Weapon Carrying, Gun Carrying, and Fighting among U.S. High School Students

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Abstract

We undertook this study to identify risk factors for weapon carrying (at school and elsewhere), gun carrying, and physical fighting (at school and elsewhere). We analyzed data files from the 1995 and 1997 national Youth Risk Behavior Surveys of U.S. students in grades 9 through 12. We identified two risk factors—use of alcohol or marijuana on school property and being threatened or injured with a weapon at school—that were closely associated with all of the problem behaviors described. Of the risk factors examined, those that significantly predicted one problem behavior generally predicted the other problem behaviors as well. Although weapon carrying and fighting are distinct phenomena (i.e., only fighting is violent per se), they are both indicative of a general pattern of problem behavior in school and the broader community. We discuss some shortcomings of common survey research approaches to weapon carrying among youth.

Introduction

A considerable volume of time series data indicates that serious youth violence, and especially firearm-related youth violence, has declined since its peak in the early 1990s. Homicides of juveniles peaked at about 2,800 in 1993 and declined to approximately 2,100 in 1997, roughly as many as in 1989 (Snyder & Sickmund, 1999). Nearly all of the increase in the number of murdered juveniles during the early 1990s can be accounted for by an increase in firearm-related homicides involving victims between 12 and 17 years of age. Of the juveniles murdered in 1997, 56% were killed with a firearm (Snyder & Sickmund, 1999). Data from the National Crime Victimization Survey (NCVS) show that the serious violence victimization rate for juveniles ages 12–17 declined from a peak of about 38 per 1,000 in 1993 to about 28 per 1,000 in 1996 (Snyder & Sickmund, 1999). Using data from its national Youth Risk Behavior Survey, the Centers for Disease Control and Prevention (CDC) reports significant ($p<.05$) declines between 1993 and 1997 in the number of high school students carrying a weapon (anywhere), carrying a gun (anywhere), carrying weapon on school property, fighting (anywhere), and fighting on school property (CDC, 1999).

Other indicators of youth violence at school and in the wider community have shown less dramatic improvement. The CDC reports no improvement in the proportion of high school students who felt too unsafe to go school or who were threatened or injured with a weapon on school property (CDC, 1999). Data from the Monitoring the Future Study show that the percentage of high school seniors injured with a weapon increased from 4.7% in 1986 to 5.6% in 1990, then declined more modestly to 5.0% in 1995 and 1998 (Maguire & Pastore, 1999). The trend on injuries with a weapon at school among high school seniors moved more substantially from 5.4% in 1986 to 5.8% in 1990 before declining to 4.9% in 1995 and 4.6% in 1998 (Maguire & Pastore, 1999). Students in grade 12 who were threatened (but not injured) with a weapon increased from 15.8% in 1986 to 18.1% in 1990 and leveled off at 17.9% in 1995 and 17.7% in 1998. Threats with weapons against 12th graders at school held steady at 13.2% in 1986 and 1990 and 13.3% in 1995 before dropping recently to 11.0% in 1998 (Maguire & Pastore, 1999).

Even after this mixed bag of declining and steady trends, youth violence and weapon carrying remain at high levels. In 1997, 18.3% of U.S. high school students carried a weapon, 5.9% carried a gun, and 8.5% carried a weapon on school property (CDC, 1999). More than 1 in 3 (36.6%) were involved in a fight, 14.8% were in fights at school, 7.4% were threatened or injured with a weapon, and 4.0% stayed home from school on at least one day because they felt too unsafe to attend (CDC, 1999).

This study examines risk factors for weapon carrying, gun carrying, and physical fighting among U.S. students in grades 9 through 12. Previous studies have identified a variety of risk factors for weapon carrying including: gang affiliation (Simon et al., 1997), known weapon carrying by a peer or older associate (Myers et al., 1997), marijuana use (McNabb et al., 1996), and not knowing that an apology may prevent a fight (Kingery et al., 1996b). See Kingery et al. (1999) for a more thorough review of risk factors for youth weapon carrying. Valois & McKewon (1998), using data from a survey of South Carolina high school students, identified alcohol use, use of illegal drugs, and recent sexual intercourse as risk factors for physical fighting. A separate analysis of the same South Carolina data found that the same risk factors also predicted weapon carrying (McKeown et al., 1998).

A study of youth in inner-city Miami found that race/ethnicity was not a significant predictor of weapon-carrying, fighting and associated attitudes (Kingery et al., 1996a). The only difference related to race/ethnicity was weapon preference: Non-Hispanic blacks preferred guns while Hispanics and non-Hispanic whites preferred knives. Among black immigrants, the preference for firearms was positively related to the number of years they had resided in the U.S.

Weapon carrying and physical fighting are different phenomena. Weapon carrying is not a violent behavior in itself, whereas fighting is explicitly violent. Despite this important difference, numerous studies have documented that the two behaviors are closely related, especially among youth (see Lowry et al., 1998). Youth who carry weapons are more likely than youth who do not carry weapons to report fighting. Similarly, youth who fight are more likely to report weapon carrying than are youth who do not fight. This similarity in the risk factors for the two behaviors should not obscure the possibility that a substantial minority of the youthful weapon carriers detected by self-report surveys may be non-assaultive weapon carriers. An anonymous survey of 11th graders in Seattle public schools in 1990 found that 22% of male handgun owners did not report gang membership, sentencing by a judge,

selling illegal drugs, suspension or expulsion from school, or assault and battery (Callahan & Rivara, 1992).

By sharpening our methods, it may be possible to distinguish those youth who carry weapons, even "at school" or "on school property", for legitimate recreational or self-defensive purposes from those assaultive weapon carriers who represent the real threat to public safety. Greater attention to the nuance of weapon carrying among youth may yield better insights for policy making. Unfortunately, the data used in this study do not permit the attention to the nuances that we recommend. The data described here do illustrate the need for more careful study of the nuances of weapon carrying among youth, however.

This study is based on a cross-sectional data file that contains variables on a variety of risk-taking behaviors (e.g., seat belt use, sexual behavior, substance use, and school violence) in addition to basic demographics. That is, the data file does not contain the sort of variables required to construct satisfying causal models of the three problem behaviors of interest. Instead, we have conducted a risk factor study that attempts to move beyond yet another demonstration that risk-taking behavior predicts risk-taking behavior. The contribution of this study, we believe, lies in our focus on differences in the risk factors that predict related behaviors, such as weapon carrying at school as compared to weapon carrying elsewhere. The basic methods we employ virtually duplicate those developed by Simon, Crosby, and Dahlberg (1999). Whereas Simon et al. (1999) examined only weapon carrying in a data file from 1995, however, we have examined weapon carrying, gun carrying, and physical fighting in data files from 1995 and 1997.

Methods

The data for this study come from the national-level surveys of the Youth Risk Behavior Surveillance (YRBS) System from 1995 and 1997. The national YRBS survey is conducted biennially by the Centers for Disease Control and Prevention (CDC) on a stratified, three-stage cluster sample designed to be representative of students in public and private schools in grades 9-12 in the 50 states and the District of Columbia. At the first stage in the both 1995 and 1997, the sampling frame was comprised of about 2,000 primary sampling units (PSUs) stratified by urbanization and percentage (non-Hispanic) black and Hispanic (Kann et al., 1996, 1998). Of these, approximately 50 were selected with probability proportional to school enrollment. At the second stage, 150-200 schools were selected with probability proportional to school enrollment. Schools with higher proportions of enrolled black and Hispanic students were oversampled at this stage. At the third and final sampling stage, one or two classes of a required subject were randomly selected from each school. All students in the selected classes were eligible to complete the self-administered questionnaire, so that cluster sampling was applied only at the third stage.

