0 [unexposed] to 6 [exposed to all forms]).

Violence-related perpetration was defined by 8 behavioral constructs: delinquent behavior, bullying, physical fighting, dating violence, weapon-carrying on school property, and self-directed violence (self-mutilation, suicidal ideation, suicide attempt) (Table 1). Because delinquent behavior has been linked to violence involvement,<sup>27</sup> and interpersonal and self-directed violence are interconnected on the basis of mutual risk and protective factors,<sup>5,6,28</sup> the outcomes included in this

**TABLE 1** Adverse Childhood Events and Violence-Perpetration Outcomes: Frequencies According to Gender

Variable	Girls	Boys	Total
Questions of adverse childhood experiences, <i>n</i> (%)			
Abuse			
Has any adult in your household ever hit you so hard or so often that you had marks or were afraid of that person? (1) <sup>b</sup>	7670 (11.6)	5817 (9.1)	13 487 (10.4)
Has any older or stronger member of your family ever touched you sexually or had you touch them sexually? (1) <sup>b</sup>	2381 (3.6)	956 (1.5)	3337 (2.6)
Has any adult or other person outside the family ever touched you sexually against your wishes or forced you to touch them sexually? (1) <sup>b</sup>	4872 (7.4)	1734 (2.7)	6606 (5.1)
Household dysfunction			
Has alcohol use by any family member repeatedly caused family, health, job, or legal problems? (1) <sup>b</sup>	11 135 (16.8)	7778 (12.1)	18 913 (14.5)
Has drug use by any family member repeatedly caused family, health, job, or legal problems? (1) <sup>b</sup>	7509 (11.4)	5593 (8.7)	13 102 (10.1)
Has anyone in your family ever hit anyone else in the family so hard or so often that they had marks or were afraid of that person? (1) <sup>b</sup>	8802 (13.3)	6337 (9.9)	15 139 (11.6)
No. (score) of adverse childhood events			
0	44 669 (66.7)	49 101 (75.5)	93 770 (71.0)
1	10 374 (15.5)	8283 (12.7)	18 657 (14.1)
2	6711 (10)	4823 (7.4)	11 534 (8.7)
3	3039 (4.5)	1694 (2.6)	4733 (3.6)
≥4	2148 (3.2)	1148 (1.8)	3296 (2.5)
Violence-perpetration outcomes			
Delinquent behaviors: past-month truancy, past-year running from home, vandalism, theft from store, gambling <sup>a</sup> : online, casino, lottery tickets, betting on sports, betting on games of personal skill, playing cards for money (summed, range: 0–10) (5), mean (SD)	1.0 (1.4)	1.8 (2.1)	1.4 (1.9)
Bullying: past-month teasing another student in a hurtful way and/or exclusion of another student from friendship or activities (1), <i>n</i> (%) <sup>b</sup>	28 625 (42.2)	31 751 (47.5)	60 376 (44.8)
Physical fighting: past-year hit or beat up another person (1), <i>n</i> (%) <sup>b</sup>	10 555 (15.9)	19 707 (30.7)	30 262 (23.2)
Dating violence: any history of threats of harm, physically or sexually hurting someone going out with (1), <i>n</i> (%) <sup>a,b</sup>	1585 (3.7)	1227 (3.0)	2812 (3.4)
Weapon-carrying: past-month carrying a gun or other weapons on school property (2), <i>n</i> (%) <sup>b</sup>	1801 (2.6)	5869 (8.7)	7670 (5.7)
Self-harm: any history of hurting self on purpose (cutting, burns, bruises) (1), <i>n</i> (%) <sup>b</sup>	14 176 (21.3)	8486 (13.2)	22 662 (17.3)
Suicidal ideation: any history of contemplating suicide (1), <i>n</i> (%) <sup>b</sup>	17 357 (26.3)	11 763 (18.4)	29 120 (22.4)
Suicide attempt: any history of suicide attempt (1), <i>n</i> (%) <sup>b</sup>	4667 (7.1)	2999 (4.7)	7666 (5.9)

Shown in parentheses are the number of items that constituted variables.

