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Victimization from Mental and Physical Bullying and Substance Use in Early Adolescence

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Abstract

Logistic regression analyses were used to assess the association between victimization from mental and physical bullying and use of alcohol, cigarettes, marijuana, and inhalants among middle school students. Self-report data were analyzed from 926 ethnically diverse sixth through eighth grade students (43% white, 26% Latino, 7% Asian American/Pacific Islander, 3% African American, 14% mixed ethnic origin, and 5% "other") ages 11 – 14 years from southern California. Substance use was collected at two time points (fall 2004 and spring 2005) during an academic year. Models were run for each substance separately. Results supported an association between victimization from bullying and substance use. Youths who experienced each type of bullying (mental or physical) separately or in combination were more likely to report use of each substance in spring 2005. This finding held after controlling for gender, grade level, ethnicity and substance use in fall 2004.

Keywords

bullying; substance use; adolescents; victimization

During the middle school years (grades 6 – 8), an increasing number of youths become the victims of bullying (e.g., Espelage, Bosworth & Simon, 2001), or *repeated "intentional physical and psychological harm"* (Smith & Thompson, 1991, p. 1). Bullying can include verbal or written name-calling, teasing, and threats, social exclusion, and hitting, kicking, or other violent bodily contact (Espelage et al., 2001). Bullying can negatively affect concentration, self-esteem and social relationships in school, and promote feelings of isolation and hopelessness, often with long-term consequences that lead into adulthood (Batsche & Knoff, 1994; Kaltiala-Heino, Rimpela, Marttunen, Rimpela, & Rantanen, 1999; Olweus, 1993). National statistics on the incidence of victimization from bullying indicate that bullying is a significant problem. Finkelhor, Ormrod, Turner, and Hamby (2005) sampled a nationally

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representative group of children between the ages of 2 – 17 and found that 50% of their sample had experienced bullying, which they termed *emotional bullying* or teasing. In earlier work that focused directly on school aged children, Nansel et al. (2001) found that 10.6% of students in grades 6 through 10 in the United States reported being victims of bullying and another 6.3% reported being both victims and perpetrators. They defined bullying as when someone "[says or does] nasty and unpleasant things to him or her" or "when a student is teased repeatedly in a way he or she doesn't like."

Bullying victimization may be more prevalent among certain racial groups; at the same time boys and girls may be more likely to experience certain forms of bullying victimization. Results on race and its relationship to the prevalence of bullying victimization are equivocal, with many studies reporting higher victimization rates among whites in comparison to African Americans and Hispanics; however, other studies report higher rates in African American populations compared to whites and Hispanics (Spriggs, 2007; Peskin, Tortolero, & Markham, 2006). Similarly, gender differences have been found for bullying victimization. Studies suggest that girls and boys experience these forms of bullying to a differential degree (Chesney-Lind et al., 2007; Ordonez, 2007). Specifically, boys are more likely than girls to experience physical bullying (Batsche & Knoff, 1994; Finkelhor et al., 2002; Nolin, Davies, & Chandler, 1995; Olweus, 1993; Whitney & Smith, 1993) and girls are more likely to demonstrate verbal/ relational bullying than physical bullying (Smith, & Thompson, 1991; See Chesney-Lind, Morash & Irwin, 2007 for a review). Further research in the area of bullying victimization and race and gender is needed.

In addition to being a time when the likelihood for experiencing bullying increases, early adolescence is also a key developmental period for initiation into substance use (D'Amico, Ellickson, Wagner, Turrisi, Fromme, & Ghosh-Dastidar, 2005; Johnston, O'Malley, Bachman, & Schulenberg, 2007). For example, 12% of 6th graders report lifetime use of alcohol (D'Amico, Ellickson, Wagner et al., 2005) compared to 39% of 8th graders (Johnston et al., 2008). In addition, from 6th to 8th grade, marijuana use increases more than eight fold (i.e., from 2% in 6th grade to 18% in 8th grade), cigarette use almost triples (i.e., from 9% 6th grade to 22% in 8th grade), and by 8th grade 16% of youths report using inhalants (D'Amico, Ellickson, Wagner et al., 2005; Johnston et al., 2008). Early initiation of substance use can lead to increased use and problems in late adolescence (Grant, 1997; Stice, Myers, & Brown, 1998), which can then lead to substance abuse and/or dependence in young adulthood (D'Amico, Ellickson, Collins, Martino, & Klein, 2005). Thus, it is important to understand factors that may contribute to substance use.