Weights were developed for each student who completed the survey to correct for differences in the probability of selection and the oversampling of ethnic minorities. In 1995, 10,094 questionnaires were completed by students in 110 schools. The school response rate was 70 percent and the student response rate was 86 percent, yielding an overall response rate of 60 percent, without accounting for item non-response (Kann et al., 1996). In 1997, 16,262 questionnaires were completed by students in 151 schools. The school response rate was 79 percent and the student response rate was 87 percent, for an overall response rate of 69 percent, without adjusting for item non-response (Kann et al., 1998). In both 1995 and 1997, the YRBS survey was administered during the Spring semester.

We acquired public-use versions of both the 1995 and 1997 data files from the CDC. The public-use file from 1995 lacked two variables that were present in the data file examined by Simon et al. (1999). Their file included school-level variables on the percentage of students eligible for subsidized lunches and metropolitan status. Data was also missing from our data file on the geographic region of one of the PSUs. Since the PSU with the missing data was one of only two PSUs in its stratum, it was not possible for us to include geographic region in any of our models. Since the data file used by Simon et al. (1999) was more complete, we refer the reader to their report for information on the degree of association between these variables and weapon carrying.

We performed virtually identical analyses on both the 1995 and 1997 YRBS data files. The analyses were only *virtually* identical because the 1995 data file did not contain a variable equivalent to the metropolitan status variable included in the 1997 data file. In the interest of brevity, this report focuses on our analysis of the more complete and more current data from 1997. We have noted, however, instances where our results from both data files are both comparable and interesting. Results from the 1995 data file may be obtained from the authors.

We performed all of our statistical analyses using

Intercooled Stata 6.0, which is capable of accounting for complex sampling designs when calculating standard errors (Stata Corp., 1999). Since all of our dependent variables are dichotomous, we elected to perform logistic regression analysis using the SVYLOGIT procedure in Stata. While this procedure allows the accurate estimation of the standard errors, it is based on a pseudo-likelihood rather than a true likelihood. Consequently, post hoc likelihood ratio tests to assess goodness of fit are not appropriate (Stata Corp., 1999: 328).

Outcome Measures

We used five items from the YRBS questionnaire to construct our outcome measures. Two of the items concerned weapon carrying generally in the 30 days prior to the survey:

- During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club?
- During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club on school property?

From these two items we constructed three dichotomous variables. The first of these was equal to 1 for respondents who reported carrying a weapon but who reported that they had not carried a weapon on school property. This first variable was equal to 0 for respondents who reported that they had neither carried a weapon on school property nor carried a weapon anywhere else in the prior 30 days. The second weapon carrying dichotomy contrasted respondents who reported carrying a weapon on school property (equal to 1) with respondents who reported that they had neither carried a weapon on school property nor carried a weapon anywhere else (equal to 0). The third weapon carrying dichotomy contrasted respondents who reported carrying a weapon on school property (equal to 1) with those who reported that they had carried a weapon but that they had not carried a weapon on school property (equal to 0).

We applied similar logic to construct three dichotomous variables on gun carrying using the following two items from the questionnaire:

- During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club?
- During the past 30 days, on how many days did you carry a gun?

The first dichotomous variable was designed to contrast respondents who had carried a weapon but had not carried a gun (equal to 1) with respondents who reported that they had neither carried a gun nor any type of weapon in the 30 days prior to the survey (equal to 0). The second variable contrasted respondents who reported carrying a gun (equal to 1) with respondents who had not carried a gun or any other type of weapon (equal to 0). The third variable contrasted gun carriers (equal to 1) with respondents who had carried weapons other than guns (equal to 0). The reader should note that the 'no weapon carrying' reference group in the first two gun carrying variables is not precisely equivalent to the 'no weapon carrying' reference group in the first two weapon carrying variables. To be included in the 'no weapon carrying' group in the weapon carrying variables, the respondent must have answered negatively to both weapon carrying items. Similarly, to be included in the 'no weapon carrying' group in the gun carrying variables, the respondent must have answered negatively to both gun carrying variables. In 1995, one respondent answered both gun-carrying items negatively but did not respond to the item about weapon carrying on school property. Consequently, this respondent was included in the 'no weapon carrying' group for the gun carrying dichotomies but was coded as missing for the weapon carrying dichotomies. In the 1997 sample, five respondents answered these items with the same response pattern and were coded in the same manner as the 1995 respondent.

The logic behind the construction of the three physical fighting outcome variables is exactly parallel to that applied to the construction of the weapon carrying outcome variables. The original physical fighting items on the YRBS survey were as follows:

- During the past 12 months, how many times were you in a physical fight?
- During the past 12 months, how many times were you in a physical fight on school property?

Risk Factors

Several items related to the sociodemographic characteristics of respondents and additional items inquiring about other risky behaviors were examined as potential risk factors. Sociodemographic variables included gender, race/ethnicity, grade level, parental education, and (in 1997 only) urbanicity. With the exception of parental education, the derivation of the indicator variables from the original variables in the data file is simple and does not require additional explication.

The parental education indicator variables were derived from two items on the original questionnaire. The first item asked: "How much education does your mother have?" Response options ranged from

"Did not finish high school" to "She graduated from college". An additional response option, "Not sure" was also offered. The second item offered identical response options and parallel question phrasing except that it concerned the extent of the father's education. Neither item specifies whether the parent upon whom the response is based should be the biological, step-, foster, or resident parent.

To generate indicator variables from these two items, we recoded the "Not sure" responses to missing. Respondents who provided information on the education of both their mother and father were assigned a parental education score corresponding to the greater of the two values. Thus, a respondent with one college graduate parent and one parent who did not complete high school would be assigned the same value as a respondent with two college graduate parents. If information was provided on the education of only one parent, the respondent was assigned a parental education score based on the attainment of that parent alone. Respondents who did not answer either of the items validly were scored as missing. This logic was adopted because it seemed plausible to suppose that this would maximize the validity of the parental education score as a proxy for socio-economic status. In addition, this logic most closely replicated the results of Simon et al. (1999) using the 1995 YRBS data file.

In addition to sociodemographic factors, we also examined measures of substance use (cigarettes, alcohol, and marijuana) at school and elsewhere, receiving an offer of drugs on school property, property crime victimization at school, aggravated assault victimization at school, self-perceived school safety, suicide attempts, and sexual activity.

Results

The prevalence of the dependent variables and our key risk factors related to substance use is described in Table 1. Among the high school students surveyed, 18.2% reported carrying a weapon of some type somewhere in the 30 days preceding the survey. Of those weapon carrying students, 46.1% (or 8.4% of the entire sample) reported carrying a weapon on school property during the same time period. Gun carrying (anywhere) was less common than weapon carrying (of any type) on school property; 5.8% of the entire sample (32.0% of the weapon carriers) had carried a gun somewhere in the previous 30 days. The survey did not permit us to estimate the prevalence of gun carrying at school.

More than 1 in 3 students (36.6%) reported fighting in the 12 months preceding the survey, and 14.8% reported involvement in one or more fights at school in that time. The percentage of fighters who fought at school (40.5%) was somewhat less than the percentage of weapon carriers who carried weapon on school property (46.1%).

