The Relationship between Bullying and Suicide in A Sample of 53,000 Young Minnesotans

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Abstract

Data from the spring 2010 Minnesota student survey were analyzed in order to quantify the risk for suicide ideation as a function of bullying variability. Other factors available from the survey included alcohol and other drug use, within-family violence and abuse, mental health symptoms. In addition, a factor analysis revealed a protective connectedness factor (with family, community, and educators). A principal component analysis was conducted to determine systematic variables that were subsequently entered into a logistical regression equation. The bullying factor (victimization plus some mild bullying), alcohol and other drug use, mental health indicators and gender (coded as Female), and family violence all significantly and strongly predicted suicide ideation among 53,000 Minnesota youth. Connectedness with family, school, and community turned out to be a protective factor (e.g., demonstrated a negative correlation with suicidal thoughts). Additional results demonstrated that bullying also was associated with with self-reported suicide attempts.

Keywords: Bullying; suicide; intra-familial aggression; mediating variable; family abuse; quality of school life.

Many media reports direct the attention of helping professionals to the connection between bullying and suicide; a term that has gained currency online and in the popular media is "bullycide" (coined by the journalists Marr and Field [2001] in their book *Death At Playtime*). At first glance it makes sense that the often-brutal abuse of young people at the hands of their peers produces levels of stress that naturally lead to, among other issues, somatic complaints, depression, and even suicidal ideation and attempts (see excellent reviews by Klomek, Sourander, & Gould, 2010; Rigby & Slee, 1999). As will be developed below, a complicated relationship exists between bullying and thoughts about suicide, ideation, attempts, and completions, commonly known as "suicidality… a broad term that includes both suicidal ideation and behavior, both nonfatal and fatal" (Food and Drug Administration, 2010).

Bullying. If child-on-child aggression predicts suicide ideation then the incidence of bullying becomes a public health and suicide prevention concern. Several reasonably large-scale, population studies have revealed that bullying remains a significant problem in the United States (U.S.). For example, in 2001, Nansel, Overpeck, Pilla, Ruan, Simons-Morton, and Scheidt reported that among 16,000 students in grades six through ten, 13% reportedly bullied others, 11% experienced bullying, but seldom bullied others, and 6% both bullied others and suffered peer aggression (bully-victims). This means that seven in ten students did not participate in some way.

Rose, Espelage and Monda-Amaya (2009) reported similar findings based on a study of 22,000 third- through eighth-grade students: Fifteen percent were rated as chronically victimized, 17% ringleader bullies (e.g., led others in the mobbing of individual students); Rose et al. rated 8% as bully-victims (participating on both aspects). This leaves 60% as bystanders or non-participants. Simanton, Burthwik, and Hoover (2000) sampled over 2,300 youth in North Dakota, reporting roughly 62% as bystanders; 19.6% bullying others, 9.2% categorized as bully-victims, and 8.8% victims only. Simanton et al. noted that self-reported bullying systematically increased as a function of grade, while self-reported victimization declined between late elementary (19.5%) through middle

school (14.7%) to the high-school figure of 8.8%. Self-admitted bullying, on the other hand, increased significantly as a function of grade level.

S*uicide.* As is true of bullying, experts list suicide as a significant problem in the U.S. and elsewhere. In the U.S., for example, suicide is responsible for about 37,000 deaths per year (12 per 100K, Kochanek, Xu, Murphy, Miniño, & Kung, 2012). It was the tenth leading cause of death in the U.S. in 2009 (the most recent year for which figures are available), rises to third among teens and young adults (Kochanek, et al., N = 4,371, 10.1 per 100K) behind accidents (28.9 per 100K) and homicides (11.3 per 100K).

About 8% of adolescents and young adults report having participated in an attempt in any given year, obviously non-fatal (Gould, Greenerg, Velting, et al., 2003). In our present investigation based on a poll of approximately 135,000 Minnesota students, 13.6% reported that they thought about an attempt during the year prior to the investigation, with 5.5% reporting an attempt during the preceding year.