One factor that may be associated with substance use is being the victim of bullying. There is a great deal of research that supports a strong association between victimization and substance use in adult populations (Kantor & Straus, 1989; Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997; Martino, Collins, & Ellickson, 2004). Despite the co-occurrence and increase of both bullying and substance use in early adolescent populations, few studies have examined this association. Research in this area has shown that victimization from bullying is associated with alcohol use among high school students (Kaltiala-Heino et al., 1999), with students who reported experiencing mental bullying victimization on a weekly basis also reporting heavier drinking compared to youths who did not report experiencing mental bullying victimization. Another study (Kuntsche & Gmel, 2004) found that teens who drank alone were more often victims of bullying than those who drank in social settings.

Although these studies add to our knowledge on bullying and substance use, the focus of this work to date has been on older youths. In addition, previous studies have mainly focused on alcohol use and have not addressed use of other substances, such as cigarettes, marijuana, and inhalants, all of which tend to increase during early adolescence. Furthermore, earlier work

has not controlled for prior substance use when examining the relationship between substance use and bullying victimization. Therefore, they are unable to address whether or not the association between bullying victimization and substance use is significant for youths who already use a given substance. Finally, the questions examining bullying victimization have been limited and no one has examined whether mental or physical bullying may differentially impact substance use and whether these associations may differ depending on race and gender.

Our study attempts to address these gaps in the literature through an examination of the potential relationship between bullying victimization and substance use. Specifically, we assessed middle school (6th -8th grade) adolescents' 30-day alcohol, cigarette, marijuana, and inhalant use (ACMI) in fall 2004 and spring 2005. We examined both mental bullying (e.g., rumors, teasing, and threats) and physical bullying (e.g., pushing, shoving, hitting, and fighting) for the past 12 months in spring 2005.

We expected that victims of either type of bullying would be more likely to use ACMI compared to those who did not report victimization. Moreover, we hypothesized that youths who experienced both types of bullying would use ACMI more than those who had not experienced both types of bullying. We also expected that this association would be significant even after controlling for demographics and prior substance use. We expected that gender would play a role in bullying victimization rates, with more boys reporting physical bullying victimization and more girls reporting mental bullying victimization. We were interested in assessing whether ethnic differences would emerge in this younger population.

Method

Participants

Data for these secondary analyses came from youths who participated in a survey which was collected from sixth, seventh, and eighth graders from middle schools in southern California during fall 2004 and spring 2005 (D'Amico & Edelen-Orlando, 2007; D'Amico & McCarthy, 2006). Youths who were outliers for age were excluded from further analyses (i.e., youths under 10 and older than 14 years of age, n=11), based on the theory that these youths may represent cohorts that are developmentally behind or substantively advanced compared to the rest of the sample.

The survey instrument included items that asked about use of a non-existent drug during the past month to identify youths who may inflate drug use reports. This procedure has been utilized in the state wide California Healthy Kids Survey (WestEd, 2005) and previous work published from these data (D'Amico & McCarthy, 2006). Typically, students who report use of this nonexistent drug (approximately 1-5%) also tend to report high rates of other drug use. These adolescents were compared to those who did not report use of the non-existent drug. As expected, their use rates were significantly higher for all other substances. We therefore excluded these cases from data analyses (n = 41). The remaining sample (N = 926) was 45% male (Table 1), and ranged in age from 11 to 14 years (M = 12.45, SD = .86). Approximately 43% self-identified as White, 26% Latino, 7% Asian American/Pacific Islander, 3% African American, 14% identified themselves as mixed ethnic origin, and 5% identified themselves as “other”.

Procedure

All materials and procedures were approved by the Internal Review Board at the institution, the school district, and the individual schools. Students at both schools were surveyed during the same semesters on days when normal absentee rates were expected (< 5%), and with no school vacation (e.g., spring break; winter break) in the preceding month (D'Amico &

McCarthy, 2006). Students were allowed to participate if their parents returned a consent form giving them permission to be in the study. Across both schools, approximately 77% of parents returned consent forms. Written assent statements were completed by students before the survey administration and copies of assent forms were provided to all students. Surveys were completed on an assigned day during physical education (PE) class. Trained proctors described the survey, responded to student questions, and reviewed confidentiality and voluntary participation. Responses were protected by a Certificate of Confidentiality from the National Institute of Health. Students answered survey questions on Scantron forms that were given to the proctor upon completion. Students without parental consent and those choosing not to participate at the time of the survey attended their regular Physical Education class.