<sup>a</sup> Question(s) asked of 9th- and 12th-graders only.

<sup>b</sup> Dichotomous construct.

**TABLE 2** Percentages for Overlap of Adverse Childhood Events

Adverse Childhood Event	Physical Abuse by Household Adult, %	Sexual Abuse by Family Member, %	Sexual Abuse by Non-Family Member, %	Alcohol Use by Family Member Caused Problem, %	Drug Use by Family Member Caused Problem, %	Witnessing Physical Abuse by Family Member on Another Family Member, %
Physical abuse by household adult	100	10.7	18	35.5	27	60.5
Sexual abuse by family member	43.3	100	49.1	42.4	36.8	46.4
Sexual abuse by non-family member	36.8	24.8	100	37.3	29.9	36.2
Alcohol use by family member caused problem	25.3	7.5	13	100	44.9	30.2
Drug use by family member caused problem	27.8	9.4	15.1	64.8	100	34.2
Witnessing physical abuse by family member on another family member	53.9	10.2	15.8	37.8	29.6	100

The denominator for each value corresponds to the adverse-childhood-event row frequency; the numerator for each value corresponds to the adverse-childhood-event column frequency.

study represent a range of violence-related behaviors for young people.

Demographic variables used as covariates in multivariate analyses were age, race/ethnicity, receipt of free or reduced-price lunch at school, family structure, and region. Age was applied as a continuous variable. Race/ethnicity was defined as African/African American/black, white, Latin American/Hispanic (Puerto Rican, Mexican, or other Latin American), Asian American/Pacific Islander (Cambodian, Hmong, Korean, Laotian, Vietnamese), American Indian/Native American, mixed race/ethnicity (all youth marking more than 1 descriptive category), and other (youth responding “don’t know” to race/ethnic description). Youth replied yes or no to whether they received free or reduced-price lunch. Family structure was defined as youth living with 2 biological parents versus any other adults as a family unit. Region delineated the 7-county Twin Cities metropolitan area versus greater Minnesota.

### Data Analysis

Univariate statistics were used to identify characteristics of the study sample, including frequencies of adverse childhood events and nonfatal violence-related outcomes. To account for differences in patterns of abuse victimization as well as differences in violence perpetration and associated

risk factors,<sup>5,6,29</sup> all analyses were stratified according to gender. Multivariate linear and logistic regression was conducted to determine if the presence of each type of adverse childhood experience was significantly associated with risk of perpetration of each violence-related outcome after adjustment for demographic covariates. Recognizing the importance of considering the impact of multiple adverse experiences,<sup>3,26</sup> the number of adverse experiences as a single ordinal variable (0, 1, 2, 3, or  $\geq 4$ ) was entered into separate linear and logistic regression models for each violence-related outcome, adjusting for demographic covariates. The adverse-events score was entered into linear and logistic regression models with adjustment for demographic constructs to test for a dose-response relationship between the event score and each outcome of violence perpetration. All multivariate analyses were performed by using Stata 10.0 IC (Stata Corp, College Station, TX).

## RESULTS

### Characteristics of the Study Sample

Twenty-nine percent of the youth identified at least 1 adverse childhood experience (Table 1). The most commonly reported experience was alcohol abuse by a household member

that caused problems, identified by 14.5% of the youth (Table 1). Report of 1 type of adverse event was often not an isolated occurrence (Table 2). Girls more commonly reported all types of adverse events (Table 1). Demographic covariates were significantly related to childhood experiences of abuse and household dysfunction (Table 3). Using white youth as the referent group, Latin American/Hispanic youth, American Indian/Native American youth, youth of mixed race/ethnicity, and youth reporting “don’t know” to the question of race/ethnic description were significantly more likely to report at least 1 adverse childhood event. History of an adverse childhood event was also significantly associated with female gender, older age, not living with both biological parents, and receiving free or reduced-priced lunch in both bivariate analyses and in analyses that controlled for all of the demographic variables (Table 3). Frequencies of violence-related outcomes are listed in Table 1.

