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Attacks Intended to Seriously Harm and Co-Occurring Drug Use among Youth in the United States

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Abstract

Background—While it is known that substance use and violence co-occur, less is understood in terms of how this relationship might vary based on the degree of youth involvement in violence.

Objectives—This study sought to examine the prevalence and degree that substance use disorders (SUD) and related intrapersonal and contextual factors were associated with violent attacks.

Method—Repeated cross-sectional data from a population-based study (National Survey on Drug Use and Health) of youth ages 12–17 ($n = 216,852$) in the United States between 2002 and 2013 were pooled to increase the analytic sample size. Survey multinomial regression was used to examine psychosocial and substance use differences between youth reporting episodic (1–2 times, $n = 13,091$; 5.84%) and repeated violent attacks (3+ times, $n = 1,819$; 0.83%) in contrast with youth reporting no attacks. Additional analyses examined the association of sociodemographic, intrapersonal, and contextual factors with SUD among youth reporting violent attacks.

Results—The prevalence of SUD among youth with no attacks was 6% compared to 22% among episodic and 36% among repeatedly violent youth. Violence-involved youth were substantially more likely to experience elevated sensation-seeking, easy drug access, and recent drug offers and less likely to benefit from religiosity and protective substance use beliefs.

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Conclusions/Importance—Findings highlight the importance of distinguishing between the various gradations of violence among youth in understanding the relationship between substance use and violence, and shed light on the intrapersonal and contextual factors that can help identify violent youth at greatest risk for substance use problems.

Keywords

violence; alcohol; drugs; substance use; risk and protective factors

The co-occurrence of substance use and youth violence has been well-established (Boles & Miotto, 2003; French, 2000; Salas-Wright & Todic, 2014; Vaughn, Freedenthal, Jenson, & Howard, 2007; Wagner, 1997). Indeed, it is estimated that more than half (\$35 billion) of the social costs associated with underage drinking in the United States (\$62 billion) can be attributed to alcohol-related youth violence (Pacific Institute for Research and Evaluation, 2011). An array of epidemiological studies have documented the comorbidity of substance use and violence among adolescent and adult samples and have explored salient intrapersonal and contextual correlates of these interrelated behaviors (DeLisi, Vaughn, Salas-Wright, & Jennings, 2015; Piquero, Jennings, Diamond, & Reingle, 2015; Reyes, Foshee, Baure, Ennett, & 2012; Salas-Wright, Hernandez, Maynard, Saltzman, & Vaughn, 2014; Salas-Wright, Olate, & Vaughn, 2015; Salas-Wright & Vaughn, 2015; Stoddard et al., 2015; Vaughn, Salas-Wright, DeLisi, & Piquero, 2014; Vaughn, Salas-Wright, DeLisi, Shook, & Terzis, 2015). From a developmental perspective, evidence suggests that early substance use initiation is related to risk of involvement in violent and antisocial behavior during adolescence and young adulthood (Craig, Morris, Piquero, Farrington, 2015; DuRant, Smith, Kreiter, Krowchuk, 1999; Maldonado-Molina, Reingle, & Jennings, 2011), and that violent behavior may also place youth at risk for subsequent substance use initiation (White, Loeber, Stouthamer-Loeber, & Farrington, 1999). Simply put, there is little doubt that substance use and violence are profoundly interrelated behaviors.

Substance use and violence may co-occur for a number of reasons. One possibility is that salient intrapersonal factors, such as sensation seeking and religious engagement, have implications for both behaviors. Indeed, recent studies on temperament and religiosity seem to suggest that the influence of factors such as sensation seeking and religious engagement are not limited to one particular type of behavior (DeLisi & Vaughn, 2014; Salas-Wright, Vaughn, Hodge, & Perron, 2012; Salas-Wright, Vaughn, & Maynard, 2015). This finding is certainly consistent with research suggesting a substantial degree of overlap in the etiological factors that influence a wide array of adolescent health-risk behaviors, including substance use and violence (Hawkins, Catalano, & Arthur, 2002; Resnick et al., 1997). Another possibility is that adolescent substance use can place young people at risk for involvement in violent behavior, and vice versa. Indeed, evidence from observational and experimental studies has illustrated the ways in which consuming alcohol and other drugs can lead to impaired executive functioning and altered neurochemical systems (Heinz, Beck, Meyer-Lindenberg, Sterzer, & Heinz, 2011). Such impairments can, in turn, increase the risk of youth involvement in disinhibited and potentially aggressive behavior (DeWall, Bushman, Giancola, & Webster, 2010). Alternatively, youth involvement in violent behavior may increase risk for substance use by introducing young people to peer groups comprised of

individuals who, in addition to enacting violence, may also endorse lenient substance use norms (Monahan, Rhew, Hawkins, & Brown, 2014; Salas-Wright, Olate, & Vaughn, 2015). Recent studies on the links between violence, substance use, and drug selling also suggest that involvement in antisocial peer networks may increase adolescent drug access and the likelihood of receiving drug offers (Shook, Vaughn, & Salas-Wright, 2013; Vaughn, Salas-Wright, DeLisi, Shook, & Terzis, 2015).

Problem behavior theory is commonly used to explain the inter-relationships between substance use and violent behavior (Jessor et al., 1968; Jessor & Jessor, 1977). Specifically, problem behavior theory posits that problem behavior, including substance use, delinquency and violence, is functional, purposive and highly dependent upon the context in which the behavior takes place (Jessor et al., 1968). Problem behavior proneness develops in the presence of instigations (e.g., risk factors) and absence of controls (e.g., protective factors). An early application of problem behavior theory to impaired driving found that risk behavior (in this case, driving under the influence of alcohol) was highly comorbid with other high-risk behaviors, such as frequency of delinquent behavior, alcohol intoxication frequency, marijuana use, and smoking (Jessor, 1987).

