

Trends in Bullying, Physical Fighting, and Weapon Carrying Among 6th- Through 10th-Grade Students From 1998 to 2010: Findings From a National Study

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Youth violence is a major public health concern.^{1,2} Even violence that does not lead directly to morbidity or mortality may have mental health consequences.^{3,4} Three prominent indicators of youth violence are bullying at school, physical fighting, and weapon carrying. These violent behaviors are associated with a number of negative behavioral and emotional outcomes that can last into adulthood.⁵⁻¹⁰ A recent meta-analysis of longitudinal studies found bullying perpetration and victimization were both related to involvement in violence in the future.⁸ Bullying and being a victim of bullying have also been found to predict depression and criminal offenses later in life.^{5,7} A prospective longitudinal twin study in England found that frequent bullying victimization in childhood increased risk of self-harm.¹¹ Finally, a meta-analysis found that both victimized bullies and victims had higher risk for psychosomatic problems (such as aches, sleeping problems, poor appetite, bedwetting, and feeling tense) than noninvolved children.⁶

In cross-sectional studies, physical fighting and weapon carrying have been associated with an increased likelihood of injury that required medical attention.¹² Physical fighting has also been concurrently associated with mental health problems, substance use, school adjustment problems, and violent crime.¹⁰ Similarly, correlates of weapon carrying include substance use¹³⁻¹⁵ and property offenses.¹⁶

The national Youth Risk Behavior Surveillance Survey (YRBS) biennially assesses violent behaviors among 9th- through 12th-grade students. Bullying has only been assessed since 2009 and is limited to having been a victim of bullying on school property or having been bullied electronically. There has been no change in bullying victimization from 2009 to 2011.¹⁷ Physical fighting and weapon carrying have been assessed since 1991. Physical fighting

Objectives. We examined trends from 1998 to 2010 in bullying, bullying victimization, physical fighting, and weapon carrying and variations by gender, grade level, and race/ethnicity among US adolescents.

Methods. The Health Behavior in School-Aged Children surveys of nationally representative samples of students in grades 6 through 10 were completed in 1998 (n = 15 686), 2002 (n = 14 818), 2006 (n = 9229), and 2010 (n = 10 926). We assessed frequency of bullying behaviors, physical fighting, and weapon carrying as well as weapon type and subtypes of bullying. We conducted logistic regression analyses, accounting for the complex sampling design, to identify trends and variations by demographic factors.

Results. Bullying perpetration, bullying victimization, and physical fighting declined from 1998 to 2010. Weapon carrying increased for White students only. Declines in bullying perpetration and victimization were greater for boys than for girls. Declines in bullying perpetration and physical fighting were greater for middle-school students than for high-school students.

Conclusions. Declines in most violent behaviors are encouraging; however, lack of decline in weapon carrying merits further attention. (*Am J Public Health.* 2014;104:1100-1106. doi:10.2105/AJPH.2013.301761)

declined from 1991 to 2009, with no significant change from 2009 to 2011.¹⁷ Weapon carrying declined from 1991 to 1999 but there has been no significant decrease since 1999.¹⁷ Other than YRBS, there has been only 1 other nationally representative study of trends in violent behavior in the United States. Molcho et al.¹⁸ examined trends in bullying and victimization in 11-, 13-, and 15-year-old adolescents in 27 European countries and the United States from 1994 to 2006 (only from 1998 to 2006 in the United States). They found a significant decrease in all measures of bullying (occasional and chronic victimization and bullying) among boys in the United States but no change among girls. However, they did not examine violent behaviors other than bullying and the sample was not adequate for testing differences in trends by characteristics other than gender.

No studies to date have presented trends in bullying, being the victim of a bully (hereafter referred to as *victimization*), physical fighting, and weapon carrying among US students before high school. The current study expands on

the work by Molcho et al.¹⁸ by examining more indicators of violent behavior in students aged 11 through 16 years with samples adequate for examining racial/ethnic, gender, and school-grade differences through 2010. It also expands on the YRBS data¹⁷ by including students in grades 6 through 8 (as young as 11 years), more waves of data when assessing trends in bullying and bullying perpetration, and testing for differences in trends by gender, race/ethnicity, and grade in school. Little is known about trends in violent behaviors among younger adolescents, where bullying is more prevalent.¹⁹ The 2 objectives of the current study were (1) to examine the trends in prevalence of bullying, physical fighting, and weapon carrying in US children and adolescents from grades 6 through 10 spanning 12 years (1998–2010); and (2) to test for variations by gender, grade, and race/ethnicity.

METHODS

Nationally representative samples of US adolescents from grades 6 through 10 completed

questionnaires in the winter of the 1997–1998 ($n = 15\,686$), 2001–2002 ($n = 14\,818$), 2005–2006 ($n = 9229$), and 2009–2010 ($n = 10\,925$) school years as part of the Health Behavior in School-Aged Children (HBSC) study. The sampling strategy included a multistage stratified design, with 9 census divisions and school grades as strata, and with classrooms as the primary sampling units. African American and Hispanic students were oversampled to provide representative samples. Further detail about the international HBSC study and US sampling methods has been described previously.^{19,20} Data were collected from self-report questionnaires administered in classrooms by teachers and trained health researchers. Teachers were directed to maintain classroom order but not to answer questions about the survey. Youth assent and, depending on the requirements of the participating school districts, active or passive parental consent were obtained.