Measures

Demographic variables—Information on students' school attended, gender, grade, and ethnicity were collected.

Substance use—Substance use items were taken from well established measures, including Monitoring the Future (Johnston et al., 2003) and the Customary Drinking and Drug Use Record (Brown et al., 1998). The measures were collected in fall 2004 and spring 2005. Current use was defined as use over the past 30 days. Adolescents were asked how many days during the past 30 days they had used each substance on a Likert scale (0 days, 1 – 2 days, 3 – 9 days, 10 – 19 days, and 20 – 30 days). We dichotomized this variable and classified participants as either current users or non-users. Current users were youths who reported any level of use over the past 30 days. Non-users were those who reported no use of a substance for the past 30 days. We ran each model twice, once using substance use as a continuous measure and again with substance use a dichotomous variable. These analyses produced similar results. Therefore, we made the determination to run all models using only the dichotomized substance for the remainder of the analyses.

Bullying victimization—Questions related to victimization from mental and physical bullying were taken from the California Healthy Kids Survey (CHKS), a widely used self-report youth survey that assesses all major areas of health related risk behavior and resilience (WestEd, 2005). Items related to bullying victimization were asked with the common stem, “During the past 12 months, how many times on school property have you…” Questions addressed mental bullying (e.g.,…been afraid of being beaten up?; … had mean rumors or lies spread about you?) and physical bullying (e.g., …been pushed, shoved, slapped, hit, or kicked by someone who wasn't just kidding around?). Bullying victimization was measured in spring 2005.

Overview of analyses

We first conducted chi-square tests or Fisher's exact tests to examine differences in ACMI use and mental and physical bullying victimization by gender, grade, and ethnicity. We next conducted logistic regression analyses and reported relative risk ratios to assess the association between victimization from mental and physical bullying and ACMI use. Models were run for each substance separately. The model included demographic variables, victimization from mental and physical bullying, and controlled for prior use of the outcome substance. Separate models were run to test the interactions of grade, race/ethnicity and gender with bullying victimization for each substance use outcome. When the interactions were significant, the linear combinations of the main and interaction effects were estimated in order to describe the different associations between bullying victimization and substance use for each demographic group.

Of note, substance use questions were administered at both time points (fall—October 2004 and spring—June 2005). Youth were asked to report past 30-day use and thus reports of substance use covered September 2004 and May 2005. Bullying victimization questions were administered in the spring (June 2005) and asked about the previous 12 months. Thus, these behaviors covered May 2004-May 2005. One limitation to these surveys is that the initial instance of substance use (September 2004) could have occurred before the bullying victimization. However, we controlled for substance use in the fall (September 2004) in our analyses and only examined whether bullying victimization was associated with substance use in the spring (May 2005).

Results

Cross tabulations

Cross tabulations indicate that of those students who used any of the substances investigated in this study at time 2, 70 – 86% did not report use of that substance at time 1. This suggests that some students started using substances during the time period while they were victimized. These data also show that the majority of youth who reported using any other substances also reported drinking alcohol (76%, 71%, and 72% respectively for co-occurring cigarette, marijuana, or inhalants use). However, only a quarter of youth who reported alcohol use also reported using cigarettes or marijuana, and 20% of alcohol users also reported inhalant use. Crosstabs of the other substances show less overlap with a range of 36 – 70% across the other substances. The highest levels of co-occurrence are between cigarette and marijuana use and the lowest are between alcohol and inhalant use. Thus, while there is some overlap between use of various substances at the two time points, the cross tabulations show that there are different groups of youth reporting use of the different substances.

Substance Use

As shown in Table 1, in the spring 2005 semester, 4.54% of the sample reported cigarette use in the last 30 days, 13.61% reported alcohol use, 4.86% reported marijuana use, and 3.89% reported inhalant use.

Grade differences—Similar to previous work with this data set (D'Amico & McCarthy, 2006), chi-square comparisons (Table 2) indicated that prevalence rates for alcohol and marijuana differed across grades, with 7th and 8th graders more likely to report marijuana use (X^2 (df = 2, N = 926) = 24.73, p < 0.001), and alcohol use increasing at each grade level (X^2 (df = 2, N = 926) = 12.34, p < .01). There was no significant association between grade and cigarette or inhalant use.