While research advancements have contributed to our understanding of the interrelatedness of substance use and violence using problem behavior theory, a number of important questions remain. First, while we know that substance use and violence co-occur, less is understood in terms of the ways in which this relationship might vary based on the degree of youth involvement in violence. While it is reasonable to surmise that the prevalence of substance use would be greater among youth involved *more frequently* in violence, empirical evidence in this area is lacking. Similarly, it is also uncertain if salient intrapersonal and contextual factors related to substance use vary among less and more frequently violent youth. Finally, we know that the prevalence of substance use disorders is certainly higher among youth involved in violence (Reingle, Jennings, & Komro, 2013; Teplin, Abram, McClelland, Dulcan, & Mericle, 2002; Vaughn, Salas-Wright, DeLisi, Maynard, Boutwell, 2015); however, we also know that most youth involved in violence do not meet criteria for substance use disorders. As such, questions remain as to what factors predict substance use disorders among youth involved in episodic and repeated acts of violence.

The Present Study

The present study aims to address the aforementioned gaps by employing more than a decade's worth of data from a population-based survey of adolescents ages 12–17 in the United States (National Survey on Drug Use and Health [NSDUH]; SAMHSA, 2014). To our best knowledge, this study is among the largest of its kind and, as a result, offers a unique contribution to our understanding of the relationship between substance use and youth violence. Specifically, we are unaware of prior studies that examine these constructs with the degree of scope and generalizability made available by the NSDUH data. The very large sample size also allows for very stable prevalence estimates even with low prevalence phenomena (e.g., other illicit drug use disorders) among relatively rare subgroups (repeat

violent offender youth [$< 1\%$ of youth ages 12–17]). In this study we seek to address two specific aims:

1. To assess the prevalence of substance use disorders and related intrapersonal and contextual factors, including sensation-seeking behavior, religious engagement, protective substance use beliefs, and access to drugs, related to substance use risk among youth with no violent involvement and those involved in episodic and repeated violent attacks; and
2. To examine the degree to which intrapersonal and contextual factors, including sensation-seeking behavior, religious engagement, protective substance use beliefs, and access to drugs, are associated with substance use disorders among violent youth.

A more in-depth understanding of these relationships can serve to inform theory in this area, as well as the continued development and implementation of prevention programs and interventions designed to target adolescent substance use and violence.

Method

Sample and Procedures

The current study is based on data collected between 2002 and 2013 as part of the NSDUH. The NSDUH provides population estimates of drug use and a variety of health-related behaviors in the U.S. general population. Collected on a yearly basis, the NSDUH relies upon multistage area probability sampling methods to select a representative sample of the U.S. civilian, non-institutionalized population aged 12 years or older. Study participants include household residents; residents of shelters, rooming houses, and group homes; residents of Alaska and Hawaii; and civilians residing on military bases. A total of 668,012 respondents aged 12 years or older completed the survey between 2002 and 2013. The current study restricted analyses to adolescents between the ages of 12 and 17 ($n = 216,852$).

Measures

Attacks Intended to Seriously Harm (“Attacks”)—To examine violent behavior, respondents were asked: “During the past 12 months, how many times have you attacked someone with the intent to seriously hurt them?” Respondents reporting violent behaviors were categorized as either “episodic” (1–2 attacks; coded as 1) or “repeated” (3+ attacks; coded as 2) violent youth. Respondents who reported “no attacks” were coded as 0.

Sensation Seeking—Two items measured adolescent sensation seeking. Respondents were asked: “How often do you get a real kick out of doing things that are a little dangerous?” and “How often do you like to test yourself by doing something a little risky?” Consistent with previous NSDUH-based studies (DeLisi, Vaughn, & Salas-Wright, 2015; Herman-Stahl, Krebs, Kroutil, & Heller, 2006) the response options for each of these items were dichotomized (0 = “never” or “seldom” [No]); 1 = “sometimes” or “always” [Yes] for “get a kick out of doing dangerous things” and “Like to test yourself by doing risky things”) to enhance interpretability.

Religiosity—Two items were used to examine adolescent religious engagement. To tap public religiosity, respondents were asked: “During the past 12 months, how many times did you attend religious services?” Consistent with prior research and the coding structure suggested by SAHMSA in the NSDUH codebook (SAMHSA, 2014), youth reporting regular service attendance (i.e., two or more times per month) were coded as 1 and all other youth coded as 0 (Salas-Wright, Lombe, Maynard, & Vaughn, 2015). Respondents were also asked if they agreed with the following: “Your religious beliefs influence how you make decisions.” Consistent with previous NSDUH studies examining religiosity and youth violence (Salas-Wright, Vaughn, & Maynard, 2014) and the NSDUH codebook, youth who reported that they “strongly agree” were coded as 1 and others were coded as 0.

Substance Use Disapproval—Respondents were asked about their views on people their age regularly using alcohol and marijuana. Consistent with coding structure suggested by SAHMSA in the NSDUH codebook, youth reporting strong disapproval were coded as 1 and all other youth (i.e., “neither approve nor disapprove” or “somewhat disapprove”) coded as 0. This analytic approach is also consistent with recent studies highlighting the unique importance of strong disapproval with respect to adolescent substance use (Salas-Wright, Vaughn, Todic, Córdova, & Perron, 2015).

Drug Accessibility—Youth were asked about the difficulty or ease of accessing marijuana and crack/cocaine. Those reporting that it would be “fairly easy” or “very easy” were coded as 1 and youth reporting greater difficulty in accessing drugs (i.e., “fairly difficult”, “very difficult”, “impossible”) were coded as 0 (SAHMSA, 2014).

Recent Drug Offers—Youth were asked if they had been approached by someone who intended to sell them an illegal drug in the previous 30 days. Youth responding affirmatively were coded as 1 and all other youth coded as 0.

Substance Use Disorders—We examined past 12-month measures of alcohol, cannabis, and other drug use disorders based on the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) (American Psychiatric Association, 2000). Substance use disorder measures in the NSDUH are based on a battery of questions related to core diagnostic criteria (e.g., unable to cut down or stop using a substance, continued use of substance despite problems, etc.). Prior research indicates that these DSM-based measures have good validity and reliability (Gruza, Abbacchi, Przybeck, & Gfroerer, 2007; Jordan, Karg, Batts, Epstein, & Wiesen, 2008).