Half (50.8%) of the students in grades 9-12 reported using alcohol in the past 30 days making alcohol the most commonly used of the three substances examined. Few students (5.6%) reported using alcohol on school property, however. About 1 in 4 (26.2%) of students reported current marijuana use, and 6.9% reported using marijuana on school property in the past 30 days. Cigarettes, in contrast to alcohol and marijuana, are commonly used by students at school (15.2%) and elsewhere (36.3%).

Tables 2a and 2b present coefficients from nine logistic regression models that predict weapon carrying, gun carrying, and physical fighting using only sociodemographic independent variables. Across all nine models, gender is among the most predictive variables, even after controlling for ethnicity, parental education, grade, and metropolitan status. In eight of the nine models, males are more likely than females to engage in the risky behavior. The ninth model, however, indicates that, among weapon carriers, females are more likely than males to carry weapons on school property.

Among weapon carriers, non-Whites were more likely than Whites to report carrying guns (Table 2a). In our parallel analysis of the 1995 YRBS data file, we controlled for gender, ethnicity, and grade but not for parental education or metropolitan status. We found that, among weapon carriers, Black students and "Others" were significantly more likely than Whites to carry guns.

Physical fighting, both on school property and elsewhere, is related to both grade level and parental education in addition to gender (Table 2b) after controlling for gender, ethnicity, and metropolitan status. Among students who report fighting, Black and Hispanic students are more likely than White students to report fighting at school.

Tables 3a and 3b display the results of attempts to predict the same nine outcome variables related to weapon carrying, gun carrying, and physical fighting using other self-reported risk behaviors. All odds ratios are adjusted for gender, but they are not adjusted for the other variables in the table. Three of the models comparing students who carried weapons on school property with those who carried weapons elsewhere were not statistically significant. The value of the *F* test of the null hypothesis that all of the beta coefficients in the model (including the coefficient for gender) equal zero was not significant

($p>.05$).

Both the 1995 and 1997 data indicated that students who reported using alcohol on school property were much more likely to report weapon carrying on school property, gun carrying, and fighting on school property. Self-reported marijuana use on school property was also highly predictive of the same three outcomes in both 1995 and 1997. Cigarette use at school was also moderately predictive of weapon carrying at school, gun carrying, and fighting at school. Self-reported use of these three substances—cigarettes, alcohol, and marijuana—elsewhere, other than at school, was only weakly related to the outcome variables. These relationships were similar in magnitude and identical in direction in the 1995 data.

Being the victim of a property crime at school was weakly related to weapon carrying, gun carrying, or physical fighting. Being the victim of an aggravated assault on school property was highly predictive of gun carrying, weapon carrying at school, and physical fighting at school. Skipping school due to fear of attack at school or while traveling between school and home was also associated with these problem behaviors. Attempting suicide was also moderately related to gun carrying, weapon carrying at school, and fighting at school. Having sexual intercourse was moderately related to gun carrying but was weakly related to weapon carrying and fighting at school. We obtained similar results using the 1995 data file.

None of the variables in Tables 3a or 3b were strong predictors of weapon carrying off school property, non-gun weapon carrying (anywhere), or physical fighting off school property. Alcohol and marijuana use on school property and being the victim of an aggravated assault on school property were moderately related to non-gun weapon carrying (anywhere), weapon carrying off school property, and physical fighting off school property. The remaining behavioral risk factors in Tables 3a and 3b were only weakly related to fighting and weapon carrying off school property and non-gun weapon carrying (anywhere). Once again, the 1995 data closely matched these findings from 1997.

Tables 4a and 4b display the results of an attempt to construct the best fitting models of the nine outcome variables based on the results from the preceding tables. Unfortunately, since the logistic regression procedure used is based on a pseudo-likelihood, it is not possible to conduct goodness-of-fit tests to assess the models. Consequently, the decision to include or exclude any of the available independent variables was based our best guess about their collective predictive power.

Gender remains among the strongest risk factors predicting eight of the nine outcome variables. It bears noting that once this assortment of behavioral and sociodemographic variables is included, female weapon carriers are no longer significantly more likely than male weapon carriers to bring weapons to school. We obtained a similar finding with the 1995 data file.

Grade level is generally not predictive of the weapon carrying outcomes, but it does predict physical fighting. Students in lower grades are more likely to report fighting. This relationship is somewhat stronger with respect to fighting on school property. Our analysis of the 1995 data file also found that grade level was an important predictor of physical fighting. We also found that 9^{th} graders, in 1995, were significantly more likely than 12^{th} graders to carry a weapon on school property or off school property, to carry a gun, and to carry a non-gun weapon. The 9^{th} graders of 1995 were the 11^{th} graders of 1997, so a cohort effect may be responsible for the two statistically significant coefficients for 11^{th} graders in Table 4a.

Being offered drugs on school property and having property stolen or damaged at school were both positively, but weakly, related to weapon carrying and physical fighting. Drug offers and property crime victimization were not related to gun carrying.

Students who reported being threatened or injured with a weapon at school were more likely to carry weapons both on school property and elsewhere, to carry a gun, and to fight on school property and elsewhere. In 1995, being threatened or injured with a weapon on school property was not significantly related to fighting off school property but was related to non-gun weapon carrying. Being the victim of an aggravated assault at school did not distinguish students who carried weapon on school property from other weapon carriers in either the 1995 or 1997 data files.

In 1997, students who skipped school out of fear for their safety at school (or in route to and from school) were at elevated risk for weapon carrying at school and for gun carrying. In 1995, students who stayed home for safety reasons were more likely to report weapon carrying at school and *non*-gun weapon carrying. In both data files, skipping school due to safety concerns was not related to weapon carrying off school property or to any of the physical fighting outcome variables.

Use of alcohol or marijuana on school property was associated with a heightened risk of weapon carrying, gun carrying, and fighting at school. Use of these substances at school was among the best

predictors of weapon carrying at school and gun carrying in both 1995 and 1997, while its association with physical fighting was relatively weak. Students who reported that they have had sexual intercourse had an elevated risk of all three categories of outcome variables—weapon carrying, gun carrying, and physical fighting.

Table 5 represents an attempt to express the practical predictive power of several of the risk factors that have been examined in this study. For each risk factor variable, the table expresses the percentages of the sample that were in each category of the outcome variables. It has been noted throughout that gender is among the strongest predictors of weapon carrying, gun carrying, and physical fighting. Table 5 clearly indicates that using gender alone to predict these behaviors would result in a high false positive rate. Males are at greater risk than females, but 72.4% of males did not report weapon carrying of any kind and more than half (55.0%) did not report any fighting. Similarly, grade, when used alone, is not a very discerning predictor of these outcomes, although 9th graders are at a somewhat elevated risk, especially for fighting at school.

When used alone, being the victim of an aggravated assault at school yields the lowest false positive rates. More than half (53.9%) of students who reported being threatened with a weapon at school reported that they had carried a weapon themselves. Nearly one-third (30.7%) of such students had carried a weapon at school and nearly 1 in 4 (24.3%) had carried a gun. The variable capturing use of alcohol or marijuana on school property yielded a similarly low false positive rate when used alone. Nearly half (47.3%) of the students surveyed who had used alcohol or marijuana on school property reported carrying a weapon, 29.7% reported carrying a weapon on school property, and 21.7% reported carrying a gun. Nearly 2 in 3 students (65.7%) who reported using alcohol or marijuana at school reported that they had been in a physical fight, including 35.0% who reported fighting at school.

