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School Bullying, Cyberbullying, or both: Correlates of Teen Suicidality in the 2011 CDC Youth Risk Behavior Survey

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Abstract

While school bullying has been shown to be associated with depression and suicidality among teens, the relationship between these outcomes and cyberbullying has not been studied in nationally representative samples. Data came from the 2011 CDC Youth Risk Behavior Survey (YRBS), a nationally representative sample of high-school students (N=15,425). We calculated weighted estimates representative of all students in grades 9-12 attending school in the US. Logistic regression was used to calculate adjusted odds ratios. Overall, girls are more likely to be report being bullied (31.3% vs. 22.9%), in particularly to be cyberbullied (22.0% vs. 10.8%), while boys are only more likely to report exclusive school bullying (12.2% vs. 9.2%). Reports of 2-week sadness and all suicidality items were highest among teens reporting both forms of bullying, followed by those reporting cyberbullying only, followed by those reporting school bullying only. For example, among those reporting not being bullied 4.6% reported having made a suicide attempt, compared to 9.5% of those reporting school bullying only (adjusted odd ratio (AOR) 2.3, 95% C.I. 1.8- 2.9), 14.7% of those reporting cyberbullying only (AOR 3.5 (2.6-4.7)), and 21.1% of those reporting victimization of both types of bullying (AOR 5.6 (4.4-7)). Bullying victimization, in school, cyber, or both, is associated with higher risk of sadness and suicidality among teens. Interventions to prevent school bullying as well as cyberbullying are needed. When caring for teens reporting being bullied, either at school or in cyberbullying, it's important to screen for depression and suicidality.

Keywords

suicide; bullying; cyberbullying; epidemiology

Background

Suicide is a grievous and preventable tragedy, and sadly stands among the top causes of death among teens (Cash and Bridge 2009). The lifetime prevalence of suicide ideation, planning, and attempts among teens is estimated to be 12.1%, 4%, and 4.1% respectively

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(Nock, Green et al. 2013). The role new forms of media play in this outcome is among the challenges in reducing the burden of suicide among teens (Hawton, Saunders et al. 2012). Recently, attention has been drawn to teen suicides precipitated by electronic harassment (Bazelon 2013). A Kaiser Foundation study (Rideout, Roberts et al. 2005) reported that 86% of US youngsters have a computer at home and also estimated the daily average time of recreational Internet use to be over 1 hour. More recent estimates point to 80% of American teens using social network sites (Lenhart, Purcell et al. 2010). The teens' embracement of online social network has made electronic harassment an issue of their lives and a pervasive exposure in need of study. Furthermore, surveys on US middle school students has shown that, as compared to traditional bullying, there is a stronger association between cyberbullying victimization with depression (Wang, Nansel et al. 2011) and suicidality (Hinduja and Patchin 2010), however research looking at this relationship is in its infancy (Schneider, O'Donnell et al. 2012).

The term bullying was introduced to Medical Subject Headings (MeSH) in 2011 and defined as "aggressive behavior intended to cause harm or distress. The behavior may be physical or verbal." Developmental psychology definitions of bullying also stress three common criteria: intentionality, repetitiveness, and power imbalance (Olweus 2012). Cyberbullying occurs when digital media are used for bullying (Ortega, Elipe et al. 2012). The 2011 Youth Risk Behavior Survey (YRBS), conducted biannually by the CDC, had for the first time a question addressing cyberbullying (Eaton, Kann et al. 2012). Several studies have shown an association between school bullying and depression and suicidality among teens (Brunstein Klomek, Marrocco et al. 2007, Klomek, Sourander et al. 2008, Brunstein Klomek, Sourander et al. 2010, Klomek, Kleinman et al. 2011) as well as with risk for personality disorder in adulthood along with externalizing behaviors and mental health care utilization (Sansone, Lam et al. 2010). There have been to date, few studies linking cyberbullying to mental health problems in the youth (Smith, Mahdavi et al. 2008, Ortega, Elipe et al. 2012, Schneider, O'Donnell et al. 2012). In a 2008 sample of Massachusetts high school students 15.8% reported cyberbullying and 25.9% reported school bullying in the past 12 months, and victimization was associated with significant psychological distress (Schneider, O'Donnell et al. 2012). In a study of teens from three European countries, four different forms of bullying were described (direct, indirect, mobile phone, and internet) and regional variations were found, with England having the highest victimization rate, Spain the lowest, with Italy in the middle (Ortega, Elipe et al. 2012). Another study of English teens looked at seven forms of cyberbullying and found an overall incidence of 22.2% being victims of cyberbullying within the last couple of months, with girls being at a higher risk (Smith, Mahdavi et al. 2008). Two regional samples of the YRBS have been used to study cyberbullying and teen mental health, one in Arizona (Sinclair, Bauman et al. 2012) and another in the Midwest (Litwiller and Brausch 2013), both showing an association between cyberbullying and teen suicidality. A previous study on school bullying and suicide attempt was done using the New York City YRBS (Levasseur, Kelvin et al. 2013). To our knowledge, no study on a nationally representative sample of American teens has been conducted to look at the association between cyberbullying and teen mental health.