Substance Use—Past 12-month measures of alcohol, cannabis and other illicit drugs were measured using the ‘time since last used’ alcohol, cannabis, or other illicit drugs measures. If the time since last use was “more than 12 months ago”, use of each substance was coded as “0” (did not use in the past year). If use was reported in the past year, respondents were coded as “1” (used substance) for alcohol, cannabis, or other illicit drugs (cocaine, crack, heroin, hallucinogens, inhalants, pain relievers, tranquilizers, stimulants, and sedatives), respectively.

Sociodemographic Factors—Demographic variables included: age (0 = 12 to 14 years, 1 = 15 to 17 years), gender (0 = female, 1 = male), race/ethnicity (1 = non-Hispanic White, 2 = African-American, 3 = Hispanic, 4 = other [i.e., Asian/Pacific Islander, American Indian or Alaska native, multiracial youth]), total annual household income (1 = less than \$20,000; 2 = between \$20,000 and \$49,999; 3 = between \$50,000 and \$74,999; 4 = \$75,000 or more) and father in the household (0 = yes, 1 = no).

Statistical Analyses

A series of survey adjusted multinomial and binary logistic regression analyses were conducted to compare youth reporting no attacks with episodic and repeatedly violent youth in terms of intrapersonal and contextual factors related to substance use, as well as substance use and substance use disorders. Specifically, multinomial logistic regression was used to examine the psychosocial and behavioral differences between episodic and repeatedly violent youth in contrast with youth reporting no violent attacks (see Tables 1–3 and Figure 1). Additionally, binary logistic regression analyses were conducted with the subsamples of episodic and repeatedly violent youth to examine the association of sociodemographic, intrapersonal, and contextual factors with substance use disorders among violent youth. Odds ratios (ORs) are reported when logistic regression models were fit; relative risk ratios (RRRs) are reported for multinomial regression models. Recent methodological studies suggest that ORs—and other comparable measures such as RRRs—are meaningful measures of effect size (1.68 = small, 3.47 = medium, 6.71 = large) that can be compared to the standard guidelines for interpreting Cohen’s *d* (Chen, Cohen, & Chen, 2010).

It should be noted that—while we classify different domains of intrapersonal and contextual factors—each construct is examined individually (i.e., we did not create multi-item indexes for constructs such as sensation seeking and religious engagement; see Table 4) due to limited number of construct-specific items. This analytic approach is commonly utilized with epidemiological data sets that feature categorical data, which allows us to examine variables independently and, in turn, provide more fine-grained information (Blanco et al., 2008; Vaughn, Maynard, Salas-Wright, Perron, & Abdon, 2013). All analyses controlled for sociodemographic factors, including age, gender, race/ethnicity, household income, and father in household. Weighted prevalence estimates and standard errors were computed using Stata 13.1 SE software (StataCorp, 2013) and following the protocol described by SAHMSA in both the NSDUH Codebook (SAHMSA, 2014) and in online resources (http://samhda-faqs.blogspot.com/2014_03_01_archive.html).

Results

Sociodemographic Characteristics of Violent Youth

Table 1 displays the sociodemographic characteristics of episodic and repeatedly violent youth in the United States. Compared to youth reporting no attacks in the previous 12 months, episodic ($n = 13,091$; 5.84%) and repeatedly violent ($n = 1,819$; 0.83%) youth were significantly more likely to be between the ages of 15 and 17, male, African-American, reside within a home earning less than \$75,000 per year, and report no father in household.

Intrapersonal and Contextual Characteristics of the Violent Youth

Table 2 displays the intrapersonal and contextual characteristics of violent youth in the United States. Compared to those reporting no attacks (e.g., non-violent youth), episodic and repeatedly violent youth were significantly more likely to report sensation seeking as well as relatively easy access to marijuana and cocaine. Violent youth were also significantly less likely to report religious engagement as well as strong disapproval of daily alcohol and regular marijuana use by other adolescents.

Supplemental analyses were conducted to understand the role of explanatory variables, such as sensation seeking, religious engagement, drug use perceptions, and drug access, frequency of violent attacks (e.g., episodically violent youth compared to repeatedly violent youth). Results suggest that repeatedly violent youth were significantly more likely to endorse getting a “kick out of doing dangerous things” (RRR = 1.61, 95% CI = 1.43–1.82) and “testing [themselves] by doing risky things” (RRR = 1.52, 95% CI = 1.36–1.71); and were less likely to strongly disapprove of daily alcohol use (RRR = 0.71, 95% CI = 0.63–0.80) and regular marijuana use (RRR = 0.78, 95% CI = 0.69–0.88) when compared with episodically violent youth. Repeatedly violent youth were significantly more likely to report easy access to marijuana (RRR = 1.61, 95% CI = 1.41–1.84) and cocaine/crack (RRR = 1.79, 95% CI = 1.60–2.01) when compared to episodically violent youth. No differences were observed for religious engagement.

Figure 1 displays the prevalence of recent drug offers among youth with no violent attacks as well as episodic and repeatedly violent youth. Controlling for sociodemographic factors, we found that episodic (RRR = 3.35, 95% CI = 3.17–3.53) and repeatedly violent youth (RRR = 5.17, 95% CI = 4.64–5.76) were significantly more likely than non-violent youth to report having been approached with a drug offer in the previous 30-day period. Additionally, supplementary analyses with a modified reference group (e.g., episodically violent youth) also revealed that repeatedly violent youth were significantly more likely to report a recent drug offer in the past 30 days (RRR = 1.54, 95% CI = 1.37–1.74) when compared to youth who were violent episodically.