Table 5 also presents a simple examination of the interaction of gender, race, and urbanicity with the three problem behaviors of interest in this study. The prevalence of weapon carrying, gun carrying, and fighting among urban Black males is compared with the prevalence among suburban White males and rural White males. Most of the attention related to youth violence focuses on these three groups of students as the most likely perpetrators of serious violence. Weapon carrying off school property is most prevalent among urban Black males (20.7%), is only slightly less prevalent among rural White males (18.3%), and is substantially less prevalent among suburban White males (12.9%). Weapon carrying on school property was most common among rural White males (19.1%) and least common among urban Black males (7.8%). Rural White males were most likely to report carrying non-gun weapons (22.3%) and urban Black males were least likely to carry non-gun weapons (12.9%). Urban Black males and rural White males were about equally likely to report gun carrying (15.6% and 15.1%, respectively). Gun carrying was relatively rare among suburban White males (4.7%). Overall, rural White males were most likely to report carrying a weapon of some type somewhere (37.4%) and suburban White males were least likely to report weapon carrying (25.3%).

The prevalence of fighting at school was similar for the three groups of males. Fighting off school property was more common among urban Black males (27.7%) and least common among rural White males (21.8%).

Discussion

Perhaps the greatest weakness of this study is that the YRBS questionnaire does not ask respondents to report whether they involved in the selling of drugs or whether they are affiliated with a gang. These two variables, which are missing from this analysis, are likely to be among the most important predictors of weapon carrying and violent victimization and perpetration both in and out of school. Had we been able to control for these two factors, the odds ratios for the risk factors that we were able to include may have been dramatically different.

In addition, the YRBS samples include only current students. Expelled, suspended, or truant students, who may have been more likely to report the outcome behaviors, were not surveyed. Had these categories of students been included, we would expect to find a pattern of covariation between the risk behaviors similar to what we have described here. Some of the relationships, between aggravated assault and alcohol use at school and weapon carrying for example, may have been markedly stronger, however.

One of the more intriguing findings of this study is that, among students reporting weapon carrying, females were more likely than males to carry a weapon on school property after controlling for race/ethnicity, grade, and parental education (Table 2a). A similar analysis of the 1995 YRBS data file uncovered the same finding (Simon et al., 1999).

Two explanations have been offered. Females may carry weapons primarily for self-protection, a rationale that may motivate them to arm themselves in school and elsewhere. Males, by contrast, are more likely than females to carry guns and knives for sporting purposes (e.g., hunting, fishing, and target shooting) as well as for self-protection. To the extent that there are more males than females who carry weapons for sporting purposes, which would generally not motivate weapon carrying at school, and do not arm themselves for self-protection, we would expect to find a lower proportion of male weapon carriers armed at school (Simon et al., 1999).

Gender differences in the types of weapons preferred may also account for the finding that female weapon carriers are more likely to carry weapons on school property (Simon et al., 1999). Our preliminary analysis of the School Crime Supplement to the 1995 National Crime Victimization Survey indicates that, among students ages 12 to 19 who report self-protective weapon carrying at school, females are more likely to report carrying mace or pepper spray even after controlling for urbanicity and grade.[*] Males are more likely to carry guns (Table 5). Keeping guns out of school is a priority (or at least an object of lip service) among school administrators, but the same officials may be less vigilant in their efforts to prevent students from carrying mace and pepper spray at school. An administrator with such priorities may believe that mace and pepper spray are less likely to be used offensively because of the inherent nature of the weapons or the less violent propensities of the students (i.e., females) most inclined to carry them. Whatever the reason, if schools are less vigilant against mace than against guns, females may be more inclined to carry their preferred weapons at school while a greater proportion of male weapon carriers may leave theirs at home.

The YRBS questions on weapon carrying (anywhere) and weapon carrying on school property explicitly mention guns (as well as knives and clubs) as weapons but do not mention mace or pepper spray. The argument that a substantial number of female weapon carriers are carrying mace or pepper spray at school assumes that these respondents reported their behavior as weapon carrying even though chemical agents were not included among the examples of weapons in the questions.

Gun carrying is more common among rural students than among suburban or urban students (Table 2a; Table 5). This finding is consistent with the hypothesis that a substantial proportion of gun carrying reported by adolescents is related to sporting purposes. Weapon carrying on school property is also more common among rural students than among their suburban or rural counterparts. Some of these weapons are probably small, folding-blade knives that are thought of primarily as tools rather than weapons by the youth who carry them. In addition, many youth attending rural high schools drive privately owned automobiles to school. In the absence of automobile searches by security personnel, a car in the parking lot becomes a convenient place to keep a gun, hunting knife, or bow "on school property" without carrying it inside the school building.

In high school, students in lower grades (i.e., younger students) are more likely than older students to fight (Table 5), even after controlling for gender, race/ethnicity, parental education, and metropolitan status (Table 2b). There are at least three plausible explanations for this phenomenon. Older students may be more intellectually mature and, therefore, better equipped to defuse confrontational situations without resorting to violence. Older students may also avoid fights through deterrence effects resulting from their superior physical development (i.e., greater height and weight, especially among males), their higher status within the student body, and their established peer networks. Or, the apparent relationship between grade level and fighting may be an artifact of the sampling of current students who were present on day of the survey. If older students who are inclined to fight have a higher rate of drop out, truancy, suspension, or expulsion they would have been less likely to complete the survey than non-fighting students of the same age.

Our analyses build a strong case for arguing that using alcohol or marijuana at school and being the threatened or injured with a weapon at school are discerning predictors of all of the problem behaviors we examined (Table 5). These two variables seem to be especially strong risk factors regardless of whether they are used to predict the problem behaviors alone or in combination with other risk factors or basic demographic characteristics (e.g., gender, grade).

The use of alcohol or marijuana was widespread in this sample of high school students. More than half (50.8%) reported alcohol use and more than a quarter (26.2%) reported marijuana use. Use of these drugs on school property was relatively rare, however, with only 5-7% reporting use of either substance at school. Students who choose to use either or both of these substances have ample opportunity to use them when the likelihood and

[*] This analysis has not been finalized but some charts illustrating this relationship are available on our website: http://www.hamfish.org.

consequences of being caught are fairly low (e.g., private, weekend parties). The likelihood and consequences of being caught are relatively high if one chooses to use these substances at school. It seems likely that those who use alcohol and marijuana at school have: (1) an especially low regard for the authority of their school, (2) an especially low desire to attend school, or (3) an especially strong addiction to these substances. It is easy to appreciate why these first two groups may also be inclined to defy school rules by fighting or carrying weapons.

Students who reported being threatened or injured with a weapon at school were also at greater risk for weapon carrying, gun carrying, and fighting. Unfortunately, the cross-sectional YRBS data file does not afford any means of investigating whether the aggravated assault victimization preceded or followed the fighting and/or weapon carrying.

In addition, this analysis indicates that, among high school students, carrying a weapon is a significant risk factor for physical fighting and vice versa (Tables 4a, 4b, 5). This relationship is weaker among rural white males than among suburban white males or urban black males, however. In light of the fact that rural white males have the highest reported prevalence of weapon carrying, we would expect them to have a relatively high prevalence of physical fighting. Instead, the data indicate that they are relatively less likely or report fighting at school or elsewhere. We suspect that this notable irregularity is partially attributable to the construction of the questions on the YRBS survey instrument.

