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A Typology of Violence against Self and Others and Its Associations with Drinking and Other Drug Use among High School Students in a U.S. General Population Survey

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Abstract

This study examined associations between binge drinking and other substance use and perpetration of violence against self and others. Data were pooled from the 2003, 2005, and was constructed to reflect four categories of behaviors: other-directed violence only, self-directed violence only, combined other- and self-directed violence, and no violence. Results from multinomial logistic regressions show that the frequency of binge drinking and other substance use were significant risk factors for each of the violence categories relative to no-violence. However, the strengths of these associations varied across the violence categories.

INTRODUCTION

Numerous studies of adolescent populations have found significant associations between substance abuse and violent behaviors (Adalbjarnardottir & Rafnsson, 2002; Bachman & Peralta, 2002; Barnes, Welte, & Hoffman, 2002; Bonomo, Coffey, Wolfe et al., 2001; Bui, Ellickson, & Bell, 2000). This relationship appears to be complex and multifaceted (Collins & Messerschmidt, 1993; Giancola, 2000; Graham, Leonard, Room et al., 1998; Martin, 1992; Phil, Peterson, & Lau, 1993). Although violence-related behavior among U.S. high school students decreased between 1991 and 2003 (Centers for Disease Control and Prevention, 2004), heavy drinking and alcohol-related harm continue to be significant problems among many high school and college students (Duncan, Alpert, Duncan et al., 1997; Hingson, Heeren, Winter et al., 2005; Miller, Naimi, Brewer et al., 2007). Studies have reported substantial overlap among the different forms of violence affecting adolescents, including suicide attempts, dating and peer violence perpetration and victimization, and physical fighting (CDC, 2004, 2006; Olshen, McVeigh, Wunsch-Hitzig et al., 2007; Swahn, Simon, Hertz et al., 2008). Investigations of adolescent problem behaviors have revealed a “problem behavior syndrome” in which a number of health risks and

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problem behaviors cluster together (Donovan & Jessor, 1985). Problem behavior theory postulates that these various behaviors are manifestations of an underlying syndrome of unconventionality or proneness toward deviance (Jessor & Jessor, 1977). Others, however, have suggested that the etiological factors underlying problem behavior may vary by population group and type of problem (Ensminger, 1990; Fergusson, Horward, & Lynskey, 1994). Common threads may link both interpersonal violence and suicidal behavior with alcohol use. These linked behaviors are considered below.

Alcohol use and aggression/violence

Childhood antisocial behaviors are a central element in the developmental pathway leading to adolescent alcohol abuse or dependence. Children with antisocial behavior and related disorders (i.e., conduct disorder and oppositional defiant disorder) are more likely to experience alcohol use problems during adolescence (Clark & Scheid, 2001; Clark, Vanyukov, & Cornelius, 2002). Based on representative samples of older adolescents (i.e., age 18), Bachman & Peralta (2002) reported that both heavy alcohol consumption and polydrug use increased the likelihood of violent offending among males and females. In a large multicultural sample of adolescents, Bui, Ellickson, & Bell (2000) found that greater frequency of delinquent behavior at grade 10 predicted greater substance abuse problems at grade 12 for each racial/ethnic group. Moreover, among 9th graders attending compulsory schools in Reykjavik, Iceland, students who had not experimented with cigarettes, alcohol, or other drugs—but who had displayed signs of antisocial behaviors—were more likely to engage in heavy drinking 3 years later when compared with students who had not displayed earlier signs of antisocial behavior (Adalbjarnardottir & Rafnsson, 2002). Similarly, early violent behaviors predicted later frequency of drinking among urban African American ninth graders (Xu, Zimmerman, & Cunningham, 2009). In the course of this 8-year longitudinal study, however, it was shown also that early drinking behavior predicted later violence behavior, supporting a bidirectional relationship for these two behaviors.