Table 3 displays the substance use characteristics of episodic and repeatedly violent youth. Compared to youth involved in no violent attacks, violent youth were significantly more likely to report past 12-month alcohol, cannabis, and other illicit drug use. Similarly, episodic and repeatedly violent youth were significantly more likely to have met criteria for alcohol, cannabis, and other illicit drug use disorders in the previous 12 months. In order to assess the differences in prevalence between episodic and repeatedly violent youth, we carried out a series of supplementary analyses (not shown) for substance use and substance use disorders. These revealed that repeatedly violent youth were significantly more likely to have used alcohol (RRR = 1.44, 95% CI = 1.28–1.62), cannabis (RRR = 1.71, 95% CI = 1.51–1.94), and other illicit drugs (RRR = 1.63, 95% CI = 1.44–1.84) in the previous 12 months compared to episodically violent youth. A similar pattern of results, albeit with somewhat larger effects, was observed for substance use disorders with repeatedly violent youth significantly more likely to have met criteria for alcohol (RRR = 1.93, 95% CI = 1.67–2.24), cannabis (RRR = 1.97, 95% CI = 1.69–2.29), and other illicit drug use disorders (RRR = 2.41, 95% CI = 2.03–2.87).

Table 4 examines the sociodemographic, intrapersonal, and contextual correlates of substance use disorders among the subsamples of episodic and repeatedly violent youth only. Among episodically violent youth, those who were older (OR = 2.03, 95% CI = 1.75–2.36) and reside in households earning between \$20,000 and \$49,999 per year (OR = 1.22, 95% CI = 1.01–1.46) were significantly more likely to meet criteria for a substance use disorder than those who lived in lower income households. Males were significantly less likely to report a substance use disorder (OR = 0.66, 95% CI = 0.57–0.76). Compared to non-Hispanic whites, African-American (OR = 0.45, 95% CI = 0.37–0.55) or “other” (OR = 0.71, 95% CI = 0.54–0.95) youth were significantly less likely to have a substance use disorder. With respect to intrapersonal and contextual factors, episodically violent youth reporting regular religious service attendance (OR = 0.81, 95% CI = 0.67–0.98) and protective substance use beliefs were significantly less likely to have a substance use disorder. In contrast, episodically violent youth reporting greater sensation seeking and drug access, as well as those who received a recent drug offer (OR = 3.05, 95% CI = 2.66–3.49) were significantly more likely to have a substance use disorder.

Among the subsample of repeatedly violent youth, those who were older adolescents (OR = 2.29, 95% CI = 1.76–2.99) were significantly more likely to have a substance use disorder. In contrast, male gender (OR = 0.55, 95% CI = 0.43–0.71) as well as African American (OR = 0.48, 95% CI = 0.34–0.66) or “other” race/ethnicity (OR = 0.63, 95% CI = 0.40–0.99) were inversely associated with the likelihood of meeting criteria for a substance use disorder. Repeatedly violent youth who reported sensation seeking [enjoy doing dangerous things (OR = 1.53, 95% CI = 1.11–2.11)], easy drug access and recent drug offers (OR = 2.36, 95% CI = 1.83–3.04) were significantly more likely to meet criteria for a substance use disorder. Repeatedly violent youth who strongly disapprove of marijuana use (OR = 0.48, 95% CI = 0.34–0.67) were significantly less likely to meet criteria for a substance use disorder. No significant protective associations were identified for religious engagement.

Discussion

Below we present several key findings that emerged and consider their implications for the prevention of adolescent substance use and violence. First, consistent with prior research, we found that—compared to youth with no reports of attacks in the previous year—adolescents who carried out serious violent attacks were substantially more likely to be alcohol and other drug users and to meet criteria for substance use disorders. Indeed, we found that the prevalence of substance use morbidity among youth with no attacks was only 6% as compared to 22% among episodic and 36% among repeatedly violent youth. We also found that violence-involved youth were substantially more likely to experience interpersonal and contextual risk factors (i.e., elevated sensation seeking, easy drug access, and recent drug offers) and less likely to benefit from salient protective factors (i.e., religiosity, protective substance use beliefs) of relevance to substance use.

Beyond contrasting non-violent and serious violence-involved youth, we contrasted the differences between adolescents reporting episodic (1–2 times) and repeated (3+ times) involvement in attacks intended to seriously harm others. Across the board, repeatedly violent youth were far more likely than episodically violent youth to be alcohol or drug users

and to meet criteria for substance use disorders in the previous 12 months. A similar pattern of differences was observed with respect to intrapersonal and contextual factors related to substance use risk with repeatedly violent youth more likely to experience risk and less likely to experience key protective factors. The asymmetry in violent behavior where a small subset of youth account for a large proportion of problem behavior is characteristic of what has been termed the severe 5% (Vaughn, DeLisi, Salas-Wright, & Maynard, 2014). Overall, this pattern of results seems to point to the importance of targeted substance use prevention among serious and chronically violent youth in general and perhaps the development of intervention programs designed specifically for antisocial youth.

We also identified a number of important intrapersonal and contextual correlates of substance use disorders among episodic and repeatedly violent youth. While the prevalence of substance use is markedly elevated among violent youth, the majority of youth involved in violence do not meet criteria for a substance use disorder. As such, the capacity to accurately distinguish violent youth at greater risk for substance use disorders from those at lower levels of risk is important for prevention efforts. We found that sensation seeking and religious engagement were not strong predictors of substance use morbidity among repeatedly violent youth. This finding is noteworthy as it suggests that—despite the fact that violent youth tend to report greater sensation seeking and lower religious engagement—these factors are not particularly helpful in terms of distinguishing between repeatedly violent youth who have and do not have substance use disorders. Despite ample evidence of the importance of religiosity for substance use among youth in general (Salas-Wright, Vaughn, Maynard, Clark, & Snyder, 2015; Yonker, Schnabelrauch, & DeHaan, 2012), the finding that religiosity is not directly related to substance use is also consistent with prior research with at-risk and gang-involved youth (Salas-Wright, Olate, & Vaughn, 2015).