The YRBS questions related to weapon carrying, gun carrying, and fighting are probably less valid measures of risk of violent perpetration or victimization among rural white males than they are among suburban white males and urban black males. First, the carrying of weapons for sporting purposes is more common in rural areas than in suburban or urban areas, and these differences are probably especially pronounced among youth. Second, as noted before, rural high school students are more likely to drive privately owned automobiles to school. This provides them with a fairly secure place to keep weapons "on school property" without venturing to carry them into the school building. In many cases, rural students who keep weapons in their cars probably do so without any intention or inclination to put their weapons to criminal use. The YRBS questionnaire does not distinguish these students from those who carry weapons inside the school building during the school day.

An ideal data file for examining risk factors for weapon carrying at school and elsewhere would include items to assess the respondent's mode (e.g., in a car, on my person, in a bag) of weapon carrying and/or their motivation (e.g., self-protection, sporting purposes, other) for weapon carrying. We believe that such a data file would permit a distinction to be drawn between non-assaultive weapon-carrying youth, who carry weapons purely for legitimate recreational or self-defensive purposes, from assaultive weapon carriers. Were such a distinction made, we would expect to find that substance use, fighting, and violent victimization are closely related to assaultive weapon carrying but not to non-assaultive weapon carrying.

Conclusion

The picture of weapon carrying, gun carrying, and fighting portrayed by this analysis is highly consistent with the results of previous research. Boys are more likely than girls to report each of these behaviors. Youth who report engaging in one risky behavior typically engage in other risky behaviors as well. And, youth who carry weapons are often victims of weapon-related violence at school.

Use of alcohol or marijuana on school property and being threatened or injured with a weapon at school were among the strongest predictors of the problem behaviors of interest to this study—weapon carrying at school and elsewhere, gun carrying, and physical fighting at school and elsewhere.

Our assessment of the relative prevalence of these problem behaviors among urban black males, suburban white males, and rural white males lead us to suggest that the YRBS data are probably not equally valid for all three groups. Rural white males are most likely to carry weapons but they are least likely to fight. We speculated that differences in the way weapons are used and carried in rural areas, as compared to more urban areas, probably account for this observation.

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Tables

Table 1. Number and Weighted Percentage of Students (Grades 9-12) Reporting Weapon Carrying, Substance Use, Involvement in Physical Fights, and Gun Carrying

	A. Any Involvement in the Behavior (weighted %)	B. Involvement in the Behavior While on School Property (weighted %)	Weighted % of Columns B/A
Weapon Carrying (30 days)	18.2	8.4	46.1
Cigarette Use (30 days)	36.3	15.2	41.8
Alcohol Use (30 days)	50.8	5.6	11.0
Marijuana Use (30 days)	26.2	6.9	26.5
Physical Fighting (12 mos)	36.6	14.8	40.5
	A. Any Involvement in the Behavior (weighted %)	B. Gun Carrying (weighted %)	Weighted % of Columns B/A
Gun/Weapon Carrying (30 days)	18.2	5.8	32.0

Source: Youth Risk Behavior Surveillance System, 1997, Centers for Disease Control and Prevention

Table 2a. Adjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) from Logistic Regression Analyses Predicting Weapon Carrying (WC) and Gun Carrying (GC) from Sociodemographic Variables

	WC off School Property vs. no WC[1]	WC on School Property vs. no WC[2]	WC on School Property vs. WC off School Property[3]	Non-Gun WC anywhere vs. no WC[4]	GC anywhere vs. no WC[5]	GC anywhere vs. Non-Gun WC anywhere[6]
	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)
Gender						
Female	1.00	1.00	1.00	1.00	1.00	1.00
Male	**6.61 (5.09-8.59)**	**4.61 (3.27-6.49)**	**0.65 (0.42-1.00)**	**4.54 (3.73-5.53)**	**9.37 (5.74-15.32)**	**2.62 (1.47-4.67)**
Ethnicity						
White	1.00	1.00	1.00	1.00	1.00	1.00
Black	**1.46 (1.00-2.12)**	1.61 (1.18-2.18)	1.00 (0.74-1.35)	1.17 (0.87-1.57)	**2.71 (1.78-4.12)**	**2.92 (2.02-4.22)**
Hispanic	1.37 (1.07-1.75)	**1.43 (0.97-2.12)**	1.10 (0.73-1.65)	1.11 (0.89-1.39)	**2.26 (1.47-3.48)**	**2.19 (1.48-3.26)**
Other	0.82 (0.58-1.16)	1.37 (0.93-2.01)	1.56 (0.98-2.49)	0.87 (0.64-1.18)	1.69 (0.97-2.93)	**2.28 (1.17-4.43)**
Grade						
9	**1.61 (1.06-2.44)**	1.41 (0.97-2.05)	0.86 (0.55-1.33)	**1.42 (1.04-1.94)**	**1.72 (1.04-2.84)**	1.46 (0.96-2.23)
10	1.12 (0.76-1.64)	1.08 (0.75-1.55)	1.01 (0.66-1.54)	1.08 (0.81-1.44)	1.18 (0.72-1.94)	1.25 (0.76-2.06)
11	1.15 (0.86-1.54)	**1.39 (1.07-1.81)**	1.23 (0.84-1.80)	**1.26 (1.01-1.58)**	1.18 (0.79-1.77)	1.03 (0.65-1.63)
12	1.00	1.00	1.00	1.00	1.00	1.00
Parents' Education						
Graduated College	1.00	1.00	1.00	1.00	1.00	1.00
Some College	**1.36 (1.09-1.69)**	1.28 (0.96-1.71)	0.90 (0.60-1.35)	**1.41 (1.16-1.72)**	1.17 (0.86-1.60)	0.82 (0.56-1.19)
Graduated High School	**1.60 (1.19-2.15)**	**1.56 (1.07-2.26)**	0.93 (0.53-1.62)	**1.66 (1.35-2.04)**	1.46 (0.97-2.19)	0.93 (0.61-1.40)
Not Graduated High School	1.29 (0.83-2.00)	**2.32 (1.65-3.27)**	1.75 (0.96-3.20)	**1.44 (1.13-1.82)**	**2.47 (1.54-3.97)**	**1.85 (1.16-2.96)**
Metropolitan Status						
Rural	1.00	1.00	1.00	1.00	1.00	1.00
Suburban	**0.68 (0.50-0.93)**	**0.70 (0.51-0.97)**	1.00 (0.62-1.61)	0.89 (0.71-1.12)	**0.40 (0.27-0.58)**	**0.54 (0.37-0.79)**
Urban	0.87 (0.59-1.30)	**0.52 (0.32-0.84)**	**0.57 (0.33-1.00)**	0.87 (0.59-1.27)	**0.45 (0.30-0.67)**	**0.46 (0.32-0.68)**

[1] Model compares students who carried weapons off school property (*n* = 1792) with reference group of students who reported no weapon carrying (*n* = 12892).
[2] Model compares students who carried weapons on school property (*n* = 1291) with reference group of students who reported no weapon carrying (*n* = 12892).
[3] Model compares students who carried weapons on school property (*n* = 1291) with reference group of students who carried weapons off school property (*n* = 1792).
[4] Model compares students who carried weapons other than guns (*n* = 1988) with reference group of students who reported no weapon carrying (*n* = 12897).
[5] Model compares students who carried guns (*n* = 1095) with reference group of students who reported no weapon carrying (*n* = 12897).
[6] Model compares students who carried guns (*n* = 1095) with reference group of students who carried weapons other than guns (*n* = 1988).
[§] Odds ratios are adjusted for all other variables in the table.
Source: Youth Risk Behavior Surveillance System, 1997, Centers for Disease Control and Prevention

Table 2b. Adjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) from Logistic Regression Analyses Predicting Physical Fighting (PF) from Sociodemographic Variables