We used a publicly available, nationally representative, sample of US high school students to study the relationship between school bullying, cyberbullying, and both forms of bullying

victimization, to depression and suicide. We hypothesized that subjects reporting school bullying, cyberbullying, or both, are at higher risk of reporting 2-week sadness, as proxy for depression, and of endorsing suicide related items.

Methods

The methodology for the Youth Risk Behavior Survey (YRBS) has been described (Brener, Kann et al. 2004) and is available at the CDC website (<http://www.cdc.gov/healthyyouth/yrebs>). Briefly, these national high school surveys have been conducted biannually since 1991 and monitor several health-risky behaviors. The aggregate data is made available without any personal identifying information. State participation varies year by year but most states participate. Sampling weights are calculated to allow for nationally representative estimates. Among the participating states, the overall participation rate for the 2011 YRBS was 71%. Comprehensive descriptive results from the 2011 survey have been published (Eaton, Kann et al. 2012). This study protocol was submitted to the Institutional Review Board (IRB) at the University of Arkansas for Medical Sciences and given exempt status given the deidentified nature of the publicly available survey data.

Exposures

Bullying victimization categories were based on answers to two separate YRBS questions. The school bullying question read: “During the past 12 months, have you ever been bullied on school property?” with a yes/no answer. The cyberbullying question read: “During the past 12 months, have you ever been electronically bullied? (Include being bullied through e-mail, chat rooms, instant messaging, Web sites, or texting)” also with a yes/no answer. Given the overlap between school bullying and cyberbullying, i.e. many students who reported cyberbullying also reported school bullying, we created a new variable, used in the analysis, combining these two types of bullying, resulting in four exclusive categories: no bullying, school bullying victimization only, cyberbullying victimization only, and both forms of bullying victimization. In all analysis the “no bullying” category is the comparison category.

Outcomes

2-week sadness was assessed by the question “During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?” which was used as proxy for depression. Four questions assessed suicidality in a continuum of severity. The suicidal ideation question read “During the past 12 months, did you ever seriously consider attempting suicide?” The suicide plan question read “During the past 12 months, did you make a plan about how you would attempt suicide?” The suicide attempt question read “During the past 12 months, how many times did you actually attempt suicide?” The attempt requiring treatment question read “If you attempted suicide during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?” All questions had yes/no as alternative answers, except for the attempt question which gave options ranging from “0 times” to “6 or more times.” These YRBS items assessing suicidal thoughts and behaviors have good convergent and discriminant validity (May and Klonsky 2011).

Data analysis

All analyses were conducted using Stata 11. Weight procedures were performed according to CDC guidelines (Brener, Kann et al. 2004). All proportions are reported in tables along with 95% confidence intervals. Adjusted odds ratios (AOR) for age, gender, and race, were calculated using weighted logistic regressions. To correct for multiple comparisons, while avoiding “p-value fetishism”, we use the Bonferroni adjustment but also reported estimates along with confidence intervals (Morgan 2007). Given we had three categories of exposure (school bullying only, cyberbullying only, both forms of bullying), compared to non-exposed status, predicting five outcomes (2-week sadness, ideation, plan, attempt, and treatment), alpha was set $.05/15=.0033$.