Bullying and suicide. According to Lubell and Vetter (2006), bullying and suicidality share several noteworthy traits meaning that they should be considered simultaneously in prevention programming. At some level the relationship, if not the causal direction, of bullying and suicidality is fairly well established. Lubell and Vetter wrote that both suicide ideation and bullying appear mediated by levels of interpersonal problem-solving and coping skills. Once investigators decipher the relationship between bullying and a host of mediating individual and environmental variables, practitioners might strengthen community-wide suicide prevention programs through integrating them with anti-bullying efforts. An alarming possibility exists that suicide ideology may play a role in school shootings (Vossekuil, Fein, Reddy, Borum, & Modzeleski, 2002). Vossekuil et al. reported that nearly eight-in-ten school shooters participated in suicide-related behaviour prior to harming their peers. It is perhaps less than surprising that targeted school shootings often end with the death of the perpetrator.

Researchers have addressed several aspects of the relationship between aggression and suicide-related factors, assessing first-order relationship between bullying and suicide and studying it in combination with other factors (e.g., depression, Hawker & Boulton, 2000; Pranjic & Bajraktarevic, 2010), demonstrating that both bullying and depression tend to predict suicide ideation together and in combination, when controlling for gender and grade level (Dempsey, Haden, Goldman, Sivinski, & Wiens, 2011). However, other, longitudinal studies found that frequent bullying accompanied by depression was a stronger predictor of suicide risk than bullying alone (Klomek, Sourander, Kumpulainen, et al., 2008; Klomak, Kleinman, Altschuler, Marrocco, Amakawa, & Gould, 2011).

Klomek, et al. (2008) studied the relationship between bullying, depression, and suicide ideation in a sizable sample of nearly 10% of Finnish males born around 1981. The investigators studied risk factors twice, once when participants were about eight years of age and a second time when they turned 18. The investigation is noteworthy, not only for the excellent sampling procedures, but because the researchers treated age-eight depressive tendencies as a control variable. Frequent bullying of others at age eight predicted severe depression but not suicidality at age 18 (when early depression was held constant). Infrequent bullying predicted neither depression nor suicidal ideation. Klomek, et al. (2008), argued for the existence of a threshold level of aggression (bullying) in boys for predicting later psychiatric problems, possibly because higher levels of aggression remain somewhat normative in males and the fact that even mild levels of bullying or victimization tend to be associated with depression and suicidal ideation in females (see particularly Klomek, Marocco, Kleinmn, Schonfeld, & Gould, 2007). Finally, these data suggest that depression, perhaps particularly early depression, "…mediates the association between bullying, and suicidal ideation" (p. 53).

Klomek, Kleinman, et al. (2011) confirmed the relationship between bullying and depression at a later date in a study of 236 students in the eastern US-. The investigators followed up on thirteen-

through-eighteen-year-old students subsequent to a four-year tracking period. The researchers categorized participants into groups based on data from the original study, bullying (either bullies or victims, but few risk factors), at-risk plus bullying, and at-risk plus no bullying). Klomek, Kleinman et al. confirmed that bullying exacerbated risk; students who either bullied others or experienced bullying *and* risk at baseline proved significantly more depressed compared with members of a risk-only group. Klomek, Kleinman et al. noted that bullying victims experienced higher levels of both depression and suicide ideation after four years when compared with students who picked on others.

Researchers have combined peer-on-peer and intra-familial aggression prediction of suicide-related behaviour from both peer-on-peer (bullying) and intra-familial aggression suggesting that both predict suicide ideation, though the effect appears to occur more strongly in females (Baldry, & Winkel, 2003; Bond, et al., 2001; Dempsey, et al., 2011; Klomek, Maracco, et al., 2007). Other research teams have identified exacerbating factors such as loneliness (Hay & Meldrum, 2010) and protective mediating variables, such as intra-familial and school connections (Cui, Cheng, Xu, Chen, & Wang, 2011; McKenna, Hawk, Mullen, & Hertz, 2011; Poteat, Mereish, DiGiovanni, & Koenig, 2011). Gender appears to mediate the relationship between bullying and suicide-related behaviour, with females responding more negatively to bullying and thus demonstrating stronger reactions to peer aggression.

It is essential to understand that suicide is a significant problem in the U.S. and across the world among adolescents and young adults. In the present investigation, we examine the relationship between bullying and suicide, simultaneously examining other factors that may prove relevant to the prevention community, including gender.

