

Suicide Ideation and Attempts and Bullying in Children and Adolescents

Psychiatric and General Population Samples

Susan Dickerson Mayes, Raman Baweja, Susan L. Calhoun,
Ehsan Syed, Fauzia Mahr, and Farhat Siddiqui

Department of Psychiatry, Penn State College of Medicine, Hershey, PA, USA

Abstract. *Background:* Studies of the relationship between bullying and suicide behavior yield mixed results. *Aims:* This is the first study comparing frequencies of suicide behavior in four bullying groups (bully, victim, bully/victim, and neither) in two large psychiatric and community samples of young children and adolescents. *Method:* Maternal ratings of bullying and suicide ideation and attempts were analyzed for 1,291 children with psychiatric disorders and 658 children in the general population 6–18 years old. *Results:* For both the psychiatric and community samples, suicide ideation and attempt scores for bully/victims were significantly higher than for victims only and for neither bullies nor victims. Differences between victims only and neither victims nor bullies were nonsignificant. Controlling for sadness and conduct problems, suicide behavior did not differ between the four bullying groups. All children with suicide attempts had a comorbid psychiatric disorder, as did all but two children with suicide ideation. *Conclusion:* Although the contribution of bullying per se to suicide behavior independent of sadness and conduct problems is small, bullying has obvious negative psychological consequences that make intervention imperative. Interventions need to focus on the psychopathology associated with being a victim and/or perpetrator of bullying in order to reduce suicide behavior.

Keywords: bullying, suicide behavior, psychiatric disorders

Background

Bullying Frequency

Bullying is of huge national and international concern, and massive efforts are underway to reduce bullying and its consequences. Across seven recent large US and international epidemiologic studies using the self-report of middle and high school students, the median percentage of children who are neither a bully nor victim is 61%, whereas 17% are victims only, 13% are bullies only, and 5% are bully/victims (Espelage, & Holt, 2013; Hepburn, Azrael, Molnar, & Miller, 2012; Ivarsson, Broberg, Arvidsson, & Gillberg, 2005; Kaltiala-Heino, Rimpela, Rantanen, & Rimpela, 2000; Nansel et al., 2001; Pellegrini, Bartini, & Brooks, 1999; Rivers & Noret, 2013). Percentages are similar for 13- to 14-year-olds using peer report of bullying behavior (neither 63%, victim 13%, bully 17%, and bully/victim 8%; Kim, Leventhal, Koh, & Boyce, 2009) and in elementary school students using self-report (neither 78%, victim 6%, bully 14%, and bully/victim 2%; Glew, Fan, Katon, Rivara, & Kernic, 2005).

Victimization by bullying is even more common in children who have neuropsychiatric disorders. US and international studies of children with attention-deficit hyper-

activity disorder (ADHD), autism, learning disability, and other mental health disorders report median occurrences of 40% for victims and 15% for bullies (Luukkonen, Rasanen, Hakko, & Riala, 2009; Mayes, Calhoun et al. 2013; Mayes, Gorman, Hillwig-Garcia, & Syed, 2013; Twyman et al., 2010; Zablotzky, Bradshaw, Anderson, & Law, 2013). The 15% frequency for bullies is similar to 18% reported in the general population, but the victim frequency (40%) is almost double that for the general population (22%).

Bullying Groups and Suicide Behavior

General Population Samples

The most concerning potential consequence of bullying is suicide (Kim, Koh, & Leventhal, 2005; Klomek et al., 2009), which is the third leading cause of death in 10- to 19-year-olds in the US (Centers for Disease Control [CDC], 2013). The risk of suicide is particularly high in individuals with psychiatric disorders because almost all individuals who die by suicide have a psychiatric disorder (Gvion & Apter, 2011), and most psychiatric disorders are associated with an increased risk of suicide attempts (Goldston et al., 2009). Three large US self-report stud-

ies of children 10–19 years of age found that suicide behavior (ideation and/or attempts) was greatest in bully/victims, followed by victims only, then bullies only, and last, neither a bully nor a victim (Borowsky, Taliaferro, & McMorris, 2013; Espelage & Holt, 2013; Hepburn et al., 2012). In one of these studies, frequencies of suicide ideation and/or attempts were 38% for bully/victims, 29% for victims only, 22% for bullies only, and 11% for children who were neither a bully nor a victim in 130,908 middle and high school students (Borowsky et al., 2013). The two other large studies reported suicide ideation and attempts separately (Espelage & Holt, 2013; Hepburn et al., 2012). Mean percentages for ideation were 42% bully/victims, 26% victims, 23% bullies, and 10% neither. Corresponding percentages for attempts were 28%, 16%, 14%, and 5%.

Psychiatric Samples

Only one large psychiatric study was found that investigated suicide attempts in the four bullying groups. For 508 Finnish adolescent inpatients 12–17 years of age, percentages of suicide attempts were 45% for victims only, 33% for neither a bully nor a victim, 20% for bullies only, and 7% for bully/victims (Luukkonen et al., 2009). Compared with the two general population studies investigating attempts, percentages for the bully and victim only groups were higher in the psychiatric sample, but the percentage of attempts in the bully/victim group was much lower, which is counterintuitive. This may in part be due to the small number of psychiatric inpatients in the bully/victim group.

Correlates of Bullying and Suicide Behavior

Bullying and suicide behavior are both associated with a variety of psychological problems. Psychological profiles of children who are victims of bullying show an increase in internalizing problems (anxiety and depression) and externalizing conduct problems (Arseneault, Bowes, & Shakoor, 2010; Arseneault et al., 2006; Turner, Finkelhor, & Ormrod, 2010). Bullies have disproportionately high rates of externalizing conduct problems (Ivarsson et al., 2005; van der Wal, de Wit, & Hirasings, 2003). Some studies show that bullies also have an increased risk of depression (Glew et al., 2005; Kaltiala-Heino, Rimpela, Marttunen, Rimpela, & Rantanen, 1999), but others do not (Craig, 1998).