Alcohol use and suicide

A number of studies have reported associations between substance abuse and self-directed violence (i.e., suicide attempts, suicides, body mutilation) (Brady, 2001; Borowsky, Ireland, & Resnick, 2001; Crumley, 1990; Hacker, Suglia, Fried et al., 2006; Kelly, Cornelius, & Lynch, 2002; Lewinsohn, Rohde, & Seeley, 1994; Miller, Naimi, Brewer et al., 2007; Swahn, Bossarte, & Sullivent, 2008; Waldrop, Hanson, Resnick et al., 2007). Preteen alcohol use initiation has been associated with increased risks for suicide attempts (Swahn, Bossarte, & Sullivent, 2008), while students who binge drink (consuming 5 or more drinks in a row) have been found to be more likely than either nondrinkers or current drinkers who do not binge to attempt suicide (Aseltine, Schilling, James et al., 2009; Miller, Naimi, Brewer et al., 2007). Chino & Fullerton-Gleason (2006) found that, in addition to contributing to depressed feelings and violence victimization, alcohol and drug abuse was an important contributor to attempted suicide among American Indian adolescents living in New Mexico.

Aggression/violence and suicide

The relationship between suicidal and violent behaviors has been a focus of psychiatric studies for many years (Apter, Plutchik, & van Praag, 1993; Plutchik, van Praag, & Conte, 1989; Pfeffer, Newcorn, Kaplan et al., 1989). In their review of epidemiologic studies of suicide in individuals diagnosed with antisocial, borderline, or narcissistic personality disorders, Links, Gould, & Ratnayake (2003) concluded that antisocial personality was associated with risks for both violence toward others and suicide. Plutchik, van Praag, & Conte (1989) proposed a "two-stage" model in which risk factors yield underlying aggressive impulses that, in turn, lead to violence either toward self or others, while Becker & Grilo (2007) noted that violent behavior was a risk factor for suicide, and suicidal behavior was an important risk factor for violence. Studies conducted in treatment facilities have indicated that aggressive behaviors in early adolescence are related to subsequent suicide (Apter, Gothelf, Orbach et al., 1995; Links, Gould, & Ratnayake, 2003; O'Donnell, Stueve, & Wilson-Simmons, 2005; McGirr, Renaud, Bureau et al., 2008). In a study of 1,569 high school students in New York State, victimized students (i.e., threatened with a weapon, property damaged, felt unsafe at school) were found to be at greater risk for suicide, violence, and both suicide and violence than students who reported no suicide or violent behaviors (relative risk = 2.6 times higher for those reporting both suicide and violence compared with no suicide or violence) (Cleary, 2000). In a study of 1,653 students in grades 7, 9, 11, and 12 in a community at high risk for violence, Bossarte, Simon, & Swahn (2008) constructed a five-cluster typology for reports of dating violence, peer violence, and suicidal behaviors. Among the five clusters, the "high-violence" cluster included both victimization and perpetration and the highest level of suicidal behavior.

While a number of national school surveys have examined violence and suicide (Blum, Beuhring, Shew et al., 2000; Eaton, Kann, Kinchen et al., 2006), few have focused on students who report both suicidal behaviors and externalizing violent behaviors (Cleary, 2000; Bossarte, Simon, & Swahn, 2008). The present study seeks to broaden adolescent violent behavior research by examining a typology of violence in the U.S. high school population that incorporates violence perpetration against self, against others, and against both self and others, as well as associations of types of violence with drinking and other substance use. Drinking behavior is particularly represented by binge drinking (having 5 or more drinks within a couple of hours), because it is a common pattern of alcohol use among young people and its acute intoxication effects have many adverse health and behavioral effects (Miller, Naimi, Brewer, et al., 2007). The major objectives of this study are (1) an estimation of the prevalence of violent behavior among a national sample of U.S. high school students, as classified by the violence typology, and (2) identification of substance abuse and demographic risk factors associated with this typology of violence, with particular attention to comparisons between self- and other-directed violence and combined (i.e., self-*and* other-directed) violence versus the other types of violence.

METHODS

Data

The Youth Risk Behavior Surveillance System (YRBSS) is an epidemiologic surveillance system established by the Centers for Disease Control and Prevention (CDC) to monitor trends in youth behaviors that influence health. The national school-based Youth Risk Behavior Survey (YRBS), one component of the YRBSS, has been conducted every 2 years since 1991 with nationally representative samples of 9th- through 12th-grade students in the United States. The data include weights to adjust for nonresponse and the oversampling of Black and Hispanic students to represent the national high school population. To increase the reliability of estimates for suicide attempts and minority population groups, data for the present study were pooled from the YRBS for the years 2003, 2005, and 2007, yielding a total sample of 43,172 students.

