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Bullying Victimization, Binge Drinking, and Marijuana Use among Adolescents: Results from the 2013 National Youth Risk Behavior Survey

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ABSTRACT

The current research examines the association between bullying victimization, binge drinking, and marijuana use among adolescents. We seek to determine if this association varies based on the type of bullying experienced, traditional or cyberbullying. We used data from the 2013 Youth Risk Behavior Survey, a nationally representative sample of high school students in the United States. The dependent variables were binge drinking and marijuana use. Our key independent variable, bullying victimization, included both traditional and cyberbullying. We estimated logistic regression models, by gender, to examine the association between bullying victimization and substance use. About 25% of the sample reported bullying victimization, including 10.39% for only traditional, 5.47% for only cyber, and 9.26% for both. Traditional bullying was not significantly associated with binge drinking, but was negatively related to marijuana use. Being the victim of cyberbullying and both types of bullying was significantly associated with binge drinking and marijuana use. We also found important gender differences. The current research adds to a growing list of studies that suggests that cyberbullying is associated with more adverse outcomes than traditional bullying. Bullying prevention and intervention efforts should focus on reducing cyberbullying and providing adolescents with the skills needed to effectively deal with cyberbullying.

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Binge drinking; bullying; cyberbullying; marijuana use; victimization

The U.S. Centers for Disease Control and Prevention defines bullying as "…any unwanted aggressive behavior(s) by another youth or group of youths who are not siblings or current dating partners that involves an observed or perceived power imbalance and is repeated multiple times or is highly likely to be repeated" (Gladden et al. 2014, 7). Surveillance studies based on national samples indicate that around 20% of adolescents report bullying victimization (Kann et al. 2016; National Center for Education Statistics 2016). While bullying has been around for decades, it has recently been identified as a serious public health issue for adolescents because it has been linked to a number of negative outcomes for victims. These negative outcomes include poor physical and mental health (Bauman, Toomey, and Walker 2013; Hepburn et al. 2012; Hertz et al. 2015; Smokowski, Evans, and Cotter 2014; Turner et al. 2013; Wang, Nansel, and Iannotti 2011), sexual risk taking (Hertz et al. 2015; Holt et al. 2013), and alcohol and other drug use (D'Amico et al. 2005; Tharp-Taylor et al. 2009; Valdebenito, Ttofi, and Eisner 2015).

While bullying is typically regarded as an issue that occurs at school, advances in technology have enabled a new type of bullying, referred to as electronic or cyberbullying (Patchin and Hinduja 2010; Willard 2013). Cyberbullying has been defined as the "willful and repeated harm inflicted through the use of computers, cell phones, and other electronic devices" (Hinduja and Patchin 2009, 11). Hinduja and Patchin (2009) state that cyberbullying offenders use some form of electronic communication means to intimidate, harass, and threaten their victims. National surveillance studies show that cyberbullying has a slightly lower prevalence rate than traditional bullying among adolescents, around 15% (Kann et al. 2016; National Center for Education Statistics 2016).

With social media being ever-present in the lives of adolescents, understanding the impact of cyberbullying is increasingly important. Cyberbullying victimization is also related to a number of negative outcomes (Aboujaoude, Salame, and Naim 2015; Selkie, Fales, and Moreno 2016), including poor physical (Sourander et al. 2010; Ybarra and Mitchell 2004) and mental health (Elgar et al. 2014; Fredstrom, Adams, and Gilman 2011; Kowalski et al. 2014; Litwiller and Brausch 2013; Mitchell, Ybarra, and Finkelhor 2007; Sourander et al. 2010; Wang, Nansel, and Iannotti

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2011), as well as risky behaviors such as substance use (Elgar et al. 2014; Goebert et al. 2011; Hinduja and Patchin 2008; Litwiller and Brausch 2013; Mitchell, Ybarra, and Finkelhor 2007; Peleg-Oren et al. 2012; Sourander et al. 2010).

