Original article

Psychological, Physical, and Academic Correlates of Cyberbullying and Traditional Bullying

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A B S T R A C T

Purpose: To examine the relationship between children's and adolescents' experiences with cyberbullying and traditional bullying and psychological health, physical health, and academic performance.
Methods: Nine hundred thirty-one students in grades 6 through 12 completed an anonymous survey examining their experiences with cyberbullying and traditional bullying. Also included were measures of anxiety, depression, self-esteem, physical well-being, school attendance, and academic performance.
Results: Participants were categorized as belonging to one of four groups: cyber victims, cyberbullies, cyber bully/victims, and those not involved in cyberbullying. A similar categorization was done with traditional bullying. Those in the bully/victim groups (and particularly the cyber bully/victim group) had the most negative scores on most measures of psychological health, physical, health, and academic performance.
Conclusions: There appears to be a substantial, although not perfect, overlap between involvement in traditional bullying and cyberbullying. Additionally, the physical, psychological, and academic correlates of the two types of bullying resembled one another.

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Bullying has long been present in schools, although awareness of the harms that bullying may cause is fairly recent [1]. Bullying is commonly defined as acts of aggression that are repeated over time and that involve a power imbalance between the perpetrator and his or her targets [2]. More recently, a new mode of bullying has emerged, known as cyberbullying [3,4]. Cyberbullying involves bullying through the use of electronic venues, such as instant messaging, e-mail, chat rooms, websites, online games, social networking sites, and text messaging.

The Nature and Extent of Traditional Forms of Bullying

Research has shown that many children and youth have been involved in "traditional" forms of bullying. In the first nationally representative study of bullying in the U.S., Nansel and colleagues [5] found that 11% of sixth through tenth graders were "victims only," 13% were "bullies only," and 6% were "bully/victims" (i.e., had both bullied others and been bullied). More recently, a survey of 11- to 15-year olds in 40 countries [6] revealed that 26% of adolescents had been involved in bullying as victim or perpetrator or both with some regularity.

Research on traditional bullying has documented that children who are bullied may experience problems associated with their health, emotional well-being, and academic work. Bullied children are more likely than their nonbullied peers to report feelings of anxiety [7–9], depression [7,9–11], and low self-esteem [2,10–12]. Researchers have recognized that

depression, anxiety, and low self-esteem may be both consequences of and precursors to bullying [13,14]. Thus, children who are bullied may be more likely than others to develop problems with depression, anxiety, and low self-esteem. In other cases, these symptoms may signal to others that a child may be an "easy target" [15–17].

Research also reveals a number of physical health effects from bullying. Fekkes and colleagues [13] found that bullied children were more likely than nonbullied peers to develop stomach pain, sleep problems, headaches, tension, bedwetting, fatigue, and poor appetite after having been bullied. In a meta-analysis of 11 studies, Gini and Pazzoli [18] found that bullied children had significantly higher risks of psychosomatic problems compared with noninvolved peers.

There also is evidence that bullying may affect the academic work of bullied children. Children who are bullied are more likely than nonbullied peers to indicate that they want to avoid attending school [19], have higher absenteeism rates [20,21], dislike school, and say that they receive poorer grades and lower standardized test scores [22,23]. A meta-analysis of 33 studies [24] found a significant negative association between peer victimization and academic achievement, as measured by grades, student achievement scores, or teacher ratings of academic achievement.

Children who perpetrate bullying also are at higher risk of health and academic problems. Children who bully and those who are "bully/victims" are, for example, more likely than noninvolved peers to experience psychosomatic problems [18] and academic difficulties [25].

The Nature and Extent of Cyberbullying

Only in the past several years have researchers examined the nature and prevalence of cyberbullying among children and youth [3,26–29]. Considerable variability exists in reports of rates of cyberbullying victimization, which range from a low of 4% [30] to a high of 72% [31]. Rates of perpetrating cyberbullying also vary, ranging from 3% [32] to 23% [33]. In a U.S. study of 3,767 middle-school children [26], 18% reported being targets of cyberbullying at least once within the previous 2 months, and 11% said they had cyberbullied someone at least once within the previous 2 months. In that same study, more girls than boys reported having been both cyberbullied and having cyberbullied others. The variability in reported prevalence rates of cyberbullying stems from variations in the time parameters used to assess cyberbullying, different measurements and definitions used, and assessments across different age ranges.

Researchers also have presented discrepant views about the relationship between traditional bullying and cyberbullying. Some have suggested that cyberbullying is merely a continuation of traditional bullying executed through new means [3,31,34,35]. Others have noted that cyberbullying differs from traditional bullying in some important aspects (e.g., potential anonymity, inability to see perpetrator/victim) and suggest that, although they may share features in common, cyberbullying and traditional bullying are qualitatively different phenomena perpetrated by somewhat different groups of individuals [36,37].

