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Bullying at Elementary School and Problem Behavior in Young Adulthood: A Study of Bullying, Violence, and Substance Use from Age 11 to Age 21

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Abstract

Aim—The main aim of this paper is to investigate to what extent self-reported bullying at grade 5 predicts later violence, heavy drinking and marijuana use at age 21.

Method—Univariate and multivariate associations between bullying and later outcomes were examined based on data from the Raising Health Children (RHC) project, a longitudinal study of the etiology of problem behavior and an experimental evaluation of a preventive intervention to reduce problem behavior.

Results—Childhood bullying was significantly associated with violence, heavy drinking and marijuana use at age 21. These associations held up after controlling for prior risk factors.

Conclusions—Childhood bullying had unique associations with risk of later violence and substance use among young adults. Early intervention to prevent childhood bullying may also reduce other adverse outcomes later in life.

The goal of the present study is to examine the long-term effect of childhood bullying on problem behavior in young adulthood. Using a longitudinal community sample of 957 young people, we analyzed whether bullying at Grade 5 significantly predicted violence, heavy drinking, and marijuana use at age 21 and whether its influence remained significant after controlling for demographics and individual, family, and peer risk factors.

Methods

Sample and procedures

The data used in the present analyses were from the Raising Healthy Children (RHC) project, a longitudinal study of the etiology of problem behavior and an experimental evaluation of a preventive intervention to reduce problem behavior. The RHC participants were recruited in 1993 and 1994 from all first- and second-grade students attending 10 suburban public elementary schools in a Pacific Northwest school district in the United States (N = 1239). Parents of 1040 (84%) students consented to their families' participation

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in the study (first grade = 52%, second grade = 48%). After age 18, adolescent participants provided written consent for their participation. Data were collected annually each spring from participants, their parents (through Grade 12), and their teachers (through Grade 8). Survey completion rates were consistently high, with a completion rate of 87% at age 21. All procedures were approved by a University of Washington Institutional Review Board. Data from the two grade cohorts were organized on the basis of grade level.

The current study analyzed 957 participants, excluding 83 participants who did not respond to the fifth-grade survey when bullying was measured. The analysis sample did not differ significantly from the excluded participants on measures of gender, ethnicity, and low-income status of their families at the beginning of the project. The sample was 54% (n = 518) male. The ethnic/racial composition based on school records was 82% (n = 781) White, 4% (n = 39) African American, 5% (n = 45) Latino, 3% (n = 27) Native American, and 7% (n = 66) Asian American. Thirty percent (n = 284) received the free/reduced-price lunch program at the beginning of the RHC study. At the age 21 survey when the outcomes were measured, the average age was 21.52 years (s.d. = 0.34, range = 20.51 – 22.77).

The RHC project had an experimental test of a preventive intervention nested within it (Brown et al., 2005; Catalano et al., 2003; Haggerty et al., 2006). To ensure that the preventive intervention did not confound the predictive analyses, we completed two preliminary analyses. First, we found no significant difference by experimental condition in means of childhood bullying and problem behaviors at age 21, as well as other covariates. Second, preliminary analyses showed no statistically significant ($p < .05$) interaction effects of intervention condition on the associations between potential predictors, including childhood bullying and the outcomes, providing evidence of invariant covariance structures among variables in this study. On this basis, participants in the intervention and control conditions were combined and intervention condition was not included in the following analyses.

Measures

Childhood bullying was measured at Grade 5 based on a modified version of the Olweus Bullying Questionnaire (Harachi et al., 1999). To account for the power difference between a bully and victim of bullying, students were informed, before being asked, that friendly or playful teasing, and fighting between students of the same strength are not considered bullying. Students reported past-year participation in the following acts: (a) hit and pushed or threatened another student, (b) called another student mean names, (c) told another student you won't like her/him unless s/he did what you wanted, (d) made people not like another student, (e) told lies or spread rumors about another student, and (f) not let another student be in your group of friends (Cronbach's $\alpha = .83$). Responses ranged from 0 (never) to 5 (20 or more times). We took the mean of these items to create a bullying scale that combined physical and relational bullying based on their strong correlation and prior research suggesting stronger prediction of a combined bullying measure than separate measures of physical and relational bullying in examining problem outcomes (Crick et al., 2006).