Measures

Demographic variables. Students reported gender (boy or girl), grade (dichotomized into 6th through 8th and 9th through 10th), race (White, African American, Asian, Hawaiian/Pacific Islander, or Native American), and ethnicity (Hispanic or Latino). Because of small sample sizes of some categories, race/ethnicity was reduced to 4 categories: White, African American, Hispanic, and other race/ethnicity (Table 1).

Bullying and victimization. We assessed bullying with the revised Olweus Bully/Victim Questionnaire.^{21,22} Students were presented with a definition of bullying,

We say a student is being bullied when another student, or a group of students, say or do nasty and unpleasant things to him or her. It is also bullying when a student is teased repeatedly in a way he or she does not like or when he or she is deliberately left out of things. But it is not bullying when two students of about the same strength or power argue or fight. It is also not bullying when a student is teased in a friendly and playful way.

After the definition, participants were asked, “How often have you taken part in bullying another student(s) at school?” We dichotomized responses into fewer than 2 times a month and 2 times a month or more.

Types of bullying “in the past couple months” included the following:

1. called another student mean names, and made fun of, or teased him or her in a hurtful way (including racial or religious comments);
2. kept another student(s) out of things on purpose, excluded him or her from my group of friends, or completely ignored him or her;
3. hit, kicked, pushed, shoved around, or locked another student(s) indoors;
4. spread false rumors about another student(s) and tried to make others dislike him or her; and
5. made sexual jokes, comments, or gestures to another student(s).

We included trend analysis on different types of bullying for survey years 2002, 2006, and 2010 only, as items were different in the 1998 survey. We assessed victimization with the question “How often have you been bullied at school in the past couple of months?” Types of victimization were identical to the bullying questions but phrased to indicate victim status (e.g., I was called mean names, made fun of, or teased in a hurtful way). As with bullying, we dichotomized responses into fewer than 2 times a month and 2 times a month or more. In 2006, only half of sixth graders were presented with questions about the types of bullying or victimization. (Because of time limitations, 2 different versions of the sixth-grade survey were administered: one with the bullying items and another with alternative items. The alternate versions were assigned randomly to different sixth graders. Therefore, we included all sixth-grade students who answered the bullying and violence items in the analyses.)

Physical fighting. We measured physical fighting with a single item, “During the past 12 months, how many times were you in a physical fight?” We dichotomized responses into never or once in the past year versus 2 or more times in the past year.

Weapon carrying. We measured weapon carrying with 1 item, adapted from YRBS,¹⁷ “During the past 30 days, on how many days did you carry a weapon, such as a gun, knife, or club?” We dichotomized responses into never versus 1 or more days in the past month. We identified type of weapon by the question, “The

last time you carried a weapon during the past 30 days, what type of weapon was it?” with response options:

1. I did not carry a weapon during the past 30 days,
2. knife or pocketknife,
3. stick or club,
4. knuckle brace or brass knuckles,
5. tear gas or pepper spray or mace,
6. handgun or other firearm, or
7. other type. (Type of weapon was not assessed in 1998.)

Sixth graders were not asked about weapon carrying or weapon type in 2006 and 2010 and, thus, were excluded from analyses for this measure.

Statistical Analyses

We conducted all statistical analyses with SAS version 9.3 (SAS Institute, Cary, NC) taking into account the features of the multistage, stratified sampling design (i.e., stratification, clustering, and sampling weights). We calculated prevalence estimates for each of the violent behaviors at each of the 4 time points (Table 1). We used prevalence estimates with nonoverlapping 95% confidence intervals to determine significant differences across a demographic category within a year.

We assessed trends for each violent behavior by using logistic regression analysis with survey year as the main independent variable to test for linear trends. We included an interaction term for year to test for quadratic trends. After determining the overall trend, we conducted logistic regression analyses incorporating interaction terms for year by gender, grade (dichotomized as 6th to 8th and 9th to 10th), and race/ethnicity (White, African American, Hispanic, and other race/ethnicity) to test for significant differences in trends by each demographic category. We further explored significant differences with domain analysis and plotted trends by demographic category.

RESULTS

The number of participants varied over each of the 4 waves, with 15 686 in 1998, 14 818 in 2002, 9227 in 2006, and 10 925 in 2010. With the exception of the last wave in 2010,

TABLE 1—Sample Characteristics and Prevalence of Violent Behaviors by Demographic Characteristics and Year Among 6th through 10th Grade US Students: Health Behaviors in School-Aged Children Study, 1998–2010