Recently, an increasing number of researchers are directly comparing children's involvement in traditional bullying and in cyberbullying [29,31]. Raskauskas and Stoltz [34] observed

that victims of traditional bullying were more likely than chance to also be victims of electronic bullying (see also [29,31]). However, they did not find support for the hypothesis that victims of traditional bullying would be disproportionately represented among *perpetrators* of cyberbullying, perhaps as a means of retaliating for bullying that occurred at school. Smith et al. [29] found that 75 of 284 (26%) traditional victims were also victims of cyberbullying (see also [38,39]). Forty-two (15%) victims of traditional bullying perpetrated cyberbullying. Ybarra et al. [40] observed that 36% of youth aged 10 to 15 who were harassed online also reported being bullied at school.

Many of these same studies have made initial forays into studying the possible effects of cyberbullying. Raskauskas and Stoltz [34] examined qualitative data based on participants' responses to open-ended questions assessing how they thought the bullying had affected them. The most common responses were feelings of sadness and an unwillingness to attend school. However, a comparison was not made with the effects of traditional bullying. Smith et al. [29] also asked participants about the perceived impact of traditional bullying and cyberbullying, by asking whether participants thought cyberbullying had a greater or lesser impact than traditional bullying. Students in their study believed that bullying through use of a picture/video clip or in a chatroom would have a greater effect than traditional bullying; other forms of cyberbullying (e.g., text messaging) were perceived to have similar effects as traditional forms of bullying. Juvonen and Gross [31] found higher rates of social anxiety among those individuals who had been victimized in school bullying incidents and in online bullying incidents. Ybarra et al. [40] found increased use of alcohol and other drugs among 10 to 15 year olds who had experienced online harassment as well as increased behavior problems and weapon-carrying at school.

Research Questions

Previous research that has provided information on the possible effects of cyberbullying has been somewhat limited in the number of studies comparing the effects to traditional bullying or in examining a relatively small number of possible effects on victims. This study will contribute to the literature in two ways. First, the co-occurrence of involvement in traditional bullying and cyberbullying was examined. We hypothesized that there would be significant but not complete overlap in involvement in these two types of bullying. Second, we were interested in examining not only the possible correlates of cyberbullying, but also how those correlates compare with those experienced by children involved in traditional bullying. We hypothesized that, given the accessibility of electronic victims to their perpetrators and the often anonymous nature of the electronic exchanges, the cyber victims would report problem behaviors that were just as negative, if not more negative, than victims of traditional bullying.

Method

Participants

Participants were students at two schools in Pennsylvania during the fall of 2007 who volunteered to participate in a school-based survey. The schools were located in a rural

community and were not currently involved in any organized bullying prevention program. Information on race was not recorded on student surveys, but data published about the schools' populations indicate that white students comprised at least 95% of the student body. A total of 931 students in grades 6 through 12 participated. All students in class on the day of the survey were invited to participate and, in fact, agreed to participate. Passive consent was obtained from parents. Parents received written notice from the school that their children would be participating and were invited to contact the school if they did not want their child to participate.

Materials and procedures

A survey developed by the authors and used in previous research [26] assessed the prevalence of both traditional bullying and cyberbullying, in addition to a variety of academic and psychosocial factors that may be related to each.

Measures of traditional bullying. Following a series of demographic questions, participants answered questions about their experiences with bullying at school by completing several items drawn from the Olweus Bullying Questionnaire [41]. Bullying was defined as aggressive acts that are meant to hurt another person, that happen repeatedly, and that involve an imbalance of power. As part of the standard Olweus Bullying Questionnaire, examples of bullying were provided, including "say[ing] mean and hurtful things, or mak[ing] fun of him or her"; "ignor[ing] or exclude[ing] him or her from their group of friends"; hitting, kicking, pushing, or shoving; and telling lies or spreading false rumors. After these directions, the participants answered the questions "How often have you been bullied at school in the past couple of months (since winter break)?" and "How often have you taken part in bullying another student(s) at school in the past couple of months (since winter break)?" Both of these questions used a 5-point response scale ("I haven't been bullied at school in the past couple of months," "It has only happened once or twice," "2–3 times a month or more," "About once a week," and "Several times a week").

Measures of cyberbullying. After responding to general questions about bullying, the participant then read a definition of cyberbullying (bullied through e-mail, instant messaging, in a chat room, on a website, or through a text message sent to a cell phone) and completed a series of questions about their experiences with cyberbullying. Prevalence was assessed by asking participants how often they had been cyberbullied within the past couple of months and how often they had cyberbullied others, using the same 5-point scale mentioned with traditional bullying.

Measures of school performance. To examine the possible associations of both traditional and cyberbullying with school performance, participants were asked "In the last couple of months (since winter break), how often have you been absent from school?" and "In the last couple of months (since winter break), how often have you had to leave school early because you were sick?" Participants also indicated the grades that they *usually* get in school by selecting one of nine possible responses ("mostly As," "mostly As and Bs," "mostly Bs," "mostly Bs and Cs," "mostly Cs," "mostly Cs and Ds," "mostly Ds," "mostly Ds and Fs,"

Table 1
Bullying involvement groups

Traditional bullying status	At least once	2–3 times a month or more
Victim only	132 (14.6%)	76 (8.4%)
Bully only	156 (17.3%)	74 (8.2%)
Bully/victim	173 (19.2%)	33 (3.7%)
Not involved	442 (48.9%)	720 (79.7%)
Cyberbullying status	At least once	2 or 3 times a month or more
Victim only	88 (9.9%)	36 (4.0%)
Bully only	54 (6.1%)	23 (2.5%)
Bully/victim	47 (5.3%)	17 (1.9%)
Not involved	698 (78.7%)	828 (91.6%)

and "mostly Fs.") Responses were scored 1 through 9, with higher numbers indicating lower grades.