Violence at age 21 was measured by an index variable that summed the number of violent acts committed in the past year. Based on a 4-point scale ranging from 0 (never) to 3 (5 or more times), participants reported how often they had: (a) started a fight, (b) hit to seriously hurt someone, (c) thrown objects at cars or people, (d) carried a handgun, (e) beaten up someone so badly s/he needed a doctor, and (f) threatened someone with a weapon. The six items were dichotomized and summed to create an index of violence involvement. Although this composite measure had seven categories ranging from 0 (none) to 6 (perpetrated all of the six violent acts), categories were collapsed into three scale anchors (0 = none, 1 =

presence of one violent act, 2 = presence of two or more violent acts) for the current analysis because few young adults (6%) reported above 3 on the original index. This variable was treated as ordered categorical in regression models.

Substance use at age 21 was measured by *heavy drinking* and *marijuana use*. *Heavy drinking* was defined as the frequency of drinking “4 or more alcoholic drinks in a row” for females and “5 or more” for males in the past year (Wechsler et al., 2000). Both measures were assessed based on the participant’s report of frequency of use in the past year. Responses ranged from 0 (none) to 6 (40 or more times). Preliminary analysis using these variables as an ordinal categorical variable did not change substantive findings, so they were treated as continuous for ease of interpretation.

Family and peer risk factors included *poor family management* and *antisocial peer association*. *Poor family management* was the mean of 13 items from the fifth-grade student survey covering parental monitoring of children’s behavior (e.g., “When you are not at home do your parents know where you are and who you are with?”) and appropriate use of consequences for positive and negative behaviors (e.g., “When you have misbehaved, do your parents take away privileges?”) (Cronbach’s $\alpha = .83$). Responses ranged from 0 (YES, strongly agree) to 3 (NO, strongly disagree). *Antisocial peer association* was the mean of seven items from the sixth-grade student survey (the first available time point) asking how many of 10 closest friends (if they don’t have 10 close friends, they were asked to think of all close friends) were involved in antisocial behaviors such as getting into fights, smoking marijuana, and drinking (Cronbach’s $\alpha = .90$). Responses ranged from 0 (none) to 4 (a lot).

Control variables—Measures of gender, race/ethnicity, low-income status, and impulsivity were included as control variables in the analyses to account for possible confounds in predicting young adult problem behaviors from childhood bullying. *Gender* was coded 1 for males and 0 for females. Supporting prior research suggests that males are more likely to behave aggressively and use substances than females (Centers for Disease Control and Prevention, 2006; Naimi et al., 2003); our findings revealed higher involvement by males in childhood bullying and problem behaviors in young adulthood (reflected by significant positive correlations of being male with childhood bullying, violence, heavy drinking, and marijuana use; see Table 2). However, preliminary analyses showed no statistically significant ($p > .05$) interaction effects of gender on the associations between potential predictors and young adult problem behaviors, providing evidence of invariant covariance structures among variables in this study. Thus, gender was included as a control variable to account for mean differences by gender, and males and females were combined in the reported analyses. *Race/ethnicity* was represented with a dummy variable for White, with the reference category being Black, Asian/Pacific Islander, Latino, or Native American. *Low-income status*, assessed at Grade 5 (0 = not in low-income, 1 = low-income), was determined based on school record of students receiving free or reduced-price lunch or parents’ report of receiving public assistance or food stamps. Finally, we included *impulsivity*, assessed at Grade 6 (the first available time point), as an indicator of individual traits to examine whether childhood bullying had a unique influence on problem behavior at age 21 after adjusting for a personality trait. For this measure, we took the mean of two items from teachers’ report of students’ unpredictable behavior and being impulsive (correlation $r = .60$). A 3-point response option was used: 0 = rarely true, 1 = sometimes true, and 2 = often true.

Analysis

The analyses were conducted using Mplus Version 6.1 (Muthén and Muthén, 1998–2010). For all analyses, multiple imputation was used so that data on all 957 participants who

reported bullying acts in Grade 5 could be included (Schafer and Graham, 2002). Using the Mplus program (Muthén and Muthén, 1998–2010), 50 datasets were imputed that contained values for outcome variables, risk factors, and other covariates. The 50 datasets were subsequently used to run 50 sets of analyses. Parameter estimates were averaged across 50 analyses and standard errors were computed based on Rubin's rules (1987). Robust standard errors were calculated based on the Maximum Likelihood Robust (MLR) covariance matrix estimator.