Measures

A violence typology was constructed based on a cross-tabulation of other-directed violence and self-directed violence. The measure for *other-directed violence* was based on two YRBS questions related to fighting in the past year: (1) “During the past 12 months, how many times were you in a physical fight?” (1 = 2 or more times, 0 = once or never); and (2) “During the past 12 months, how many times were you in a physical fight at school?” (1 = 2 or more times, 0 = once or never). A positive score on either item was scored as other-directed violence. The measure of *self-directed violence* was based on the following question: “During the past 12 months, how many times did you actually attempt suicide?” (1 = 1 or more times, 0 = none). The other- and self-directed violence measures were cross-tabulated to yield the following violence categories: none, other-directed only, self-directed only, and combined (other- and self-directed).

Alcohol use in the past month was coded based on responses to the following questions: “During the past 30 days, on how many days have you had at least one drink of alcohol?” and “During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?” Alcohol use was measured by a variable that combines drinking status and frequency of binge drinking during the past 30 days into six ordinal categories: nondrinker; drinker; did not binge; and binge drinking 1–2 times, 3–9 times, and 10 or more times. Variables for “other substance use” include dichotomous measures of past-month use of cigarettes, marijuana, and cocaine, and lifetime use of heroin, methamphetamines, and steroids (all coded as 1 = yes and 0 = no).

Demographic variables included self-reported gender, age (≤14, 15, 16, 17, and 18 years), and race/ethnicity (White, Black, Hispanic, Asian, American Indian, Hawaiian/Pacific Islander, and Other). Self-reported depression was measured by one question: “In the past 12 months, did you ever feel so sad or hopeless almost every day for 2 weeks or more in a row that you stopped doing some usual activities?” (1 = yes, 0 = no).

Analysis

Multinomial logistic regression was used to assess the relationships between substance use and the violence typology categories, with those who reported no violent behavior as the comparison group. In addition, alternative parameterization models were estimated to make group comparisons among the three violence categories. Covariates in the model included demographic characteristics, depression, and the alcohol and other substance use variables. All analyses were conducted using SUDAAN, a statistical software package for analyzing survey data that takes into account sampling design effects in standard error estimates and statistical significance tests. In view of the large sample size and number of comparisons, the threshold for statistical significance was set at a=.01 and Bonferroni corrections were applied to all variables with more than two categories. Like other large surveys, there were missing values, ranging from 5.2% for cigarette use to 3.7% for cocaine use, and to a lesser extent (<2%) for other substance use. The use of a hot-deck imputation method (Andridge & Little, 2010) to impute all missing values allowed the inclusion of all cases in the present analysis. As a preliminary step before pooling the data, the frequency distributions of the violence typology were examined separately for each survey year. Both the distributions of violent behavior and findings from multinomial logistic regressions within each survey year were comparable.

RESULTS

In the total sample, past-year violent behaviors were distributed as follows: other-directed only, 17.0%; self-directed only, 4.2%; combined self- and other-directed, 2.9%; and none, 76.0% (Table 1). Demographic and substance use characteristics for each of the violence categories are shown in Table 1. There are some notable patterns in violent behaviors across the three groups. The prevalence of alcohol and other substance use was higher in each of the violence categories than among students with no past-year violence, and use of every substance was highest among those in the combined violence category. Self-reported depression was highest among students in the combined violence category (81.3%) and lowest in the other-directed violence category (32.4%). The percentage of males was highest in the other-directed violence category (69.4%) and lowest in the self-directed violence category (25.7%). Compared to students in the no-violence category, the percentage of Hispanic students in each violence category was relatively high, while the percentage of Black students was somewhat higher in the other-directed violence category. Students in the other-directed and combined violence categories are slightly younger when compared with students in the self-directed and no-violence categories.

The adjusted odds ratios from the multinomial logistic regression analyses for the total sample are shown in Table 2. In view of the large number of comparisons in this analysis, the findings are summarized and reported separately in the following sections: violence (categories 1–3) versus no violence (category 4); other-directed (category 1) versus self-directed violence (category 2); and combined self- and other-directed violence (category 3) versus each of the other two violence types (categories 1 and 2).

Violence versus no violence

Overall, past-month drinking; binge drinking; cigarette smoking; marijuana use; cocaine use; and lifetime use of heroin, methamphetamines, and steroids were all significantly associated with greater odds for both forms of violence, although the odds ratios for past-month cocaine use and lifetime heroin use were only statistically significant for combined violence compared with no violence. Past-month use of marijuana was not significantly related to self-directed violence. Increased frequency of binge drinking was associated with much greater odds for other-directed and combined violence compared with no violence (odds ratios ranging 1.76 to 4.53 and 2.13 to 4.76, respectively). Self-reported depression was associated with significantly greater odds for violent behaviors—especially self-directed and combined violence—compared with no violence.