Measures of physical health outcomes. To determine possible associations between traditional bullying and cyberbullying and health outcomes, participants indicated how often in the past 4 weeks they had experienced 10 symptoms (anxiety, problems sleeping, irritability, headache, tension, fatigue, poor appetite, sadness, skin problems, and bed-wetting [8]). Response options included "never," "sometimes," and "often." Scores across these 10 symptoms were averaged to provide an overall index of health. Higher numbers indicated more health problems. Internal consistency with this sample was .85.

Measures of self-esteem, depression, and anxiety. Additionally, participants also completed the Rosenberg Self-Esteem Scale [42], the Beck Youth Depression Scale (BDI-Y [43]), and the Beck Youth Anxiety Scale (BAI-Y) [43]. For each of the 10 items on the Rosenberg Self-Esteem Scale, participants used a 5-point response format to indicate their agreement or disagreement with each statement. After reverse-scoring appropriate items, participants' scores were averaged with higher scores indicating *lower* self-esteem. Internal consistency with the present sample was .85. The BDI-Y consists of 20 symptoms characteristic of depression (e.g., "I feel like crying," "I feel lonely"), including one item ("I wish I were dead") that addresses suicidal ideation. The BAI-Y consists of 20 items symptomatic of anxiety (e.g., "I worry," "I am afraid that something bad might happen to me"). For both the BDI-Y and the BAI-Y, participants indicated how often they had experienced each of the symptoms using a 4-point scale (1 = never; 4 = always). Scores were averaged across the 20 BDI-Y items and the 20 BAI-Y items to provide an overall index of depressive and anxiety symptomatology, respectively. Internal consistency for the BDI-Y and the BAI-Y with the present sample was .96 and .94, respectively.

Procedure. Surveys were distributed in all classes in grades 6 through 12, and all students agreed to participate.

Table 2
Overlap between cyberbullying and traditional bullying

Cyberbullying status[*]	Traditional bullying status			
	Victim only	Bully only	Bully/victim	Not involved
Victim only	14 (1.6%)	1 (0.1%)	5 (0.6%)	15 (1.7%)
Bully only	1 (0.1%)	16 (1.8%)	1 (0.1%)	4 (0.4%)
Bully/victim	2 (0.2%)	2 (0.2%)	10 (1.1%)	2 (0.2%)
Not involved	59 (6.6%)	55 (6.2%)	17 (1.9%)	687 (77.1%)

[*] Status reflects the conservative criterion of 2–3 times/month or more. χ^2 [9] = 350.23, $p < .001$.

Table 3
Main effects of cyberbullying group

Variable	Cyberbullying group			
	Victim	Bully	Bully/victim	Not involved
Anxiety	36.05$_a$* (11.82)	31.83$_b$ (13.55)	44.81$_{a,b,c}$ (18.69)	28.71$_{c,d}$ (9.02)
Depression	35.51$_{a,d}$ (14.18)	31.61$_b$ (15.91)	42.38$_{a,b,c}$ (17.84)	26.67$_{c,d}$ (9.57)
Suicidal ideation	1.71$_{a,d}$ (.94)	1.65$_{b,e}$ (1.15)	2.06$_{a,b,c}$ (1.29)	1.23$_{c,d,e}$ (.61)
Self-esteem**	2.72$_{a,d}$ (.59)	2.76$_{b,e}$ (.44)	3.11$_{a,b,c}$ (.28)	2.36$_{c,d,e}$ (.55)
Number of absences	4.82$_a$ (5.14)	7.29$_c$ (7.70)	7.93$_{a,b}$ (7.85)	3.21$_{b,c}$ (3.87)
Leaving school early	1.62$_{a,d}$ (2.04)	2.54$_{a,b,c}$ (3.19)	1.46$_{b,e}$ (1.81)	.74$_{c,d,e}$ (1.65)
Grades	3.56$_{a,d}$ (1.78)	4.10$_{b,e}$ (2.23)	4.64$_{a,b,c}$ (2.24)	3.02$_{c,d,e}$ (1.82)
Health problems	1.86$_{a,b}$ (.37)	1.68$_a$ (.48)	1.76$_c$ (.57)	1.50$_{b,c}$ (.40)

* Means in a single row that share a common subscript differ significantly, $p < .05$.
** Lower scores on measures of self-esteem and grades indicate higher self-esteem and higher grades.