First, zero-order correlations were examined to estimate overall bivariate associations between variables analyzed. For tests of unique influences of childhood bullying on young adult problem behaviors after adjusting for effects of other variables in the analyses, we conducted multiple regression models for each outcome. Step 1 entered childhood bullying and control variables (i.e., gender, race/ethnicity, low-income status, and impulsivity). In step 2 we added family and peer risk factors.

Results

Table 1 presents descriptive information on all variables in the present analyses. Approximately 78% of the analysis sample reported being involved in any type of bullying acts at least once in the past year, with a mean frequency of 0.69 (standard deviation = 0.85). At age 21, a third of the participants reported any violence involvement at least once, over two thirds reported drinking heavily at least once, and about 42% used marijuana at least once.

Zero-order correlations

As presented in Table 2, childhood bullying had significant associations with risk of violence, heavy drinking, and marijuana use at age 21. We also found that students involved in bullying were more likely to show impulsivity and be exposed to poor family management and antisocial peers.

Multiple regression models

Table 3 shows standardized coefficients from regression models of violence, heavy drinking, and marijuana use on childhood bullying. Childhood bullying significantly predicted risk of young adult violence after accounting for demographics and impulsivity, and it remained significant after controlling for poor family management and antisocial peer association. Further, childhood bullying had unique associations with risk of heavy drinking and marijuana use after adjusting for effects of demographics, impulsivity, and family and peer risk factors. These models explained 5% of variance in violence and heavy drinking, and 7% of variance in marijuana use in young adulthood. Although results indicated small explained variance in problem behavior among young adults, it is noteworthy that childhood risk factors, including bullying other students, accounted for significant variance in behavioral problems 10 years later.

Some limitations of the measures should be noted. Although our measure of bullying was based on the Olweus' self-report of bullying questionnaire (1996) which has been most widely used, a self-report measure may lack objectivity and underestimate bullying involvement. In addition, young adult violence was measured by an index variable that did not fully capture the various forms or frequency of violence involvement. A more comprehensive measure of violence may yield different results. Despite these limitations, results are compelling because this study was based on a prospective longitudinal data collected from Grade 5 to age 21 with low attrition (less than 15%). Other sample strengths include heterogeneity of gender and family income.

In conclusion, this study revealed that childhood bullying had unique associations with risk of later violence and substance use among young adults. Early intervention to prevent children from being involved in bullying may also reduce violence and substance use in young adulthood.

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References

- Brown EC, Catalano RF, Fleming CB, Haggerty KP, Abbott RD. Adolescent substance use outcomes in the Raising Healthy Children Project: A two-part latent growth curve analysis. *Journal of Consulting and Clinical Psychology*. 2005; 73:699–710. [PubMed: 16173857]
- Catalano RF, Mazza JJ, Harachi TW, Abbott RD, Haggerty KP, Fleming CB. Raising healthy children through enhancing social development in elementary school: Results after 1.5 years. *Journal of School Psychology*. 2003; 41:143–164.
- Centers for Disease Control and Prevention. Youth Risk Behavior Surveillance-United States, 2005. 2006. Retrieved December 15, 2006, from the World Wide Web: <http://www.cdc.gov/MMWR/preview/mmwrhtml/ss5505a1.htm>
- Crick NR, Ostrov JM, Werner NE. A longitudinal study of relational aggression, physical aggression, and children's social-psychological adjustment. *Journal of Abnormal Child Psychology*. 2006; 34:131–142. [PubMed: 16741683]
- Haggerty KP, Fleming CB, Catalano RF, Harachi TW, Abbott RD. Raising Healthy Children: Examining the impact of promoting healthy driving behavior within a social development intervention. *Prevention Science*. 2006; 7:257–267. [PubMed: 16752099]
- Harachi, TW.; Catalano, RF.; Hawkins, JD. Comparative study on bullying: U.S. country report. In: Smith, PK.; Morita, Y.; Junger, Tas J.; Olweus, D.; Catalano, RF.; Slee, P., editors. *The nature of school bullying: A cross-national perspective*. New York: Routledge; 1999. p. 279-295.
- Muthén, LK.; Muthén, BO. *Mplus users' guide*. 6. Los Angeles, CA: Muthen & Muthen; 1998–2010.
- Naimi TS, Brewer RD, Mokdad A, Denny C, Serdula MK, Marks JS. Binge drinking among US adults. *JAMA*. 2003; 289:70–75. [PubMed: 12503979]
- Olweus, D. Mimeo. Bergen, Norway: Research Center for Health Promotion (HEMIL Center), University of Bergen; 1996. *The Revised Olweus Bully/Victim Questionnaire*.
- Rubin, DB. *Multiple imputation for nonresponse in surveys*. New York: Wiley; 1987. Wiley series in probability and mathematical statistics. Applied probability and statistics
- Schafer JL, Graham JW. Missing data: Our view of the state of the art. *Psychological Methods*. 2002; 7:147–177. [PubMed: 12090408]
- Wechsler H, Lee JE, Kuo M, Lee H. College binge drinking in the 1990s: A continuing problem: Results of the Harvard School of Public Health 1999 College Alcohol Study. *Journal of American College Health*. 2000; 48:199–210. [PubMed: 10778020]