Behavior and Year	Total, % (SE)	Gender, % (95% CI)		Grade, % (95% CI)			Race/Ethnicity, % (95% CI)							
		Boy	Girl	6th–8th	9th–10th	White	African American	Hispanic	Other					
Total														
1998		46.7 ^a (44.8, 48.5)	53.4 ^b (51.5, 55.2)	59.6 ^a (54.8, 64.4)	40.4 ^b (35.6, 45.2)	64.0 ^a (59.5, 68.5)	16.5 ^b (13.3, 19.6)	12.6 ^b (10.1, 15.5)	6.9 ^c (5.3, 8.6)					
2002		48.1 ^a (47.0, 49.2)	51.9 ^b (50.8, 53.0)	61.8 ^a (57.7, 65.9)	38.2 ^b (34.1, 42.3)	62.8 ^a (58.4, 67.3)	16.5 ^b (12.9, 20.1)	12.8 ^b (10.2, 15.3)	7.9 ^c (6.6, 9.2)					
2006		49.7 (48.0, 51.4)	50.3 (48.6, 52.0)	58.0 ^a (52.5, 63.4)	42.0 ^b (36.6, 47.5)	48.9 ^a (42.6, 55.3)	17.9 ^b (12.9, 22.9)	19.1 ^b (15.0, 23.1)	14.1 ^b (10.7, 17.5)					
2010		52.1 (50.7, 53.4)	47.9 (46.6, 49.3)	57.9 ^a (53.6, 62.1)	42.1 ^b (37.9, 46.4)	50.7 ^a (44.2, 57.3)	16.9 ^b (12.9, 20.8)	19.8 ^b (14.9, 24.7)	12.7 ^b (10.2, 15.1)					
Bullying														
1998	16.5 (0.8)	22.7 ^a (20.7, 24.7)	11.2 ^b (9.5, 12.9)	17.8 (16.0, 19.7)	14.5 (12.7, 16.4)	16.7 ^{ab} (14.7, 18.7)	14.7 ^a (12.7, 16.7)	18.8 ^b (16.8, 20.8)	15.3 ^{ab} (12.4, 18.3)					
2002	12.6 (0.4)	17.1 ^a (15.8, 18.4)	8.6 ^b (7.7, 9.5)	12.8 (11.7, 14.0)	12.2 (11.0, 13.5)	11.8 (10.6, 13.0)	13.9 (12.3, 15.6)	14.4 (12.7, 16.1)	14.3 (11.8, 16.9)					
2006	10.7 (0.5)	12.5 ^a (10.9, 14.1)	8.9 ^b (7.8, 10.0)	11.3 (9.9, 12.6)	9.9 (8.4, 11.4)	9.5 ^b (8.1, 11.1)	13.6 ^b (11.5, 15.6)	11.8 ^{ab} (9.8, 13.8)	9.8 ^{ab} (7.7, 12.0)					
2010	7.5 (0.5)	9.3 ^a (8.1, 10.5)	5.6 ^b (4.5, 6.8)	7.0 (6.0, 8.1)	8.2 (6.8, 9.5)	6.0 ^b (4.9, 7.2)	10.3 ^b (8.0, 12.6)	8.2 ^{ab} (6.7, 9.7)	8.4 ^{ab} (6.5, 10.3)					
Victimization														
1998	13.7 (0.7)	16.4 ^a (14.3, 18.5)	11.4 ^b (10.2, 12.5)	16.4 ^a (14.5, 18.4)	9.7 ^b (8.6, 10.9)	14.6 ^a (12.8, 16.3)	10.1 ^b (8.5, 11.9)	12.6 ^{ab} (10.9, 14.4)	15.9 ^{ab} (11.6, 20.2)					
2002	12.2 (0.4)	14.6 ^a (13.6, 15.6)	10.0 ^b (9.0, 10.9)	13.8 ^a (12.9, 14.7)	9.5 ^b (8.4, 10.6)	12.4 (11.7, 13.3)	10.6 (9.2, 12.0)	12.1 (10.4, 13.8)	13.4 (11.0, 15.7)					
2006	10.6 (0.5)	11.2 (9.8, 12.7)	10.0 (8.9, 11.1)	13.2 ^a (12.1, 14.3)	7.0 ^b (5.6, 8.4)	10.2 (8.8, 11.7)	10.9 (8.7, 13.0)	9.7 (8.3, 11.2)	12.58 (10.0, 15.5)					
2010	10.2 (0.4)	10.7 (9.6, 11.8)	9.7 (8.7, 10.9)	12.4 ^a (11.2, 13.6)	7.3 ^b (6.8, 8.3)	10.3 (9.2, 11.4)	11.1 (9.23, 12.9)	9.2 (7.4, 11.0)	10.2 (8.0, 12.4)					
Fighting														
1998	23.5 (0.7)	32.3 ^a (30.7, 34.5)	15.9 ^b (14.5, 17.3)	26.7 (24.6, 28.9)	18.7 (17.5, 19.9)	22.2 ^a (20.4, 24.0)	26.2 ^{ab} (23.4, 29.1)	26.6 ^b (24.3, 29.0)	22.6 ^{ab} (18.1, 27.0)					
2002	20.4 (0.5)	27.8 ^a (26.3, 29.2)	13.7 ^b (12.5, 14.8)	21.2 (20.0, 22.5)	18.9 (17.4, 20.4)	19.0 ^a (17.1, 20.3)	24.1 ^b (22.2, 26.0)	21.5 ^{ab} (19.4, 23.6)	21.4 ^{ab} (17.9, 25.0)					
2006	18.4 (0.8)	25.1 ^a (23.0, 27.1)	11.8 ^b (10.3, 13.3)	19.9 (18.2, 21.7)	16.2 (14.0, 18.3)	14.1 ^a (12.7, 15.6)	26.7 ^b (23.8, 29.6)	21.8 ^b (19.1, 24.5)	18.4 ^{ab} (14.7, 22.1)					
2010	18.8 (0.7)	24.8 ^a (23.0, 26.5)	12.4 ^b (10.8, 14.7)	18.5 (17.1, 19.9)	19.3 (16.8, 21.7)	16.4 ^a (14.7, 18.1)	23.0 ^b (19.8, 26.1)	21.6 ^b (18.8, 24.4)	18.7 ^{ab} (15.6, 21.7)					
Weapon carrying														
1998	12.2 (0.6)	19.7 ^a (18.1, 21.3)	6.0 ^b (4.6, 7.3)	12.6 (11.1, 14.1)	11.9 (10.2, 13.5)	10.7 ^a (9.5, 11.9)	13.7 ^{ab} (11.2, 16.2)	17.3 ^b (15.1, 19.6)	13.7 ^{ab} (10.5, 16.9)					
2002	14.5 (0.7)	23.8 ^a (21.6, 26.0)	6.3 ^b (5.4, 7.2)	14.5 (12.6, 16.4)	14.6 (13.0, 16.2)	14.8 (13.1, 16.5)	13.6 (11.5, 15.7)	14.9 (12.4, 17.4)	13.2 (9.8, 16.7)					
2006	13.4 (0.8)	20.8 ^a (18.6, 23.1)	6.3 ^b (5.0, 7.7)	12.9 (10.6, 15.1)	13.9 (12.0, 15.8)	12.6 (10.6, 14.7)	14.6 (12.1, 17.0)	14.6 (11.5, 17.8)	13.6 (10.4, 16.8)					
2010	14.8 (0.8)	22.6 ^a (20.1, 25.1)	6.3 ^b (5.2, 7.4)	13.3 (11.4, 15.2)	16.2 (14.3, 18.1)	15.5 (13.3, 17.8)	13.0 (10.7, 15.3)	14.0 (11.9, 16.2)	15.3 (11.9, 18.7)					