### Risk of Violence-Related Perpetration According to Type of Adverse Childhood Event

For girls, the risk of violence perpetration was increased 1.7- to 5-fold ( $P < .001$ ) by any adverse childhood experience regardless of the type of event (Tables 4 and 5). For adolescent boys, the risk of violence perpetration was

**TABLE 3** Demographic Relationships With Any History of Adverse Child Event

Characteristic	Frequency	OR (95% CI) <sup>a</sup>	Adjusted OR (95% CI) <sup>b</sup>
Gender, female, <i>n</i> (%)	68 561 (50.2)	1.54 (1.50–1.58) <sup>c</sup>	1.58 (1.54–1.62) <sup>c</sup>
Race/ethnicity, <i>n</i> (%)			
African, African American, black	6560 (4.8)	1.35 (1.28–1.43) <sup>c</sup>	0.89 (0.84–0.95) <sup>c</sup>
White	99 907 (73.2)	0.58 (0.57–0.60) <sup>c</sup>	Referent
Latin American, Hispanic	4877 (3.6)	1.36 (1.28–1.45) <sup>c</sup>	1.10 (1.03–1.18) <sup>d</sup>
Asian American, Pacific Islander	6730 (4.9)	1.14 (1.08–1.20) <sup>c</sup>	1.06 (1.00–1.13)
American Indian, Native American	1975 (1.5)	2.45 (2.23–2.69) <sup>c</sup>	1.85 (1.67–2.04) <sup>c</sup>
Mixed race/ethnicity	10 381 (7.6)	2.01 (1.93–2.10) <sup>c</sup>	1.74 (1.66–1.82) <sup>c</sup>
Youth report “don’t know”	5033 (3.7)	1.27 (1.19–1.35) <sup>c</sup>	1.29 (1.21–1.39) <sup>c</sup>
Age, mean (SD), <i>y</i> <sup>e</sup>	14.4 (2.4)	1.01 (1.005–1.010) <sup>c</sup>	1.02 (1.02–1.03) <sup>c</sup>
Lives with both biological parents, yes, <i>n</i> (%)	85 140 (63.0)	0.37 (0.36–0.38) <sup>c</sup>	0.42 (0.41–0.43) <sup>c</sup>
Receives free or reduced-price lunch, yes, <i>n</i> (%)	31 347 (23.8)	2.02 (1.97–2.08) <sup>c</sup>	1.54 (1.49–1.59) <sup>c</sup>
Region, greater Minnesota (not metropolitan), <i>n</i> (%)	64 932 (47.6)	1.02 (1.00–1.05)	1.00 (0.97–1.03)

OR indicates odds ratio; CI, confidence interval.

<sup>a</sup> Bivariate relationship between any history of adverse childhood event and demographics.

<sup>b</sup> Adjusted for gender, race/ethnicity, age, family structure, receipt of free or reduced-price lunch, and region.

<sup>c</sup>  $P < .001$ .

<sup>d</sup>  $P < .01$ .

<sup>e</sup> Age range: 10 to 19 years.