While younger age was consistently related to all forms of violence, gender and race/ethnicity showed varying associations across the three violence categories. Compared to female students, males were more likely to report other-directed violence and less likely to report self-directed violence relative to no violence. Compared to White students, all minority students except Asians and Hawaiian/Pacific Islander were more likely to report other-directed violent behavior. All minority students except Asians and Hawaiian/Pacific Islanders were at increased risk for classification in the combined violence category when compared with Whites.

In gender-specific analyses (data not shown), there were no significant differences between male and female students related to alcohol use in the violence categories. However, female students were more likely than male students to report heroin use in the other-directed violence category relative to no violence. Female students were more likely than male students to report cigarette and steroid use in the self-directed violence category relative to no violence and both marijuana and cocaine use in the combined category relative to no violence. Male students were more likely than female students to report steroid use in the other-directed violence category relative to no violence.

Other- versus self-directed violence

Increased frequency of binge drinking (more than two times in the past month) was associated with greater odds of other-directed versus self-directed violence (ORs ranging from 1.77 to 3.48). Past month use of marijuana was the only other substance use that was significantly associated with increased odds of other-directed versus self-directed violence (OR=1.33). Male students were much more likely than female students to report other-directed versus self-directed violence (OR=4.86). Black students were more likely (OR=1.80) to report other-directed violence.

Combined violence versus self- and other-directed violence

Although many risk factors were similar across the three violence categories, the combined violence category showed a risk pattern with some demographic factors and drinking behavior for which the strengths of the associations fell between that for the self-directed only and the other-directed only categories. For instance, students in the combined category were more likely to be male and the most frequent binge drinkers than those in the self-

directed category, but less likely to report these characteristics and behaviors than those in the other-directed category. However, compared with those in the self-directed and other-directed categories, students in the combined category were most likely to use cocaine (OR=1.92 and 1.64, respectively), and to have ever used heroin (OR=1.91 and 2.17, respectively) and methamphetamines (OR=1.87 and 1.85, respectively).

DISCUSSION

While there have been reports of recent declines in violence-related behavior among U.S. high school students (CDC, 2004) and in suicide death rates for adolescents ages 15–19 (National Center for Health Statistics, 2009), approximately one-quarter (24%) of U.S. high school students in this study reported some form of violent behavior in the past 12 months. This rate is comparable to that reported in other national studies (Eaton, Kann, Kinchen et al., 2006). Consistent with the literature, all forms of violence were higher among younger students (Hacker, Suglia, Fried et al., 2006; Orpinas, Basen-Engquist, Grunbaum et al., 1995; Swahn, Bossarte, & Sullivent, 2008). When compared with the larger proportion of students reporting no involvement in violence in the past year (approximately 76% in this study), each of the alcohol and other substance use variables analyzed here were associated with all violence categories. These findings are generally comparable to those from a broad range of studies indicating that heavy alcohol consumption and polydrug use are related to violence toward others (Adalbjarnardottir & Rafnsson, 2002; Bachman & Peralta, 2002; Barnes, Welte, & Hoffman, 2002; Bonomo, Coffey, Wolfe et al., 2001; Bui, Ellickson, & Bell, 2000; Miller, Naimi, Brewer et al., 2007) and against self (Aseltine, Schilling, James et al. 2009; Miller, Naimi, Brewer et al., 2007; Swahn, Bossarte, & Sullivent, 2008; Waldrop, Hanson, Resnick et al., 2007).

Studies of risk profiles for violence toward others and suicidal behaviors typically have been conducted in separate populations, but the current typology enabled a direct comparison between each of these behaviors. An important finding to emerge in the present study indicated that the risks for other-directed and combined violent behavior increased monotonically with frequency of binge drinking compared with those for nondrinkers. While heavy episodic drinking has been found to be a strong risk factor for suicidal behavior (Aseltine, Schilling, James et al., 2009), our findings suggest that the frequency of binge drinking and past-month use of marijuana are more significant risk factors for *other*-directed than for self-directed violence. The differences in the patterns of frequent binge drinking in these two forms of violence may indicate variations in the problem behavior syndrome. The higher proportion of other-directed violence (17%) might reflect differential exposure to heavier drinking networks and delinquent peer groups (Swahn, Bossarte, & Sullivent, 2008; Bossarte, Simon, & Swahn, 2008), an important area for future studies.