Note. CI = confidence interval. Percentages are weighted. The sample sizes were n = 15 686 for 1998, n = 14 818 for 2002, n = 9227 for 2006, and n = 10 925 for 2010. Values with different superscripts are significantly different at P < .05.

there were slightly more girl than boy participants, ranging from 53.4% girls in 1998 to 47.9% in 2010 (Table 1). Reflecting demographic changes in the United States, the racial/ethnic composition of the sample changed over the 4 waves from a sample that was a majority White in 1998 (64.0%) to 1 wave that was barely a majority White in 2010 (50.7%), because of increases in Hispanic youths (19.8% in 2010, up from 12.6% in 1998) and those of other race/ethnicity (Table 1). Boys had higher rates of bullying, fighting, and weapon carrying than girls at all waves and higher rates of victimization in 1998 and 2002. There were no differences by grade except for victimization at all 4 waves, where younger students were more likely to be the victims of bullying. The differences in violent behaviors by race/ethnicity were inconsistent with White students having lower rates of getting into physical fights than Hispanic (in 1998 and 2010), African American (in 2002), and Hispanic and African American (in 2006) students. In addition, White students reported lower rates of weapon carrying than Hispanic students in 1998.

Bullying Trends

Overall, bullying decreased linearly from 1998 (16.5%) to 2010 (7.5%; $b = -0.28$; $P < .001$; Figure 1) and each demographic subgroup declined significantly from 1998 to 2010; however, the rate of decline differed

across groups. The decline in bullying was significantly larger for boys than girls (Wald $\chi^2 = 19.0$ [3]; $P < .001$). Students in grades 6 through 8 had greater declines in bullying rates than those in grades 9 and 10 (Wald $\chi^2 = 8.9$ [3]; $P < .05$). There was also a significant interaction with race/ethnicity (Wald $\chi^2 = 28.0$ [9]; $P < .001$); bullying rates among African Americans declined 30% from 1998 to 2010, whereas bullying rates among Whites declined 64%.

Boys had higher rates of all subtypes of bullying than girls at all waves, but this was not the case for social exclusion in 2010 (data not shown). All types of bullying declined from 2002 to 2010 (Figure 2; 1998 was excluded because of different items). Name calling, social exclusion, rumor spreading, physical bullying, and sexual comments all declined linearly. Name calling and social exclusion were the most common forms of bullying at all waves and showed the largest relative declines.

Victimization Trends

From 1998 to 2010, there was an overall significant decline in having been bullied from 13.7% to 10.2% ($b = -0.12$; $P < .001$; Figure 1). This decline was only significant for boys, not for girls (Wald $\chi^2 = 15.6$ [3]; $P < .001$); that is, boys had lower victimization from 1998 to 2010, whereas girls did not have a decreasing trend. There were no significant differences in trends in victimization by grade or race/ethnicity.