Stronger effects were identified for factors more directly linked with substance use, including substance use beliefs, drug access, and receipt of drug offers. Specifically, with respect to repeatedly violent youth, the odds of substance use was roughly 50% lower among those who were unequivocal in their disapproval of peer marijuana use. This finding is consistent with extant research highlighting the importance of disapproval and other critical drug use attitudes with respect to adolescent substance use (Bachman et al., 1990, 1998; Keyes et al., 2011, 2012; Palamar, Halkitis, & Kiang, 2013). Receipt of a recent drug offer and, to a lesser extent, access to illicit substances, also seem to be important factors in predicting substance use disorders among repeatedly violent youth.

These findings may be explained in two ways. First, informed by problem behavior theory (Jessor et al., 1968; Jessor & Jessor, 1977), our results support the notion that problem behavior occurs in the presence of multiple risk factors with a corresponding absence in guardianship (e.g., limited number of protective factors). In this case, violent youth exhibited multiple co-morbid problem behaviors, including substance use, elevated sensation seeking, easy drug access. At the same time, violent youth experienced lower religiosity and protective substance use beliefs when compared with non-violent youth. As a result, effects to increase the presence or intensity of risk factors, such as religiosity, may attenuate the effect that identified risk factors have on violent behavior. If the level of guardianship were to be increased in quality or intensity, we would expect to observe a reciprocal decline in the

likelihood of youth violence. However, in the absence of protective factors (or when the quantity of frequency [‘dose’] of risk exceeds the dose of protection), youth violence is likely to occur.

Secondly, these findings may be interpreted in the context of previous literature documenting consistent co-morbidity in substance use, violence, and other delinquent behavior among youth (DeLisi, Vaughn, Salas-Wright, & Jennings, 2015; Piquero, Jennings, Diamond, & Reingle, 2015; Reyes, Foshee, Baure, Ennett, & 2012; Salas-Wright, Hernandez, Maynard, Saltzman, & Vaughn, 2014; Salas-Wright, Olate, & Vaughn, 2015; Salas-Wright & Vaughn, 2015; Stoddard et al., 2015; Vaughn, Salas-Wright, DeLisi, & Piquero, 2014; Vaughn, Salas-Wright, DeLisi, Shook, & Terzis, 2015). Although the temporality of these inter-relationships is unclear, early substance use initiation appears to enhance the likelihood violent and antisocial behavior during adolescence and young adulthood will occur (Craig, Morris, Piquero, Farrington, 2015; DuRant, Smith, Kreiter, Krowchuk, 1999; Maldonado-Molina, Reingle, & Jennings, 2011). Conversely, violent behavior may also place youth at risk for subsequent substance use initiation (White, Loeber, Stouthamer-Loeber, & Farrington, 1999).

This inter-relatedness of problem behaviors may be attributable to overlapping etiology. Just as sensation seeking and religious engagement are not protective from only one particular type of behavior (DeLisi & Vaughn, 2014; Salas-Wright, Vaughn, Hodge, & Perron, 2012; Salas-Wright, Vaughn, & Maynard, 2015), substance use is not a risk factor for only one type of behavior. The causal processes that precede youth violence likely include an array of factors ranging from childhood trauma exposure (DePrice, Weinzierl, & Combs, 2009), executive functioning deficits (Heinz, Beck, Meyer-Lindenberg, Sterzer, & Heinz, 2011), deviant peer associations, decision-making capacity, social norms and antisocial networks (Shook, Vaughn, & Salas-Wright, 2013; Vaughn, Salas-Wright, DeLisi, Shook, & Terzis, 2015); many of these relationships will be cyclical or reciprocal in nature (Monahan, Rhew, Hawkins, & Brown, 2014; Salas-Wright, Olate, & Vaughn, 2015). Our findings suggest that sensation seeking and religious engagement were not strong predictors of substance use among repeatedly violent youth; however, it is possible that substance use is positively related to sensation-seeking, which in turn, is associated with violent behavior. In summary, these findings are highly consistent with research suggesting a substantial degree of overlap in the etiological factors that influence a wide array of adolescent health-risk behaviors, including substance use and violence (Hawkins, Catalano, & Arthur, 2002; Resnick et al., 1997).

It should be noted that it is difficult to disentangle the directionality of the effect (e.g., whether drug access increases substance use *or* if youth with substance use disorders are more likely to have access to drugs and contact with drug sellers) or whether the contextual effects actually influence behavior directly given to the cross-sectional nature of our data. Nevertheless, these findings collectively point to the importance of targeting both intrapersonal factors, such as normative beliefs, and contextual factors, such as drug access and drug selling (rather than religiosity and sensation-seeking), in interventions designed specifically for violent youth. Future studies should be designed to more thoroughly

investigate the relationship (and interaction) between social context, norms, and individual attitudes and violent behavior among youth.

Study findings have a number of implications for identification of youth exhibiting problem behavior, prevention, and intervention. Our results highlight the importance of targeted substance use prevention efforts among serious and chronically violent youth, regardless of the consistency of involvement in violent behavior. Further, our study provides further support for substance use, including substance use beliefs, and drug access as prevention targets rather than factors such as religiosity. Future research could further inform prevention targets through development and testing of a causal model of violent behavior, which we expect to include indicators of sensation-seeking, substance use, protective substance use beliefs, and access to drugs.

Study Limitations

Study findings should be interpreted in light of several limitations. First, while multiple years of data were pooled to increase the analytic sample size, the NSDUH is fundamentally a repeated cross-sectional study. Thus, while large in scope, the annual data collection from new respondents does not permit strong causal inferences or inform directionality. As such, we are unable to draw causal conclusions as to the relationships between substance use, violence, and related intrapersonal and contextual factors. This is certainly an area for future inquiry, as prospective study designs are necessary to assess the causal and developmental pathways by which substance use and violence interrelate. Additionally, the use of intensive longitudinal designs, such as ecological momentary assessment, would allow for an investigation into the ways in which substance use might lead to violence, or vice versa. Second, all data were derived from self-report measures. It is, therefore, possible that adolescent respondents under- or over-reported with respect to their involvement in substance use and violence as well as for intrapersonal/contextual factors. Finally, while the NSDUH does include a variety of sociodemographic, psychosocial, and behavioral outcome variables, it does not include biological, neighborhood, or situational information that might help to deepen our understanding of the relationship between substance use and violence among adolescents.