Results

The participants included 433 female and 485 male students; 13 individuals did not indicate a sex. Ages of participants ranged from 11 to 19 ($M = 15.16$; $SD = 1.76$). Because we wanted to compare the effects of bullying and cyberbullying across bullying involvement groups, participants were classified as victims, bullies, bully/victims, or not involved separately for traditional bullying and for cyberbullying. The relative percentages of participants falling within each of these groups based on the frequency of involvement in cyberbullying and in traditional bullying are provided in Table 1. For most subsequent analyses, to be classified as a bully or a victim, a conservative criterion of two or three times a month or more was used. (A more conservative criterion was selected to maintain consistency with previous research examining the prevalence rates of traditional bullying. Importantly, however, all analyses were repeated using a less stringent criterion of "at least once" within the previous 2 months but these analyses are not reported. The overall pattern of results using this more liberal criterion closely mirrored the results reported here.)

For comparison purposes, prevalence rates using the conservative criterion of two or three times a month or more and the more liberal criterion of at least once in the previous 2 months are provided. Fifteen percent (n = 132) reported being bullied at school at least once within the past couple of months (i.e., victim only); 17% (n = 156) indicated they bullied others at school (i.e., bully only). Nineteen percent (n = 173) reported bullying others and being bullied (i.e., bully/victim). Forty-nine percent (n = 442) were not involved with traditional bullying. (See Table 1 for prevalence of involvement in traditional bullying with a more conservative criterion, i.e., two to three times a month or more.)

With regards to cyberbullying, 10% (n = 88) reported having been cyberbullied at least once in the past couple of months (i.e., victim only). Six percent (n = 54) stated that they had

cyberbullied others within the last couple of months (i.e., bully only). Just over 5% (n = 47) reported that they had cyberbullied others and been cyberbullied (i.e., cyber bully/victims). Seventy-nine percent (n = 698) indicated that they had not been involved with cyberbullying in the previous 2 months. As with traditional bullying, prevalence rates of involvement in cyberbullying using a more conservative criterion are provided in Table 1.

The correspondence between traditional bullying and cyberbullying is shown in Table 2. Three quarters (77.1%) of respondents were involved in neither traditional bullying nor cyberbullying. Notably, most victims of traditional bullying were not involved in cyberbullying (6.6%). Of those who were involved in cyberbullying, a greater percentage were victims (1.6%) compared with bullies (0.1%) or bully/victims (0.2%). Similarly, among traditional bully/victims, the largest percentage was not involved in cyberbullying, but a sizable number were cyber bully/victims. Among traditional bullies, the largest percentage was not involved in cyberbullying. However, those who were involved were most likely to be online perpetrators.

Separate 4 (cyberbullying group) × 2 (sex: male/female) analyses of variance (ANOVAs) were conducted for each of the eight outcome variables. Analyses were conducted on each of the outcome variables covarying out involvement in the other type of bullying. The results did not change when using the conservative criterion of "two to three times a month or more" and were very similar when using the more liberal criterion of "at least once." Significant main effects of cyberbullying group were obtained for all eight variables (Table 3). These main effects of cyberbullying group were moderated by significant interactions of cyberbullying group and sex for anxiety, $F(3, 883) = 14.23$, $p < .001$ ($\eta^2 = .04$), depression, $F(3, 881) = 15.22$, $p < .001$ ($\eta^2 = .05$), and suicidal ideation, $F(3, 875) = 12.67$, $p < .001$ ($\eta^2 = .04$). (Means are reported in Table 4.) No significant main effects of sex were observed.

Table 4
Correlates of traditional bullying and cyberbullying as a function of group and sex

Variable	Victim		Bully		Bully/victim		Not involved	
	Male	Female	Male	Female	Male	Female	Male	Female
Anxiety/cyberbullying	33.47*	38.65$_a$	26.91$_e$	36.33	52.45$_{c,d,e,f}$	28.00$_d$	26.35$_{b,c}$	31.33$_{a,b}$
Depression/cyberbullying	31.60$_f$	38.55$_a$	25.64$_e$	37.08	48.0$_{c,d,e,f}$	30.0$_d$	25.33$_{b,c}$	28.17$_{a,b}$
Suicidal ideation/cyberbullying	1.64$_a$	1.75	1.36$_b$	1.92^d	2.27$_{a,b,c}$	1.60	1.20$_c$	1.27$_d$
Anxiety/traditional bullying	32.59$_a$	42.56$_{a,b,c}$	28.09$_g$	33.07$_{f,g}$	38.26$_e$	32.08$_{c,f}$	25.91$_{d,e}$	30.39$_{b,d}$
Depression/traditional bullying	29.97$_{a,c}$	38.05$_{a,b}$	28.59$_d$	32.70	39.21$_{c,d,e}$	32.15	24.65$_{e,f}$	27.32$_{b,f}$
Suicidal ideation/traditional bullying	1.24$_{a,c}$	1.64$_{a,b}$	1.60	1.70$_g$	2.05$_{c,d}$	1.59$_f$	1.15$_{d,e}$	1.23$_{b,e,f,g}$
Grades/traditional bullying**	3.09$_a$	3.38	4.15$_{a,b}$	2.96$_{b,c}$	3.83	5.0$_{c,d}$	3.26$_e$	2.67$_{d,e}$

* Means in a single row that share a common subscript differ significantly, $p < .05$.
** Lower scores on grades indicate higher grades.