Table 1Descriptive statistics for the analysis sample ($n = 957$)

	Mean (Standard deviation)	Percent
Outcome variables at age 21		
Violence	0.48 (0.73)	33.6 ^a
Frequency of heavy drinking	2.36 (2.12)	71.4 ^b
Frequency of marijuana use	1.67 (2.37)	42.1 ^b
Childhood bullying (Grade 5)	0.69 (0.85)	78.4 ^a
Family and peer risk factors		
Poor family management (Grade 5)	1.51 (0.41)	
Antisocial peer association (Grade 6)	0.49 (0.56)	
Control variables		
Male		54.1
White		81.6
Low-income status (Grade 5)		26.1
Impulsivity (Grade 6)	0.39 (0.53)	

^aPrevalence estimates based on any types of bullying or violent acts that occurred at least once within the past year.

^bPrevalence estimates based on any heavy drinking or marijuana use within the past year.

Table 2

Standardized correlation coefficients

	Childhood bullying	Males	White	Low income	Impulsivity	Poor family management	Antisocial peer association	Violence	Heavy drinking
Male	.22	--							
White	-.02 ^{ns}	-.01 ^{ns}	--						
Low-income status	.05 ^{ns}	.02 ^{ns}	-.18	--					
Impulsivity	.27	.27	.04 ^{ns}	.07 ^{ns}	--				
Poor family management	.39	.06	-.02 ^{ns}	.04 ^{ns}	.09	--			
Antisocial peer association	.41	.16	-.03 ^{ns}	.06 ^{ns}	.28	.28	--		
Violence at age 21	.16	.11	-.03 ^{ns}	.07	.14	.12	.13	--	
Heavy drinking at age 21	.18	.10	.03 ^{ns}	.00 ^{ns}	.10	.05 ^{ns}	.11	.30	--
Marijuana use at age 21	.19	.13	.09	.03 ^{ns}	.18	.11	.16	.21	.45

Note: $N = 957$; unless otherwise noted, correlations are significant at $p = .05$ or better.

^{ns} nonsignificant (i.e., $p > .05$)

Table 3
Standardized regression coefficients in predicting risk of violence, heavy drinking, and marijuana use at age 21

	Violence		Heavy Drinking		Marijuana use	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
	Beta (SE)	Beta (SE)	Beta (SE)	Beta (SE)	Beta (SE)	Beta (SE)
Bullying at Grade 5	.13* (.04)	.09* (.04)	.15* (.04)	.15* (.04)	.13* (.04)	.10* (.04)
Male	.05 (.03)	.05 (.04)	.05 (.04)	.04 (.04)	.06 (.04)	.06 (.04)
White	-.02 (.04)	-.02 (.04)	.02 (.03)	.02 (.03)	.10* (.03)	.10* (.04)
Low-income status	.07 (.04)	.06 (.04)	-.00 (.03)	-.00 (.03)	.02 (.04)	.01 (.04)
Impulsivity	.09* (.04)	.08 (.04)	.04 (.03)	.03 (.04)	.13* (.04)	.12* (.04)
Poor family management at Grade 5		.07 (.04)		-.03 (.04)		.04 (.04)
Antisocial peer association at Grade 6		.04 (.04)		.06 (.04)		.07 (.04)
<i>R</i> ²	.05	.05	.04	.05	.06	.07

Note: *N* = 957

* *p* < .05 or better