Most studies investigating correlates of suicide behavior in children and adolescents also focus on internalizing and externalizing problems. Several studies show that both depression and externalizing problems, such as conduct disorder, oppositional defiant disorder (ODD), and aggression, are linked with suicide behavior (Cho et al., 2008; Hurtig, Taanila, Moilanen, Nordstrom, & Ebeling, 2012; Ialongo et al., 2004; Kelly, Cornelius, & Clark, 2004). Anxiety disorders alone were not significantly related to suicide behavior in a study of 9- to 16-year-olds, but suicide behavior was highest in children who had depres-

sion plus generalized anxiety disorder and depression plus ODD (Foley, Goldston, Costello, & Angold, 2006).

Sleep studies also show an association between sleep disturbance and suicide behavior. Specifically, nightmares are linked with suicide ideation in college students (Cukrowicz et al., 2006; Nadorff, Nazem, & Fiske, 2011, 2013) and in adolescents (Liu, 2004); nightmares and sleeping less than 8 hr a night correlate with suicide attempts in adolescents (Liu, 2004); and insomnia is associated with 7- to 17-year-olds who are depressed and suicidal (Barbe et al., 2005). A study of adolescents who completed suicide showed an increase in both insomnia and hypersomnia in comparison with controls (Goldstein, Bridge, & Brent, 2008).

Relationship Between Bullying and Suicide Behavior

General Population Samples

Four studies found a positive association between bullying and suicide behavior in the general population (Hepburn et al., 2012; Hinduja, & Patchin, 2010; Klomek, Marrocco, Kleinman, Schonfeld, & Gould, 2007; Wang et al., 2012), but these studies did not control for comorbid psychopathology. In other studies controlling for internalizing and externalizing problems, the relationship between bullying and suicide behavior is weak or nonsignificant. In one general population study, bullying and victimization were no longer associated with suicide behavior when depression was controlled for (Bauman, Toomey, & Walker, 2013). In another general population study, bullying was no longer associated with suicide ideation when controlling for psychiatric comorbidity, but victimization was (Skapinakis et al., 2011). Similarly, in another general population study, bullying was no longer associated with suicide behavior after controlling for depression and delinquency, but victimization was, although the authors noted the differences were “minimal” (Espelage & Holt, 2013).

Psychiatric Samples

In a psychiatric inpatient sample, girls (but not boys) who were victims or bullies were at increased risk for suicide attempts after controlling for psychiatric disorders (Luukkonen et al., 2009). In children with ADHD, victimization and bullying were both related to suicide behavior in the univariate analyses, but when psychopathology was controlled, only sadness and behavior problems were significant predictors of suicide behavior in the multivariate analyses (Mayes, Calhoun et al., 2013). Similarly, victimization was no longer a significant correlate in children with autism controlling for psychological comorbidity, whereas sadness and conduct problems were significant predictors of suicide behavior in regression analyses (Mayes, Gorman et al., 2013). In children and adolescents with eating disorders, victimization was not significantly related to suicide behavior. By contrast, bullies had more suicide

behavior than nonbullies, but the difference was nonsignificant when controlling for psychopathology (Mayes, Fernandez-Mendoza et al., 2014).

General Population Prospective Studies

Prospective studies yield mixed results. Two prospective self-report general population studies controlled for comorbid psychopathology. Elementary school children who were victims or bullies had greater suicide ideation and attempts in middle school than children who had not been a victim or bully, controlling for internalizing and externalizing problems (Winsper, Lereya, Zanarini, & Wolke, 2012). Controlling for depression and conduct problems, girls who were victims during elementary school had greater suicide attempts in young adulthood than girls not bullied, but girls who were bullies and boys who were bullies or victims did not have an increased risk of attempts (Klomek et al., 2009).

Three adolescent self-report prospective studies controlled for suicide behavior at baseline and yielded different findings. Bullies and victims who were not suicidal or depressed in middle adolescence were still not suicidal at follow-up in late adolescence (Klomek et al., 2011). Adolescents with suicide behavior, depression, or substance abuse plus bullying at baseline had greater ideation 2 years later than adolescents with suicide behavior, depression, or substance abuse who were not bullies at baseline, but findings for victims and bully/victims were nonsignificant (Klomek et al., 2013). Controlling for baseline internalizing and externalizing problems and suicide behavior, male and female bully/victims and female victims at baseline had greater ideation at 1-year follow-up, and female bullies at baseline had greater attempts at 1-year follow-up than adolescents who were neither a bully nor victim at baseline (Kim et al., 2009). Other comparisons yielded nonsignificant results.

Psychiatric Prospective Studies

The only psychiatric prospective study found in the literature search showed that adolescent inpatients who were bullies at baseline had greater suicide ideation than nonbullies at 1-year follow-up (King, Horwitz, Berona, & Jiang, 2013). However, comorbid psychopathology was not controlled for, and victimization and suicide attempts were not studied.

Purpose

No other study has used the same methodology to compare the frequency of suicide ideation and attempts in the four bullying groups (bully, victim, bully/victim, and neither) in two large and young psychiatric and community samples. Ours is also the first study to conduct these analyses using maternal report of bullying and suicide behavior. Our goals were to determine the significance of differences

in suicide ideation and attempts between the four bullying groups controlling for sadness, anxiety, conduct problems, and sleep disturbance and to determine the most powerful predictors of suicide behavior scores using bullying, internalizing and externalizing problems, and sleep scores.