Conclusion

To our best knowledge, this study is among the largest to systematically examine the relationship between substance use and youth violence. Building upon a robust body of research on adolescent substance use and violence, we examined the prevalence of substance use and intrapersonal and contextual factors related to substance use risk among adolescents in the United States. Beyond simply contrasting youth not involved in violence with violence-involved youth with respect to substance use, we were sufficiently powered to distinguish between young people involved in episodic (1–2 episodes) versus repeated (3+) violent attacks intended to seriously injure others. Findings from the present study point to the importance of distinguishing between the various gradations of violent youth in understanding the relationship between substance use and violence, as well as shed light on

the intrapersonal and contextual factors that can help identify violent youth at greatest risk for substance use morbidity.

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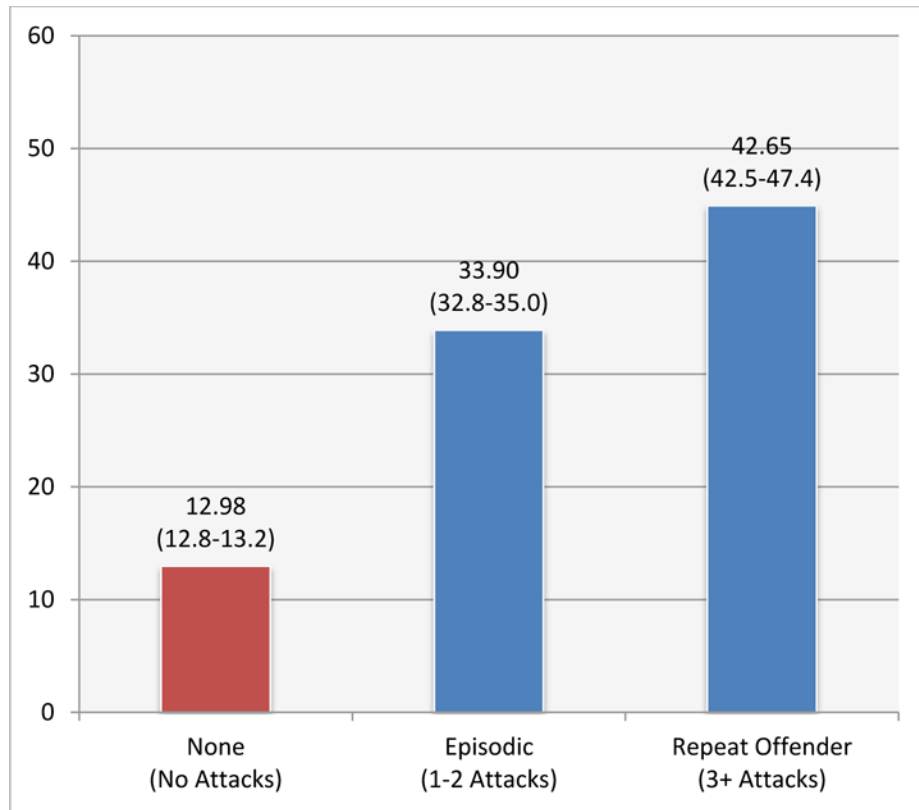


Figure 1. Prevalence of youth who have received past-30 day (recent) drug offers by level of involvement in violent attacks

Table 1

Sociodemographic characteristics of violent youth in the United States

	<i>During the past 12 months: How many times have you attacked someone with the intent to seriously hurt them?</i>					
	None (No Attacks)	Episodic (1–2 Attacks)		Repeat (3+ Attacks)		
	Percent (95% CI)	Percent (95% CI)	RR	Percent (95% CI)	RR	Percent (95% CI)
		<i>(n = 200,047; 92.83%)</i>		<i>(n = 13,091; 5.84%)</i>		<i>(n = 1,819; 0.83%)</i>
<i>Age</i>						
12–14 years	49.36 (49.1–49.6)	46.86 (45.7–48.0)	1.00	42.78 (40.4–45.2)	1.00	
15–17 years	50.64 (50.3–50.9)	53.14 (52.0–54.3)	1.11	(1.06–1.16)	1.32	(1.19–1.46)
<i>Gender</i>						
Female	49.85 (49.5–50.1)	38.45 (37.3–39.6)	1.00	34.30 (32.0–36.7)	1.00	
Male	50.15 (49.9–50.4)	61.55 (60.4–62.7)	1.62	(1.54–1.70)	1.94	(1.75–2.15)
<i>Race/Ethnicity</i>						
Non-Hispanic white	59.78 (59.5–60.1)	49.79 (48.6–50.9)	1.00	47.49 (45.1–49.9)	1.00	
African-American	13.95 (13.7–14.1)	24.89 (23.9–25.9)	1.71	(1.60–1.82)	1.76	(1.55–2.00)
Hispanic	18.96 (18.7–19.2)	6.81 (6.2–7.5)	1.00	(0.93–1.08)	1.05	(0.91–1.23)
Other	7.31 (7.1–7.5)	18.51 (17.6–19.5)	1.06	(0.95–1.17)	0.99	(0.80–1.23)
<i>Household Income</i>						
< \$20,000	16.75 (16.5–17.0)	24.06 (23.1–25.0)	1.66	(1.53–1.80)	2.13	(1.79–2.54)
\$20,000–\$49,999	31.73 (31.4–32.0)	37.21 (36.1–38.3)	1.52	(1.42–1.63)	1.74	(1.50–2.03)
\$50,000–\$74,999	18.28 (18.1–18.5)	16.35 (15.5–17.2)	1.26	(1.17–1.37)	1.35	(1.14–1.59)