**TABLE 4** Risk of Interpersonal Violence-Related Outcome According to Type of Adverse Childhood Event

Adverse Childhood Event	Delinquent Behavior, Regression Coefficient (SE)	Bullying, OR (95% CI)	Physical Fighting, OR (95% CI)	Dating Violence, OR (95% CI)	Weapon-Carrying, OR (95% CI)
<b>Girls</b>					
<b>Abuse</b>					
Physical abuse by household adult	0.75 (0.02)	2.01 (1.91–2.12)	3.18 (3.01–3.36)	3.18 (2.83–3.57)	4.22 (3.79–4.69)
Sexual abuse by family member	0.71 (0.03)	1.91 (1.76–2.09)	2.42 (2.21–2.66)	2.96 (2.52–3.49)	4.06 (3.52–4.69)
Sexual abuse by non–family member	0.74 (0.02)	1.99 (1.87–2.12)	2.69 (2.51–2.88)	3.40 (3.01–3.85)	4.06 (3.61–4.56)
<b>Household dysfunction</b>					
Alcohol use by family member caused problem	0.62 (0.01)	1.80 (1.72–1.88)	2.10 (1.99–2.21)	2.29 (2.05–2.56)	2.61 (2.35–2.90)
Drug use by family member caused problem	0.70 (0.02)	1.78 (1.70–1.88)	2.31 (2.18–2.45)	2.55 (2.27–2.87)	3.06 (2.74–3.42)
Witnessing physical abuse by family member on another family member	0.63 (0.02)	2.00 (1.90–2.09)	3.18 (3.02–3.36)	2.74 (2.44–3.07)	3.44 (3.09–3.82)
<b>Boys</b>					
<b>Abuse</b>					
Physical abuse by household adult	1.03 (0.03)	1.85 (1.75–1.96)	2.96 (2.79–3.13)	7.96 (6.99–9.06)	3.62 (3.36–3.90)
Sexual abuse by family member	2.50 (0.06)	1.93 (1.68–2.22)	4.46 (3.86–5.16)	44.78 (37.69–53.21)	6.82 (5.92–7.86)
Sexual abuse by non–family member	1.85 (0.05)	2.28 (2.06–2.54)	3.85 (3.47–4.28)	26.63 (23.04–30.78)	6.46 (5.80–7.20)
<b>Household dysfunction</b>					
Alcohol use by family member caused problem	0.96 (0.02)	1.71 (1.62–1.80)	2.22 (2.11–2.34)	4.99 (4.40–5.65)	2.65 (2.47–2.84)
Drug use by family member caused problem	1.11 (0.02)	1.81 (1.71–1.92)	2.52 (2.37–2.67)	7.11 (6.25–8.08)	3.09 (2.87–3.33)
Witnessing physical abuse by family member on another family member	0.85 (0.03)	1.87 (1.77–1.98)	2.89 (2.73–3.05)	7.28 (6.40–8.29)	3.04 (2.82–3.27)

Regression coefficient and odd ratios were adjusted for age, race/ethnicity, family structure, receipt of free or reduced-price lunch, and region. All values are significant at  $P < .001$ . OR indicates odds ratio; CI, confidence interval.

increased 1.7- to 44-fold ( $P < .001$ ) by any adverse childhood experience (Tables 4 and 5). A significant positive relationship between each adverse event and delinquent behaviors for girls and boys was identified (regression coefficient: 0.62–2.50 [SE: 0.01–0.06];  $P < .001$ ).

### Risk of Violence-Perpetration Outcomes According to Adverse-Childhood-Event Score

The likelihood of adolescent violence-related perpetration increased as the number of adverse events identified by the youth increased. When adolescents

with 4 or more events were compared with those who reported no adverse-event exposure, the likelihood of female perpetration increased 2- to 7-fold (bullying and suicide attempts, respectively) and male perpetration increased 2.7- to 10-fold (bullying and suicide attempts, respectively) (data not shown).