Method

Samples

The two samples comprised 1,291 children with psychiatric disorders and 658 general population children. All children were 6–18 years of age (elementary through high school) and had an IQ of 80 or higher (on the Wechsler Intelligence Scale for Children-IV or Wechsler Abbreviated Scales of Intelligence) or were enrolled in regular education without academic problems. Children in the psychiatric sample were referred to our psychiatry outpatient clinic for diagnostic evaluations and were evaluated by licensed PhD psychologists and/or board-certified child psychiatrists. DSM-5 diagnoses include 290 children with attention deficit hyperactivity disorder-combined presentation (ADHD-C) and ODD, 276 with ADHD-C and no ODD, 235 children with attention deficit hyperactivity disorder-inattentive presentation (ADHD-I), 329 with autism spectrum disorder, 90 with eating disorders, and 71 with anxiety disorders and/or depression. Children in the psychiatric sample were 6–18 years of age ($M = 9.4$, $SD = 2.8$). Males comprised 67.6% of the sample, 93.1% were white, and 43.9% had a parent with a professional or managerial occupation. The general population sample comprised elementary school students who participated in an epidemiologic study of the prevalence of sleep disorders in children (Bixler et al., 2009). Children with psychiatric diagnoses were not excluded from this sample, so that the children are representative of the general population. These children were 6–13 years of age ($M = 8.7$, $SD = 1.7$). Males comprised 52.4% of the sample, 80.7% were white, and 48.5% had a parent with a professional or managerial occupation. Children on psychotropic medication were not excluded from the study because that would create biased samples with spuriously lower levels of psychopathology (including suicide and bullying behavior) not representative of psychiatric or general population children.

Instrument

Mothers rated their children on a 4-point scale (*not at all*, *sometimes*, *often*, and *very often a problem*) on the 165-item Pediatric Behavior Scale (PBS; Lindgren & Koepl, 1987). The PBS includes four suicide behavior and bullying items. These are suicide ideation (“talks about harming or killing self”), suicide attempts (“deliberately harms self or attempts suicide”), bullies (“threatens, bullies, or picks on other children”), and bullied (“gets teased or picked on by other children”). Additional PBS scores used in the

study are sad, anxious, conduct problems (disobedient, argues, uncooperative, defiant, aggressive, destructive, lies or cheats, steals, explosive, angry/irritable, and temper outbursts), and sleep disturbance (difficulty falling and staying asleep, nightmares, and sleeping less than other children). Internal consistency for the PBS subscale scores is high, with a median coefficient of .91 (Lindgren & Koepl, 1987). Validity studies show that the PBS differentiates diagnostic groups, and the PBS has been used to diagnose and measure psychological problems and sleep disturbances in several published studies (Mattison & Mayes, 2012; Max et al., 1997; Mayes & Calhoun, 2009; Mayes, Calhoun, Bixler, & Vgontzas, 2009; Mayes, Calhoun, Murray, Ahuja, & Smith, 2011; Nichols et al., 2000; Wolraich et al., 1994).

Data Analysis

Differences in the frequency of suicide ideation and attempts (present at least sometimes based on maternal ratings) between children who are and are not bullies and children who are and are not bullied (at least sometimes) were analyzed using χ^2 and risk ratios. The significance of differences in suicide ideation and attempt severity scores (*never to very often* rated by mothers on a 4-point scale) between the four bullying groups was determined with ANOVA, post hoc Bonferroni *t* tests (controlling for multiple comparisons), and the effect size with Cohen's *d*. The linear relationships between suicide ideation and attempt severity scores and bullying and victimization severity

scores (*never to very often*) were calculated using Pearson correlations and explained variance. ANCOVA was used to determine the significance of differences in ideation and attempt scores between the four bullying groups controlling for conduct problems, sadness, anxiety, and sleep disturbance. Bully, victim, conduct problems, sadness, anxiety, and sleep disturbance scores were entered in stepwise linear regression analysis to predict suicide ideation and attempt scores.

Results

Frequencies

Frequencies for bullying, victimization, suicide ideation, and suicide attempts (present at least sometimes) were significantly greater in the psychiatric than in the general population samples, $\chi^2 > 31.0$, $p < .0001$. Bullies and victims (at least *sometimes*) were 2.1 and 2.2 times, respectively, more prevalent in the psychiatric sample than in the general population sample, and severe victimization and bullying (*often to very often*) were 4.7 and 5.0 times, respectively, more prevalent in the psychiatric group (Table 1). Similarly, suicide ideation and attempts (occurring *sometimes or more*) were 5.4 and 7.2 times more prevalent in the psychiatric sample than in the general population sample. All six children in the general population who had suicide attempts had scores in the clinical range on the PBS depression subscale and they had an average of two

Table 1. Suicide ideation and attempts and perpetrators and victims of bullying: percentages for the psychiatric sample ($n = 1,291$) and general population sample ($n = 658$)

Sample	% Children					
	Bullies			Victims		
	Sometimes	Often–very often	Total	Sometimes	Often–very often	Total
Psychiatric	19.4	10.7	30.1	32.3	27.2	59.5
General population	12.2	2.3	14.5	22.2	5.4	27.6
	Suicide ideation			Suicide attempts		
	Sometimes	Often–very often	Total	Sometimes	Often–very often	Total
Psychiatric	12.9	4.8	17.7	4.7	1.8	6.5
General population	3.0	0.3	3.3	0.6	0.3	0.9

Table 2. Bullying group and percent of children with suicide ideation and attempts^a

Group, <i>n</i> (psychiatric/general population)	% Psychiatric sample		% General population sample	
	Ideation	Attempts	Ideation	Attempts
Bully and victim ^a (288/48)	32.6	11.5	16.7	6.3
Bully only (100/47)	25.0	9.0	6.4	0.0
Victim only (479/134)	15.0	5.6	5.2	1.5
Neither (424/429)	9.0	3.8	0.9	0.2

Note. ^aAt least sometimes.

Table 3. Significant predictors of suicide ideation and attempts^a and standardized β values

Predictors	Ideation				Attempts			
	β	(SE)	<i>t</i>	<i>p</i>	β	(SE)	<i>t</i>	<i>p</i>
Psychiatric sample								
Sadness	.29	(.02)	10.7	<.0001	.22	(.01)	7.6	<.0001
Conduct problems	.22	(.00)	8.3	<.0001	.13	(.00)	4.5	<.0001
General population sample								
Sadness	.25	(.01)	6.5	<.0001	.24	(.01)	6.0	<.0001
Bullying	.12	(.02)	3.0	.003	.12	(.01)	3.0	.003

Note. ^aRange 0–3 (*never to very often*).

additional subscale elevations (ADHD, ODD, or anxiety disorder). All but two of the 22 general population children with suicide ideation had elevated scores on one or more of the clinical subscales, and the two without clinical symptoms had suicide ideation only *sometimes* without attempts.