Studies that compare traditional bullying to cyberbullying (Kowalski et al. 2014; Selkie, Fales, and Moreno 2016; Waasdorp and Bradshaw 2015; Wang, Nansel, and Iannotti 2011) point out a number of key differences (Patchin and Hinduja 2010). First, cyberbullying creates a wider audience, and is no longer limited to a specific place that can be witnessed only by people who are present during the interaction. The permanence of the Internet, or cyberspace, allows the victimization experience to be relived over and over again by the victim and others. Second, cyberbullying allows an aggressor to remain anonymous by using fake email accounts and pseudonyms in social media (Kowalski and Limber 2007). This anonymity allows bullies to maintain a physical distance between the aggressor and their victim. Patchin and Hinduja (2006) found that this physical distance allows aggressors to be more malicious than they might be in a face-to-face altercation due to their lack of consideration of social norms, rules, morals, and laws. Third, there are fewer opportunities for adult supervision with cyberbullying. While the anonymity and physical distance that come with cyberbullying seem to "benefit" the aggressors, they also inhibit individuals in authority from taking actions against these behaviors. Finally, cyberbullying is not limited to a specific time period, such as during school hours, as it is possible to cyberbully 24 hours a day. These differences make it difficult for educators, administrators, and other authorities to effectively deal with the problems associated with cyberbullying.

Research shows that the effects of cyberbullying may be more harmful than traditional bullying, as they may be more difficult to avoid or escape (Peleg-Oren et al. 2012; Waasdorp and Bradshaw 2015; Ybarra and Mitchell 2004). In addition, cyberbullying is often used in conjunction with traditional bullying on school grounds, so that victims do not have reprieve from harassment and infliction of harm (Englander 2013; Hinduja and Patchin 2012; Juvonen and Gross 2008; Olweus 2012).

The current study examines the association between bullying victimization (traditional, cyber, and both) and binge drinking and marijuana use among adolescents. Using nationally representative data, it adds to the small body of existing literature on cyberbullying victimization and its associated negative outcomes by focusing on the association between victimization and substance use. Prior research has established a link between cyberbullying victimization and alcohol use, but has generally used a measure that involves any level of use within a defined time period (Hertz et al. 2015; Hinduja and Patchin 2008; Litwiller and Brausch 2013; Mitchell, Ybarra, and Finkelhor 2007; Peleg-Oren et al. 2012). Given that alcohol use is common during adolescence, with about 60% of twelfth graders reporting use in the past 12 months (Miech et al. 2016); it is useful to examine more harmful patterns of alcohol use. Therefore, we focus on binge drinking, which is a pattern of alcohol use that places adolescents at increased risk for negative outcomes (Wechsler and Nelson 2008).

In addition, prior research on cyberbullying victimization and drug use has rarely used a distinct measure of marijuana use (Goebert et al. 2011). Marijuana use is often combined with other types of drugs, tobacco, and/or alcohol use as a measure of "substance use" (Hinduja and Patchin 2008; Litwiller and Brausch 2013; Mitchell, Ybarra, and Finkelhor 2007). Marijuana has become increasingly available to adults in the U.S. as an increasing number of states are making it available both medically and recreationally. Rates of annual marijuana use among twelfth graders have slightly increased over the last 10 years, from 31.5% in 2006 to 34.9% in 2015 (Miech et al. 2016). This is in contrast to patterns of alcohol use among adolescents during the same period, as 47.9% of twelfth graders reported being drunk at least once in the past 12 months in 2006, while only 37.7% reported being drunk in 2015 (Miech et al. 2016). More importantly, prior research shows that bullying is related to negative mental health outcomes (Luk et al. 2012) and research shows that adolescents with mental health problems turn to marijuana to self-medicate (Wilkinson, Halpern, and Herring 2016).