	PF off School Grounds vs. no PF[1]	PF on School Grounds vs. no PF[2]	PF on School Grounds vs. PF off School Grounds[3]
	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)
Gender			
Female	1.00	1.00	1.00
Male	**2.14 (1.90-2.40)**	**3.73 (2.98-4.67)**	**1.82 (1.44-2.31)**
Ethnicity			
White	1.00	1.00	1.00
Black	1.19 (0.94-1.51)	**1.69 (1.37-2.10)**	**1.59 (1.24-2.04)**
Hispanic	1.01 (0.81-1.24)	1.29 (0.94-1.78)	**1.32 (1.03-1.68)**
Other	**1.48 (1.12-1.95)**	1.06 (0.72-1.56)	0.79 (0.59-1.06)
Grade			
9	**1.66 (1.30-2.13)**	**2.83 (2.07-3.88)**	**1.70 (1.37-2.12)**
10	**1.51 (1.22-1.88)**	**2.17 (1.57-3.00)**	1.45 (0.98-2.15)
11	**1.29 (1.08-1.55)**	**1.36 (1.09-1.69)**	1.03 (0.81-1.32)
12	1.00	1.00	1.00
Parents' Education			
Graduated College	1.00	1.00	1.00
Some College	**1.52 (1.24-1.86)**	**1.40 (1.05-1.86)**	0.98 (0.75-1.28)
Graduated High School	**1.45 (1.12-1.86)**	**1.48 (1.25-1.76)**	1.06 (0.83-1.37)
Not Graduated High School	**1.84 (1.37-2.45)**	**2.51 (1.95-3.23)**	**1.44 (1.10-1.89)**
Metropolitan Status			
Rural	1.00	1.00	1.00
Suburban	1.28 (0.98-1.69)	1.08 (0.70-1.66)	0.84 (0.62-1.14)
Urban	1.20 (0.89-1.62)	1.07 (0.68-1.69)	0.88 (0.63-1.24)

[1] Model compares students who were involved in fights off school property (*n* = 3380) with reference group of students who reported no fighting (*n* = 10207).
[2] Model compares students who were involved in fights on school property (*n* = 2467) with reference group of students who reported no fighting (*n* = 10207).
[3] Model compares students who were involved in fights on school property (*n* = 2467) with reference group of students who were involved in fights off school property (*n* = 3380).
[§] Odds ratios are adjusted for all other variables in the table.
Source: Youth Risk Behavior Surveillance System, 1997, Centers for Disease Control and Prevention

Table 3a. Adjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) from Logistic Regression Analyses Predicting Weapon Carrying (WC) and Gun Carrying (GC) from Risk Behaviors

	WC off School Property vs. no WC[1]	WC on School Property vs. no WC[2]	WC on School Property vs. WC off School Property[3]	Non-Gun WC anywhere vs. no WC[4]	GC anywhere vs. no WC[5]	GC anywhere vs. Non-Gun WC anywhere[6]
	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)
Cigarette use (30 days)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes—not at school	1.93 (1.48-2.52)	1.96 (1.52-2.53)	1.03 (0.75-1.40)	1.92 (1.54-2.40)	2.07 (1.50-2.86)	1.07 (0.75-1.53)
Yes—on school property	3.13 (2.66-3.69)	6.34 (4.77-8.42)	2.06 (1.52-2.81)	3.31 (2.61-4.19)	7.95 (6.08-10.40)	2.39 (1.77-3.24)
Alcohol use (30 days)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes—not at school	2.41 (1.88-3.09)	2.80 (2.20-3.58)	1.18 (0.91-1.52)	2.38 (1.91-2.96)	3.17 (2.37-4.25)	1.33 (1.01-1.76)
Yes—on school property	3.97 (2.81-5.61)	16.24 (10.97-24.04)	3.81 (2.44-5.94)	5.82 (4.13-8.20)	18.00 (11.56-28.04)	3.48 (2.26-5.35)
Marijuana use (30 days)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes—not at school	1.98 (1.47-2.67)	2.16 (1.49-3.14)	1.06 (0.73-1.54)	1.94 (1.47-2.58)	2.46 (1.77-3.42)	1.34 (1.07-1.69)
Yes—on school property	4.17 (3.13-5.57)	11.04 (8.49-14.36)	2.68 (1.91-3.77)	5.03 (4.06-6.22)	12.82 (9.79-16.79)	2.73 (2.10-3.54)
Physical fighting (12 mos)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes—not at school	3.54 (2.68-4.67)	3.68 (2.70-5.02)	0.98 (0.65-1.49)	3.41 (2.65-4.39)	4.27 (2.97-6.13)	1.35 (0.84-2.17)
Yes—on school property	3.64 (3.01-4.41)	7.21 (4.96-10.47)	1.89 (1.37-2.60)	3.79 (3.08-4.65)	9.12 (5.64-14.73)	2.64 (1.58-4.41)
Offered drugs on school property (12 mos)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.08 (1.72-2.52)	3.14 (2.49-3.97)	model n.s.	2.40 (1.96-2.93)	2.82 (2.25-3.52)	1.16 (0.84-1.60)
Had property stolen/damaged while on school property (12 mos)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.69 (1.40-2.05)	2.00 (1.59-2.51)	model n.s.	1.82 (1.53-2.16)	1.86 (1.39-2.48)	1.00 (0.76-1.33)
Was threatened/injured with a weapon on school property (12 mos)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	4.08 (2.86-5.83)	7.12 (4.87-10.40)	model n.s.	4.23 (3.31-5.40)	8.28 (6.07-11.29)	2.01 (1.55-2.61)
Skipped school out of concern for personal safety (30 days)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.06 (1.23-3.44)	5.87 (3.81-9.07)	2.71 (1.90-3.86)	2.46 (1.43-4.25)	7.03 (4.54-10.90)	3.17 (1.95-5.15)
Attempted suicide (12 mos)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.97 (2.05-4.30)	5.98 (4.38-8.15)	2.10 (1.27-3.48)	3.29 (2.37-4.57)	8.02 (5.66-11.35)	2.30 (1.41-3.75)
Ever had sexual intercourse						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.34 (1.76-3.11)	3.80 (2.99-4.84)	1.63 (1.19-2.24)	2.19 (1.75-2.74)	6.37 (4.53-8.95)	3.02 (2.22-4.09)

[1] Model compares students who carried weapons off school property (*n* = 1792) with reference group of students who reported no weapon carrying (*n* = 12892).
[2] Model compares students who carried weapons on school property (*n* = 1291) with reference group of students who reported no weapon carrying (*n* = 12892).
[3] Model compares students who carried weapons on school property (*n* = 1291) with reference group of students who carried weapons off school property (*n* = 1792).
[4] Model compares students who carried weapons other than guns (*n* = 1988) with reference group of students who reported no weapon carrying (*n* = 12897).
[5] Model compares students who carried guns (*n* = 1095) with reference group of students who reported no weapon carrying (*n* = 12897).
[6] Model compares students who carried guns (*n* = 1095) with reference group of students who carried weapons other than guns (*n* = 1988).
[§] Odds ratios are adjusted for gender. Source: Youth Risk Behavior Surveillance System, 1997, Centers for Disease Control and Prevention

Table 3b. Adjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) from Logistic Regression Analyses Predicting Physical Fighting (PF) from Risk Behaviors