Gender and ethnic differences—Fisher's exact test indicated that substance use rates did not differ significantly by gender. Chi-square comparisons were conducted for Latinos, Whites, African Americans, Asian American/Pacific Islanders, and those of other or mixed ethnicity. Use rates did not differ by ethnicity.

Bulling victimization

Approximately 51% of the youths reported having experienced mental bullying and 34% reported having experienced physical bullying. Twenty-eight percent reported experiencing both mental and physical bullying.

Grade differences—Chi-square comparisons (Table 2) indicated that reports of experiencing mental bullying differed across grades, with 7th and 8th graders more likely to report mental bullying (X^2 (df = 2, N = 926) = 16.76, p < 0.001). There were no significant difference in reports of physical bullying by grade (X^2 (df = 2, N = 926) = 0.53, p = 0.76).

Gender differences—Fisher's exact tests indicated that reports of physical bullying differed by gender, with boys more likely to report experiencing physical bullying than girls ($p < 0.001$). Reports of mental bullying did not significantly differ by gender.

Ethnic differences—Chi-square comparisons were conducted for Latinos, Whites, African Americans, Asian American/Pacific Islanders, and those of other or mixed ethnicity. Reports of mental bullying differed significantly by ethnicity (X^2 (df = 5, N = 926) = 11.31, $p < .05$) with youths who self-reported their race/ethnicity as Latino/Hispanic reporting the lowest rates (standardized Pearson residual = -2.83). Reports of experiencing physical bullying did not differ significantly by ethnicity (X^2 (df = 5, N = 926) = 646, $p = 0.26$).

Prior substance use—Correlations between prior substance use and victimization from both types of bullying were significant for each substance. Pearson coefficients ranged between .13 and .22, $p < 0.05$.

Logistic regression analyses of associations between bullying victimization and substance use

For each analysis, the dependent measure was the dichotomous classification (used/did not use) of substance use (prior 30 days) measured in the spring 2005 semester. Bullying victimization was also dichotomized (experienced the type of bullying/did not experience the type of bullying). Analyses were run separately for ACMI use. Ethnicity was dummy-coded, with white as the reference group. Sex was also dummy coded, with male as the reference group. The models included demographic variables (i.e., school attended, grade level, sex, and ethnicity), victimization from both mental and physical bullying, and controlled for prior use of the outcome substance. Model 1 provides relative risk ratios modeling the association between victimization from mental and physical bullying and alcohol, cigarette, marijuana, and inhalant use. Model 2 tested the interactions between the demographic variables and victimization from mental and physical bullying for each substance. When a significant interaction was found we also report the post estimation test estimates. Results for all regressions are presented in Tables 3a and 3b.

Alcohol use—Model 1 controlled for demographic variables and prior alcohol use and documented the association of each type of bullying victimization (Table 3a). Results for Model 1 indicated that after controlling for prior use of alcohol at Time 1, youths who reported victimization from either mental (RRR = 2.89; $p < .001$) or physical bullying (RRR = 1.62; $p = .04$) were also more likely to report current alcohol use at Time 2. Youths in higher grade levels were also more likely to use alcohol at Time 2 ($p < .05$).

Model 2 (Table 3b) shows that mental bullying victimization did not have a significantly different association with alcohol use for boys and girls. Physical bullying victimization had 3.65 times the effect on girls' as on boys' alcohol use ($p < .01$) with post-estimation tests showing significant associations for girls but not boys (girls' RRR = 2.80; $p < .001$; boys' RRR = 0.77; $p = .46$). The interactions of grade and race/ethnicity with mental and physical bullying victimization were not significant.

Cigarette use—Model 1 supported our hypothesis that after controlling for prior cigarette use at Time 1, youths who reported mental bullying victimization were almost three times more likely to use cigarettes ($p = .02$) and those who reported physical bullying victimization were 2.5 times more likely to use cigarettes at Time 2 ($p = .01$). These estimates suggest that the additive effect of experiencing both mental and physical bullying is approximately a five fold increase in the likelihood of cigarette use. None of the demographic factors were associated with cigarette smoking. In Model 2, there were no significant interactions between any of the

demographic factors and mental or physical bullying victimization, suggesting that none of these demographic factors moderated the association of bullying victimization with cigarette use.