Finally, we examine the gendered relationship between bullying victimization and substance use. Previous research has shown that gender is associated with the type of victimization experienced, as well as rates of substance use (Tharp-Taylor et al. 2009). Tharp-Taylor et al. (2009) found that girls were more likely to engage in higher levels of marijuana and alcohol use when they experienced traditional, physical bullying than their male counterparts. Conversely, boys were more likely to engage in marijuana use when they experienced verbal or mental bullying victimization (Tharp-Taylor et al. 2009). The gendered difference in negative outcomes based on type of bullying experienced is likely explained by the typical behaviors of boys and girls. Researchers have argued that the occurrence of traditional bullying behaviors among

male adolescents can be considered a somewhat normative behavior, as boys (compared to girls) generally have higher levels of aggression (Wasserman et al. 2005). Therefore, girls may view traditional bullying victimization more extremely than boys, resulting in higher levels of substance use. Conversely, girls are more likely to demonstrate verbal/mental bullying, which may result in the higher levels of marijuana use for boys, as they may not have the same coping mechanisms for this type of victimization as their female counterparts (Tharp-Taylor et al. 2009).

Methods

Data

We used the 2013 National High School Youth Risk Behavior Survey (YBRS), which assesses and monitors health risk behaviors that contribute to the leading causes of social problems, disability, and death among adolescents in the U.S. (U.S. Department of Health and Human Services [DHHS] 2014). Specifically, this survey monitors six categories of behaviors that have been linked to health risks among adolescents, including: (1) behaviors that lead to violence and unintentional injuries; (2) high-risk sexual behaviors contributing to the spread of sexually transmitted diseases and unintentional pregnancies; (3) the use of tobacco products; (4) the use of alcohol and drugs; (5) risky dieting behaviors; and (6) physical inactivity. The YRBS is one of the only national surveys with a section devoted to adolescents' experiences with cyberbullying victimization.

The YRBS obtains a nationally representative sample of approximately 13,000 students in grades 9–12 by using a "three-stage, cluster sample design." All students in grades 9–12 in both public and private schools are included in the target population. Data are collected from all 50 states and the District of Columbia. Following a three-stage cluster sample design, schools are first sorted into primary sampling units (PSUs) in accordance with the size of the county in which they are located. Next, schools are selected from PSUs and divided into "whole" schools, meaning the school has all four high school grades (9–12), or "fragment" schools, meaning they have any other set of grades. Schools with more than 25 students in each grade are considered "large" schools, and schools with lower enrollment numbers are considered "small.". Approximately 25% of PSUs are selected for "small school sampling," and out of each of these PSUs, one "small school" and three "large schools" are selected with probability relative to the school's enrollment size. Finally, one or two entire classes in each school are chosen randomly from grades 9–12. All students in the sampled classes are chosen as participants.

Data collectors go to each participating school to administer the questionnaire to students. Additionally, data collectors record grade level and the number of students enrolled in the sample classes, which is later used to verify sample selection and weight data. The school response rate for the 2013 survey was 77% and the response rate for students was 88% (U.S. DHHS 2014).

Measures

We included two measures of substance use in the past 30 days as our dependent variables; both are coded 0 = No and 1 = Yes. First, *binge drinking* was defined as having five or more drinks of alcohol in a row; that is, within a couple of hours. Respondents were considered *marijuana* users if they reported any marijuana use.

The independent variable was *bullying victimization* during the past 12 months. We used two measures from the YRBS to create an index of bullying victimization. To measure traditional bullying, respondents were asked, "…have you ever been bullied on school property?" To measure cyberbullying, respondents were asked, "…have you ever been electronically bullied (include being bullied through e-mail, chat rooms, instant messaging, Web sites, or texting)?" We used these items to create a categorical measure of bullying victimization, coded as follows: (1) no victimization; (2) victim of traditional bullying only; (3) victim of cyberbullying only; and (4) victim of both traditional and cyberbullying.