In addition to frequent binge drinking, the present findings indicate that other-directed—compared with self-directed violence involvement—was more likely to occur among males and all minority groups with the exception of Asian students. Previous research has found that males are more likely to engage in other-directed violence (Cleary, 2000; O'Donnell, Stueve, & Wilson-Simmons, 2005; Orpinas, Basen-Engquist, Grunbaum et al., 1995; Swahn, Bossarte, & Sullivent, 2008; Walter, Vaughan, Armstrong et al., 1995), and females

in self-directed violence (Beautrais, 2002; Becker & Grilo, 2007; Brezo, Paris, Tremblay et al., 2007). American Indian, Black, and Hispanic youths have been found to be more likely than Whites to engage in other-directed violence and less likely to attempt suicide (Blum, Beuhring, & Shew, 2000; Chino & Fullerton-Gleason, 2006; O'Donnell, Stueve, & Wilson-Simmons, 2005; Shaughnessy, Doshi, & Jones, 2004; Willis, Coombs, Drentea et al., 2003). Especially in regards to race/ethnicity, the large, nationally representative sample of students utilized here expands upon earlier findings, which often have been based on regional samples (e.g., inner cities and rural areas).

In summary, compared to students who reported self-directed violence, those reporting other-directed violence, were more likely to be male, Black, and to engage in frequent binge drinking, and less likely to be depressed. Students in the self- and other-directed violence categories did not differ in their use of cigarettes or illicit substances other than marijuana. The differences in the patterns of frequent binge drinking in these two forms of violence may indicate variations in the problem behavior syndrome. The higher proportion of other-directed violence (17%) than self-directed violence (4.2%) might reflect differential exposure to heavier drinking networks and delinquent peer groups (Swahn, Bossarte, & Sullivent, 2008; Bossarte, Simon, & Swahn, 2008), an important area for future studies.

Of particular interest in the present study is the combined violence category, which had the lowest prevalence (approximately 3%) among the four categories in our violence typology. When compared to the large proportion of students who reported no forms of past-year violence, students in the combined violence category exhibited risk factors similar to those in the other two violence categories. Among the three violence categories, some of the risk patterns observed in the combined category (e.g., gender, Black, and frequent binge drinking) fell between that for the other-directed only and self-directed only categories. However, students in the combined category were most likely to use illicit drugs other than marijuana. While frequency of binge drinking did not differ between the combined and other-directed violence categories, it was significantly higher for the combined violence than for the self-directed violence category. Moreover, the use of other drugs was shown to further increase the risk for report of involvement in combined forms of violence relative to students who exhibited either suicidal behavior or violence towards others.

The presence of depressed feelings over a 2-week period in the past year further distinguishes the combined violence category from the others. While depression has long been associated with suicidal behaviors (Borowsky, Ireland, & Resnick, 2001; Kelly, Cornelius, & Lynch, 2002), in the current study depression showed a strong association with combined violence. Recent studies of adolescents in the general population have documented the presence of mood and anxiety disorders (Chen, Killeya-Jones, & Yega, 2005; Robert, Robert, & Xing, 2007; Shaffer, Fisher, Dulcan et al., 1996). Robert, Robert, & Xing (2007), for example, reported that 11% of youth aged 11–17 in a large metropolitan area met DSM-IV criteria for one or more psychiatric disorders in the past year. In view of these studies and treatment studies linking aggressive behaviors with suicidal behaviors (Apter, Gothelf, Orbach et al., 1995; Links, Gould, & Ratnayake, 2003), the presence of combined forms of violence and other psychiatric disorders in the present study may reflect unique etiological pathways distinct from the other forms of violence. Recent media reports

of high-profile teenage murder–suicide cases indicate a possible emerging problem of violence against both self and others in this age-group (Borum, 2000; Christle, Nelson, & Jolivette, 2001). The extent to which the combined violence category represents a meaningful category of violent behavior in general, and provides some clues to high-profile teenage murder–suicide cases in particular, requires further study.