Marijuana use—After controlling for prior marijuana use at Time 1 in Model 1, mental (RRR = 3.56; $p < .01$) and physical (RRR = 2.06; $p < .05$) bullying victimization were both associated with an increased likelihood of marijuana use. Grade level was also positively associated with increases in marijuana use in all models ($p < .01$).

Mental bullying victimization was not strongly associated with marijuana use for girls compared to boys (RRR = .14; p =< .05). Post estimation tests showed a significant association for boys (RRR = 11.34; $p < .01$), but not for girls (RRR = 1.55; $p = .46$). In contrast, physical bullying victimization was more strongly associated with marijuana use for girls than boys (RRR = 5.12; $p = .03$). Post estimation tests showed a significant association for girls' marijuana use (RRR = 4.24; $p < .01$) but not for boys (RRR = 0.83; $p = .29$). The interactions of grade and race/ethnicity with mental and physical bullying victimization were not significant.

Inhalant use—Model 1 shows victimization from mental (RRR = 3.26; $p < .05$) and physical (RRR = 2.58; $p < .05$) bullying were significantly associated with a higher likelihood of inhalant use at Time 2, after controlling for prior use of marijuana at Time 1. Time 1 inhalant use was also strongly related to the likelihood of inhalant use at Time 2 (RRR = 8.39; $p < .001$). Additionally, boys ($p < .05$) and seventh graders ($p = .01$ in comparison with sixth graders) were less likely to use inhalants.

Mental bullying victimization did not significantly differ for on inhalant use between boys and girls (RRR = .30; $p = .27$). Physical bullying victimization was more strongly associated with inhalant use for girls compared to boys (RRR = 12.79; $p < .01$). Post estimation tests showed a significant association of physical bullying with inhalant use for girls (RRR = 6.35; $p < .001$) but not for boys (RRR = 0.50; $p = .30$). The interactions of grade and race/ethnicity with mental and physical bullying victimization were not significant.

Discussion

During the middle school years, bullying victimization and substance use both tend to increase. In spite of this phenomenon, research has primarily examined this association among older adolescents. The unique contributions of this study include its focus on early adolescents, assessment of both mental and physical bullying victimization, examination of the association between these two types of bullying victimization and several substances: alcohol, cigarettes, marijuana, and inhalants, and controlling for prior substance use. Another significant contribution is the investigation into the differential association of these phenomena by gender.

Association between bullying victimization and substance use

Results clearly supported an association between both forms of bullying victimization and substance use for each of the four substances we examined, with victimized youths more likely to use substances than youths who did not experience victimization. This finding held for each substance controlling for gender, grade level, and ethnicity of the youths. Importantly, it also remained significant after controlling for prior use in fall 2004, with youths who reported experiencing physical and mental bullying still being more likely to use all substances in spring 2005. More longitudinal data demonstrating that bullying victimization precedes initiation or escalation of substance use are needed to confirm the direction of causality; however, the stability of our results after controlling for prior use suggests that experiencing bullying puts younger adolescents at higher risk for substance use.

In our sample, 50% of youths reported experiencing mental bullying, one third of our sample reported being bullied physically, and 28% reported experiencing both forms of victimization. These findings are consistent with data from Finkelhor et al.'s (2005) sample of youths age 2-17. However, our rates of bullying are substantially higher than rates reported by Nansel and colleagues (2001) in their study of 6th-10th graders. Nansel and colleagues (2001) used the Health Behaviour in School-aged Children (HBSC) Research Protocol for the 1997-98 Survey and provided students with a detailed definition of bullying along with examples. That definition stated that bullying occurs when someone "[says or does] nasty and unpleasant things to him or her" or "when a student is teased repeatedly in a way he or she doesn't like." Instructions expressly indicated that bullying is not "when two students of about the same strength quarrel or fight." We believe that our definition of bullying may have generated more reports of experiences with bullying in part because questions were asked to address particular situations for bullying (e.g., [Have you]…been afraid of being beaten up?; … had mean rumors or lies spread about you?;…been pushed, shoved, slapped, hit, or kicked by someone who wasn't just kidding around?). These more specific examples of bullying situations may have served to remind participants of instances that they may not have recalled had they been provided with a more general description of bullying as was the case in the HBSC protocol. Additionally, we did not prohibit students from including interactions with aggressors who were smaller in size or situations that only occurred once or twice (as opposed to *repeatedly*). Indeed, Nansel et al. (2001) mentioned that use of the HBSC was limited in its utility because it was a general measure and they said in their report that more specific work focusing on bullying is needed.