In our models, we included covariates commonly used in research on bullying and substance use (Hertz et al. 2015; Hinduja and Patchin 2008; Litwiller and Brausch 2013; Mitchell, Ybarra, and Finkelhor 2007; Peleg-Oren et al. 2012). These included gender (0 = female, 1 = male), race (0 = non-White, 1 = White), and age (12–18 years old). As our main variable of interest was bullying victimization, we included other measures of victimization. Respondents were asked about being injured in a fight: "during the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor or a nurse?" This item was coded 1 = 0 times through 5 = 6 or more times. Respondents were also asked about dating violence during the past 12 months: "…how many times did someone you were dating or going out with physically hurt you on purpose? Count such things as being hit, slammed into

something, or injured with an object or a weapon." This item was coded 0 = no dating history through 6 = 6 or more times. We also include a measure of time online: "On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? Count time spent on things such as XBOX, PlayStation, and iPod, iPad or other tablet, a smartphone, YouTube, Facebook or other social networking tools, and the Internet." This item was coded 1 = 0 through 7 = five or more hours per day. Finally, we included measures of age of initiation for both alcohol and marijuana use, coded 0 = never used or first use at age 13 or older, 1 = first use age 12 or younger.

Analytic strategy

We examined the bivariate relationships between bullying victimization and binge drinking and marijuana use. We identified the number and percentage of respondents in each category of bullying victimization that reported binge drinking or marijuana use. We also estimated a number of bivariate logistic regression models to assess the relationship between each category of bullying victimization and binge drinking and marijuana use. We examined the relationship between bullying victimization and substance use by estimating separate logistic regression models for binge drinking and marijuana use. In both of these models, we entered bullying victimization as a categorical predictor variable with no victimization as the reference category. For all analyses, we estimated separate models for male and female respondents. In order to take into account the complex multistage sampling design of the YRBS, we conducted analyses using the SVYSET and SVY commands in STATA. These commands allowed STATA to consider survey design effects, including stratification and weight variables and the primary sampling unit, when estimating test statistics.

Results

Sample characteristics

About 21% of the sample reported binge drinking and 22% reported marijuana use in the past 30 days (Table 1). The prevalence for both substance use measures was slightly higher for males than females. About 25% of respondents reported some type of bullying victimization; this includes 10% that reported only traditional bullying, 5% only cyberbullying, and 9% both types of bullying. Females reported a higher prevalence of bullying victimization. This was primarily driven by

Table 1. Sample characteristics (N = 11,868).

Measure	Coding	Total	Female	Male
Binge drinking	0–No	78.81%	80.42%	77.33%
	1–Yes	21.09%	19.58%	22.67%
Marijuana use	0–No	77.44%	78.93%	75.89%
	1–Yes	22.56%	21.07	24.11%
Bullying victim	1–No	74.88%	68.39%	81.69%
	2–Traditional Only	10.39%	10.66%	10.11%
	3–Cyber Only	5.47%	7.74%	3.08%
	4–Both	9.26%	13.21%	5.12%
Gender	0–Female	51.17%	—–	—–
	1–Male	48.83%		
Race	0–Non-White	43.41%	43.02%	41.75%
	1–White	57.59%	56.98%	58.25%
Age	12–18 years old	16.10 (m)	16.07 (m)	16.13 (m)
Video games/Internet	1–0 hours	4.01 (m)	3.96 (m)	4.07 (m)
	2–1 hour per day			
	3–2 hours per day			
	4–3 hours per day			
	5–4 hours per day			
	6–5 hours per day			
	7–6 hours per day			
Injured in fight	1–0 times	1.04 (m)	1.03 (m)	1.05 (m)
	2–1 time			
	3–2 or 3 times			
	4–4 or 5 times			
	5–6 or more times			
Dating violence	1–no dating relationship	1.89 (m)	1.94 (m)	1.83 (m)
	2–0 times			
	3–1 time			
	4–2 or 3 times			
	5–4 or 5 times			
	6–6 or more times			
First alcoholic drink	0–Never or 13 years or older	82.44%	84.40%	80.39%
	1–12 years of age or younger	17.56%	15.60%	19.61%
First marijuana use	0–Never or 13 years or older	92.20%	94.61%	89.67%
	1–12 years of age or younger	7.80%	5.39%	10.33%

Table 2. Prevalence of substance use by category of bullying victimization.