Males complete suicides five times as often as do females (National Institute on Mental Health, 2007), though females report suicidal ideation and attempt self-injury at higher rates than do their male peers. In one study, gender served as a mediating variable for the suicidality-bullying nexus (Klomek, et al., 2009). Specifically, with conduct disorder and depression controlled, significant variance (predicating suicide ideation from bully status) occurred in females, though not in males (Klomek, et al., 2009). Based on an exploratory analysis of a very large data set we [attempted to] predict suicide ideation from bullying (mostly victimization and correlated aggression variables), alcohol and other drug use and abuse, intra-familial aggression (Baldry & Winkel, 2003). Finally, based on an initial exploratory structural analysis, we included a protective factor, namely connectivity (with family, community, school, friends).

Method

Instrumentation

We obtained permission in September of 2011 to procure data from the 2009-2010 versions of the *Minnesota Student Survey* (*MSS*), collected across the state in late February of 2010 (Minnesota Student Survey Interagency Team, 2010). The Minnesota State Department of Education (Minnesota, 2010) views the MSS as a partnership with other state agencies charged with evaluating and thus enhancing the well-being of children and youth (school districts, the Department of Employment and Economic Development, Health, Human Services, and Public Safety), arguing that results may prove useful "in planning and evaluation for school and community initiatives and prevention programming."

We could not locate a script for administration of the instrument, but noted, via the Minneapolis Public School's web site (Minneapolis Public Schools, 2010), that passive or "opt-out" consent as well as child assent were obtained. State and local education officials administer the MSS every three years, targeting students in sixth, ninth, and twelfth grades.

Other than demographic information allowing for disaggregation by age, grade, gender, region, and site (e.g., alternative schools/ corrections facilities), the instrument includes over 300 items

covering topics including safety near school, physical activity and nutrition, emotional health, alcohol and other drug use, school performance, family life, and future plans (Minneapolis, 2010).

Minnesota Student Survey content differs as a function of age; in a sense an item sampling approach is employed. Ninth- and twelfth-graders receive items about sexual behaviour not seen by sixth-graders, but in other aspects are the same.

Participants

Altogether, 135,494 Minnesota teens responded to the instrument in 2010. In some ways, the survey process itself suggests that the *MSS* process is closer to a census than a survey. However, almost no individual survey item was answered by every respondent, therefore item responses become samples, with all of the potential unreliability that comes with volunteer effects. Nonetheless, the numbers were large enough on all pertinent items to warrant a reasonable estimate of risk issues. We discuss response rates in more detail later in the analysis section. Table 1 (below) shows the grade characteristics for the entire sample, whereas gender and other characteristics of samples and sub-samples appear later.

Table 1: Grade subdivisions for the entire sample and for the sample used in the analysis .

	Total Sample		Sample used in logistic regression analysis (responded to all items)	
Level	N	Valid Percent	N	Valid Percent
Not applicable	69	0.1	41	0.1
Grade 6	46791	34.5	1	<0.1
Grade 7	74	<0.1	24	< 0.1
Grade 8	137	0.1	53	0.1
Grade 9	47775	35.3	27365	51.8
Grade 10	665	0.5	283	0.5
Grade 11	1226	0.9	579	1.1
Grade 12	38718	28.6	24476	46.3
Total	135,445	100.0	52822	100.0
Missing	49	.0	19	< .1

We calculated a mean age of 14.5 for the entire sample (SD = 2.5, range = 10 to 21). The corresponding data for the final sample employed in analyses (responded to all items in the logistical analysis) was 16.1 (SD = 1.6, range = 11 to 21). It appears that older students proved more able or willing to respond to items. The racial and ethnic characteristics of the two samples are shown in Table 2 (Page 8).

Table 2: Racial and ethnic characteristics of the sample.

	Total Sample		Sample used in logistic regression analysis (responded to all items)	
Level	N	Percent	N	Percent
American Indian	2,120	1.6	531	1.0
Black/ African American	7,943	5.9	1,944	3.7
Hispanic/ Latino(a)	6,176	4.6	1,711	3.2
Asian American/ Pacific Islander	7,164	5.3	2,633	5.0
White/ Euro-American	96,844	71.5	41,973	79.4
Mixed Race (checked more than 1)	9,285	6.9	3,099	5.9
Don't Know/ No Answer	5,962	4.4	950	1.8
TOTAL	135,494	100.0	52,841	100.0

Statistical approach

Because of the diverse array of topics addressed in the survey, we approached this exploratory analysis of the relationship between bullying and suicidality by means of a three-step process.