It is also important to recognize the limitations of our measure. We believe that work in this area is needed that can focus more in-depth on bullying victimization as opposed to peer aggression or fighting in general. For example, mental bullying through text and instant messaging and via email has been a recent topic in the media and indeed is beginning to surface in research as well (e.g., Patchin & Hinduja, 2006; Smith, Mahdavi, Carvalho, Fisher, Russell, & Tippett, 2008.). Additionally, the field is in need of a more tailored definition and operationalization of bullying victimization. This definition would include the methods and strategies as well as the relationship and interpersonal factors involved in this specific type of peer aggression (Greif, Furlong, & Morrison, 2003).

Though this analysis focuses on bullying victimization as a risk factor for substance use, other factors such as peer influence cannot be ignored as important risk factors for drug use in adolescents (Svensson, 2000; van den Bree & Pickworth, 2005). Research has shown, for example, that youth who socialize with peers who are delinquent and use substances are also more likely to engage in delinquent acts and substance use (Piko, 2006; Windle, 2000). Additional research that examines the role of peers as part of these relationships is needed.

Gender interactions

We consistently found for each substance, except for cigarettes, that girls were more sensitive to physical bullying than boys. Additionally, for marijuana use, we found that boys were more sensitive to mental bullying than girls. Of note, it has been documented repeatedly that girls and boys experience these forms of bullying to a differential degree (Chesney-Lind et al., 2007; Ordonez, 2007). Specifically, boys are reportedly more likely than girls to experience physical bullying (Batsche & Knoff, 1994; Finkelhor et al., 2002; Nolin, Davies, & Chandler, 1995; Olweus, 1993; Whitney & Smith, 1993) and girls more likely to demonstrate verbal/relational bullying than physical bullying (Smith, & Thompson, 1991). Consistent with this past work, we find that girls report lower levels of victimization from physical bullying suggesting that physical bullying may be a more extreme occurrence for girls, in turn making it more likely to contribute to substance use. In our work we do not see differences between

boys and girls in rates of mental bullying victimization yet the stronger association of mental bullying with marijuana use for boys is suggestive that boys may not have the repertoire of skills to effectively cope with mental as compared to physical bullying. However, while this speculation is consistent with much of the empirical work on incidences of mental and physical bullying based on gender; definitive sources for this phenomenon would require additional data.

Grade differences

Our findings that the prevalence of bullying victimization increases with grade level are similar to those reported by Nansel et al. (2001). Thus, it is crucial to teach proper coping strategies to youth early, for example, by working with schools to increase awareness of the different types of bullying and helping schools provide a climate that does not tolerate bullying.

Ethnic differences

We found that Latino/Hispanic youth were least likely to report experiencing mental bullying, whereas physical bullying rates were similar across groups. Results contrast with Finkelhor's work (2005) in which whites reported more physical bullying than African Americans and Hispanics and similar rates of mental bullying across groups. Overall results suggest that working with minority youths on this issue is important.

As with many studies of this nature, there are several limitations. For example, we are limited in our ability to make causal assertions on the direction of the relationship between substance use and victimization. However, we found strong associations between these two variables even after controlling for prior use and our results do support previous longitudinal work in this area with adults (Kantor and Straus, 1989; Kilpatrick et al., 1997; Martino et al., 2004) that suggest that exposure to bullying may increase substance use. Further work is needed that examines this relationship longitudinally among younger adolescents.

It is also possible that because bullying was measured over 12 months that substance use in fall 2004 may have occurred prior to bullying victimization. To control for this possibility, we conducted analyses in which we only examined the association between bullying victimization and substance use in spring 2005, while controlling for prior use in fall 2004.

In addition, we relied on self-report from students. Although self-report is a common and accepted method of measuring victimization and substance use, individual perceptions of bullying as well as respondents' recall may vary, leading to inaccurate reports. We attempted to increase accurate reporting by training proctors to administer the survey, not requesting identifying information, and having youths complete answers on Scantron forms. Reports of substance use in this sample (D'Amico & McCarthy, 2006; D'Amico & Edelen, 2007) have previously been shown to be similar to national norms (Johnston et al., 2008). In addition, rates of bullying victimization in the sample are similar to rates found in other adolescent age samples (Finkelhor et al., 2005) suggesting that the majority of the youth were able to accurately report on these experiences.