Results

Of the 17,672 sampled students submitted questionnaires, 15,425 were usable after data editing, yielding a student participation rate of 87% (2012). The YRBS ethnicity/race variable includes eight categories: American Indian/Alaska Native (N=293), Asian (N=476), Black or African American (N=2,767), Native Hawaiian/other Pacific Islander (N=125), White (N=6,171), Hispanic/Latino (N=2,227), Multiple – Hispanic (N=2,400), Multiple non-Hispanic (N=651), with 315 missing data. We re-categorized those eight ethnicity/race categories into four categories: Caucasian (White), African-American (Black or African-American), Hispanic (Hispanic/Latino and Multiple – Hispanic), and “Other” (all remaining non-missing subjects).

Prevalence of different forms of bullying victimization by gender, age, and race

Overall, girls are more likely to be report being bullied (31.3% vs. 22.9%), in particularly to be cyberbullied (22.0% vs. 10.8%), while boys are only more likely to report exclusive school bullying (12.2% vs. 9.2%) – see table 1 for estimates, confidence intervals, and test statistics. The prevalence of overall bullying decreases from age 14 (32.6%) to age 18 and older (21.2%), this decrease is due mostly to a decrease in exclusive school bullying (from 16.6% to 7.1%) while exclusive cyberbullying actually increased from 6.2% in 14 year-olds to 7.4% among 18 year-olds – see **table 1** for estimates, confidence intervals, and test statistics. Prevalence of bullying varied by race: Caucasians and other races tended to reports more overall bullying (30.1% and 29.1%, respectively) compared to Hispanics (23.9%) and African-Americans (16.5%), see **table 1** for estimates, confidence intervals, and test statistics. A similar pattern is observed in school bullying only, cyberbullying only (this is the only group with a higher prevalence of “other” race/ethnicity), and both types of bullying victimization (Caucasian > Other > Hispanic > African-American).

Prevalence of suicide outcomes by gender, age, and race

There were differences in prevalence of the outcomes by gender. Girls were significantly (design-based $p<.003$) more likely to reports 2-week sadness (36% vs. 21%), suicidal ideation (19% vs. 12%), suicide plan (15% vs. 11%), attempt (10% vs. 6%), and treatment for attempt (3% vs. 2%). We found no difference in outcomes based on age ($p>.003$).

Hispanic and other races presented higher 2-week sadness prevalence (32%) compared to Caucasians (27%) and African-Americans (25%). Students categorized as “other” race also presented higher suicide ideation (20%). Hispanic (14%) and other (16%) were also more likely to report suicide plan. Hispanic (10%) and other (11%) were more likely to report having made a suicide attempt compared to Caucasians (6%) and African-Americans (8%). Students categorized as “other” race also were more likely to report treatment for suicide (4%), followed by Hispanics (3%), African-Americans (2%) and Caucasians (1.8%). In sum, the pattern of distribution of the outcomes noticed was: Other > Hispanics > African-Americans > Caucasians. All differences reported are significant at design-based p-value < .003.

Association between bullying victimization and teen suicidality

A pattern of increased prevalence for each outcome studied can be noticed where those reporting school bullying only have higher prevalence than those reporting no bullying, those reporting cyberbullying an even higher prevalence, and those reporting being victims of both types of bullying reporting the highest risk. Students reporting suicidality were more likely to also report bullying. For example, of those reporting having made a suicide attempt 13.9% reported school bullying only, 13.7% reported cyberbullying only, and 27.3% reported both forms of bullying. These estimates for all categories of suicidality, and their 95% confidence intervals, are presented on **table 1**. Another way to look at this relationship is to look at the prevalence of suicide related outcomes per bullying victimization categories. For example, among those reporting not being bullied 4.6% reported having made a suicide attempt, compared to 9.5% of those reporting school bullying, 14.7% of those reporting cyberbullying, and 21.1% of those reporting victimization of both types of bullying. See **table 1a** for these estimates and confidence intervals on the prevalence of suicidality items per bullying victimization category.