Association Between Bullying and Suicide Ideation and Attempts

Children who were bully/victims (group 1) had significantly higher ideation and attempt scores (*never to very often*) than children who were neither bullies nor victims (group 4) and higher scores than children who were victims but not bullies (group 3). This was the case for both the psychiatric sample, ideation $F = 22.3$, $p < .0001$, $d = 0.6$ and 0.4 ; attempts $F = 5.0$, $p = .002$, $d = 0.3$ and 0.2 , and the general population sample, ideation $F = 13.3$, $p < .0001$, $d = 0.9$ and 0.7 ; attempts $F = 8.7$, $p < .0001$, $d = 0.3$ and 0.2 . Only two other comparisons were significant (Bonferroni $p < .05$). Children in the psychiatric sample who were bullies only (group 2) had more suicide ideation than children who were neither a bully nor a victim (group 4), $d = 0.3$. In the general population sample, children who were bully/victims (group 1) had greater attempt scores than children who were bullies only (group 2), $d = 0.3$.

The degree to which children were bullies (*never to very often*) was significantly correlated with suicide ideation and attempt severity scores (*never to very often*) in the psychiatric sample, $r = .24$ and $.12$, $p < .0001$, and in the general population sample, $r = .20$ and $.19$, $p < .0001$, but bullying explained less than 6% of the variance in the suicide behavior scores. Degree of victimization by bullying (*never to very often*) was not significantly correlated with attempt severity scores in the psychiatric sample, $r = .04$, $p = .17$, but was related to ideation scores in the psychiatric group, $r = .12$, $p < .0001$, and to ideation and attempt scores in the general population sample, $r = .14$ and $.14$, $p < .0001$. However, explained variance was less than 2%. Correlations between bullying and victim scores were .23 in the psychiatric sample and .25 in the general population sample; explained variance 5.3% and 6.2%, $p < .0001$. Table 2 shows the percent of children with suicide ideation and attempts in the four bullying groups.

Results Controlling for Comorbidity

When controlling for conduct problems and sadness, differences in suicide ideation and attempts between the four bullying groups were nonsignificant at .01. This was the case for ideation and attempts in the psychiatric sample, $F = 1.2$, $p = .32$; $F = 0.3$, $p = .86$, and in the general population sample, $F = 3.0$, $p = .03$; $F = 2.5$, $p = .06$. Differences in suicide ideation and attempt scores between the bullying groups were still significant controlling for only sleep disturbance, $F = 3.1$ – 17.6 , $p < .0001$ – $.03$ and controlling for only anxiety, $F = 3.5$ – 18.1 , $p < .0001$ – $.02$.

As shown in Table 3, the strongest predictor of ideation and attempt scores (*never to very often*) in the psychiatric sample was sadness, which explained 13.4% and 6.8% of the variance, respectively. Explained variance increased to 17.7% and 8.3% with the addition of conduct problems. The other variables (bully, victim, anxiety, and sleep disturbance) increased explained variance by less than 1%. In the general population sample, sadness was the strongest predictor of suicide ideation and attempt scores, which explained 8.4% and 7.4% of the variance, respectively. Explained variance increased to 9.6% and 8.6% with the addition of bullying. The other variables (victim, conduct problems, anxiety, and sleep disturbance) did not contribute significantly more to prediction. As expected, bullying and conduct problems were highly correlated, both in the psychiatric and general population samples, $r = .60$ and $.54$, $p < .0001$.

Discussion

This is the first study to compare frequencies of suicide ideation and attempts in four bullying groups (bully only, victim only, bully/victim, and neither) using the same methodology in two large psychiatric and community samples of young children. In our general population elementary school sample, percentages of children in each of the bullying groups (7% bully/victim, 7% bully only, 20% victim only, and 65% neither) were similar to median percentages across the seven self-report general population studies of middle and high school students reviewed

in our introduction (5% bully/victim, 13% bully only, 17% victim only, and 61% neither). Percentages were also similar for a general population elementary school sample using self-report (Glew et al., 2005) and for an adolescent sample using peer report (Kim et al., 2009). This suggests that bullying frequencies are similar for elementary, middle, and high school children and that estimates are similar using self-, peer, and maternal report.

Bullying and victimization were twice as common in our psychiatric sample as in our general population sample, and severe victimization and bullying were 5 times more common. Far more children in our psychiatric sample were bully/victims (22%) and victims only (37%) than in the general population. By contrast, the percentage of bullies only (8%) was similar to that for the general population. Overall, 59% of our children with psychiatric disorders were victims of bullying (vs. 28% in the general population sample). Other studies also show that children with psychiatric disorders are two times more likely to be victims of bullying than community controls are (Luukkonen et al., 2009; Mayes, Calhoun et al., 2013; Mayes, Gorman et al., 2013; Twyman et al., 2010; Zablotsky et al., 2013).

Suicide ideation and attempts were six times more common in our psychiatric sample than in our general population sample. In the general population sample, children who were bully/victims had more suicide ideation and attempts than children in the three other bullying groups and bullies and victims had similar levels of suicide behavior, consistent with results from other child general population studies (Borowsky et al., 2013; Espelage & Holt, 2013; Hepburn et al., 2012). In our psychiatric sample, children who were bully/victims also had more suicide ideation and attempts than children in the three other bullying groups, but bullies had almost two times more suicide ideation and attempts than victims in the psychiatric sample. Therefore, intervention designed to decrease suicide behavior needs to be provided not only for victims, but for bullies as well.