	Binge Drinking			Marijuana Use		
	N	%	OR (95% C.I.)	*N*	%	OR (95%)
Total sample						
No victim	1,858	18.8%	0.73 (0.66, 0.80)	2,470	24.5%	0.86 (0.79, 0.94)
Traditional victim	216	16.6%	0.78 (0.67, 0.91)	253	19.3%	0.68 (0.59, 0.79)
Cyber victim	193	28.1%	1.60 (1.35, 1.90)	238	33.3%	1.52 (1.29, 1.79)
Both types of victim	335	30.40	1.85 (1.61, 2.12)	371	33.1%	1.52 (1.34, 1.74)
Females						
No victim	736	16.4%	0.64 (0.56, 0.73)	963	21.2%	0.73 (0.64, 0.83)
Traditional victim	99	14.9%	0.75 (0.60, 0.94)	118	17.6%	0.70 (0.57, 0.86)
Cyber victim	126	25.8%	1.60 (1.29, 1.97)	158	31.3%	1.60 (1.31, 1.95)
Both types of victim	222	29.1%	2.01 (1.69, 2.38)	247	31.9%	1.70 (1.44, 2.00)
Males						
No victim	1,117	20.7%	0.77 (0.67, 0.89)	1,507	27.3%	0.96 (0.83, 1.10)^{ns}
Traditional victim	116	18.4%	0.80 (0.65, 0.99)	135	20.9%	0.67 (0.55, 0.82)
Cyber victim	67	33.7%	1.89 (1.40, 2.55)	80	38.3%	1.67 (1.25, 2.22)
Both Types of victim	113	33.2%	1.88 (1.49, 2.38)	124	35.5%	1.49 (1.19, 1.87)

This table shows the number of respondents, percentage, unadjusted odds ratio, and 95% confidence intervals for each category of bullying victimization. Type of victimization is significantly associated with binge drinking and marijuana use in each model shown in the table, with one exception. No victimization is not significantly associated with marijuana use among male respondents.

higher rates of cyberbullying victimization among females. The sample was 49% female, 57% White, with a mean age of roughly 16 years old.

Bivariate analysis

Bivariate relationships between bullying victimization and binge drinking and marijuana use are shown in Table 2. Findings show that respondents who reported only traditional victimization had the lowest prevalence of both binge drinking and marijuana use. The highest prevalence of binge drinking was among respondents (all respondents and females only) who reported both traditional and cyberbullying victimization, and for cyberbullying victimization among male respondents. For marijuana use, respondents (all respondents and males only) who reported only cyberbullying victimization had the highest prevalence, while female respondents who reported both traditional and cyberbullying victimization had the highest prevalence.

We also estimated a number of bivariate logistic regression models to assess these relationships. These models were estimated for the entire sample and for female and male respondents separately. Two findings emerged. First, respondents who reported no bullying victimization and those who reported only traditional bullying victimization were significantly less likely to report binge drinking or marijuana use. Second, respondents who reported only cyberbullying victimization or both traditional and cyberbullying victimization were more likely to report binge drinking and marijuana use.

Logistic regression

The results of the multivariate logistic regression models showed no significant relationship between being the victim of only traditional bullying and binge drinking (Table 3). However, being the victim of only cyberbullying was significantly related to binge drinking for the total sample (AOR = 1.70)

Table 3. The relationship between bullying victimization and binge drinking.