**TABLE 5** Risk of Self-directed Violence-Related Outcome According to Type of Adverse Childhood Event

Adverse Childhood Event	Self-harm, OR (95% CI)	Suicidal Ideation, OR (95% CI)	Suicide Attempt, OR (95% CI)
<b>Girls</b>			
<b>Abuse</b>			
Physical abuse by household adult	4.34 (4.12–4.58)	5.01 (4.75–5.28)	5.07 (4.73–5.43)
Sexual abuse by family member	3.31 (3.03–3.61)	3.75 (3.43–4.10)	4.34 (3.92–4.81)
Sexual abuse by non-family member	4.16 (3.91–4.43)	4.14 (3.89–4.42)	5.11 (4.74–5.52)
<b>Household dysfunction</b>			
Alcohol use by family member caused problem	2.64 (2.52–2.76)	2.47 (2.36–2.58)	2.75 (2.57–2.94)
Drug use by family member caused problem	2.71 (2.57–2.86)	2.53 (2.40–2.67)	2.91 (2.70–3.13)
Witnessing physical abuse by family member on another family member	3.14 (2.99–3.30)	3.63 (3.45–3.81)	3.55 (3.31–3.81)
<b>Boys</b>			
<b>Abuse</b>			
Physical abuse by household adult	4.07 (3.82–4.33)	5.11 (4.81–5.43)	6.85 (6.28–7.47)
Sexual abuse by family member	6.14 (5.34–7.06)	6.50 (5.64–7.50)	15.04 (12.98–17.43)
Sexual abuse by non-family member	5.56 (5.00–6.17)	4.98 (4.49–5.53)	11.08 (9.85–12.45)
<b>Household dysfunction</b>			
Alcohol use by family member caused problem	2.49 (2.34–2.64)	2.49 (2.35–2.63)	3.35 (3.07–3.65)
Drug use by family member caused problem	2.74 (2.56–2.93)	2.63 (2.47–2.79)	3.61 (3.30–3.96)
Witnessing physical abuse by family member on another family member	3.14 (2.95–3.41)	3.69 (3.47–3.90)	4.85 (4.45–5.30)

Regression coefficient and odds ratios were adjusted for age, race/ethnicity, family structure, receipt of free or reduced-price lunch, and region. All values are significant at  $P < .001$ . OR indicates odds ratio; CI, confidence interval.

To evaluate the relationship between the adverse-events score and risk of perpetration of violence-related outcomes, we entered the adverse-events score into linear and logistic regression models with adjustment for demographic covariates (Table 6). For girls, in the full regression models, the risk of violence perpetration was increased 38% to 88% for each increase in the adverse-events score. For boys, in the full regression models, the risk for violence perpetration was increased 35% to 144% with each increase in the adverse-childhood-events score.

## DISCUSSION

### Study Findings in Context

Findings from this large, cross-sectional study of a school sample of

adolescents indicate that multiple types of adverse childhood experiences, including abuse and household dysfunction, are associated not only with increased risk for suicidality during adolescence but also self-mutilatory behaviors and interpersonal violence-related outcomes: delinquent behaviors, bullying, physical fighting, dating violence, and weapon-carrying on school property. Our findings are consistent with those of previous research that demonstrated an association of childhood abuse and other adverse experience with suicidal ideation and/or suicide attempt among adolescents<sup>3,15–17,22,23,30</sup> and with youth weapon-carrying.<sup>22–24</sup> Our findings add to what is known by demonstrating elevated risk for a spectrum of nonfatal violence-related outcomes

during adolescence among youth with a history of several different types of abuse and household dysfunction.

Each type of adverse experience studied was associated with significantly increased risk for violence-related outcomes; however, the degree of associated risk for these outcomes differed among boys and girls. Although boys were least likely to report experiences of abuse and household dysfunction, history of physical and/or sexual abuse was a notably powerful risk factor for dating-violence perpetration, weapon-carrying, and self-directed violence among boys. Sexual abuse of boys has been associated with greater risk for problem behavior including running from home, substance use, suicide attempt,<sup>15</sup> and male sexual aggression.<sup>31</sup>