In 2002, boys reported significantly higher rates of name calling, social exclusion, and physical types of victimization than girls. Boys also had higher rates of physical victimization in 2010. Girls reported significantly higher rates of experiencing sexual comments in 2006 (data not shown). The most common forms of victimization (name calling, having rumors spread, sexual comments, and being socially excluded) all had significant linear declines from 2002 to 2010 (Figure 2; not measured in 1998). Of the less frequently reported victimization experiences, having been physically hurt significantly declined, but experiencing racial or religious comments remained stable from 2002 to 2010.

Physical Fighting Trends

There was a significant linear decline in physical fighting from 23.5% in 1998 to 18.8% in 2010 ($b = -0.36$; $P < .001$), with a significant quadratic trend ($b = 0.05$; $P < .05$) indicating that most of the decline occurred from 1998 to 2006 (23.5% to 18.4%), and the rate was stable from 2006 through 2010 (Figure 1). This was the only behavior with a significant quadratic trend. There was an interaction by grade in school (Wald $\chi^2 = 22.7$ [3]; $P < .001$), with significant declines for students in grades 6 through 8, but not in grades 9 and 10. A year-by-race/ethnicity interaction (Wald $\chi^2 = 24.0$ [9]; $P < .01$) revealed a decrease in physical fighting for White and Hispanic students but no significant declines from 1998 to 2010 for African American students or students of other race/ethnicity.

Weapon Carrying Trends

There was a small but significant increase in weapon carrying over the study time period ($b = 0.06$; $P < .05$; Figure 1). A race/ethnicity-by-year interaction (Wald $\chi^2 = 31.8$ [9]; $P < .001$) revealed an increase from 1998 to 2010 in weapon carrying for White students, but no significant change over the same time period for African Americans, Hispanics, or students of other race/ethnicity (Figure 3). Of the roughly 15% of adolescents who carried weapons in 2010, the frequency of each weapon was as follows: knife or pocket knife (58.0%), hand gun or firearm (20.5%), brass knuckles (6.3%), stick or club (4.3%), mace or tear gas (3.3%), or some other weapon (7.7%).

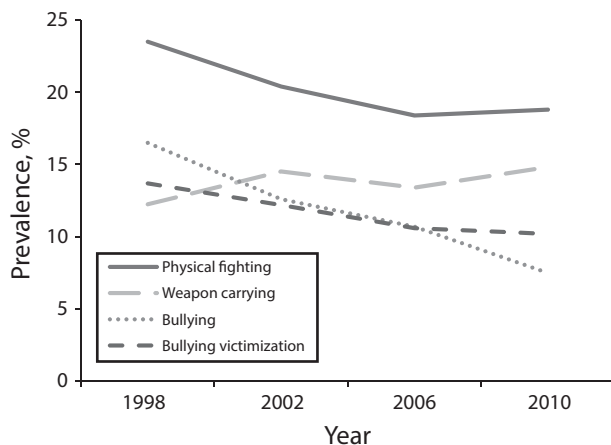


FIGURE 1—Overall prevalence of physical fighting, weapon carrying, and bullying among US youths in 6th through 10th grades: 1998–2010 Health Behaviors in School-Aged Children Study.

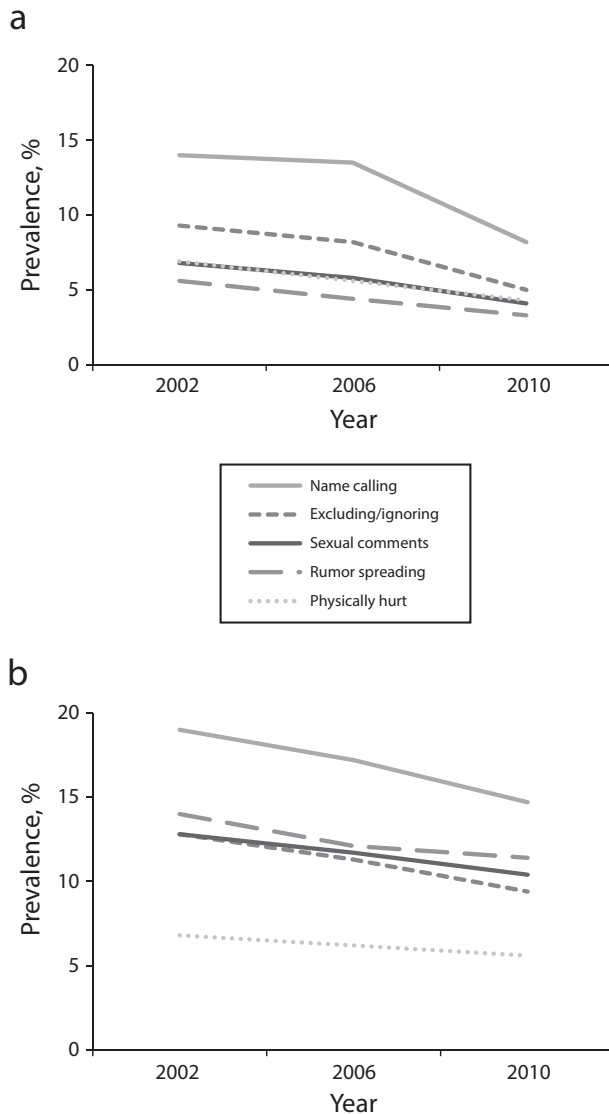


FIGURE 2—Prevalence of 6th- through 10th-grade US students who reported 2 or more times in the past month being (a) bullied or (b) victimized: 1998–2010 Health Behaviors in School-Aged Children Study.