A number of study limitations need to be highlighted. First, the data are based on questionnaires administered in the classroom, and, although obtained by trained data collectors with allowance for anonymous participation, they are subject to self-report biases. Secondly, the measurement and categorization of violent behavior in the present study is restricted to a limited number of question items. Other-directed violence, for example, is based on reports of two or more incidents of physical fighting. This measure of physical fighting does not discriminate between instigator and victim, multiparty instigation, or incident severity. Similarly, the self-directed violence measure is limited to suicide attempts, and therefore does not include other types of self-destructive behaviors. Third, the study is limited to cross-sectional data and does not allow for assessment of directionality (i.e., substance abuse leads to violence, violence leads to substance abuse, or presence of other factors common to both substance abuse and violence), as well as the order of violence (other-directed versus self-directed). Fourth, the time frames for the violence measures (i.e., past 12 months) and alcohol/other illicit substances (i.e., past month or lifetime) differ, further confusing the temporal ordering of these variables. Moreover, the past-month measures only identify a subset of binge drinkers and other substance users in the past 12 months, and thereby are likely to dilute the contrast in violence behaviors between substance-user and non-user groups, resulting in conservative estimates of the associations. Finally, the YRBS sample excludes school dropouts. Thus, the data may underrepresent the most high-risk subpopulations of adolescents. As noted above, the prevalence of all types of violence was lower among older students. We are unable to assess the extent to which this represents the presence of an age trend or reflects a confounding effect such that students with violent behavior are at higher risk for dropping out of school.

Nonetheless, these data likely provide a reliable and valid representation of this population's characteristics. A reliability study of the YRBS questionnaire found that students appeared to report most health risk behaviors reliably over time, including data on suicide ideation and attempts, physical fights, and alcohol use (Brener, Collins, Kann et al., 1995). Another study focusing on self-reported drinking concluded that the YRBS provides a valid measure of youth drinking behavior (Gast, Caravella, Sarvela et al., 1995). As noted in the method section, our preliminary analysis showed a good comparability of measures used in this study over each of the three survey years. This provides strong evidence of reliability of these national estimates.

In summary, the findings reported here have broadened the framework for studies of violent behaviors and the role of substance abuse, particularly the frequency of heavy drinking. Despite several commonalities underlying the three types of violence, there are indications of potential differences in etiology (socially nonconforming or deviant behaviors, self-destructive patterns, psychiatric disorders). The findings underscore the need for comprehensive prevention programs— including targeted interventions—for both self-

directed and other-directed forms of violent behaviors, and for all racial/ethnic groups. Insofar as high school students with symptoms of problem drinking or reported incidents of physical aggression may be referred to school guidance counselors, such officials might well be alerted to the need for screening and referral of such students for the other potentially related behaviors and psychiatric conditions that are investigated here. The same public health message also might apply to adolescent alcohol and drug treatment providers, caseworkers, teachers, clergy, and, indeed, parents.

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Table 1

Percentage distribution of demographic characteristics, drinking, and other substance use behavior among high school students, by violent behavior typology, United States, 2003, 2005, and 2007, YRBS.