	PF off School Grounds vs. no PF[1]	PF on School Grounds vs. no PF[2]	PF on School Grounds vs. PF off School Grounds[3]
	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)
Cigarette Use (30 days)			
No	1.00	1.00	1.00
Yes—not at school	1.81 (1.48-2.21)	1.74 (1.36-2.21)	0.96 (0.67-1.36)
Yes—on school property	2.82 (2.32-3.43)	4.18 (3.24-5.38)	1.49 (1.18-1.87)
Alcohol Use (30 days)			
No	1.00	1.00	1.00
Yes—not at school	2.42 (2.11-2.78)	2.59 (2.03-3.31)	1.07 (0.87-1.31)
Yes—on school property	3.64 (2.80-4.75)	8.36 (6.10-11.47)	2.28 (1.59-3.28)
Marijuana Use (30 days)			
No	1.00	1.00	1.00
Yes—not at school	2.33 (2.05-2.64)	2.22 (1.79-2.76)	0.93 (0.74-1.18)
Yes—on school property	3.75 (2.63-5.34)	7.74 (6.01-9.98)	2.06 (1.43-2.97)
Weapon Carrying (30 days)			
No	1.00	1.00	1.00
Yes—not at school	3.59 (2.72-4.75)	3.68 (3.06-4.42)	1.04 (0.78-1.38)
Yes—on school property	3.68 (2.69-5.03)	7.11 (4.86-10.40)	2.00 (1.64-2.44)
Offered drugs on school property (12 mos)			
No	1.00	1.00	1.00
Yes	2.36 (1.85-3.02)	2.96 (2.39-3.66)	1.26 (0.97-1.63)
Had property stolen/damaged while on school property (12 mos)			
No	1.00	1.00	1.00
Yes	1.72 (1.50-1.97)	2.38 (2.08-2.71)	1.37 (1.18-1.59)
Was threatened/injured with a weapon on school property (12 mos)			
No	1.00	1.00	1.00
Yes	3.35 (2.39-4.70)	7.38 (6.18-8.81)	2.32 (1.57-3.43)
Skipped school out of concern for personal safety (30 days)			
No	1.00	1.00	1.00
Yes	1.93 (1.36-2.74)	4.70 (3.50-6.31)	2.43 (1.55-3.81)
Attempted suicide (12 mos)			
No	1.00	1.00	1.00
Yes	2.80 (2.12-3.69)	5.12 (4.03-6.51)	1.82 (1.31-2.51)
Ever had sexual intercourse			
No	1.00	1.00	1.00
Yes	2.40 (2.05-2.82)	3.89 (3.29-4.61)	1.61 (1.32-1.97)

[1] Model compares students who were involved in fights off school property (n = 3380) with reference group of students who reported no fighting (n = 10207).
[2] Model compares students who were involved in fights on school property (n = 2467) with reference group of students who reported no fighting (n = 10207).
[3] Model compares students who were involved in fights on school property (n = 2467) with reference group of students who were involved in fights off school property (n = 3380).
[§] Odds ratios are adjusted for gender.
Source: Youth Risk Behavior Surveillance System, 1997, Centers for Disease Control and Prevention

Table 4a. Adjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) from Logistic Regression Analyses Predicting Weapon Carrying (WC) and Gun Carrying (GC) from Exposure to School Crime, Self-Reported Substance Use, Physical Fighting, Sexual Behavior, and Suicidality

	WC off School Property vs. no WC[1]	WC on School Property vs. no WC[2]	WC on School Property vs. WC off School Property[3]	Non-Gun WC anywhere vs. no WC[4]	GC anywhere vs. no WC[5]	GC anywhere vs. Non-Gun WC anywhere[6]
	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)
Gender						
Female	1.00	1.00	1.00	1.00	1.00	1.00
Male	**5.98 (4.49-7.95)**	**3.82 (2.54-5.74)**	0.67 (0.39-1.16)	**4.18 (3.40-5.15)**	**8.10 (4.60-14.26)**	**2.59 (1.40-4.80)**
Grade						
9	1.69 (0.98-2.91)	1.27 (0.88-1.82)	0.77 (0.46-1.27)	**1.50 (1.08-2.11)**	1.46 (0.72-2.96)	1.00 (0.57-1.79)
10	1.18 (0.74-1.87)	1.02 (0.66-1.56)	0.94 (0.60-1.47)	1.09 (0.76-1.55)	1.20 (0.63-2.28)	1.18 (0.72-1.93)
11	1.19 (0.84-1.68)	**1.47 (1.01-2.12)**	1.33 (0.86-2.05)	**1.36 (1.05-1.77)**	1.16 (0.70-1.93)	0.79 (0.50-1.26)
12	1.00	1.00	1.00	1.00	1.00	1.00
Offered drugs on school property (12 mos)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	**1.30 (1.00-1.68)**	**1.46 (1.09-1.96)**	1.11 (0.76-1.61)	**1.47 (1.16-1.85)**	1.11 (0.75-1.63)	0.70 (0.44-1.10)
Had property stolen/damaged while on school property (12 mos)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	**1.26 (1.04-1.52)**	1.18 (0.91-1.54)	0.96 (0.71-1.30)	**1.31 (1.11-1.53)**	0.96 (0.69-1.33)	**0.70 (0.53-0.92)**
Was threatened/injured with a weapon on school property (12 mos)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	**2.36 (1.66-3.36)**	**2.70 (1.55-4.71)**	1.19 (0.63-2.25)	**2.23 (1.64-3.03)**	**3.04 (1.77-5.22)**	1.50 (0.99-2.27)
Skipped school out of concern for personal safety (30 days)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.83 (0.38-1.82)	**2.11 (1.18-3.77)**	**2.25 (1.39-3.66)**	1.09 (0.48-2.50)	**2.61 (1.44-4.73)**	**2.57 (1.33-4.98)**
Used alcohol or marijuana on school property (30 days)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	**1.85 (1.37-2.50)**	**3.71 (2.84-4.84)**	**2.00 (1.42-2.82)**	**2.26 (1.77-2.88)**	**4.00 (3.12-5.14)**	**1.82 (1.34-2.46)**
Physical Fighting (12 mos)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes—not at school	**2.80 (2.17-3.61)**	**2.46 (1.70-3.57)**	0.85 (0.52-1.37)	**2.65 (2.05-3.41)**	**2.87 (1.99-4.15)**	1.14 (0.69-1.87)
Yes—on school property	**2.18 (1.80-2.64)**	**3.14 (2.10-4.69)**	1.32 (0.90-1.92)	**2.35 (1.88-2.94)**	**3.31 (2.04-5.37)**	1.49 (0.90-2.45)
Attempted suicide (12 mos)						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	**1.55 (1.02-2.37)**	**1.87 (1.43-2.44)**	1.34 (0.79-2.26)	**1.68 (1.22-2.31)**	**2.07 (1.34-3.20)**	1.41 (0.77-2.56)
Ever had sexual intercourse						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	**1.79 (1.29-2.50)**	**2.13 (1.57-2.89)**	1.14 (0.73-1.77)	**1.59 (1.24-2.04)**	**3.61 (2.30-5.66)**	**2.29 (1.52-3.46)**

[1] Model compares students who carried weapons off school property (*n* = 1792) with reference group of students who reported no weapon carrying (*n* = 12892).
[2] Model compares students who carried weapons on school property (*n* = 1291) with reference group of students who reported no weapon carrying (*n* = 12892).
[3] Model compares students who carried weapons on school property (*n* = 1291) with reference group of students who carried weapons off school property (*n* = 1792).
[4] Model compares students who carried weapons other than guns (*n* = 1988) with reference group of students who reported no weapon carrying (*n* = 12897).
[5] Model compares students who carried guns (*n* = 1095) with reference group of students who reported no weapon carrying (*n* = 12897).
[6] Model compares students who carried guns (*n* = 1095) with reference group of students who carried weapons other than guns (*n* = 1988).
[§] Odds ratios are adjusted for all other variables in the table. Source: Youth Risk Behavior Surveillance System, 1997, Centers for Disease Control and Prevention