Since the bullying victimization categories varied according to gender, age, and race/ethnicity, on **Table 2** we present the crude and adjusted (for gender, race, and age) odds ratios (95% confidence intervals) between the bullying victimization categories and the suicidality outcomes. Again the dose-response pattern is evident: no bullying < school bullying < cyberbullying < both forms of bullying.

Conclusion

In a large, nationally representative sample of US high school students, we found that bullying, both school bullying and cyberbullying, is prevalent (27.4%) and that those reporting either form of bullying are at higher risk for also reporting 2-week sadness, suicidal ideation, plans, attempts, and attempts requiring treatment. We also found that while school bullying decreases with age, as previously reported in other studies (Nansel, Overpeck et al. 2001), this decreasing trend was not observed with cyberbullying. In fact, we see a slight increase in the prevalence of cyberbullying taking place in the 17-year-old age bracket. We also found that, while boys are more exposed to school bullying, girls are almost twice as likely to be cyberbullied, as previously reported among middle school students (Kowalski and Limber 2007).

The limitations of our study should be considered. First, survey data depends on self-reports which can be biased, being especially prone to recall bias. Second, a cross-sectional analysis such as ours cannot show the sequence of events leading to the association noticed. In other words, it's possible that being bullied leads to depression and suicidal ideation, but it's also conceivable that students who were showing signs of depression and suicidal thoughts were picked on as vulnerable.

The first limitation on self-report surveys can be partially addressed by looking at the validity of the suicidality items of the YRBS. A study examining those items' relationships to criterion variables, such as anxiety, depression, and substance abuse, found that these YRBS items assessing suicidal thoughts and behaviors have good convergent and discriminant validity (May and Klonsky 2011). The second limitation on the cross-sectional data has to be viewed in the context of cyberbullying being a recent exposure – the term cyberbullying was first used according to Webster's in 2000, the term bullying itself was added to the MeSH in 2011, and the 2011 YRBS used in this study was the first one to have a specific question on cyberbullying.

Prospective studies are best suited to answer the question about which came first. A recent longitudinal study conducted in North Carolina documented long term adverse mental health outcome among those being school bullied as teens, with the worst effects affecting both bullying victims and the bullies themselves (Copeland, Wolke et al. 2013). Given the novelty of the cyberbullying exposure in the population, any such longitudinal study on the topic starting today will take at least ten years to be completed.

We hope this study serves to inform health care professionals, students, parents, and teachers, about the prevalence of bullying in our schools, as well as in cyberspace, and that those behaviors are associated with high levels of reported sadness and suicidality. The advantage of recognizing such association is that interventions to mitigate school bullying have been shown to be effective and should be made available (Smith, Ananiadou et al. 2003, Karna, Voeten et al. 2011, Ttofi and Farrington 2012) while effective measures against cyberbullying can, and should, be developed (Ortega-Ruiz and Nunez 2012).

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Abbreviations

YRBS Youth Risk Behavior Survey

References

- 2011 YRBS Data User's Guide. V. h. National Center for HIV/AIDS, STD, and TB prevention; 2012.
- Bazelon, E. Sticks and stones : defeating the culture of bullying and rediscovering the power of character and empathy. Random House; New York: 2013.
- Brener ND, Kann L, Kinchen SA, Grunbaum JA, Whalen L, Eaton D, Hawkins J, Ross JG. Methodology of the youth risk behavior surveillance system. MMWR Recomm Rep. 2004; 53(RR-12):1–13. [PubMed: 15385915]