Table 5
Main effects of traditional bullying group

Variable	Traditional bullying group			
	Victim	Bully	Bully/victim	Not involved
Anxiety	37.92^*_a (14.26)	29.91_c (10.27)	$35.75_{b,c}$ (15.01)	$28.08_{a,b}$ (8.18)
Depression	$34.29_{a,d}$ (14.71)	$20.09_{b,d,e}$ (12.15)	$36.34_{c,e}$ (16.52)	$25.94_{a,b,c}$ (8.70)
Suicidal ideation	$1.46_{a,d}$ (.82)	1.64_b (1.07)	$1.84_{c,d}$ (1.22)	$1.19_{a,b,c}$ (.53)
Self-esteem**	2.52_c (.64)	2.60_a (.55)	$2.80_{b,c}$ (.55)	$2.34_{a,b}$ (.53)
Number of absences	3.55 (3.80)	4.42 (5.41)	4.78 (4.69)	3.25 (4.08)
Leaving school early	1.06 (1.91)	1.25 (2.40)	1.38 (3.14)	$.72 (1.54)^{***}$
Grades	3.24 (1.72)	3.73 (2.06)	4.25_a (2.46)	2.97 (1.79)
Health problems	$1.82_{a,c}$ (.41)	1.62_c (.45)	1.75_b (.51)	$1.47_{a,b}$ (.38)

* Means in a single row that share a common subscript differ significantly, $p < .05$.
** Lower scores on measures of self-esteem and grades indicate higher self-esteem and higher grades.
*** Although the F-value was significant, post-hoc tests showed no significant mean differences for this variable.

ANOVAs by traditional bullying group and sex were also conducted on the eight outcome variables. Main effects of traditional bullying group were observed for all variables except for the number of times participants were absent from school (see Table 5). Significant main effects of sex were obtained on two of the variables: anxiety, $F(1, 882) = 8.80, p < .003 (\eta^2 = .01)$, and overall health, $F(1, 756) = 12.53, p < .001 (\eta^2 = .02)$. Relative to males, females reported more anxiety ($M = 31.73, SD = 10.22$; males: $M = 27.12, SD = 8.78$) and more health problems ($M = 1.65, SD = .41$; males: $M = 1.42, SD = .38$). A significant interaction of sex and traditional bullying group was obtained on anxiety, $F(3, 882) = 5.93, p < .001, (\eta^2 = .02)$, depression, $F(3, 880) = 4.43, p < .02 (\eta^2 = .02)$, suicidal ideation, $F(3,874) = 3.62, p < .01 (\eta^2 = .01)$, and grades in school, $F(3, 861) = 3.91, p < .009 (\eta^2 = .01)$ (Table 4, Figure 1).

Additionally, 4 (cyberbullying group) × 2 (grade level: middle school/high school) ANOVAs were conducted on the eight outcome variables. Significant interactions of cyberbullying group and grade level were observed with three of the variables: anxiety, $F(3, 888) = 6.80, p < .001 (\eta^2 = .02)$, depression, $F(3, 886) = 5.52, p < .001 (\eta^2 = .02)$, and health, $F(3, 763) = 3.17, p < .02 (\eta^2 = .01)$. As shown in Table 6, high school students who

were both cyberbullies and cyber victims had the highest anxiety and depression scores and the most health problems.
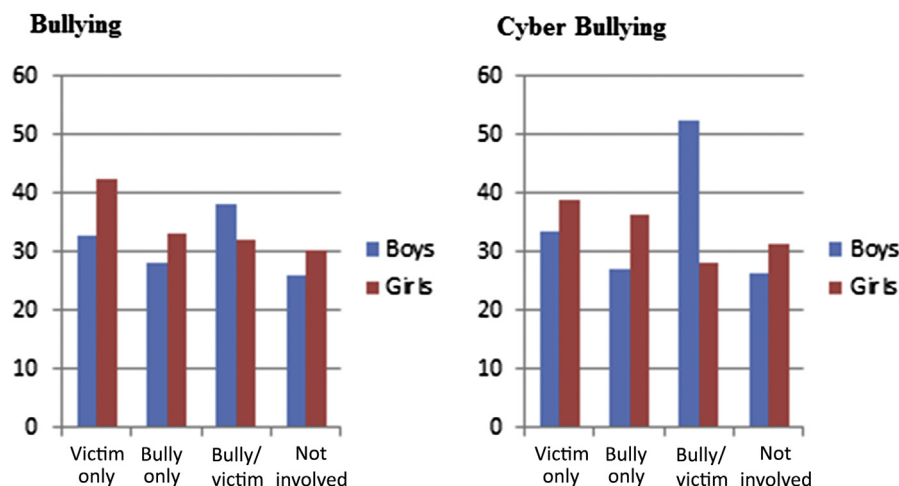
Similar 4 (grade level) × 2 (grade level) analyses conducted with traditional bullying revealed no significant traditional bullying group by grade level interactions, $p > .05$. Thus, middle and high school students did not differ in the effects of traditional bullying across groups.