(1) We attempted to detect latent structure in the data set through an exploratory factor analysis, by which we derived defensible scales and non-scalar variables that loaded together and that produced the lowest-possible between-factor correlations.
(2) We constructed scales and variables based on the PRINCOMP (though we added gender as a variable because of findings from the literature review).
(3) We entered the variables into a logistic regression equation, with suicide ideation (bi-variate- none versus some) as the criterion variable.

Results

Factor analysis

We converted as many variables as possible to meaningful scalar versions (wherein higher values represented "more" of some trait). When this proved impossible, we converted other items to reasonable bi-variate entities (coded as vectors of 1s [trait present] and 0s [trait not present]).

All pertinent variables (those related to safety, drug use, suicidality, mental health, and interpersonal connections, N = 101) were subjected to a principal components analysis. Through an iterative, trial-and-error process, we discerned that a five-factor, orthogonally rotated (Varimax) solution generated the most reasonable simple structure. We chose to interpret a model wherein (1) the most items loaded on at least one factor at .40 or greater; (2) the fewest items loaded on more than one factor at .40; and (3) a scree plot of eigenvalues depicted a reasonable break from randomness. (4) We also produced what we considered an "eyes on" sense that the resulting latent variables were thematically and theoretically sensible. After NFact = 5, idiosyncratic entities appeared that did not tie to any reasonable theory of human behaviour.

Factor solution

The five derived latent variables are shown in Table 3 (Pages 9-10). These results should be interpreted cautiously in that scales designed from the factors correlated from .19 (alcohol and drug abuse and family abuse) to .43 (absolute value, actually -.43, [mental health/ wellness & connected support]) despite the orthogonal rotation; in fact all 10 correlations proved statistically significant even with the Bonferroni adjustment). Of course, the method of rotating factors held these correlations within scales to the smallest possible values (the meaning of orthogonal rotation).

Table 3: Explanation and description of the five rotated factors.

Factor		Percent Variance Explained	Description	Sample Variables
1		21.1	***Significant alcohol and other substance abuse***. This factor was made up of the propensity to use and especially to abuse mind-altering substances; the variables loading most strongly all reflected substantial substance abuse with negative outcomes	Significant alcohol use, use of illicit drugs, blacked out, missed significant school days due to substance use; experienced trouble with legal authorities related to substance use
2		9.1	***Mental health and wellness.*** This factor represents general levels of mental health across several categories of stresses and treatment modalities	Mental health treatment (now or past), somatization, sadness, anxiety, hopelessness, experience of stress (within 30 days of completing the questionnaire)
3		4.0	***Connected support***. This entity measures the degree to which individuals are integrated into their schools, families, and communities. It looks very much like a protective factor, though purely empirical, not reflecting any extant psychological or sociological theory	School attendance, intent to pursue more education, intent to stay in school, sense that teachers take an interest [in me], relationships with other adults, "friends care" [about me]. Felt supported by spiritual leaders.

4		3.3	***Tendency to "provocative" peer victimization.*** This factor consists of the degree to which the individual had been victimized in specific ways over the school year, but included an "exclude others" and "exhibit conduct aggression" items; students scoring high would reflect Olweus's (1993) constructsof both passive- and provocative victization	Someone threatened you at school [last 12 months], pushed you, kicked you, touched [unwanted] in sexual way, comments of a sexual nature, damaged, stole, you were excluded, you excluded others, conduct problems
5		2.6	***Family abuse***. This factor measures the respondent's level of conflict and abuse encountered in their domicile and immediate surroundings	Abused by adult in household, family member(s) hit family member(s), adult in (out of) family touched you [inappropriately]

Predictors

Based on the factor solution and a review of the literature, we constructed five predictor variables. Descriptions of bi-variate variables employed in the analysis are laid out in Table 4 (below). By way of comparison, we included numbers and descriptive results for both those individuals (N = 52,841) included in the predication equation (responded to all items in the logistical analysis) and those among the entire sample who responded to each item, but not to all of them. The proportions of respondents selecting choices proved remarkably similar across samples (except for age as noted above).

Table 4: Descriptive data for bi-variate variables in the investigation.