**TABLE 6** Regression Models for Adverse Childhood Event Scale and Violence-Perpetration Outcomes

ACE Scale	Delinquent Behavior, Regression Coefficient (SE)	Bullying, OR (95% CI)	Physical Fighting, OR (95% CI)	Dating Violence, OR (95% CI)	Weapon-Carrying, OR (95% CI)	Self-harm, OR (95% CI)	Suicidal Ideation, OR (95% CI)	Suicide Attempt, OR (95% CI)
Girls	0.33 (0.005)	1.38 (1.36–1.41)	1.60 (1.57–1.63)	1.60 (1.55–1.66)	1.74 (1.69–1.80)	1.83 (1.80–1.86)	1.88 (1.85–1.92)	1.88 (1.84–1.92)
Boys	0.52 (0.01)	1.35 (1.32–1.37)	1.65 (1.62–1.68)	2.44 (2.35–2.54)	1.72 (1.68–1.76)	1.75 (1.71–1.78)	1.85 (1.81–1.89)	2.06 (2.00–2.11)

All regression models were adjusted for age, race/ethnicity, family structure, receipt of free or reduced-price lunch, and region. All values are significant at  $P < .001$ . OR indicates odds ratio; CI, confidence interval; ACE, adverse childhood event.

Furthermore, for boys and girls, adverse experiences were cumulative with respect to risk for delinquent and violent outcomes. For every unit increase in the adverse-events score (additional type of adverse event reported), the risk of violence perpetration increased 35% to 144%. These findings are particularly sobering given what is known about the interrelatedness of child abuse and household dysfunction.<sup>26</sup> As well, in their comprehensive, nationally representative assessment of youth victimization, Finkelhor et al<sup>1</sup> found that among the 71% of youth reporting at least 1 victimization in the course of a year, the average number of separate, different types of incidents was 3.

### **Proposed Mechanisms for Adverse Events and Adolescent Violence Perpetration**

In the last decade, adverse childhood experiences have been linked to long-term adult risk behaviors and poor physical health status.<sup>2,3</sup> Results of research that focusing on childhood physical abuse, sexual abuse, and neglect suggest multiple pathways from adversity to delinquent and violence-perpetration outcomes in adolescence and adulthood. Poverty and poor contextual life circumstances manifesting on multiple levels including low parental supervision and responsiveness, poor parent/family mental health and propensity to interpersonal conflict, more frequent use of physical punishment as disciplinary style, low-quality home environment, insecure attachment and residential transience, low neighborhood resource availability, and community violence have all been identified as influential in increasing the likelihood of adverse childhood events and also potentially facilitating a model for violent values and norms.<sup>9,32,33</sup> Social and psychological mediators of the relationship between childhood physical and

sexual abuse and youth violent outcomes identified to date include hopelessness cognitions and depressive symptomatology,<sup>30</sup> parental attachment and abuse relationships,<sup>18</sup> stigmatization, internalizing symptoms, and anger,<sup>19</sup> and perceived need for self-protection.<sup>24</sup> In their study, which addressed childhood physical maltreatment and the perpetuation of a cycle of violence, Jaffe et al<sup>34</sup> estimated that 50% of the intergenerational transmission of antisocial behavior is environmentally mediated.

Heterogeneity in sensitivity to abusive environments and subsequent development of abnormal behavior lends support for a triad of interaction including genetic makeup, environmental context/pathogen, and disordered behavior.<sup>12</sup> The convergence of genetic-environmental models and experimental neuroscience implicates altered susceptibility to neural reactivity and physiology resulting in variations of a stress response and the potential for maladjustment and poor behavioral functioning. Lee and Hoaken<sup>35</sup> postulate childhood physical abuse and neglect as a cause of cognitive distortions and biases for perceived threat and hostile attribution; experiences of trauma and fear produce chronic activation and selective pruning of critical areas of the brain involved in emotional regulation. McGowan et al<sup>36</sup> connect experiences of childhood abuse, including sexual contact, severe physical abuse, and/or severe neglect, with alteration of the hypothalamic-pituitary-adrenal stress response and increased risk for suicide completion.