Overall, conduct problems (which are significantly related to bullying) and sadness had the strongest association with suicide ideation and attempts in our study, similar to other studies (Cho et al., 2008; Hurtig et al., 2012; Ialongo et al., 2004; Kelly et al., 2004). Anxiety did not contribute significantly more to the prediction of suicide behavior (consistent with the results of a study by Foley et al., 2006), nor did sleep disturbance. This was in contrast to previous studies showing an association between sleep disturbance and suicide behavior (Barbe et al., 2005; Cukrowicz et al., 2006; Goldstein et al., 2008; Liu, 2004; Nadorff et al., 2011, 2013). The discrepancy may be explained by the older age of these samples compared with ours.

The relationship between bullying and suicide behavior in our study and others is statistically significant, but explained variance is small. When sadness and conduct problems are controlled, differences between the bullying groups are nonsignificant or minimal, suggesting that psychopathology, not bullying per se, primarily accounts for suicide behavior. In our study, sadness was the most powerful predictor of suicide ideation and attempts, followed by conduct problems in the psychiatric group and bullying in

the general population sample. However, bullying increased explained variance in the general population sample by only 1% beyond sadness alone. Prospective studies controlling for comorbid internalizing and externalizing problems yield mixed results, although some (Kim et al., 2009; Winsper et al., 2012) show that bullying and victimization are independently associated with later suicide behavior. Further, children who are victims have an increased risk of becoming bullies (Barker, Arseneault, Brendgen, Fontaine, & Maughan, 2008). Therefore, even though the overall effect of bullying on suicide behavior may be small compared with other factors, there are clear negative repercussions of bullying, and victimization may be a trigger for some completed suicides. One study of 1,046 completed suicides in children 10–17 years of age in the US reported that 3.1% of the children had recently been bullied (Karch, Logan, McDaniel, Floyd, & Vagi, 2013). Clearly, the relationship between bullying and completed suicides needs to be researched further.

Children with psychiatric disorders are at far greater risk for bullying behavior (both as victims and perpetrators) and for suicide behavior than children in the general population. Furthermore, all children in our general population sample who had suicide attempts had depression plus symptoms of, on average, two additional disorders (ADHD, ODD, or anxiety). Similarly, Foley et al. (2006) found that children with depression plus comorbid ODD or anxiety had the highest frequency of suicide behavior. For our general population children with suicide ideation, almost all had depression, ADHD, ODD, and/or an anxiety disorder. Therefore, the presence of suicide behavior in children is a marker for psychiatric disorders. This underlying psychopathology needs to be evaluated and treated to reduce suicide.

Limitations and Directions for Future Research

Our study involves a psychiatric sample from a single site and community control children from four local school districts. Therefore, our findings need to be replicated with other samples. Further, some studies have reported that gender has a moderator effect on the relationship between bullying and suicide behavior, which should be explored in future studies, along with the possible effects of age, socioeconomic status (SES), and race. Our samples are predominantly white, and more racially diverse samples are needed to investigate racial effects. Our study used ratings of sadness and anxiety as dependent variables, which are different from clinical depression and anxiety disorders, and which need to be analyzed in future studies. Moreover, our study relied on maternal report of bullying and suicide ideation and attempts, which is important in young samples like ours, but needs to be supplemented with self-, teacher, and peer report in future research.

Conclusion

Even though the contribution of bullying to suicide ideation and nonlethal attempts is small, bullying has enormous negative psychological consequences that justify intervention to prevent bullying. Victimization by bullying is a common problem (occurring in 60% of our psychiatric sample and in 28% of our general population sample). Furthermore, 30% of children in our psychiatric sample were bullies, as were 14% in our general population sample. Bullying behavior should continue to be the target of intervention to reduce current suffering and improve psychiatric outcomes for those affected. Children should routinely be screened and monitored for bullying and victimization in school, primary care, community, and clinical settings in order to identify those in need of intervention.

Unfortunately, reviews by several authors (Fox, Farrington, & Ttofi, 2012; Karna, Voeten, Little, Poskiparta, Kaljonen, et al., 2011; Smith, Schneider, Smith, & Ananiadou, 2004; Vreeman & Carroll, 2007) indicate that many bullying intervention programs are ineffective. Successful bullying prevention programs are those that are intensive, of long duration, are systematically monitored, and have multiple components, including parent and teacher training and meetings (Dake, Price, & Telljohann, 2003; Fox et al., 2012; Smith et al., 2004). Controlled studies in Finland showed a significant reduction in bullying and victimization following implementation of an intensive multicomponent national school-based antibullying program (Karna, Voeten, Little, Poskiparta, Kaljonen, et al., 2011; Karna, Voeten, Little, Poskiparta, Alanen, et al. 2011). Additional research has identified school disciplinary actions effective in decreasing bullying (loss of privileges and formal meetings with the bully, parent, teacher, and/or administrator), as well as ineffective consequences, including detention, suspension, time in the office, and parent contact (Ayers, Wagaman, Geiger, Bermudez-Parsal, & Hedberg, 2012). A meta-analysis of school-based suicide prevention programs also shows that few programs produce statistically significant effects (Miller, Eckert, & Mazza, 2009). Two elements of intervention that have promise are providing information to students regarding suicide awareness and intervention and teaching coping and problem-solving skills (Miller et al., 2009). Important components of adolescent suicide treatment programs are intensity (number of treatment sessions, especially early in the treatment process), improving family interactions, and providing sources of support for the adolescent (Brent et al., 2013).

Acknowledgments

This study was supported by National Institutes of Health grants RO1 HL063772, MO1 RR010732, and CO6 RR 016499.