	Total	Female	Male
No victimization (ref)	—–	—–	—–
Traditional only	0.87 (0.72, 1.08)	0.86 (0.64, 1.15)	0.90 (0.67, 1.23)
Cyber only	1.70** (1.27, 2.56)	1.72** (1.19, 2.48)	1.57 (0.97, 2.54)
Both	1.68*** (1.31, 2.15)	1.62*** (1.26, 2.09)	1.87* (1.12, 3.10)
Female (ref)	—–	—–	—–
Male	1.27* (1.06, 1.52)		
Non-White (ref)	—–	—–	—–
White	1.49*** (1.22, 1.82)	1.31* (1.05, 1.62)	1.67*** (1.30, 2.15)
Age	1.44*** (1.36, 1.52)	1.36*** (1.28, 1.45)	1.53*** (1.42, 1.64)
Video games/Internet	0.95** (0.92, 0.97)	0.98 (0.93, 1.03)	0.90*** (0.86, 0.95)
Injured in fight	1.85*** (1.45, 2.36)	2.12*** (1.43, 3.13)	1.71** (1.26, 2.32)
Dating violence	1.51*** (1.40, 1.64)	1.51*** (1.37, 1.67)	1.52*** (1.32, 1.75)
First drink 13+ (ref)	—–	—–	—–
First drink <13	3.45*** (3.09, 3.84)	2.81*** (2.37, 3.33)	4.07*** (3.50, 4.73)

Adjusted odds ratios (AOR) and 95% confidence intervals (95% CI) are shown in the table (* $p < .05$, ** $p < .01$, *** $p < .001$).

Table 4. The relationship between bullying victimization and marijuana use.

	Total	Female	Male
No victimization (ref)	—–	—–	—–
Traditional only	0.72** (0.59, 0.88)	0.71* (0.53, 0.94)	0.74* (0.56, 0.98)
Cyber only	1.68** (1.24, 2.27)	1.76** (1.27, 2.45)	1.54 (0.83, 2.86)
Both	1.40** (1.10, 1.78)	1.42* (1.04, 1.94)	1.43* (1.06, 1.92)
Female (ref)	—–	—–	—–
Male	1.10 (0.92, 1.30)		
Non-White (ref)	—–	—–	—–
White	0.71** (0.58, 0.86)	0.59*** (0.45, 0.76)	0.85 (0.67, 1.07)
Age	1.28*** (1.20, 1.36)	1.22*** (1.14, 1.31)	1.34*** (1.22, 1.46)
Video games/Internet	1.05*** (1.02, 1.07)	1.08*** (1.04, 1.13)	1.01 (0.97, 1.04)
Injured in fight	1.82*** (1.46, 2.27)	2.31*** (1.52, 3.52)	1.58*** (1.25, 2.00)
Dating violence	1.38*** (1.30, 1.48)	1.37*** (1.23, 1.53)	1.39*** (1.26, 1.53)
First pot 13+ (ref)	—–	—–	—–
First pot <13	12.19*** (10.17, 14.61)	12.14*** (8.57, 17.21)	12.51*** (9.95, 15.73)

Adjusted odds ratios (AOR) and 95% confidence intervals (95% CI) are shown in the table (* $p < .05$, ** $p < .01$, *** $p < .001$).

and for only female respondents (AOR = 1.72). Being the victim of both types of bullying was significantly related to binge drinking in all three regression models that were estimated. In addition, binge drinking was significantly related to gender (males more likely), race (Whites more likely), age (older respondents more likely), time gaming or on the Internet (less time increased odds of binge drinking—but not significant for females), being injured in a fight (injury increased odds of drinking), being the victim of dating violence (victims were at increased odds of drinking), and having your first drink prior to age 13 (early initiation linked to drinking).

The results for the multivariate logistic regression models showing the relationship between bullying victimization and marijuana use are shown in Table 4. Respondents who were the victims of traditional bullying only were less likely to report marijuana use. Like binge drinking, all respondents (AOR = 1.68) and female respondents (AOR = 1.76) who reported only cyberbullying victimization were at increased odds for marijuana use. Respondents who reported both types of bullying victimization were at increased odds of marijuana use. In addition, marijuana use was significantly related to race (White females less likely), age (older respondents more likely), time on the Internet (increased odds of marijuana use among females only), being injured in a fight (increased odds of marijuana use), being the victim of dating violence (victims were at increased odds of marijuana use), and first use of marijuana prior to age 13 (early initiation linked to marijuana use).