### **Prevention and Intervention for Adverse Childhood Experiences**

Study findings have underscored the critical importance of prevention and intervention strategies that reduce the occurrence, frequency, and impact of

multiple types of adverse experiences during childhood and adolescence. With respect to prevention, significant and enduring impact for prenatal and early childhood nurse home visitation for high-risk mothers in reducing perpetration of child abuse and neglect has been established.<sup>37</sup> Recent evidence provides support for a public health approach to parenting; the Triple P (Positive Parenting Program) has demonstrated significant reductions in a number of child-maltreatment indicators for participating communities compared with control communities: rates of confirmed child abuse, out-of-home placements, emergency department visits, and hospitalizations for child abuse injuries.<sup>38</sup>

Regarding youth mental health intervention, a positive impact for skills-based behavioral therapy models that facilitate identification of negative or damaging thought patterns, evaluation of these patterns, and generation of alternative interpretations that are more hopeful has been demonstrated.<sup>39</sup> In these models, youth come to understand that a self-perpetuating reality created by continually having thoughts screened through previous abuse histories and given global, stable, and internal attribution may not be accurate.<sup>39</sup> This understanding would theoretically and empirically make possible changes in cognitions and emotions, so-called self-talk, that may fuel delinquency and violence perpetration.

Health realization presents an example of a skill that offers potential healing and altered life trajectory for youth who are adversely affected by harmful life circumstance. Techniques provide an enduring framework for circumventing the recurring stress response that results from experiences of childhood abuse and neglect. In contrast to cognitive behavior therapies, youth are taught to (1) identify low-value, in-



trusive thoughts and distortions triggered by memory of abuse and/or neglect, (2) disengage from the thoughts, and (3) shift consciousness to higher-value, functional thinking. Evidence exists that, even in cases in which a young person has been exposed to contexts lacking in nurturing capacity, the natural, self-righting abilities of a young person can be reached or renewed to alter or deter substance use, delinquency, and violence-perpetration patterns.<sup>40</sup>

### Limitations

The study begins with adolescents in traditional school environments; as such, findings do not reflect youth who have dropped out of school, are incarcerated, or attend alternative schools. Findings correspond to youth in a large, Midwestern state and may not generalize to adolescents who live in other regions in the United States. Data are based on youth self-report, and histories of abuse are not substantiated by evidentiary interviews or clinical diagnoses. However, youth perceptions for adverse life events and their self-report on behaviors have been found to be reliable and valid in other settings,<sup>30,41,42</sup> and limitation of data to substantiated and authorized

statements does not account for the prevalence of adverse events<sup>24,43</sup> and violence-related outcomes not rising to the level of official report. In addition, anonymity of the self-report questionnaire may have improved the veracity of responses. The young age of the respondents makes problems of recall bias less likely. Within the limitations of a question format for a school-based questionnaire designed to be administered during a class period, the number of child adversities examined was limited. In addition, complexities of the ecological context for child maltreatment may mean that the adversities examined in this study represent a proxy for other exposures that contribute to disturbances in development manifesting as violence perpetration, including poverty, parenting deficit, and lack of formal and informal support systems. Because the data are cross-sectional, the findings are correlational, and no determinations can be made about causal relationships among the variables examined in this study.

### CONCLUSIONS

Multiple types of adverse childhood experiences should be considered as

risk factors for a spectrum of nonfatal violence-related outcomes during adolescence. This information is necessary for providers and youth advocates when engaging and counseling parents and youth on preventive health strategies. Interventions that serve delinquent and violent youth perpetrators may benefit from increased sensitivity to and recognition of a wide range of adverse-event histories, including household dysfunction, when designing secondary and tertiary prevention efforts. Findings of this study support broadening the current discourse on types of adverse events when considering pathways/mechanisms (social-psychological, genetic-environmental, biophysical) from child maltreatment to adolescent perpetration of delinquent and violent outcomes.

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## Adolescent Violence Perpetration: Associations With Multiple Types of Adverse Childhood Experiences

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