References

- Arseneault, L., Bowes, L., & Shakoor, S. (2010). Bullying victimization in youths and mental health problems: 'Much ado about nothing'? *Psychological Medicine*, 40, 717–729.
- Arseneault, L., Walsh, E., Trzesniewski, K., Newcombe, R., Caspi, A., & Moffitt, T. E. (2006). Bullying victimization uniquely contributes to adjustment problems in young children: A nationally representative cohort study. *Pediatrics*, 118, 130–138.
- Ayers, S. L., Wagaman, M. A., Geiger, J., Bermudez-Parsai, M., & Hedberg, E. C. (2012). Examining school-based bullying interventions using multilevel discrete time hazard modeling. *Prevention Science*, 13, 539–550.
- Barbe, R. P., Williamson, D. E., Bridge, J. A., Birmaher, B., Dahl, R. E., Axelson, D. A., & Ryan, N. D. (2005). Clinical differences between suicidal and nonsuicidal depressed children and adolescents. *Journal of Clinical Psychiatry*, 66, 492–498.
- Barker, E. D., Arseneault, L., Brendgen, M., Fontaine, N., & Maughan, B. (2008). Joint development of bullying and victimization in adolescence: Relations to delinquency and self-harm. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47, 1030–1038.
- Bauman, S., Toomey, R. B., & Walker, J. L. (2013). Associations among bullying, cyberbullying, and suicide in high school students. *Journal of Adolescence*, 36, 341–350.
- Bixler, E. O., Vgontzas, A. N., Lin, H.-M., Calhoun, S., Vela-Bueno, A., Fedok, F., ... Graff, G. (2009). Sleep disordered breathing in children in a general population sample: Prevalence and risk factors. *Sleep*, 32, 731–736.
- Borowsky, I. W., Taliaferro, L. A., & McMorris, B. J. (2013). Suicidal thinking and behavior among youth involved in verbal and social bullying: Risk and protective factors. *Journal of Adolescent Health*, 53, S4–S12.
- Brent, D. A., McMakin, D. L., Kennard, B. D., Goldstein, T. R., Mayes, T. L., & Douaihy, A. B. (2013). Protecting adolescents from self-harm: A critical review of intervention studies. *Journal of the American Academy of Child and Adolescent Psychiatry*, 10, doi:10.1016/j.jaac.2013.09.009
- Centers for Disease Control. (2013). *National Center for Injury Prevention and Control Web-based Injury Statistics Query and Reporting System*. Retrieved from <http://www.cdc.gov/nccipc/wisqars>
- Cho, S.-C., Kim, J.-W., Choi, H.-J., Kim, B.-N., Shin, M.-S., Lee, J.-H., & Kim, E.-H. (2008). Association between symptoms of attention deficit hyperactivity disorder, depression, and suicide in Korean female adolescents. *Depression and Anxiety*, 25, E142–E146.
- Craig, W. M. (1998). The relationship among bullying victimization, depression, anxiety, and aggression in elementary school children. *Personality and Individual Differences*, 24, 123–130.
- Cukrowicz, K. C., Otamendi, A., Pinto, J. V., Bernert, R. A., Krakow, B., & Joiner, T. E. (2006). The impact of insomnia and sleep disturbances on depression and suicidality. *Dreaming*, 16, 1–10.
- Dake, J. A., Price, J. H., & Telljohann, S. K. (2003). The nature and extent of bullying at school. *Journal of School Health*, 73, 173–180.
- Espelage, D. L., & Holt, M. K. (2013). Suicidal ideation and school bullying experiences after controlling for depression and delinquency. *Journal of Adolescent Health*, 53, S27–S31.
- Foley, D. L., Goldston, D. B., Costello, E. J., & Angold, A. (2006). Proximal psychiatric risk factors for suicidality in youth. *Archives of General Psychiatry*, 63, 1017–1024.
- Fox, B. H., Farrington, D. P., & Ttofi, M. M. (2012). Successful bullying prevention programs: Influence of research design, implementation features, and program components. *International Journal of Conflict and Violence*, 6, 273–283.