DISCUSSION

We examined trends in the prevalence of bullying, bullying victimization, physical fighting and weapon carrying in US adolescents spanning 12 years, from 1998 to 2010. There were some variations by gender, grade, and race/ethnicity in these trends. Overall, it is encouraging that bullying and bullying victimization significantly declined over the time period studied. Declines in bullying and victimization differed for boys and girls, with

greater declines in boys leading to convergence over time. Physical fighting also declined, but the decline was less dramatic than that with bullying and limited to middle school-aged students and White students. Lastly, there was no overall decline in the rate of weapon carrying; notably there was an increase in weapon carrying for White students. This trend is surprising when one considers that White students had the largest declines in bullying and physical fighting over the same time period.

The current study (HBSC) is 1 of only 2 nationally representative sources of trend data for violent behaviors, and the only data for middle school-aged students. A previous study using HBSC data for 11-, 13-, and 15-year-olds found declines from 1998 to 2006 in bullying and bullying victimization for boys, but not for girls.¹⁸ The current study extends that analysis through 2010 using nationally representative samples for grades 6 through 10 and confirms that there have been more substantial declines in bullying for boys than for girls.

The only other nationally representative trend data on violence behaviors, the YRBS, has only assessed bullying victimization for the previous 2 survey administrations (2009 and 2011) and has not assessed bullying perpetration. Thus, it is difficult to make comparisons between the current study and the YRBS regarding bullying behaviors. The YRBS has shown declines in physical fighting from 1991 to 2009, but no change from 2009 to 2011. Likewise, the current study found an overall decline in physical fighting from 1998 to 2010, with indications that the rate of decline has slowed. Regarding weapon carrying, the YRBS reported that weapon carrying declined from 1991 to 1999, with no decrease since then. The current study extends that observation by finding a small increase in weapon carrying from 1998 to 2010 among White students.

The overall decrease in bullying and victimization may be attributed to 2 related factors, an increasing recognition of the need for bullying prevention programs,²³ and the increased number of evidence-based bullying prevention programs.²⁴ Since 1999, 48 states have passed legislation requiring school districts to adopt policies regarding bullying.²⁵ Most of these laws require schools to create procedures for investigating incidents of bullying, provide disciplinary consequences for bullying, and have at least some requirements for education or prevention programs for students.^{25–27} However, some have criticized the laws for substantial ambiguity and lack of accountability on the part of schools.^{25,28} Nonetheless the laws reflect and reinforce the growing attention to the problem of bullying in schools. In addition to state legislation, there have been national (and international) efforts to promote awareness of bullying.^{29–31}

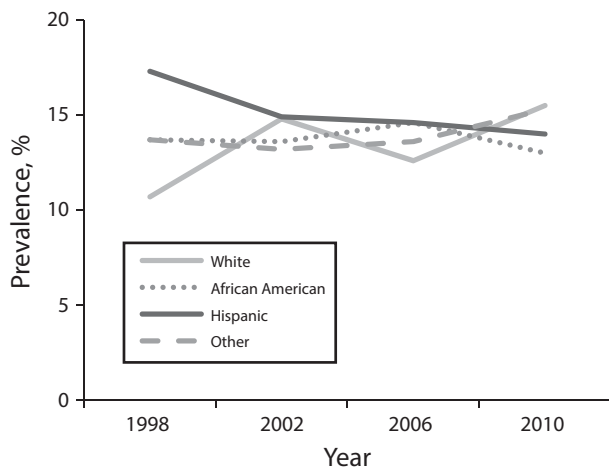


FIGURE 3—Prevalence of 6th- through 10th-grade US students who reported carrying a weapon at least once in the previous month by race: 1998–2010 Health Behaviors in School-Aged Children Study.

Corresponding to the increased recognition of the problem of bullying, there have been several reviews of bullying prevention programs.²⁴ A recent meta-analysis included 53 different evaluation studies of school-based bullying prevention programs, including 17 randomized trials. The authors concluded that the average effect of these programs was to reduce bullying by 20% to 24% and victimization by 17% to 20%.²⁴ As with bullying, several systematic reviews and meta-analyses have identified evidence-based approaches to prevent and reduce youth violence, including physical fighting as 1 of several possible outcomes.^{32–34} These reviews suggest that universal school-based prevention programs that develop social skills, behavior management programs, and parent-training programs can be effective strategies to reduce violence.^{32–34} The national declines in bullying and physical fighting over the past dozen years suggest that a continued focus on implementing evidence-based prevention programs in schools may lead to further declines.

Compared with bullying and fighting, there have been relatively few interventions specifically designed to prevent weapon carrying at school. The efforts that are typically employed include increased school security through metal detectors, weapons searches, or both^{35–39} or increases in disciplinary actions such as through zero-tolerance policies.^{40,41} These approaches have rarely been tested and the few studies

conducted thus far have found mixed results. Some evidence suggests that metal detectors and weapon searches can lead to decreased weapon carrying, but have no effect on other violent behaviors such as physical fighting.^{38,39} It is possible that evidence-based approaches to preventing bullying and fighting could have an effect on weapon carrying, but this question has rarely been addressed.⁴² Long-term consequences of weapon carrying and physical fighting have yet to be established.