Demographic Characteristics and Substance Use[1]	Violent Behavior Typology[1]							
	Other-directed (1) (N= 7,430)		Self-directed (2) (N= 1,936)		Both other- and self-directed (3) (N= 1,230)		None (4) (N= 32,576)	
	%	99%CI	%	99%CI	%	99%CI	%	99%CI
Proportion of Type	17.0	16.0–18.0	4.2	3.8–4.6	2.9	2.5–3.3	76.0	74.7–77.2
Demographic Characteristics								
Gender								
Male	69.4	67.2–71.4	25.7	21.8–30.1	44.2	39.0–49.5	48.3	47.2–49.4
Race/ethnicity								
White	53.1	48.4–57.8	56.2	49.9–62.3	50.1	44.0–56.1	62.7	58.2–66.9
American Indian	1.2	0.7–2.1	1.7	0.7–4.0	2.3	1.0–4.8	0.9	0.5–1.7
Asian	2.3	1.6–3.2	3.8	2.3–6.4	3.3	1.8–6.0	3.6	2.7–4.7
Black	19.0	15.9–22.5	12.3	9.3–16.1	12.1	9.2–15.8	13.5	11.2–16.0
Hawaiian/Pacific Islander	1.0	0.6–1.6	1.9	0.9–4.0	1.6	0.7–3.7	0.8	0.6–1.0
Hispanic	18.5	15.9–21.5	19.0	15.4–23.2	20.7	16.6–25.4	15.1	12.8–17.7
Other	5.0	4.0–6.1	5.1	3.2–8.1	10.0	7.1–13.8	3.6	3.2–4.1
Age								
14 or younger	11.4	10.1–13.0	12.1	9.9–14.9	16.0	12.5–20.3	11.4	10.5–12.3
15	28.9	27.1–30.8	27.3	23.8–31.1	29.0	24.3–34.3	25.1	24.2–26.1
16	27.3	25.3–29.4	28.5	25.5–31.7	29.9	25.1–35.3	25.4	24.6–26.3
17	21.6	19.9–23.4	21.3	18.6–24.4	15.4	11.9–19.6	24.1	23.3–25.0
18	10.8	9.5–12.2	10.8	8.7–13.3	9.7	7.3–12.7	14.0	13.0–15.0
Depression	32.4	30.5–34.3	75.0	70.3–79.2	81.3	76.6–85.3	23.0	21.9–24.1
Substance Used in Past Month								
Alcohol								
Nondrinker	35.8	33.0–38.6	39.6	35.6–43.6	19.5	15.6–23.9	59.5	57.3–61.7
Drinker, didn't binge	23.0	21.2–24.9	24.4	21.1–28.1	21.6	18.0–25.8	18.9	17.4–20.5
Binge drinking 1–2 times	18.8	17.2–20.5	21.4	18.1–25.1	24.7	21.2–28.5	13.4	12.4–14.4
Binge drinking 3–9 times	16.7	14.8–18.7	12.7	10.1–15.7	19.1	15.1–24.0	7.2	6.3–8.1
Binge drinking 10+ times	5.8	4.8–6.9	1.9	1.2–3.2	15.1	10.9–20.6	1.1	0.8–1.3
Cigarettes	34.8	32.0–37.8	34.5	29.8–39.5	58.6	52.8–64.1	16.5	15.0–18.1
Marijuana	37.0	34.3–39.8	28.7	24.9–32.9	55.0	49.4–60.5	15.4	14.2–16.8
Cocaine	7.0	5.9–8.3	5.2	3.8–7.2	29.2	22.5–36.9	1.8	1.5–2.1
Substance Used in Lifetime								
Heroin	5.1	4.2–6.1	4.2	2.9–5.9	27.5	22.0–33.9	1.1	0.8–1.4
Methamphetamines	11.3	9.8–13.0	11.3	8.9–14.2	40.9	34.7–47.4	3.3	2.8–4.0
Steroids	8.3	6.9–9.9	9.1	6.8–12.2	28.5	24.4–33.0	2.8	2.1–3.6

[1] Percentages weighted.

Table 2

Multinomial logistic regression of the violent behavior typology among high school students, United States, 2003, 2005, and 2007, YRBS.