- Brunstein Klomek A, Marrocco F, Kleinman M, Schonfeld IS, Gould MS. Bullying, depression, and suicidality in adolescents. *J Am Acad Child Adolesc Psychiatry*. 2007; 46(1):40–49. [PubMed: 17195728]
- Brunstein Klomek A, Sourander A, Gould M. The association of suicide and bullying in childhood to young adulthood: a review of cross-sectional and longitudinal research findings. *Can J Psychiatry*. 2010; 55(5):282–288. [PubMed: 20482954]
- Cash SJ, Bridge JA. Epidemiology of youth suicide and suicidal behavior. *Curr Opin Pediatr*. 2009; 21(5):613–619. [PubMed: 19644372]
- Copeland WE, Wolke D, Angold A, Costello EJ. Adult psychiatric outcomes of bullying and being bullied by peers in childhood and adolescence. *JAMA Psychiatry*. 2013; 70(4):419–426. [PubMed: 23426798]
- Eaton DK, Kann L, Kinchen S, Shanklin S, Flint KH, Hawkins J, Harris WA, Lowry R, McManus T, Chyen D, Whittle L, Lim C, Wechsler H. Youth risk behavior surveillance - United States, 2011. *MMWR Surveill Summ*. 2012; 61(4):1–162. [PubMed: 22673000]
- Hawton K, Saunders KE, O'Connor RC. Self-harm and suicide in adolescents. *Lancet*. 2012; 379(9834):2373–2382. [PubMed: 22726518]
- Hinduja S, Patchin JW. Bullying, cyberbullying, and suicide. *Arch Suicide Res*. 2010; 14(3):206–221. [PubMed: 20658375]
- Karna A, Voeten M, Little TD, Poskiparta E, Kaljonen A, Salmivalli C. A large-scale evaluation of the KiVa antibullying program: grades 4–6. *Child Dev*. 2011; 82(1):311–330. [PubMed: 21291444]
- Klomek AB, Kleinman M, Altschuler E, Marrocco F, Amakawa L, Gould MS. High school bullying as a risk for later depression and suicidality. *Suicide Life Threat Behav*. 2011; 41(5):501–516. [PubMed: 21793875]
- Klomek AB, Sourander A, Kumpulainen K, Piha J, Tamminen T, Moilanen I, Almqvist F, Gould MS. Childhood bullying as a risk for later depression and suicidal ideation among Finnish males. *J Affect Disord*. 2008; 109(1-2):47–55. [PubMed: 18221788]
- Kowalski RM, Limber SP. Electronic bullying among middle school students. *J Adolesc Health*. 2007; 41(6 Suppl 1):S22–30. [PubMed: 18047942]
- Lenhart, A.; Purcell, K.; Smith, A.; Zickuhr, K. Social Media and Mobile Internet Among Teens and Adults, Pew Research Center. 2010.
- Levasseur MT, Kelvin EA, Grosskopf NA. Intersecting Identities and the Association Between Bullying and Suicide Attempt Among New York City Youths: Results From the 2009 New York City Youth Risk Behavior Survey. *Am J Public Health*. 2013
- Litwiller BJ, Brausch AM. Cyber Bullying and Physical Bullying in Adolescent Suicide: The Role of Violent Behavior and Substance Use. *J Youth Adolesc*. 2013
- May A, Klonsky ED. Validity of suicidality items from the Youth Risk Behavior Survey in a high school sample. *Assessment*. 2011; 18(3):379–381. [PubMed: 20622196]
- Morgan JF. p Value fetishism and use of the Bonferroni adjustment. *Evid Based Ment Health*. 2007; 10(2):34–35. [PubMed: 17459968]
- Nansel TR, Overpeck M, Pilla RS, Ruan WJ, Simons-Morton B, Scheidt P. Bullying behaviors among US youth: prevalence and association with psychosocial adjustment. *JAMA*. 2001; 285(16):2094–2100. [PubMed: 11311098]
- Nock MK, Green JG, Hwang I, McLaughlin KA, Sampson NA, Zaslavsky AM, Kessler RC. Prevalence, correlates, and treatment of lifetime suicidal behavior among adolescents: results from the national comorbidity survey replication adolescent supplement. *JAMA Psychiatry*. 2013; 70(3):300–310. [PubMed: 23303463]
- Olweus D. Cyberbullying: An overrated phenomenon? *European Journal of Developmental Psychology*. 2012; 9(5):520–538.
- Ortega-Ruiz R, Nunez JC. Bullying and cyberbullying: research and intervention at school and social contexts. *Psicothema*. 2012; 24(4):603–607. [PubMed: 23079358]
- Ortega R, Elipe P, Mora-Merchan JA, Genta ML, Brighi A, Guarini A, Smith PK, Thompson F, Tippet N. The Emotional Impact of Bullying and Cyberbullying on Victims: A European Cross-National Study. *Aggress Behav*. 2012