*During the past 12 months:
How many times have you attacked someone with the intent to seriously hurt them?*

	None (No Attacks)		Episodic (1–2 Attacks)		Repeat (3+ Attacks)	
	Percent (95% CI)	RR (95% CI)	Percent (95% CI)	RR (95% CI)	Percent (95% CI)	RR (95% CI)
	<i>(n = 200,047; 92.83%)</i>		<i>(n = 13,091; 5.84%)</i>		<i>(n = 1,819; 0.83%)</i>	
> \$75,000	33.24 (32.9–33.5)	1.00	22.38 (21.4–23.4)	1.00	19.32 (17.4–21.4)	1.00
<i>Father in Household</i>						
Yes	74.69 (74.4–74.9)	1.00	64.16 (63.1–65.2)	1.00	60.99 (58.6–63.3)	1.00
No	25.31 (25.1–25.6)	1.25 (1.18–1.32)	35.4 (34.7–36.9)	1.25 (1.18–1.32)	39.01 (36.7–41.4)	1.31 (1.17–1.47)

Note: Youth reporting no group fights specified as base category for multinomial regression. Relative risk ratios (RRR) are adjusted for age, gender, race/ethnicity, household income, and father in household. RR and 95% confidence intervals (95% CI) in bold are statistically significant.

Table 2

Intrapersonal and contextual characteristics of violent youth in the United States

		<i>During the past 12 months: How many times have you attacked someone with the intent to seriously hurt them?</i>			
		None (No Attacks)	Episodic (1-2 Attacks)	Repeat (3+ Attacks)	
		Percent (95% CI)	Percent (95% CI)	RR	Percent (95% CI)
		<i>(n = 200,047; 92.83%) (n = 13,091; 5.84%) (n = 1,819; 0.83%)</i>			
Sensation Seeking					
Do you:					
<i>Get a real kick out of doing dangerous things?</i>					
No	63.94 (63.6-64.2)	38.62 (37.5-39.8)	1.00		28.25 (26.2-30.4)
Yes	36.06 (35.8-36.3)	61.38 (60.2-62.5)	3.07		71.75 (69.6-73.8)
<i>Like to test yourself by doing risky things?</i>					
No	69.32 (69.0-69.6)	43.08 (41.9-44.2)	1.00		33.25 (31.0-35.6)
Yes	30.68 (30.4-30.9)	56.92 (55.8-58.1)	3.14		66.75 (64.4-69.0)
Religiosity					
During the past 12 months:					
<i>How many times did you attend religious services?</i>					
Never/occasionally	72.49 (72.2-72.8)	79.84 (78.9-80.8)	1.00		80.08 (78.0-82.0)
Regularly (Twice monthly or more)	27.51 (27.2-27.8)	20.16 (19.2-21.1)	0.69		19.92 (17.9-22.0)
<i>Your religious beliefs influence how you make decisions</i>					
No	67.78 (67.5-68.0)	77.28 (76.3-78.2)	1.00		78.75 (76.6-80.7)
Yes	32.22 (31.9-32.5)	22.72 (21.8-23.7)	0.66		21.25 (19.3-23.4)
Substance use Disapproval					
How do you feel about someone your age:					
					0.66 (0.58-0.74)

		<i>During the past 12 months:</i>					
		<i>How many times have you attacked someone with the intent to seriously hurt them?</i>		<i>Episodic (1-2 Attacks)</i>		<i>Repeat (3+ Attacks)</i>	
		<i>None (No Attacks)</i>	<i>Percent (95% CI)</i>	<i>Percent (95% CI)</i>	<i>RR (95% CI)</i>	<i>Percent (95% CI)</i>	<i>RR (95% CI)</i>
		<i>(n = 200,047; 92.83%)</i>		<i>(n = 13,091; 5.84%)</i>		<i>(n = 1,819; 0.83%)</i>	
<i>Having 1-2 drinks of an alcoholic beverage nearly every day?</i>							
Ambivalent/Somewhat Disapprove	28.56 (28.3-28.8)	52.27 (51.1-53.4)	1.00	61.44 (59.0-63.8)	1.00		
Strongly Disapprove	71.44 (71.2-71.7)	47.73 (46.6-48.9)	0.37	0.35-0.39	0.27	0.24-0.30	
<i>Using marijuana once a month or more?</i>							
Ambivalent/Somewhat Disapprove	32.17 (31.9-32.4)	55.76 (54.6-56.9)	1.00	62.75 (60.3-65.1)	1.00		
Strongly Disapprove	67.83 (67.5-68.1)	44.24 (43.1-45.4)	0.37	0.35-0.39	0.29	0.26-0.32	
Drug Accessibility							
How difficult or easy would it be for you to get some:							
<i>Marijuana</i>							
Impossible/very difficult/fairly difficult	51.15 (50.8-51.4)	32.80 (31.7-33.9)	1.00	23.43 (21.5-25.5)	1.00		
Fairly/very easy	48.85 (48.5-49.1)	67.20 (66.1-68.3)	2.44	2.31-2.58	3.93	3.48-4.45	
<i>Cocaine/Crack</i>							
Impossible/very difficult/fairly difficult	74.47 (74.2-74.7)	59.36 (58.2-60.5)	1.00	45.40 (42.9-47.8)	1.00		
Fairly/very easy	25.53 (25.3-25.8)	40.64 (39.5-41.8)	2.11	2.00-2.22	3.78	3.41-4.20	

Note: Youth reporting no attacks specified as base category for multinomial regression. Relative risk ratios (RIRR) are adjusted for age, gender, race/ethnicity, household income, and father in household. RR and 95% confidence intervals (95% CI) in bold are statistically significant.