Strengths and Limitations

There are several limitations of the measures used in the study. First, not all indicators were assessed at all waves (e.g., subtypes of bullying and bullying victimization behaviors) or for every grade (e.g., weapon carrying). In recent years cyber-bullying has been increasing, which often takes place outside schools and has also shown to have negative consequences similar to traditional bullying.^{19,43} It should be noted the definition of bullying provided to participants allows room for individual interpretation of “playful” and “teasing” and it is possible bullies and victims interpret the same behavior differently. The bullying behaviors specifically asked about bullying at school, which may underestimate the amount of overall bullying experienced by the youths. In contrast, the questions about weapon carrying or being in a fight were not limited to the school

context, which may limit direct comparison of the bullying items with the fighting and weapon-carrying items. The weapon-carrying measure used in this study did not distinguish between weapon carrying for self-defense or for intended harm. In addition, the data were self-reported from US children that attend public or private schools, which may limit generalizability to youths not in school, for example, those who are homeschooled or have dropped out.

Strengths of the HBSC study include the nationally representative samples spanning more than a decade with oversampling of African American and Hispanic youths to provide better population estimates. Unlike other nationally representative, repeated cross-sectional studies assessing violent behaviors, the HBSC study includes students as young as sixth grade.

Conclusions

Bullying and bullying victimization behaviors declined from 1998 to 2010, yet remain substantial with 7.5% of students reporting bullying another person and 10.2% reporting being victimized in 2010. Physical fighting also declined, particularly for middle school-aged students and White and Hispanic students. Rates of weapon carrying remained stable overall but increased among White adolescents, which may indicate a need for targeted intervention. ■

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Contributors

J. G. Perlus led the drafting of the article and contributed to the analysis plan and interpretation of the results. A. Brooks-Russell led the statistical analysis and interpretation of the results, and provided revisions to the article. J. Wang and R. J. Iannotti made substantive contributions to the analysis plan, interpretation of the results, and revisions to the article.

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Human Participant Protection

The study was approved by the institutional review board at the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