- Rideout, V.; Roberts, D.; Foehr, U. *Generation M: Media in the Lives of 8–18 Years-Old*. Henry J Kaiser Family Foundation; Menlo Park, CA: 2005.
- Sansone RA, Lam C, Wiederman MW. Being bullied in childhood: correlations with borderline personality in adulthood. *Compr Psychiatry*. 2010; 51(5):458–461. [PubMed: 20728001]
- Schneider SK, O'Donnell L, Stueve A, Coulter RW. Cyberbullying, school bullying, and psychological distress: a regional census of high school students. *Am J Public Health*. 2012; 102(1):171–177. [PubMed: 22095343]
- Sinclair KO, Bauman S, Poteat VP, Koenig B, Russell ST. Cyber and bias-based harassment: associations with academic, substance use, and mental health problems. *J Adolesc Health*. 2012; 50(5):521–523. [PubMed: 22525118]
- Smith PK, Ananiadou K, Cowie H. Interventions to reduce school bullying. *Can J Psychiatry*. 2003; 48(9):591–599. [PubMed: 14631879]
- Smith PK, Mahdavi J, Carvalho M, Fisher S, Russell S, Tippett N. Cyberbullying: its nature and impact in secondary school pupils. *J Child Psychol Psychiatry*. 2008; 49(4):376–385. [PubMed: 18363945]
- Ttofi MM, Farrington DP. Risk and protective factors, longitudinal research, and bullying prevention. *New Dir Youth Dev*. 2012; 2012(133):85–98. [PubMed: 22504793]
- Wang J, Nansel TR, Iannotti RJ. Cyber and traditional bullying: differential association with depression. *J Adolesc Health*. 2011; 48(4):415–417. [PubMed: 21402273]

Key points

What's known

- Suicide is among the top causes of death among teenagers.
- School bullying is a risk factor for suicide. School bullying risk is higher among males and decrease through high school. Previous research on middle school students has shown increased female risk on cyberbullying victimization and an association with increased depression risk.

What's new

- Among US high school students, cyberbullying risk is higher among females and does not show a decreasing trend through high school.
- Teens reporting being victims of cyberbullying only are at increased risk for suicide than those reporting school bullying only. Those reporting both forms of bullying are at the highest risk.

What's clinically relevant

- Clinicians working with adolescents reporting school bullying should also inquire about cyberbullying and assess suicidality.

Table 1
Prevalence and 95% Confidence Interval of selected variables by categories of bullying victimization (N=13,846)