Table 3

Substance use characteristics of violent youth in the United States

		<i>During the past 12 months: How many times have you attacked someone with the intent to seriously hurt them?</i>					
		None (No Attacks)		Episodic (1–2 Attacks)		Repeat (3+ Attacks)	
		Percent (95% CI)	RR	Percent (95% CI)	RR	Percent (95% CI)	RR
		<i>(n = 200,047; 92.83)</i>		<i>(n = 13,091; 5.84%)</i>		<i>(n = 1,819; 0.83%)</i>	
Substance Use (Last 12 Months)							
<i>Alcohol</i>							
No	70.79 (70.5–71.0)	49.51 (48.4–50.7)	1.00	1.00			1.00
Yes	29.21 (28.9–29.5)	50.49 (49.3–51.6)	3.00	(2.84–3.16)	59.22 (56.8–61.6)	4.31	(3.86–4.82)
<i>Cannabis</i>							
No	87.59 (87.4–87.8)	70.07 (69.0–71.1)	1.00	1.00			1.00
Yes	12.41 (12.2–12.6)	29.93 (28.9–30.9)	3.23	(3.04–3.42)	41.98 (39.6–44.4)	5.52	(4.91–6.21)
<i>Other Illicit Drugs</i>							
No	93.29 (93.1–93.4)	78.91 (77.9–79.8)	1.00	1.00			1.00
Yes	6.71 (6.6–6.9)	21.09 (21.2–22.0)	4.09	(3.84–4.36)	30.06 (27.9–32.3)	6.66	(5.96–7.46)
Substance Use Disorders (Abuse/Dependence)							
<i>Alcohol</i>							
No	96.01 (95.9–96.1)	85.51 (84.7–86.3)	1.00	1.00			1.00
Yes	3.99 (3.9–4.1)	14.49 (13.7–15.3)	4.71	(4.37–5.08)	24.03 (21.9–26.2)	9.12	(7.99–10.40)
<i>Cannabis</i>							
No	97.27 (97.2–97.4)	88.42 (87.6–89.1)	1.00	1.00			1.00

<i>During the past 12 months:</i>						
<i>How many times have you attacked someone with the intent to seriously hurt them?</i>						
	None (No Attacks)	Episodic (1–2 Attacks)	Repeat (3+ Attacks)			
	Percent (95% CI)	Percent (95% CI)	RR	(95% CI)	RR	(95% CI)
						(n = 1,819; 0.83%)
Yes	2.73 (2.6–2.8)	11.58 (10.8–12.3)	4.71	(4.32–5.13)	20.74 (18.8–22.8)	9.27 (8.09–10.64)
<i>Other Illicit Drugs</i>						
No	98.63 (98.5–98.7)	93.61 (93.0–94.1)	1.00			1.00
Yes	1.37 (1.3–1.4)	6.39 (5.8–7.0)	5.41	(4.85–6.03)	13.99 (12.4–15.8)	13.06 (11.16–15.27)

Note: Youth reporting no attacks specified as base category for multinomial regression. Relative risk ratios (RRR) adjusted for age, gender, race/ethnicity, household income, and father in household. RR and 95% confidence intervals (95% CI) in bold are statistically significant.

Table 4

Sociodemographic and intrapersonal/contextual correlates of substance use disorders among violent youth

	1+ Substance Use Disorder in Previous 12 Months (0 = no, 1 = yes)			
	Episodic Subsample (1–2 Attacks)		Repeat Subsample (3+ Attacks)	
	(n = 13,091; 5.84%)		(n = 1,819; 0.83%)	
	OR	95% C.I.	OR	95% C.I.
Sociodemographic Control Variables				
<i>Age</i> (1 = older adolescent)	2.03	(1.75–2.36)	2.29	(1.76–2.99)
<i>Gender</i> (1 = male)	0.66	(0.57–0.76)	0.55	(0.43–0.71)
<i>Race/Ethnicity</i>				
African American	0.45	(0.37–0.55)	0.48	(0.34–0.66)
Hispanic	0.90	(0.74–1.08)	0.98	(0.70–1.37)
Other	0.71	(0.54–0.95)	0.63	(0.40–0.99)
<i>Household Income</i>				
< \$20,000	1.11	(0.89–1.38)	1.32	(0.88–1.98)
\$20,000–\$49,999	1.22	(1.01–1.46)	1.18	(0.84–1.66)
\$50,000–\$74,999	1.00	(0.81–1.22)	1.19	(0.81–1.76)
Father in Household (1 = no)	1.12	(0.96–1.31)	1.14	(0.87–1.50)
Intrapersonal and Contextual Factors				
<i>Sensation Seeking</i>				
Get a Kick Out of Doing Dangerous Things	1.76	(1.48–2.10)	1.53	(1.11–2.11)
Like to Test Yourself by Doing Risky Things	1.37	(1.17–1.61)	1.13	(0.84–1.53)
<i>Religious Engagement</i>				
Regular Religious Service Attendance	0.81	(0.67–0.98)	0.93	(0.67–1.30)
Religious Beliefs Influence Decision Making	0.94	(0.78–1.11)	0.82	(0.61–1.12)
<i>Protective Substance Use Beliefs</i>				
Strong Disapproval of Daily Alcohol Use	0.60	(0.51–0.70)	0.75	(0.54–1.04)
Strong Disapproval of Regular Marijuana Use	0.45	(0.38–0.53)	0.48	(0.34–0.67)
<i>Drug Accessibility</i>				
Fairly/Very Easy to Get Marijuana	1.79	(1.45–2.21)	1.78	(1.22–2.61)
Fairly/Very Easy to Get Cocaine/Crack	1.28	(1.12–1.47)	1.90	(1.45–2.47)
<i>Recent Drug Offers</i> (1 = Yes)	3.05	(2.66–3.49)	2.36	(1.83–3.04)

Note: Logistic regression examining the predictors of substance use disorders among the subsamples of episodic and repeatedly violent youth. Odds ratios (OR) adjusted for adjusted for age, gender, race/ethnicity, household income, father in household, and all intrapersonal and contextual factors. ORs and 95% confidence intervals (95% CI) in bold are statistically significant.