Discussion

The current research uses data from the 2013 YRBS to examine the association between different types of bullying victimization (traditional, cyber, or both) and different types of substance use (binge drinking and marijuana use). Prior research in this area focuses on any alcohol use and generally includes marijuana with a list of other illicit drugs. In addition, the current research includes a more comprehensive list of possible covariates in our analytical models compared to prior research. We also included a measure of time spent on the Internet, which increases risk for cyberbullying and other types of victimization, and could also serve as a risk factor for substance use (Juvonen and Gross 2008; Mishna et al. 2012; Rice et al. 2015).

In our analyses, the relationship between only traditional bullying victimization and binge drinking was not significant. This is similar to findings by Hertz et al. (2015) that showed no significant relationship between only traditional bullying and current cigarette use, current alcohol use, and lifetime illicit drug use among male respondents. However, the relationship between being the victim of only traditional bullying and marijuana use was significant. Respondents who reported only traditional bullying were less likely to report marijuana use. This finding was not supported by Hertz et al. (2015), who found a positive relationship between only traditional bullying and illicit drug use among female respondents. It is important to note that the Hertz study includes marijuana in their measure of illicit drug use and we look at a separate measure of marijuana. It is possible that those who are traditionally bullied have less access to marijuana through their peer groups. Perren and Alasker (2006) noted that bullying victims tend to be less sociable, have fewer friends, and tend to withdraw from social interactions. This is important, as the majority of adolescent marijuana users obtain marijuana by sharing or receiving it free from friends (King, Merianos, and Vidourek 2016).

The finding that adolescents who report only traditional bullying victimization are less likely to report marijuana use speaks to the importance of separating marijuana use from other illicit drug use. Not only is marijuana the most widely used illegal drug, rates of use have increased in recent years for marijuana, while rates of most other illicit drugs have decreased, according to the Youth Risk Behavior Survey. This finding is placed in context when looking at the results shown in Table 2. These findings show that the lowest rates of both binge drinking and marijuana use are among respondents who reported only traditional bullying victimization and not among the respondents who reported no victimization. Further research should examine adolescents who are targeted for only traditional bullying to determine why they have the lowest rates of substance use. Furthermore, it is possible that the relationship between bullying victimization and marijuana use is a function of age. To assess this, we estimated the same regression models by respondent age and found that the relationship between traditional bullying victimization and marijuana use was only significant among respondents ages 17 and 18. This is important, as additional analysis shows that the prevalence of reporting only traditional bullying declines with age, while the prevalence of cyberbullying increases with age. It seems that older adolescents who are still being bullied face-to-face may be a unique population in need of additional research.

The current research looked specifically at the impact of cyberbullying victimization. Respondents who report only cyberbullying victimization were more likely to report both binge drinking and marijuana use. This finding was significant in the set of analysis that included all respondents and females, but the relationship between cyberbullying victimization and binge drinking and marijuana use was not significant among males. This finding contradicts those of Hertz et al. (2015), which showed that cyberbullying was related to current alcohol use and also lifetime illicit drug use among both males and females. Our findings suggest that the relationship between cyberbullying and substance use is gendered.

Chan and La Greca (2016) had similar findings when looking at cyber victimization and substance use. Cyber victimization was associated with more frequent drinking among girls, but not for boys. They also found that girls reported higher levels of certain types of bullying victimization, which included cyber, relational, and reputational victimization. Conversely, boys experienced higher levels of overt or physical bullying (Chan and La Greca 2016). It is possible that the nature of cyberbullying is gendered, with girls experiencing more long-term effects (e.g., damage to their reputation and social standing) from cyberbullying. Additionally, those who engage in cyberbullying also spend more time online (Rice et al. 2015), which may increase the frequency and severity of cyberbullying attacks.