Correlations were conducted between the outcome variables and victimization and perpetration by both electronic and traditional means. A range of significant effects can be seen in Table 7. Notable among these findings, however, are the strong relationships observed between traditional victimization and anxiety ($r = .33$) and between cyber victimization and depression ($r = .29$).

Discussion

Consistent with previous research [26], a substantial minority (21%) of respondents were involved at least once within the past couple of months with cyberbullying as victim, bully, or bully/victim, whereas, using a more conservative criterion (two or three times a month or more), 8% had been involved with

Figure 1. Beck Anxiety Scale: Group x gender interactions. V0 = Victim only; BO = Bully only; BV = Bully/victim; NI = Not involved.

Table 6
Correlates of cyberbullying as a function of grade level and cyberbullying group

Variable	Victim		Bully		Bully/victim		Not involved	
	Middle	High	Middle	High	Middle	High	Middle	High
Anxiety	$40.27_{a,b}$	34.67_d	29.0_a	34.0_e	37.67_c	$57.25_{c,d,e,f}$	27.98_b	29.14_f
Depression	$43.45_{a,b}$	$31.88_{b,c}$	31.90	31.38_d	38.44	$51.13_{c,d,e}$	26.49_a	26.81_e
Health problems	$1.96_{a,b}$	1.83	$1.44_{b,c}$	1.84_c	1.60	2.10_e	$1.44_{a,d}$	$1.54_{d,e}$

Means in a single row that share a common subscript differ significantly, $p < .05$.

cyberbullying. For traditional bullying, 51% of respondents had been involved at least once as victim, bully, or bully/victim. Using a more conservative criterion, 20% had been involved in traditional bullying.

Previous research has been inconsistent in its conclusions regarding the relationship between traditional bullying and cyberbullying. On one hand, some researchers argue that cyberbullying is a logical extension of traditional bullying and that we can apply our knowledge of traditional bullying to electronic bullying. Others suggest that, although sharing certain features in common, electronic bullying and traditional bullying are somewhat unique types of bullying. The present data suggest that there is clear overlap between involvement in traditional forms of bullying and cyberbullying (Table 2). For some, cyberbullying may simply be another method by which to bully; for others, it may be a means of retaliating for being bullied at school, although the present data suggest this is not a primary motive. For still others, cyberbullying may provide a mechanism for saying and doing things to others that one would never say or do in face-to-face interactions.

The physical, psychological, and academic correlates of the two types of bullying resembled one another [44]. Consistent with research on traditional bullying, the possible negative effects of cyberbullying were most pronounced for the cyber-bully/victim participants, especially the males. These individuals generally reported having more negative physical, psychological, and academic effects from electronic bullying than those in other groups. Others have noted that bully/victims experience the emotional problems associated with victimization and the behavioral difficulties associated with children who bully [4,9].

This is particularly interesting given that, among males who bullied others, anxiety and depression scores closely paralleled levels of males not involved with bullying. This applied whether the bullying was electronic or traditional. For girls who bullied, however, rates of anxiety and depression were higher when compared with girls not involved with traditional or electronic bullying. Future research is needed that examines sex differences not only in the frequency of experiencing cyberbullying but also in reactions to it. Research is also needed looking at males' and females' involvement in cyberbullying via different venues.

Because of our interest in comparing electronic bullying with traditional bullying, we used overall prevalence rates of involvement in cyberbullying. It may be, however, that males are more likely to be involved in and more likely to be affected by particular types of cyberbullying (e.g., video gaming) than females.

In addition, in spite of the fact that the majority of the research on cyberbullying has focused on middle school students, the results of the present study suggest that prevention/intervention efforts should also closely target high school students who are bully/victims. Rates of anxiety and depression were particularly high among this group. Cyberbullying prevention and intervention efforts need to be included at all grade levels to effectively address this issue [45] and, given the overlap between cyberbullying and traditional forms of bullying, ideally should be integrated into broader comprehensive bullying prevention efforts [4].

Our findings also highlight the need to examine developmental differences in the experience of cyberbullying. To date, research has shown that as many individuals experience their first episode of cyberbullying in college as experience it during middle school [46]. However, we do not know whether or not the subjective experience of cyberbullying among middle school students and among older individuals is the same. Whether this trend will continue is unclear as more and more children are exposed to cyberbullying at younger ages.

Correlational analyses indicate that depression, anxiety, self-esteem, self-reported health problems, absences from school, leaving school because of illness, and grades were, with only one exception, significantly related to students' involvement in cyberbullying others, being cyberbullied, bullying others through traditional means, and being bullied through traditional means. The strongest correlations were for cyber victimization and depression, traditional victimization and anxiety, and traditional victimization and health problems. Suicidal ideation, as measured by one item on the BDI-Y, was related to both perpetration and victimization, although it is worth noting, as have others [47], that involvement in bullying accounts for a relatively small amount of the variance (between 4% and 7%) in suicidality. This finding underscores the importance of viewing suicide as a complex behavior with many risk factors, including involvement in bullying.