In sum, current findings provide support for the association between bullying victimization and substance use among younger adolescents. While other factors, such as peer influences, have been found to play a large role in substance use, we suggest that further research also include investigations of participants' exposure to both mental and physical bullying in their efforts to understand how these types of experiences may contribute to younger adolescents' substance use.

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Table 1

Descriptive Data

Variables	Frequency	Percentage
Gender		
Male	417	45.03
Female	509	54.97
Grade		
6th Grade	355	38.34
7th Grade	369	39.85
8th Grade	202	21.81
School		
School_1	599	64.69
School_2	327	35.31
Ethnicity		
Latino	245	26.46
Asian/Pacific Islander	68	7.34
African American/Black	32	3.45
Other	52	5.62
White	402	43.41
Mixed/Multi-ethnic	127	13.71
Bullying Method		
Mental bullying	472	50.97
Physical bullying	312	33.69
Both Mental & Physical	263	28.41
	Any Use –Fall 2004 semester	
Substance Use		
Alcohol	74	7.99
Cigarette	36	3.89
Marijuana	19	2.05
Inhalants	23	2.48
	Any Use – Spring 2005 semester	
Substance Use		
Alcohol	126	13.61
Cigarette	42	4.54
Marijuana	45	4.86
Inhalants	36	3.89

Table 2

Chi-Square Relationships Between Demographic and Substance Use/Bullying Variables in Spring Semester (N = 926)

	Percentage of Participants Using Each Substance/Reporting Bullying Victimization						
	Bullying	**Alcohol**	**Cigarettes**	**Marijuana**	**Inhalants**	**Mental**	**Physical**
Gender							
Female		14.15	5.11	4.91	4.91	52.46	25.93
Male		12.95	3.84	4.80	2.64	49.16	43.17
p-value		.63	.43	1.00	.09	.32	<.001
Grade							
6th Grade		9.30	3.94	2.25	5.35	42.54	32.39
7th Grade		14.36	3.52	3.79	2.44	55.28	34.96
8th Grade		19.80	7.43	11.39	3.96	57.92	33.66
p-value		.002	.08	<.001	.13	<.001	.76
Ethnicity							
Latino		12.13	4.60	3.35	4.60	43.10	30.13
Asian/Pacific Islander		8.70	2.90	1.45	1.45	50.72	26.09
African American/Black		16.13	9.68	9.68	.00	64.52	45.16
White		12.93	3.96	5.28	4.75	53.03	34.83
Other		15.79	3.51	5.26	3.51	47.37	40.35
Mixed/Multi-ethnic		18.54	5.96	6.62	2.65	56.95	35.10
p-value		.35	.63	.34	.54	.05	.26

Table 3a

Logistic Regression Analyses (N = 926)

	Model 1			
Use Ratio	**Alcohol Use Risk Ratio (95% Conf. Interval)**	**Cigarette Use Risk Ratio (95% Conf. Interval)**	**Marijuana Use Risk Ratio (95% Conf. Interval)**	**Inhalants Risk (95% Conf. Interval)**
Sex	1.15 (.75 - 1.77)	1.63 (.83 – 3.20)	1.22 (.63 - 2.37)	2.56* (1.18 - 5.59)
Grade 7	1.42 (.86 - 2.33)	0.75 (.34 – 1.65)	1.36 (.55 – 3.35)	0.32* (.13 - .77)
Grade 8	1.93* (1.12 - 3.35)	1.57 (.71 – 3.47)	3.49** (1.43 - 8.48)	0.62 (.25 - 1.54)
School	0.94 (.60 - 1.49)	0.82 (.41 – 1.66)	0.62 (.29 - 1.31)	1.78 (.83 - 3.80)
Latino	0.94 (.53 - 1.66)	1.42 (.60 – 3.32)	0.83 (.33 - 2.08)	0.79 (.33 - 1.90)
Asian/Pacific Islander	0.79 (.31 -2.01)	0.81 (.18 – 3.72)	0.27 (.03- 2.18)	0.30 (.04 - 2.39)
African American/Black	1.01 (.33 - 3.14)	2.50 (.64 – 9.80)	1.70 (.39 - 7.46)	0.00 -
Other	1.36 (.58 -3.19)	0.85 (.181 - 3.95)	1.15 (.31 – 4.17)	0.80 (.17 - 3.75)
Mixed/Multi-ethnic	1.67 (.96 - 2.92)	1.38 (.56 – 3.36)	1.12 (.47 - 2.71)	0.47 (.15 - 1.46)
Mental Bullying	2.89*** (1.73 - 4.84)	2.83* (1.18 - 6.80)	3.56** (1.43 - 8.85)	3.26* (1.21 - 8.84)
Physical Bullying	1.62* (1.02 - 2.57)	2.51* (1.21 - 5.21)	2.06* (1.01 - 4.22)	2.58* (1.13 - 5.88)
Prior Use of Each Substance	8.25*** (4.76 - 14.31)	4.49** (1.62 - 12.45)	10.73*** (3.31 - 34.82)	8.38*** (2.77 - 25.35)