Table 4b. Adjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) from Logistic Regression Analyses Predicting Physical Fighting (PF) from Exposure to School Crime, Self-Reported Substance Use, Weapon Carrying, Sexual Behavior, and Suicidality

	PF off School Grounds vs. no PF[1]	PF on School Grounds vs. no PF[2]	PF on School Grounds vs. PF off School Grounds[3]
	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)	Adj. OR[§] (95% CI)
Gender			
Female	1.00	1.00	1.00
Male	**1.74 (1.53-1.99)**	**2.76 (2.14-3.57)**	**1.58 (1.20-2.09)**
Grade			
9	**2.18 (1.80-2.64)**	**4.19 (2.97-5.91)**	**1.93 (1.55-2.42)**
10	**1.81 (1.44-2.27)**	**3.13 (2.20-4.44)**	**1.68 (1.15-2.43)**
11	**1.40 (1.16-1.70)**	1.53 (1.17-2.00)	1.11 (0.84-1.46)
12	1.00	1.00	1.00
Offered drugs on school property (12 mos)			
No	1.00	1.00	1.00
Yes	**1.77 (1.39-2.25)**	**1.86 (1.39-2.48)**	1.07 (0.82-1.39)
Had property stolen/damaged while on school property (12 mos)			
No	1.00	1.00	1.00
Yes	**1.43 (1.23-1.67)**	**1.51 (1.22-1.86)**	1.03 (0.86-1.22)
Was threatened/injured with a weapon on school property (12 mos)			
No	1.00	1.00	1.00
Yes	**1.63 (1.03-2.60)**	**2.54 (1.85-3.49)**	**1.72 (1.24-2.37)**
Skipped school out of concern for personal safety (30 days)			
No	1.00	1.00	1.00
Yes	1.19 (0.70-2.01)	1.86 (1.27-2.73)	1.62 (0.99-2.66)
Used alcohol or marijuana on school property (30 days)			
No	1.00	1.00	1.00
Yes	1.30 (0.92-1.84)	**1.75 (1.38-2.23)**	**1.56 (1.18-2.06)**
Weapon Carrying (30 days)			
No	1.00	1.00	1.00
Yes—not at school	**2.91 (2.26-3.76)**	**2.13 (1.71-2.64)**	0.79 (0.62-1.01)
Yes—on school property	**2.42 (1.64-3.56)**	**3.06 (2.21-4.23)**	1.25 (0.92-1.70)
Attempted suicide (12 mos)			
No	1.00	1.00	1.00
Yes	**1.33 (1.00-1.76)**	**1.45 (1.08-1.95)**	1.04 (0.73-1.48)
Ever had sexual intercourse			
No	1.00	1.00	1.00
Yes	**2.18 (1.81-2.62)**	**3.24 (2.61-4.01)**	**1.54 (1.26-1.88)**

[1] Model compares students who were involved in fights off school property (*n* = 3380) with reference group of students who reported no fighting (*n* = 10207).
[2] Model compares students who were involved in fights on school property (*n* = 2467) with reference group of students who reported no fighting (*n* = 10207).
[3] Model compares students who were involved in fights on school property (*n* = 2467) with reference group of students who were involved in fights off school property (*n* = 3380).
[§] Odds ratios are adjusted for all other variables in the table.
Source: Youth Risk Behavior Surveillance System, 1997, Centers for Disease Control and Prevention

Table 5. Percentages of Respondents with Various Risk Factors Who Reported Weapon Carrying (WC), Gun Carrying (GC), or Physical Fighting

	WC off School Property	WC on School Property	No WC	Non-Gun WC anywhere	GC anywhere	No WC	PF off School Property	PF on School Property	No PF
	%[§]	%[§]	%[§]	%[§]	%[§]	%[§]	%[§]	%[§]	%[§]
Gender									
Female	3.3	3.7	93.0	5.6	1.4	93.0	17.2	8.5	74.3
Male	15.3	12.3	72.4	18.1	9.5	72.4	25.5	19.6	55.0
Grade									
9	12.7	9.9	77.4	14.8	7.8	77.4	23.6	21.0	55.4
10	9.7	7.6	82.8	11.4	5.8	82.8	23.2	16.7	60.1
11	8.8	9.4	81.8	12.9	5.3	81.8	21.5	12.0	66.5
12	8.5	6.9	84.6	10.8	4.6	84.6	18.9	9.5	71.6
Offered drugs on school property (12 mos)									
No	7.6	5.3	87.2	9.0	3.8	87.2	17.8	10.7	71.5
Yes	14.7	15.0	70.4	19.6	10.1	70.4	29.9	22.9	47.3
Had property stolen/damaged while on school property (12 mos)									
No	8.3	6.5	85.2	10.1	4.7	85.2	19.5	11.4	69.1
Yes	13.1	12.2	74.8	17.1	8.1	74.8	26.0	21.2	52.8
Was threatened/injured with a weapon on school property (12 mos)									
No	8.8	6.7	84.5	11.1	4.4	84.5	21.0	12.5	66.6
Yes	23.2	30.7	46.1	29.6	24.3	46.1	30.7	42.6	26.7
Skipped school out of concern for personal safety (30 days)									
No	9.7	7.6	82.7	12.2	5.2	82.7	21.5	13.7	64.7
Yes	12.8	28.1	59.1	18.6	22.4	59.1	24.2	36.1	39.7
Used alcohol or marijuana on school property (30 days)									
No	8.7	5.6	85.7	10.8	3.5	85.7	20.7	12.1	67.2
Yes	17.7	29.7	52.7	25.7	21.7	52.7	30.7	35.0	34.3
Physical Fighting (12 mos)									
No	5.4	3.7	90.8	7.0	2.1	90.8	*	*	*
Yes—not at school	17.5	12.2	70.3	21.1	8.6	70.3	*	*	*
Yes—on school property	17.2	22.3	60.5	21.9	17.5	60.5	*	*	*
Weapon Carrying (30 days)									
No	*	*	*	*	*	*	18.6	10.8	70.7
Yes—not at school	*	*	*	*	*	*	38.9	25.7	35.4
Yes—on school property	*	*	*	*	*	*	31.8	39.3	28.9
Attempted suicide (12 mos)									
No	9.4	7.2	83.4	11.9	4.8	83.4	20.8	13.1	66.1
Yes	11.5	19.7	68.8	17.4	13.8	68.8	29.1	27.3	43.6
Ever had sexual intercourse									
No	6.9	4.2	88.9	9.2	1.9	88.9	16.9	8.5	74.7
Yes	12.7	12.7	74.6	15.8	9.6	74.6	27.1	20.9	52.0
Metropolitan status, race, and sex									
Urban Black males	20.7	7.8	71.5	12.9	15.6	71.5	27.7	20.6	51.7
Suburban White males	12.9	12.4	74.7	20.6	4.7	74.7	24.7	20.8	54.5
Rural White males	18.3	19.1	62.6	22.3	15.1	62.6	21.8	18.9	59.3

[§] Percentages may not sum to 100 due to rounding error.

Source: Youth Risk Behavior Surveillance System, 1997, Centers for Disease Control and Prevention