Demographic Characteristics and Substance Use[2]	Contrast of Violence Categories[1]											
	1 vs. 4		2 vs. 4		3 vs. 4		1 vs. 2		3 vs. 1		3 vs. 2	
	OR	CI[3]	OR	CI[3]	OR	CI[3]	OR	CI[3]	OR	CI[3]	OR	CI[3]
Demographic Characteristics												
Gender (female)												
Male	2.59*	2.32–2.90	0.53*	0.43–0.66	1.07	0.83–1.37	4.86*	3.77–6.26	0.41*	0.32–0.53	2.00*	1.44–2.78
Race/ethnicity (White)												
American Indian	1.55*	1.02–2.35	2.17	0.93–5.08	2.94*	1.56–5.57	0.71	0.30–1.72	1.90	0.90–4.01	1.36	0.46–4.04
Asian	1.01	0.70–1.47	1.59	0.80–3.17	1.83	0.81–4.12	0.64	0.33–1.23	1.80	0.76–4.29	1.15	0.38–3.45
Black	2.13*	1.77–2.55	1.18	0.78–1.80	1.98*	1.32–2.98	1.80*	1.17–2.77	0.93	0.59–1.46	1.68	0.95–2.96
Hawaiian/Pacific Islander	1.66	0.94–2.96	2.45	0.80–7.52	2.05	0.59–7.16	0.68	0.21–2.20	1.23	0.34–4.47	0.84	0.19–3.76
Hispanic	1.48*	1.24–1.76	1.22	0.93–1.61	1.50*	1.04–2.15	1.21	0.91–1.60	1.01	0.72–1.43	1.22	0.80–1.87
Other	1.64*	1.20–2.24	1.42	0.75–2.69	2.90*	1.75–4.82	1.16	0.60–2.23	1.77*	1.06–2.97	2.05	0.94–4.47
Age (<=14)												
15	0.98	0.81–1.18	0.95	0.66–1.35	0.77	0.51–1.14	1.03	0.68–1.57	0.78	0.53–1.16	0.81	0.46–1.43
16	0.82	0.67–1.00	0.93	0.70–1.23	0.76	0.49–1.20	0.88	0.62–1.26	0.93	0.59–1.47	0.82	0.50–1.36
17	0.61*	0.50–0.75	0.69*	0.49–0.98	0.33*	0.21–0.51	0.89	0.60–1.32	0.53*	0.34–0.85	0.48*	0.27–0.84
18	0.46*	0.37–0.59	0.60*	0.42–0.87	0.29*	0.18–0.49	0.77	0.49–1.20	0.63	0.36–1.11	0.49*	0.27–0.88
Depression	1.56*	1.39–1.76	7.76*	6.09–9.88	9.49*	6.90–13.06	0.20*	0.16–0.26	6.07*	4.55–8.10	1.22	0.86–1.74
Substance Used in Past Month												
Alcohol (Nondrinker)												
Drinker, didn't binge	1.76*	1.48–2.09	1.40*	1.09–1.81	2.13*	1.45–3.14	1.25	0.96–1.64	1.21	0.80–1.83	1.52	0.97–2.39
Binge drinking 1–2 times	1.83*	1.51–2.21	1.48*	1.09–2.01	2.33*	1.51–3.59	1.24	0.89–1.73	1.27	0.80–2.02	1.57	0.98–2.51
Binge drinking 3–9 times	2.70*	2.12–3.43	1.52*	1.00–2.31	2.47*	1.45–4.21	1.77*	1.13–2.79	0.92	0.53–1.59	1.63	0.90–2.95
Binge drinking 10+ times	4.53*	3.18–6.47	1.30	0.60–2.81	4.76*	2.37–9.55	3.48*	1.59–7.65	1.05	0.52–2.12	3.65*	1.61–8.31

Demographic Characteristics and Substance Use[2]	Contrast of Violence Categories[1]											
	1 vs. 4		2 vs. 4		3 vs. 4		1 vs. 2		3 vs. 1		3 vs. 2	
	OR	CI[3]	OR	CI[3]	OR	CI[3]	OR	CI[3]	OR	CI[3]	OR	CI[3]
Cigarettes	1.49*	1.32–1.69	1.51*	1.16–1.96	2.10*	1.58–2.80	0.99	0.74–1.32	1.41*	1.06–1.87	1.39	0.95–2.04
Marijuana	1.59*	1.41–1.79	1.20	0.94–1.52	1.54*	1.11–2.14	1.33*	1.02–1.72	0.97	0.70–1.34	1.28	0.87–1.89
Cocaine	1.13	0.88–1.44	0.96	0.63–1.47	1.85*	1.14–3.00	1.17	0.75–1.82	1.64*	1.01–2.67	1.92*	1.17–3.15
Substance Used in Lifetime												
Heroin	1.30	0.91–1.85	1.48	0.90–2.43	2.82*	1.70–4.67	0.88	0.54–1.43	2.17*	1.39–3.39	1.91*	1.06–3.42
Methamphetamines	1.47*	1.20–1.79	1.45*	1.04–2.03	2.72*	1.88–3.92	1.01	0.72–1.41	1.85*	1.28–2.67	1.87*	1.17–2.99
Steroids	1.53*	1.17–2.00	2.02*	1.43–2.84	2.67*	1.91–3.75	0.76	0.50–1.15	1.75*	1.23–2.50	1.33	0.87–2.03

*p<.0017 (i.e., .01/6) for race/ethnicity subcategories, p<.0025 (i.e., .01/4) for age and alcohol subcategories, and p<.01 for all other categories.

[1]1=Other-directed only; 2=Self-directed only; 3=Both other- and self-directed; and 4=No violence.

[2]Reference group in parentheses.

[3]99.83% CI for race/ethnicity subcategories, 99.75% CI for age and alcohol subcategories, and 99% CI for all other categories