Table 3b
Logistic Regression Analyses (N = 926)

	Model II			
Use Ratio	Alcohol Use Risk Ratio (95% Conf. Interval)	Cigarette Use Risk Ratio (95% Conf. Interval)	Marijuana Use Risk Ratio (95% Conf. Interval)	Inhalants Risk (95% Conf. Interval)
Sex	1.29 (.56 - 2.99)	1.69 (0.37 - 7.68)	2.42 (0.43 - 13.53)	1.37 (.24 - 7.99)
Grade 7	1.42 (.86 - 2.35)	0.75 (0.34 - 1.65)	1.34 (0.54 - 3.32)	0.32* (.13 - .78)
Grade 8	1.98* (1.14 - 3.45)	1.59 (0.71 - 3.52)	3.59** (1.46 - 8.83)	0.65 (.25 - 1.65)
School	0.97 (.62 - 1.54)	0.83 (0.41 - 1.67)	0.64 (0.30 - 1.36)	1.81 (.83 - 3.95)
Latino	0.95 (.54 - 1.67)	1.42 (0.61 - 3.35)	0.86 (0.34 - 2.17)	0.78 (.32 - 1.89)
Asian/Pacific Islander	0.84 (.33 - 2.13)	0.82 (0.18 - 3.78)	0.27 (0.03 - 2.27)	0.32 (.04 - 2.57)

	Model 1			
Use Ratio	**Alcohol Use Risk Ratio (95% Conf. Interval)**	**Cigarette Use Risk Ratio (95% Conf. Interval)**	**Marijuana Use Risk Ratio (95% Conf. Interval)**	**Inhalants Risk (95% Conf. Interval)**
African American	0.97 (.31 - 3.05)	2.48 (0.63 - 9.74)	1.65 (0.37 - 7.28)	0.00 --
Other	1.45 (.61 - 3.43)	0.88 (0.19 - 4.08)	1.23 (0.33 - 4.56)	0.84 (.17 - 4.07)
Mixed/Multi-ethnic	1.66 (.94 - 2.92)	1.38 (0.57 - 3.37)	1.12 (0.46 - 2.72)	0.47 (.15 - 1.48)
Prior Use of Each Substance	8.38*** (4.80 - 14.62)	4.44** (1.60 - 12.33)	9.98*** (2.97 - 33.55)	7.14*** (2.33 - 21.91)
Sex X Mental Bullying	0.36 (.12 – 1.03)	0.67 (0.119 – 4.00)	0.14* (0.02 - 0.99)	0.30 (.04 - 2.46)
Mental Bullying (Males)	5.34*** (2.34 - 12.19)	3.59 (.89 – 14.44)	11.34** (2.27 - 56.57)	6.74* (1.27 - 35.60)
Sex X Physical Bullying	3.65** (1.44 - 9.23)	1.55 (0.35 - 6.89)	5.12* (1.22 - 21.43)	12.79** (2.29 - 71.60)
Physical Bullying (Males)	0.77 (.38 - 1.54)	1.91 (.58 – 6.25)	0.83 (0.29 - 2.35)	0.50 (.13 - 1.88)
Mental Bullying (Females)	-- --	-- --	*1.55* *(.49 – 4.92)*	-- --
Physical Bullying (Females)	*2.80**** *(1.52 – 5.17)*	-- --	*4.24*** *(1.58 – 11.38)*	*6.35**** *(2.11 – 19.10)*

* p < .05

** p < .01

*** p < .001

† None of the African Americans in this sample reported using inhalants.

Italics indicate results of post-estimation tests.