Variable	Any bullying victimization (school or cyber) N=3,429	School bullying victimization only N=1,372	Cyberbullying victimization only N=935	Both types of Bullying victimization N=1,122	Test statistics and p value
Overall Prevalence	26.9% (25.6-28.3)	10.7% (9.7-11.8)	6.8% (6.2-7.5)	9.4% (8.6-10.3)	
Among girls	31.3% (29.7-32.8)	9.2% (8.2-10.2)	9.1% (8.3-10.0)	12.9% (11.9-14.1)	F (2.3, 90) = 52.6, p<.00001
Among boy	22.9% (21.4-24.7)	12.2% (10.9-13.6)	4.7% (3.9-5.5)	6.1% (4.9-7.4)	
Age					
≤14 years old	32.6% (29.6-35.8)	16.6% (13.9-19.7)	6.2% (5.0-7.6)	9.8% (7.8-12.2)	F (8.2, 319.6)=8.1 p<.00001
15 years old	28.7% (26.7-30.9)	12.9% (11.1-14.9) ^	6.1% (5.1-7.1)	9.8% (7.8-12.2)	
16 years old	28.1% (25.9-30.3)	9.9% (8.7-11.4)	6.9% (5.7-8.3)	11.2% (9.3-13.4)	
17 years old	24.2% (22.1-26.5)	8.4% (7.1-10.0)	7.5% (6.4-8.9)	8.3% (6.7-10.1)	
>=18 years old	21.2% (19.1-23.6)	7.1% (5.7-8.6)	7.4% (6.3-8.7)	6.8% (5.5-8.4)	
Race/Ethnicity					F (7.2, 281.6)=12.7 p<.0001
Caucasian	30.1% (28.5-31.8)	11.5% (10.3-12.9)	7.1% (6.2-8.0)	11.5% (10.3-12.9)	
Other	29.1% (25.6-32.8)	11.0% (8.5-14.1)	9.0% (6.9-11.7)	8.9% (6.9-11.5)	
Hispanic	23.9% (21.3-26.7)	10.4% (8.8-12.2)	6.4% (5.4-7.5)	7.1% (6.0-8.4)	
African-American Of those reporting	16.5% (14.3-18.9)	7.5% (5.9-9.5)	4.9% (4.0-6.1)	3.9% (3.0-5.2)	
2-week sadness N=4,537	45.9% (43.8-48.0)	14.1% (12.6-15.6)	12.0% (10.7-13.4)	19.8% (18.2-21.6)	F (2.6, 103.9)=19.4, p<.00001
Suicidal ideation N=2,179	51.3% (48.8-53.9)	15.7% (13.6-18.0)	12.4% (10.8-14.2)	23.2% (20.6-25.9)	F (1.39)= 16.5 p=.0002
Suicide plan N=1,797	52.1% (49.2-54.9)	16.3% (13.9-19.1)	11.9% (10.2-13.8)	23.9% (21.2-26.8)	F(2.7,107)=8.7 p=.0001
Suicide attempt N=1,020	54.9% (51.0-58.7)	13.9% (11.2-16.9)	13.7% (11.1-16.9)	27.3% (23.8-31.1)	F(2.7,112.7)=4.3 p=.0064
Attempt requiring treatment N=283	53.4% (45.5-61.2)	10.9% (6.8-17.0)	16.9% (11.5-24.2)	25.6% (19.6-32.6)	F(2.6, 83.1)=2.9 p=.0428

Table 2

Unadjusted and adjusted associations between mental health outcomes and reporting of bullying (N=13,495)

Outcome	Exposure	Odds Ratios (95% C.I.)	
		Unadjusted	Adjusted ^a
2-week sadness			
	School bullied only	2.2 (1.9-2.5)	2.4 (2.1-2.8)
	Cyberbullied only	3.7(3.1-4.5)	3.4 (2.8-4.1)
	Both school and cyber	5.7 (4.7-6.8)	5.4 (4.5-6.5)
Suicidal ideation			
	School bullied only	2.6 (2.1-3.1)	2.6 (2.2-3.1)
	Cyberbullied only	3.4 (2.8-4.2)	3.3 (2.7-4)
	Both school and cyber	5.5 (4.5-6.8)	5.3 (4.2-6.5)
Suicide plan			
	School bullied only	2.6 (2.2-3.2)	2.7 (2.2-3.2)
	Cyberbullied only	3.1 (2.6-3.8)	3.1 (2.5-3.7)
	Both school and cyber	5.3 (4.3-6.7)	5.2 (4.1-6.6)
Suicide attempt			
	School bullied only	2.2 (1.7-2.8)	2.3 (1.8-2.9)
	Cyberbullied only	3.6 (2.7-4.7)	3.5 (2.6-4.7)
	Both school and cyber	5.5 (4.5-6.8)	5.6 (4.4-7)
Suicide attempt requiring treatment			
	School bullied only	1.6 (1-2.6)	1.6 (1-2.6)
	Cyberbullied only	4.0 (2.4-6.6)	3.7 (2.1-6.5)
	Both school and cyber	4.4 (2.9-6.5)	4.2 (2.7-6.5)

^a Adjusted for age, gender, and race. For all comparison the reference group are those students reporting no school bullying AND no cyberbullying.