Table 7
Correlations of traditional and cyberbullying victimization and perpetration with outcome variables

	Anxiety	Depression	Self-esteem	Health	Suicidal ideation	Number of absences	Leaving school early	Grades
Cyber victimization	.27**	.29**	.23**	.23**	.22**	.12**	.11**	.15**
Cyber perpetration	.24**	.23**	.19**	.19**	.20**	.17**	.18**	.16**
Traditional victimization	.33**	.28**	.17**	.28**	.20**	.04	.12**	.08*
Traditional perpetration	.12**	.21**	.20**	.16**	.27**	.11**	.11**	.13**

* $p < .05$.
** $p < .01$.

Understanding the possible consequences of both traditional bullying and cyberbullying is important so that interventions and school policies can be designed to most effectively help both victims and perpetrators [4,48]. Rather than assuming, incorrectly, that the magnitude of the effects of traditional bullying are necessarily identical to cyberbullying, this research highlights the importance of focusing on both cyberbullying and traditional bullying, and preferably to focus on cyberbullying within broader bullying prevention efforts.

One limitation of this study is its correlational nature. Because we were unable to use a longitudinal design, we are not able to conclude that students' experiences with cyberbullying or traditional bullying *caused* psychological, physical, or academic problems. The fact that longitudinal research has found that bullying victimization may lead to subsequent psychological and physical ailments [8,13,14] lends support to such a hypothesis, however.

Additional research is also needed to examine the degree to which the possible detrimental effects observed with both cyberbullying and traditional bullying generalize to younger and older populations. The demographics of our sample were limited by age and race, potentially limiting the generalizability of our findings. Additionally, it is possible that children who were absent on the day the survey was administered, including, perhaps, some victims and perpetrators of bullying, may differ in noticeable ways from those who were present to complete the survey. Because of the anonymous nature of the survey, however, we had no way of following up with those absent on the day the survey was administered. Additionally, our survey questions regarding traditional bullying asked about bullying that had occurred at school. Certainly, traditional bullying can occur in other locations, so, if anything, our prevalence estimates may be underestimations. Finally, future research should also examine children's perceptions of the seriousness of different types of both traditional bullying and cyberbullying.

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References

[1] Nishina A, Juvonen J. Daily reports of witnessing and experiencing peer harassment in middle school. Child Develop 2005;76:435–50.
[2] Olweus D. Bullying at school: What we know and what we can do. Malden, MA: Cambridge; 1993.
[3] Hinduja S, Patchin J. Cyberbullying: An exploratory analysis of factors related to offending and victimization. Deviant Behav 2008;29:129–56.
[4] Kowalski RM, Limber SP, Agatston PW. Cyber bullying: Bullying in the digital age. 2nd ed. Malden, MA: Wiley-Blackwell; 2012.
[5] Nansel T, Overpeck M, Pilla R, et al. Bullying behaviors among US youth: Prevalence and association with psychosocial adjustment. JAMA 2001;285: 2094–100.
[6] Craig W, Harel-Fisch Y, Pickett W, et al. A cross-national profile of bullying and victimization among adolescents in 40 countries. Int J Public Health 2009;54(Suppl. 2):216–24.
[7] Craig W. The relationship among bullying, victimization, depression, anxiety, and aggression in elementary school children. Pers Individ Diff 1998;24:123–30.
[8] Fekkes M, Pijpers F, Verloove-Vanhorick S. Bullying behavior and associations with psychosomatic complaints and depression in victims. J Pediatr 2004;144:17–22.
[9] Juvonen J, Graham S, Schuster M. Bullying among young adolescents: The strong, the weak, and the troubled. Pediatrics 2003;112(6, Pt 1):1231–7.
[10] Wang J, Iannotti RJ, Luk JW, Nansel TR. Co-occurrence of victimization from five subtypes of bullying: Physical, verbal, social exclusion, spreading rumors, and cyber. J Pediatr Psychol 2010;35:1103–12.
[11] Rigby K, Slee P. Bullying among Australian school children: Reported behavior and attitudes toward victims. J Soc Psychol 1991;131:615–27.
[12] Eagan SK, Perry DG. Does low self-regard invite victimization? Dev Psychol 1998;34:299–309.
[13] Fekkes M, Pijpers F, Fredriks A, et al. Do bullied children get ill, or do ill children get bullied? A prospective cohort study on the relationship between bullying and health-related symptoms. Pediatrics 2006;117: 1568–74.
[14] Reijntjes A, Kamphuis J, Prinzie P, Telch M. Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. Child Abuse Negl 2010;34:244–52.
[15] Limber SP. Peer victimization: The nature and prevalence of bullying among children and youth. In: Dowd NE, Singer DG, Wilson RF, editors. Handbook of children, culture, and violence. Thousand Oaks, CA: Sage; 2006:331–2.
[16] Roth D, Coles M, Heimberg R. The relationship between memories for childhood teasing and anxiety and depression in adulthood. J Anxiety Disord 2002;16:149.
[17] Ttofi MM, Farrington DP. What works in preventing bullying: Effective elements of anti-bullying programmes. J Aggression Conflict Peace Res 2009;1:13–24.
[18] Gini G, Pozzoli T. 'Association between bullying and psychosomatic problems: A meta-analysis': Erratum. Pediatrics 2009;123:1059–65.
[19] Kochenderfer B, Ladd G. Victimized children's responses to peers' aggression: Behaviors associated with reduced versus continued victimization. Dev Psychopathol 1997;9:59–73.
[20] Rigby K. Bullying in schools: And what to do about it. Briston, PA: Jessica Kingsley Publishers; 1996.
[21] Smith P, Talamelli L, Cowie H, et al. Profiles of non-victims, escaped victims, continuing victims and new victims of school bullying. Br J Educ Psychol 2004;74:565–81.
[22] Eisenberg M, Neumark-Sztainer D, Perry C. Peer harassment, school connectedness, and academic achievement. J Sch Health 2003;73:311–6.
[23] Lacey A, Cornell D. The impact of bullying climate on schoolwide academic performance. Paper presented at: Annual Meeting of the American Psychological Association; 2011; Washington, DC.
[24] Nakamoto J, Schwartz D. Is peer victimization associated with academic achievement? A meta-analytic review. Soc Develop 2009;19: 221–42.
[25] Cook CR, Williams KR, Guerra NG, et al. Predictors of bullying and victimization in childhood and adolescence: A meta-analytic investigation. School Psychol Q 2010;25:65–82.
[26] Kowalski R, Limber S. Electronic bullying among middle school students. J Adolesc Health 2007;41(Suppl.):S22–30.
[27] Li Q. New bottle but old wine: A research of cyberbullying in schools. Comp Hum Behav 2007;23:1777–91.
[28] Robers S, Zhang J, Truman J, Snyder TD. Indicators of school crime and safety: 2010. U.S. Department of Education, U.S. Department of Justice Office of Justice Programs; 2010. NCES publication 2011-002 NCJ publication 230812. Available at: http://nces.ed.gov/pubs2011/2011002.pdf.
[29] Smith P, Mahdavi J, Carvalho M, et al. Cyberbullying: Its nature and impact in secondary school pupils. J Child Psychol Psychiatry 2008;49: 376–85.
[30] Ybarra M, Mitchell K. Online aggressor/targets, aggressors, and targets: A comparison of associated youth characteristics. J Child Psychol Psychiatry 2004;45:1308–16.
[31] Juvonen J, Gross E. Extending the school grounds?—Bullying experiences in cyberspace. J School Health 2008;78:496–505.
[32] Kowalski RM, Witte J. Youth internet survey. Unpublished manuscript, Clemson University; 2006.
[33] Cyber bullying. Wired Safety website. Available at: http://www.wiredsafety.org. 2008.
[34] Raskauskas J, Stoltz A. Involvement in traditional and electronic bullying among adolescents. Dev Psychol 2007;43:564–75.
[35] Sourander A, Klomek A, Helenius H, et al. Psychosocial risk factors associated with cyberbullying among adolescents: A population-based study. Arch Gen Psychiatry 2010;67:720–8.