- Glew, G. M., Fan, M. Y., Katon, W., Rivara, F. P., & Kernic, M. A. (2005). Bullying, psychosocial adjustment, and academic performance in elementary school. *Archives of Pediatric and Adolescent Medicine*, 159, 1026–1031.
- Goldstein, T. R., Bridge, J. A., & Brent, D. A. (2008). Sleep disturbance preceding completed suicide in adolescents. *Journal of Consulting and Clinical Psychology*, 76, 84–91.
- Goldston, D. B., Daniel, S. S., Erkanli, A., Reboussin, B. A., Mayfield, A., Frazier, P. H., & Treadway, S. L. (2009). Psychiatric diagnoses as contemporaneous risk factors for suicide attempts among adolescents and young adults: Developmental changes. *Journal of Consulting and Clinical Psychology*, 77, 281–290.
- Gvion, Y., & Apter, A. (2011). Aggression, impulsivity, and suicide behavior: A review of the literature. *Archives of Suicide Research*, 15, 93–112.
- Hepburn, L., Azrael, D., Molnar, B., & Miller, M. (2012). Bullying and suicidal behaviors among urban high school youth. *Journal of Adolescent Health*, 51, 93–95.
- Hinduja, S., & Patchin, J. W. (2010). Bullying, cyberbullying, and suicide. *Archives of Suicide Research*, 14, 206–221.
- Hurtig, T., Taanila, A., Moilanen, I., Nordstrom, T., & Ebeling, H. (2012). Suicidal and self-harm behaviour associated with adolescent attention deficit hyperactivity disorder – a study in the Northern Finland Birth Cohort 1986. *Nordic Journal of Psychiatry*, 66, 320–328.
- Ialongo, N. S., Koenig-McNaught, A. L., Wagner, B. M., Pearson, J. L., McCreary, B. K., Poduska, J., & Kellam, S. (2004). African American children's reports of depressed mood, hopelessness, and suicidal ideation and later suicide attempts. *Suicide and Life-Threatening Behavior*, 34, 395–407.
- Ivarsson, T., Broberg, A. G., Arvidsson, T., & Gillberg, C. (2005). Bullying in adolescence: Psychiatric problems in victims and bullies as measured by the Youth Self Report (YSR) and the Depression Self-Rating Scale (DSRS). *Nordic Journal of Psychiatry*, 59, 365–373.
- Kaltiala-Heino, R., Rimpela, M., Marttunen, M., Rimpela, A., & Rantanen, P. (1999). Bullying, depression, and suicidal ideation in Finnish adolescents: School survey. *British Medical Journal*, 319, 348–351.
- Kaltiala-Heino, R., Rimpela, M., Rantanen, P., & Rimpela, A. (2000). Bullying at school – an indicator of adolescents at risk for mental disorders. *Journal of Adolescence*, 23, 661–674.
- Karch, D. L., Logan, J., McDaniel, D. D., Floyd, C. F., & Vagi, K. J. (2013). Precipitating circumstances of suicide among youth aged 10–17 years by sex: Data from the National Violent Death Reporting System, 16 states, 2005–2008. *Journal of Adolescent Health*, 53, S51–S53.
- Karna, A., Voeten, M., Little, T. D., Poskiparta, E., Alanen, E., & Salmivalli, C. (2011). Going to scale: A nonrandomized nationwide trial of the KiVa antibullying program for grades 1–9. *Journal of Consulting and Clinical Psychology*, 79, 796–805.
- Karna, A., Voeten, M., Little, T. D., Poskiparta, E., Kaljonen, A., & Salmivalli, C. (2011). A large scale evaluation of the KiVa antibullying program: Grades 4–6. *Child Development*, 82, 311–330.
- Kelly, T. M., Cornelius, J. R., & Clark, D. B. (2004). Psychiatric disorders and attempted suicide among adolescents with substance use disorders. *Drug and Alcohol Dependence*, 73, 87–97.
- Kim, Y. S., Koh, Y. J., & Leventhal, B. L. (2005). School bullying and suicidal risk in Korean middle school students. *Pediatrics*, 115, 357–363.
- Kim, Y. S., Leventhal, B. L., Koh, Y. J., & Boyce, W. T. (2009). Bullying increased suicide risk: Prospective study of Korean adolescents. *Archives of Suicide Research*, 13, 15–30.
- King, C. A., Horwitz, A., Berona, J., & Jiang, Q. (2013). Acutely suicidal adolescents who engage in bullying behavior: 1-year trajectories. *Journal of Adolescent Health*, 53, S43–S50.
- Klomek, A. B., Kleinman, M., Altschuler, E., Marrocco, F., Amakawa, L., & Gould, M. S. (2011). High school bullying as a risk for later depression and suicidality. *Suicide and Life-Threatening Behavior*, 41, 501–516.
- Klomek, A. B., Kleinman, M., Altschuler, E., Marrocco, F., Amakawa, L., & Gould, M. S. (2013). Suicidal adolescents' experiences with bullying perpetration and victimization during high school as risk factors for later depression. *Journal of Adolescent Health*, 53, S37–S42.
- Klomek, A. B., Marrocco, F., Kleinman, M., Schonfeld, I. S., & Gould, M. S. (2007). Bullying, depression, and suicidality in adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 46, 40–49.
- Klomek, A. B., Sourander, A., Niemela, S., Kumpulainen, K., Piha, J., Tamminen, T., ... Gould, M. S. (2009). Childhood bullying behaviors as a risk for suicide attempts and completed suicides: A population-based birth cohort study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 48, 254–261.
- Lindgren, S. D., & Koepl, G. K. (1987). Assessing child behavior problems in a medical setting: Development of the Pediatric Behavior Scale. In R. J. Prinz (Ed.), *Advances in behavioral assessment of children and families* (pp. 57–90). Greenwich, CT: JAI Press.
- Liu, X. (2004). Sleep and adolescent suicidal behavior. *Sleep*, 27, 1351–1358.
- Luukkonen, A.-H., Rasanen, P., Hakko, H., & Riala, K. (2009). Bullying behavior is related to suicide attempts but not self-mutilation among psychiatric inpatient adolescents. *Psychopathology*, 42, 131–138.
- Mattison, R. E., & Mayes, S. D. (2012). Relationship between learning disability, executive function, and psychopathology in children with ADHD. *Journal of Attention Disorders*, 16, 138–146.
- Max, J. E., Arndt, S., Castillo, C., Bokura, H., Robin, D. A., Lindgren, S. D., ... Mattheis, P. J. (1997). Attention-deficit hyperactivity symptomatology after traumatic brain injury: A prospective study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37, 841–847.
- Mayes, S. D., & Calhoun, S. L. (2009). Variables related to sleep problems in children with autism. *Research in Autism Spectrum Disorders*, 3, 931–941.
- Mayes, S. D., Calhoun, S. L., Baweja, R., Feldman, L., Syed, E., Gorman, A. A., ... Siddiqui, F. (2013, October). *Comorbid oppositional-defiant disorder and depression predict suicide ideation and attempts in children with ADHD*. Poster presented at the American Academy of Child Adolescent Psychiatry Annual Meeting, Orlando, FL.
- Mayes, S. D., Calhoun, S. L., Bixler, E. O., & Vgontzas, A. N. (2009). Sleep problems in children with autism, ADHD, anxiety, depression, acquired brain injury, and typical development. *Sleep Medicine Clinics*, 4, 19–25.
- Mayes, S. D., Calhoun, S. L., Murray, M. J., Ahuja, M., & Smith, L. A. (2011). Anxiety, depression, and irritability in children with autism relative to children with other neuropsychiatric disorders and typical development. *Research in Autism Spectrum Disorders*, 5, 474–485.
- Mayes, S. D., Fernandez-Mendoza, J., Baweja, R., Calhoun, S. L., Mahr, F., Aggarwal, R., & Arnold, M. (2014). Correlates of suicide ideation and attempts in children and adolescents with eating disorders. *Eating Disorders*, 22, 352–366.
- Mayes, S. D., Gorman, A. A., Hillwig-Garcia, J., & Syed, E. (2013). Suicide ideation and attempts in children with autism. *Research in Autism Spectrum Disorders*, 7, 109–119.
- Miller, D. N., Eckert, T. L., & Mazza, J. J. (2009). Suicide prevention programs in the schools: A review and public health perspective. *School Psychology Review*, 38, 168–188.