Finally, respondents who reported being the victim of both traditional and cyberbullying were more likely to report both binge drinking and marijuana use. This was true for the entire sample and also for female and male respondents. These findings were consistent with prior findings that co-occurring (traditional and cyber) bullying victimization was linked to substance use for both males and females (Luk et al. 2012). Given that cyberbullying increased risk for both binge drinking and marijuana use while traditional bullying did not, it seems that this relationship was driven by being victimized online. This finding was consistent with prior research that showed cyberbullying victimization was more strongly connected to negative outcomes than traditional bullying (Bonanno and Hymel 2013; Kowalski and Limber 2013; Peleg-Oren et al. 2012). Due to the anonymity and physical distance of cyberbullying, aggressors are typically more malicious and persistent when bullying online than they might be in a face-to-face scenario (Patchin and Hinduja 2006). Further, cyberbullying can occur at all hours and in any location, whereas traditional bullying typically only occurs at school. Therefore, cyberbullying has the ability to permeate an adolescent's life much more than traditional bullying alone (Cyberbullying Research Center 2015).

Findings are also consistent with prior research that shows that being the victim of various types of bullying is associated with negative outcomes, including substance use (Goebert et al. 2011; Mitchell, Ybarra, and Finkelhor 2007; Tharp-Taylor et al. 2009). While not tested in the current study, it seems plausible that adolescents turn to alcohol and other drugs to cope with being bullied; this is consistent with research on substance use and self-medication (Khantzian 1997). There is a robust literature showing that individuals use alcohol or other drugs to cope with stress or deal with the victimization experience (Connolly 2017; Nowotny and Graves 2013; Pinchevsky, Wright, and Fagan 2013; Schumm and Chard 2012; Walsh et al. 2014).

There are several study limitations. The YRBS is cross-sectional and does not permit causal interpretation. In order to fully understand the causal mechanisms that link bullying victimization to substance use, longitudinal data are necessary. Second, the items in the YRBS used to measure bullying victimization are dichotomous, so we were unable to determine if level

of severity or frequency were associated substance use. The YRBS definition of bullying is similar to those used in existing studies in that it addresses bullying behavior over the past 12 months, both on school property and through electronic communication (Mitchell, Ybarra, and Finkelhor 2007; Tharp-Taylor et al. 2009). However, not including a measure of frequency of victimization is problematic because it may be that only those who are being victimized more frequently are those who are more likely to engage in substance use. Third, our measure of time online included a list of some activities that do not necessarily involve being online. While console games such as Xbox and PlayStation can be connected to the Internet, we are unaware if respondents in this survey were online while using these devices. Finally, the self-report nature of the YRBS may be an issue, as participants may have under-reported their experiences with all of the examined variables as there is a tendency for individuals to provide answers that are socially desirable (Brownfield and Sorenson 1993).

The current research adds to the literature that links bullying victimization with negative outcomes. Consistent with other research that examines traditional and cyberbullying victimization together, we found a stronger association with cyberbullying victimization. Fortunately, prior research shows that prevention programs that target bullying, in general, are also effective at reducing cyberbullying (Salmivalli, Karna, and Poskiparta 2011). Research by Limber (2010) outlines some of the best practices related to intervention and prevention. Given that most adolescents do not report bullying to adults, it is important that teachers, administrators, and other school staff be aware of the risk factors and signs of bullying so that they can identify at-risk students (Chisolm 2014). It is also important that schools establish rules/policies related to bullying and enforce them in a consistent and fair manner (Limber 2010). Families can also reduce bullying, as research shows that increased family contact and open communication can reduce harmful effects of cyberbullying victimization (Elgar et al. 2014).

These findings show that being the victim of cyberbullying, and not traditional bullying, is significantly associated with binge drinking and marijuana use among adolescents. Due to cyberbullying victimization association with behaviors that have negative impacts on the health and future success of youths, more emphasis should be placed on cyberbullying prevention programs and health interventions in regards to alcohol use and other drug use. Future research should address mediating factors, including depression, and moderating factors, including gender, race, and sexual orientation, which might be associated with cyberbullying and negative outcome. Finally, research must continue to distinguish traditional from cyberbullying and examine how being a victim is associated with negative social and health-related outcomes.

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