	All Respondents				Included in the logistic regression (responded to all Items)			
	Indicated		Not Indicated		Indicated		Not Indicated	
Variable	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Female (indicated) Vs. Male (F not indicated)	67,847	50.1	67,647	49.9	28,005	53.0	24,836	47.0
Suicidal ideation (criterion variable): Ideation at any time vs. no suicidal ideation (at any time).	27,385	21.4	100,661	78.6	12,124	22.9	40,717	77.1

1. Provocative victims

We constructed a bullying scale by summing all items for Factor Two—simply because all of the items that factored together had similar formats. We recoded as bi-variate seven variables related to victimization within the past year (experienced versus never experienced; threatened you, pushed you, kicked you, sexually touched [you] in an uncomfortable way, made sexual comments that made you uncomfortable, stole property from you). Several items referred to events over the past 30 days; we coded these from 0-2 (0 = never, 1-2 events = 1, and more than 2 events = 2) (excluded you, you excluded others). The last item that included bullying related to conduct problems (0-3 events, hit or beat up others). Thus, the provocative victimization scale ran from 0 to 13. Descriptive data for the two samples are shown in Table 2 (Page 8). Seven items related to types of victimization experienced while three related to victimization of others; all variables shared significant variance in the factor solution.

2. Gender = Female

We included gender = Female (F = 1, M = 0) in the analysis because of consistent findings that females typically experience greater levels and suicide ideation. The raw data for our sample matched this expectation from the literature with 18.3% of all males evidencing a threshold level of suicide

ideation (N = 4,551). The same indicator for females was 27.0% (N = 7,573). As might be expected, the chi square associated with the GENDER by IDEATION cross-tabulation was significant, with a value of x^2 (1 df) = 565.8, *p* < .0001.

3. Family abuse

The four variables loading on family abuse, with total possible values of 0 (no indicated items) to 1 (at least one indicated item identified via the factor analysis). Descriptive results are shown in Table 2 (Page 8). Because the total range of scores range from 0 (no abuse reported) to 4 (the respondent selected all examples of abuse), we can lay out more refined descriptive data for this variable. As can be seen in Table 2 (Page 8), 44,209 (83.7%) identified no instances, of those reporting one or more instances, 5,003 (9.5%) selected one example of familial violence; 2,755 (5.2%) selected two, 638 (1.2%) selected three, with the remaining 236 (0.4%) selecting all four exemplars.

4. Mental health/ wellness indicators

The variable constructed around Factor 2, approximated a normal distribution, though with a floor effect at value = 0. The resulting scale ran from 0 to 39, with an overall mean of 12.7, SD = 7.89, with 78,601 students responding.

5. Connected support

The connected support indicant was made up of a roughly normally-distributed variable running from 0 (selected no support mechanisms) to 42 (selected the highest value on all support choices). Descriptive data for both sub-groups are provided in Table 5 (below).

Table 5: Descriptive data for scalar variables included in the logistic analysis.

Variable (description)	Total responding to the item			Included in logistic analysis (responded to all items)		
	N	Mean	SD	N	Mean	SD
<u>Chronic Mental Health subscale</u>/ Range 0 (no issues or treatment variables selected) to 39 (all variables selected at the highest level)	78,601	12.7	7.89	52,841	12.3	7.69
<u>Connected Support</u>/ Range = 6 (selected lowest level of all 10 variables [some started at 0, some at 1]) to 43.0 (selected highest level of all variables)	77,177	30.2	6.27	52,841	30.7	6.05
<u>Provocative Victimization</u>/ Range = 0 -13 (1 vs. 0 on 6 items and 0-2, on two items, and 0-3 on one item)	80,337	2.43	2.60	52,841	2.30	2.53
<u>Family Abuse</u>/ Four bi-variate (0-1 items, range = 0-4)	126,355	.30	0.70	52,841	.25	.65