- Nadorff, M. R., Nazem, S., & Fiske, A. (2011). Insomnia symptoms, nightmares, and suicidal ideation in a college student sample. *Sleep*, 34, 93–98.
- Nadorff, M. R., Nazem, S., & Fiske, A. F. (2013). Insomnia symptoms, nightmares, and suicide risk: Duration of sleep disturbance matters. *Suicide and Life-Threatening Behavior*, 43, 139–149.
- Nansel, T. R., Overpeck, M., Pilla, R. S., Ruan, W. J., Simons-Morton, B., & Scheidt, P. (2001). Bullying behaviors among US youth: Prevalence and association with psychosocial adjustment. *Journal of the American Medical Association*, 285, 2094–2100.
- Nichols, S., Mahoney, E. M., Sirois, P. A., Bordeaux, J. D., Stehbens, J. A., Loveland, K. A., & Amodei, N. (2000). HIV-associated changes in adaptive, emotional, and behavioral functioning in children and adolescents with hemophilia: Results from the Hemophilia Growth and Development Study. *Journal of Pediatric Psychology*, 25, 545–556.
- Pellegrini, A. D., Bartini, M., & Brooks, F. (1999). School bullies, victims, and aggressive victims: Factors relating to group affiliation and victimization in early adolescence. *Journal of Educational Psychology*, 91, 216–224.
- Rivers, I., & Noret, N. (2013). Potential suicide ideation and its association with observing bullying at school. *Journal of Adolescent Health*, 53, S32–S36.
- Skapinakis, P., Bellos, S., Gkatsa, T., Magklara, K., Lewis, G., Araya, R., ... Mavreas, V. (2011). The association between bullying and early stages of suicidal ideation in late adolescents in Greece. *BMC Psychiatry* 11, 22–31.
- Smith, J. D., Schneider, B. H., Smith, P. K., & Ananiadou, K. (2004). The effectiveness of whole-school antibullying programs: A synthesis of evaluation research. *School Psychology Review*, 33, 547–560.
- Turner, H. A., Finkelhor, D., & Ormrod, R. (2010). Child mental health problems as risk factors for victimization. *Child Maltreatment*, 15, 132–143.
- Twyman, K. A., Saylor, C. F., Saia, D., Macias, M. M., Taylor, L. A., & Spratt, E. (2010). Bullying and ostracism experiences in children with special health care needs. *Journal of Developmental and Behavioral Pediatrics*, 31, 1–8.
- van der Wal, M. F., de Wit, C. A. M., & Hirasing, R. A. (2003). Psychosocial health among young victims and offenders of direct and indirect bullying. *Pediatrics*, 111, 1312–1317.
- Vreeman, R. C., & Carroll, A. E. (2007). A systematic review of school-based interventions to prevent bullying. *Archives of Pediatric and Adolescent Medicine*, 161, 78–88.
- Wang, H., Zhou, X., Lu, C., Wu, J., Deng, X., Hong, L., ... He, Y. (2012). Adolescent bullying involvement and psychosocial aspects of family and school life: A cross-sectional study from Guangdong Province in China. *PLOS ONE*, 7, e38619.
- Winsper, C., Lereya, T., Zanarini, M., & Wolke, D. (2012). Involvement in bullying and suicide-related behavior at 11 years: A prospective birth cohort study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 51, 271–282.
- Wolraich, M. L., Lindgren, S. D., Stumbo, P. J., Stegink, L. D., Appelbaum, M. I., & Kiritky, M. C. (1994). Effects of diets high in sucrose or aspartame on the behavior and cognitive performance of children. *New England Journal of Medicine*, 330, 301–307.
- Zablotsky, B., Bradshaw, C. P., Anderson, C., & Law, P. A. (2013). The association between bullying and the psychological functioning of children with autism spectrum disorders. *Journal of Developmental and Behavioral Pediatrics*, 34, 1–8.

Received October 12, 2013

Revision received March 2, 2014

Accepted March 11, 2014

Published online August 13, 2014

About the authors

Dr. Susan Mayes, PhD, is senior clinical psychologist and professor of psychiatry in the Division of Child Psychiatry at Penn State College of Medicine. She is a licensed psychologist and certified school psychologist. She has 88 publications and 40 years of experience with children who have psychiatric and neurodevelopmental disorders.

Dr. Raman Baweja, MD, is a Child and Adolescent Psychiatry fellow in the Department of Psychiatry at Penn State College of Medicine and a graduate student in Public Health Science at Penn State University. He has published more than ten articles on clinical psychiatry.

Dr. Susan L. Calhoun, PhD, is a diplomate, licensed psychologist, certified school psychologist, and associate professor of psychiatry at Penn State College of Medicine. Dr. Calhoun's expertise is in the assessment of child mental health and learning disorders and treatment of sleep disorders. She has over 50 scientific publications.

Dr. Syed, MD, is a child and adolescent psychiatrist and has over 15 years of clinical experience. Dr. Syed has published over 20 papers and book chapters. He is currently Associate Professor of Psychiatry at Penn State College of Medicine with administrative, educational, and clinical responsibilities.

Dr. Fauzia Mahr, MD, is Associate Professor of Psychiatry and Pediatrics, Vice Chief Division of Child and Adolescent Psychiatry, and Director of the Child and Adolescent Psychiatry Fellowship Program. She is Medical Director of the Eating Disorder Child Partial and Outpatient Program and has published research on eating disorders.

Dr. Farhat Siddiqui, MD, is a second-year fellow of Child and Adolescent Psychiatry at Penn State College of Medicine. She is co-chief in her fellowship program and has presented research findings at scientific meetings.

Susan D. Mayes

Department of Psychiatry H073
Hershey Medical Center
500 University Dr.
Hershey, PA 17033
USA
Tel. +1 717 531-6201
Fax +1 717 531-1578
E-mail smayes@psu.edu