[36] Dehue F, Bolman C, Völlink T. Cyberbullying: Youngsters' experiences and parental perception. Cyberpsychol Behav 2008;11:217–23.

[37] Slonje R, Smith P. Cyberbullying: Another main type of bullying? Scand J Psychol 2008;49:147–54.

[38] Gradinger P, Strohmeier D, Spiel C. Traditional bullying and cyberbullying: Identification of risk groups for adjustment problems. Zeitschrift Für Psychologie/J Psychol 2009;217:205–13.

[39] Kowalski RM, Morgan CA, Limber SE. Traditional bullying as a potential warning sign of cyberbullying. School Psychol Intl 2012;33:505–19.

[40] Ybarra ML, Diener-West M, Leaf PJ. J Adol Health 2007;41:S42–50.

[41] Olweus D. The revised Olweus Bully/Victim Questionnaire. Bergen, Norway: Research Centre for Health Promotion (HEMIL), University of Bergen; 2007. p. 1020.

[42] Rosenberg M. Society and the adolescent self-image. Princeton, NJ: Princeton University Press; 1965.

[43] Beck JS, Beck AT, Jolly JB, Steer RA. Beck Youth Inventories for children and adolescents. 2nd ed. San Antonio, TX: Harcourt Assessment; 2005.

[44] Bauman S. Cyberbullying in a rural intermediate school: An exploratory study. J Early Adolesc 2010;30:803–33.

[45] Limber S, Kowalski RM, Agatston P. Cyber bullying: A prevention curriculum for grades 6-12. Center City, MN: Hazelton; 2009.

[46] Kowalski RM, Giumetti GW, Schroeder AW, Reese HH. Cyber bullying among college students: Evidence domains of college life. In: Wankel C, Wankel L, editors. Misbehavior online in higher education. Bingley, UK: Emerald Publishing Group; 2012.

[47] Hinduja S, Patchin J. Bullying, cyberbullying, and suicide. Arch Suicide Res 2010;14:206–21.

[48] Aricak T, Siyahhan S, Memmedov C, et al. Cyberbullying among Turkish adolescents. Cyberpsychol Behav 2008;11:253–61.