6. Significant alcohol and other substance abuse

In examining the factor associated with alcohol and other drug abuse, we observed a distribution with three modes; the entire possible range of responses ran from 8 (lowest possible response on all items) to 70 (highest possible on all variables). First, a significant number of respondents (34,210, or 53.0%) indicated no use (e.g., obtained a raw score of 8). Next a roughly normal distribution ran from 9 to 24. These values clearly reflected use, perhaps experimentally, but few respondents in this range reported serious sequelae (passing out, missing school, criminal justice contacts, entering treatment). Finally, a third range ran from 25 to 70, indicating agreement with use-only items but also agreeing with choices related to negative consequences. Thus, we identified a three-level IV associated with drug and alcohol use, with a value of 0 assigned to abstainers (28,560 of those included in the logistic analysis [54.0%]), 1.0 for those in the mid-range (use, but little evidence of negative outcomes, 4,184 or 7.9%). We assigned a value of 2.0 to 20,097 participants

(38%). Over the total sample, a value of 0 accrued to 34,210 (53.1%), 1 = 5,515 (8.6%), and 2 = 24,672 (38.3%).

The criterion variable

The above five variables were employed in a logistical regression predicting suicide ideation. This variable was constructed such that all subjects who had reported any suicidal ideation at any time made up one level and those who had never engaged in such ideation made up the second level.

Logistic regression

As can be seen from Table 6 (Page 14), all variables lent significant predictability to the experience of suicide ideation, with, as might be expected, connected support proving to be a protective factor (e.g., negative predictor). The model Nagelkerke (1991) R^2 was .36, suggesting that over 30% of the probability of suicide ideation could be predicted from the model. As shown by the betas, the occurrence of bullying and family abuse proved the strongest predictors. When we ran a second model that only included bullying and mental health indicators, the Nagelkerke estimate of R^2 only decreased to .33.

Table 6: Logistic regression results.

Variable	B	SE	Wald	df	Sig	Log$_b$
Female	.088	.026	11.5	1	.001	1.09
Provocative victimization	.370	.031	143.3	1	< .001	1.45
Mental Health	.132	.002	4,654.9	1	< .001	1.14
Connected Support	-.038	.002	288.9	1	< .001	0.96
Family Abuse	.442	.018	612.6	1	< .001	1.56
AOD Pattern Abuse	.205	.013	247.2	1	< .001	1.23
Constant	-2.628	.085	955.0	1	< .001	0.07

Descriptively, the odds that students who had experienced threshold bullying would consider suicide were 45% higher than those who had not experienced such abuse, controlling for all other variables. In a separate analysis, we calculated probabilities for students who had experienced three or more types of peer abuse (versus those who had experienced fewer types or none at all, see below).

As Baldry and Winkel (2003) found, peer abuse and abuse suffered in the home or from a near relative both predicted suicidal ideation. The odds ratio suggested that students experiencing the highest levels of family abuse were 42% more likely to report suicidal thoughts. As might be expected, the odds ratio for connected support proved less than one, suggesting that interconnections in the school, home, and community may serve as a protective factor for suicidal ideation, even in the presence of the other risk events; students scoring at the highest levels of connected support were about 4% less likely to engage in suicidal thinking. Females proved slightly more likely to engage in suicidal ideation than did males.

The effect seems to be additive. To show the strength of the model, we created a cohort of students who scored above the mean on scalar variables (or where the value of the bi-variate variable = 1, excluding FEMALE), and below the median on *Protective Factors*. Nearly 800 males in the high-risk group (N = 789, 62.5%) reported suicidal ideation, while 473 (37.5%) did not. The values for females were parallel (High-risk = 2,107, 69.4% engaging in SI, while 929, 30.6%, did not). As might be expected, given results of the logistical analysis, the Female value for suicidal ideation was higher.

Discussion

The results of this large-scale study suggest that bullying in school and aggression among family members should be considered in constructing comprehensive suicide prevention programs. While the effects for mental health indices are objectively larger, given the beta weight and the fact

that the variable in the present study ran to 39, the effect is objectively larger than for a two-level index. Nonetheless, the effect for bullying on suicidal ideation proved significant.

Many anti-bullying programs and safe schools experts (see Hoover & Oliver, 2008 for a review) advocate for developing and strengthening students' sense of connection with school and community. While it is impossible to make a case for causation in a cross-sectional snapshot such as the present one (suicidal ideation could cause one to reject or avoid connections), these results seem to lend equivocal support to such efforts. All else being equal, students connecting with family, community, and educators proved less likely to think of ending their lives.