References

- Dahlberg LL, Mercy JA. The history of violence as a public health issue. *Virtual Mentor*. 2009;11(2):167–172.
- Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System. Available at: <http://www.cdc.gov/injury/wisqars/index.html>. Accessed February 5, 2013.
- Juvonen J, Graham S, Schuster MA. Bullying among young adolescents: the strong, the weak, and the troubled. *Pediatrics*. 2003;112(6 part 1):1231–1237.
- Wang J, Nansel TR, Iannotti RJ. Cyber and traditional bullying: differential association with depression. *J Adolesc Health*. 2011;48(4):415–417.
- Farrington DP, Lösel F, Ttofi MM, Theodorakis N. *School Bullying, Depression and Offending Behaviour Later in Life: An Updated Systematic Review of Longitudinal Studies*. Stockholm, Sweden: The Swedish National Council for Crime Prevention; 2012.
- Gini G, Pozzoli T. Association between bullying and psychosomatic problems: a meta-analysis. *Pediatrics*. 2009;123(3):1059–1065.
- Ttofi MM, Farrington DP, Lösel F, Loeber R. The predictive efficiency of school bullying versus later offending: a systematic/meta-analytic review of longitudinal studies. *Crim Behav Ment Health*. 2011;21(2):80–89.
- Ttofi MM, Farrington DP, Lösel F. School bullying as a predictor of violence later in life: a systematic review and meta-analysis of prospective longitudinal studies. *Aggress Violent Behav*. 2012;17(5):405–418.
- Gibb SJ, Horwood LJ, Fergusson DM. Bullying victimization/perpetration in childhood and later adjustment: findings from a 30 year longitudinal study. *J Aggress Conflict Peace Res*. 2011;3(2):82–88.
- Hawker DSJ, Boulton MJ. Twenty years' research on peer victimization and psychosocial maladjustment: a meta-analytic review of cross-sectional studies. *J Child Psychol Psychiatry*. 2000;41(4):441–455.
- Fisher HL, Moffitt TE, Houts RM, Belsky DW, Arseneault L, Caspi A. Bullying victimisation and risk of self harm in early adolescence: longitudinal cohort study. *BMJ*. 2012;344(7855):e2683.
- Pickett W, Craig W, Harel Y, et al. Cross-national study of fighting and weapon carrying as determinants of adolescent injury. *Pediatrics*. 2005;116(6):e855–e863.
- DuRant RH, Krowchuk DP, Kreiter S, Sinal SH, Woods CR. Weapon carrying on school property among middle school students. *Arch Pediatr Adolesc Med*. 1999;153(1):21–26.
- Estell DB, Farmer TW, Cairns BD, Clemmer JT. Self-report weapon possession in school and patterns of early adolescent adjustment in rural African American youth. *J Clin Child Adolesc Psychol*. 2003;32(3):442–452.
- Forrest K, Zychowski AK, Stuhldreher W, Ryan WJ. Weapon-carrying in school: prevalence and association with other violent behaviors. *Am J Health Stud*. 2000;16(3):133–140.
- Bailey SL, Flewelling RL, Rosenbaum DP. Characteristics of students who bring weapons to school. *J Adolesc Health*. 1997;20(4):261–270.
- Youth Risk Behavior Surveillance—United States. Atlanta, GA: Centers for Disease Control and Prevention, Office of Surveillance, Epidemiology and Laboratory Services; 2011. Report no. 61(4).
- Molcho M, Craig W, Due P, et al. Cross-national time trends in bullying behaviour 1994–2006: findings from Europe and North America. *Int J Public Health*. 2009;54(suppl 2):S225–S234.
- Wang J, Iannotti RJ, Nansel TR. School bullying among adolescents in the United States: physical, verbal, relational, and cyber. *J Adolesc Health*. 2009;45(4):368–375.
- Roberts C, Currie C, Samdal O, Currie D, Smith R, Maes L. Measuring the health and health behaviours of adolescents through cross-national survey research: recent developments in the Health Behaviour in School-aged Children (HBSC) study. *J Public Health (Bangkok)*. 2007;15(3):179–186.
- Solberg ME, Olweus D. Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. *Aggress Behav*. 2003;29(3):239–268.
- Olweus D. The Revised Olweus Bully/Victim Questionnaire [N05015]. Bergen, Norway: Research Center for Health Promotion, University of Bergen; 1996.
- Srabstein JC, Berkman BE, Pyntikova E. Anti-bullying legislation: a public health perspective. *J Adolesc Health*. 2008;42(1):11–20.
- Ttofi MM, Farrington DP. Effectiveness of school-based programs to reduce bullying: a systematic and meta-analytic review. *J Exp Criminol*. 2011;7(1):27–56.
- Sacco D, Baird Silbaugh K, Corredor F, Casey JA, Doherty D. An overview of state anti-bullying legislation and other related laws. Cambridge, MA: Berkman Center Research; 2012. Report no. 2013-4.
- National Center for Mental Health Promotion and Youth Violence Prevention. Bullying prevention state laws. Available at: <http://www.promoteprevent.org/bullying-prevention-state-laws>. Accessed February 5, 2013.
- Analysis of state bullying laws and policies. Washington, DC: US Department of Education, Office of Planning, Evaluation and Policy Development; 2011.
- Weaver LM, Brown JR, Weddle DB, Aalsma MC. A content analysis of protective factors within states' antibullying laws. *J Sch Violence*. 2012;12(2):156–173.
- UK Observatory. Violence in Schools Training Action 2003–2006. Available at: <http://www.ukobservatory.com/projects/project5.html>. Accessed February 5, 2013.
- US Department of Health and Human Services. StopBullying.gov. Available at: <http://www.stopbullying.gov>. Accessed February 5, 2013.
- Network of Centers of Excellence of Canada, Queens University. Promoting Relationships and Eliminating Violence Network. Available at: <http://www.pvnet.ca>. Accessed February 5, 2013.
- Matjasko JL, Vivolo-Kantor AM, Massetti GM, Holland KM, Holt MK, Dela Cruz J. A systematic meta-review of evaluations of youth violence prevention programs: common and divergent findings from 25 years of meta-analyses and systematic reviews. *Aggress Violent Behav*. 2012;17(6):540–552.
- Fagan AA, Catalano RF. What works in youth violence prevention: a review of the literature. *Res Soc Work Pract*. 2013;23:141–156.
- Office of the Surgeon General, National Center for Injury Prevention and Control, National Institute of Mental Health, Center for Mental Health Services. *Youth Violence: A Report of the Surgeon General*. Rockville, MD: Office of the Surgeon General; 2001.
- National Center for Education Statistics, US Department of Education. Indicators of school crime and safety: 2011. Available at: <http://nces.ed.gov/fastfacts/display.asp?id=334>. Accessed February 5, 2013.
- Wilson-Brewer R, Spivak H. Violence prevention in schools and other community settings: the pediatrician as initiator, educator, collaborator, and advocate. *Pediatrics*. 1994;94(4 part 2):623–630.
- Schreck CJ, Miller JM, Gibson CL. Trouble in the school yard: a study of the risk factors of victimization at school. *Crime Delinq*. 2003;49(3):460–484.
- Johnson RS. Metal detector searches: an effective means to help keep weapons out of schools. *J Law Educ*. 2000;29(2):197–203.
- Violence-related attitudes and behaviors of high school students: New York City, 1992. Atlanta, GA: Centers for Disease Control and Prevention; 1993.
- Skiba RJ, Knesting K. Zero tolerance, zero evidence: an analysis of school disciplinary practice. *New Dir Ment Health Serv*. 2001;92:17–43.
- Boccanfuso C, Kuhfeld M. Multiple responses, promising results: evidence-based, nonpunitive alternatives to zero tolerance. Brief. *Child Trends*; 2011. Report no. 2011-09.
- Gagnon JC, Leone PE. Alternative strategies for school violence prevention. *New Dir Ment Health Serv*. 2001;92:101–125.
- Bauman S, Toomey RB, Walker JL. Associations among bullying, cyberbullying, and suicide in high school students. *J Adolesc*. 2013;36(2):341–350.