These results lend support to the importance of bullying as an issue in the lives of young people. As might be expected, several research teams have shown a connection between physical and psychological safety and learning. In fact, elsewhere we have argued that after general intelligence and teacher effectiveness, psychological safety might well be the third best predictor of learning (Hoover & Oliver, 2008). As a result, prevention experts may want to consider bullying reduction as part of dropout prevention efforts (Simanton, Burthwick, & Hoover, 2000).

However, above and beyond learning and the general quality of school life, bullying prevention may well save the lives of significant numbers of students. To provide a sense of the effect size, we estimate that 68.8% of Minnesota students reported experiencing one or more types of bullying (based on our factorial combination of variables), with 36.1% reportedly undergoing three or more types (minus "excluding others").

For a sense of how these results play out on the ground, note that among the 23,080 respondents who reported facing no bullying, 561 (2.4%) reported a suicide attempt; the parallel figure for those experiencing one or more types of bullying was 4,571 [attempts] or 8.3%; the associated chi square was 951.1 suggesting that this difference did not occur by chance. Of the 6,066 who reported undergoing three or more types of peer abuse, 3,407 (11.4%) also reported an attempt (x^2, 1 df, = 1557.7, p < .0001, versus no attempts). Finally, for those experiencing from 5 to 7 types of negative peer interactions, 15% reported a suicide attempt. These compelling figures are shown in Figure 1 (Page 16). If student self-reports are to be believed, a dosage effect occurs.
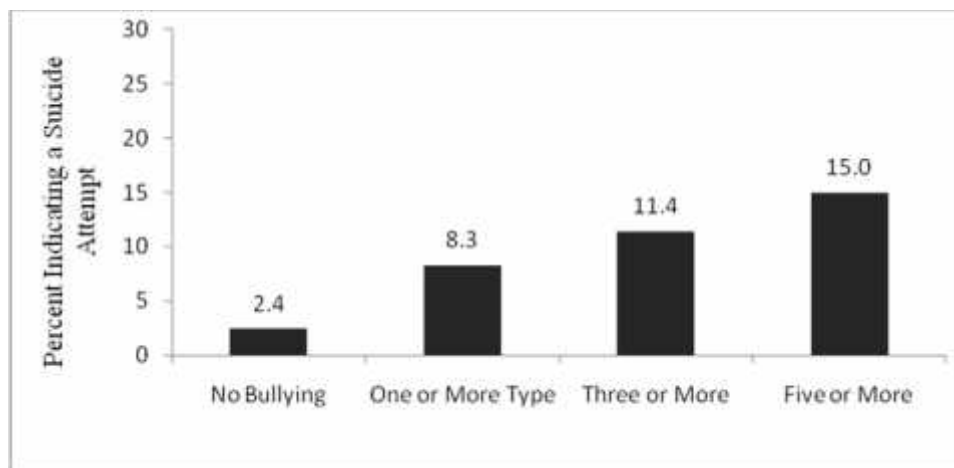

Figure 1: Reported suicide attempts as a function of the number of types of bullying experienced or perpetrated.

These results appear so compelling that it seems time for investing resources in a longitudinal study of suicide indicators that expressly include school bullying metrics. Models for such studies exist in Finland (Klomek, Sourander, et al., 2008). We suggest that officials in regions in the U.S. partner to capture a longitudinal look at a sizable cohort of individuals to look for patterns predicting both suicide and homicide that include defensible bullying indicants. Given the present results, this

might prove an excellent investment of resources for the prevention of suicide, homicide, and dropout status.

When we entered all 101 variables into a seat-of-the-pants prediction equation the Nagelkerke R^2 proved to be near 50%; when we streamlined the analysis based on factor analytic results, the explained variance reduced to 36%. This suggests that we missed a considerable amount of important variability. We believe that such factors as short-term stress (e.g., breakup of relationships, sudden familial disharmony) probably explain a significant amount of variability in suicide ideation, as might physical health factors. Though the Minnesota Student Survey includes health indices, they did not fall cleanly into any of the factors that we derived and were thus excluded from analyses.

What probably occurs is a "straw that broke the camel's back" chain of events, with such entities as familial abuse, peer abuse, and mental health issues setting the stage (perhaps via the mechanism of increasing hopelessness), but requiring an event to trigger serious intent, incidents of self-harm and ultimately a suicide attempt. A longitudinal study would go a long way toward deciphering causal and protective chains.

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