

## RESEARCH ARTICLE

# Relationships Among Cyberbullying, School Bullying, and Mental Health in Taiwanese Adolescents

FONG-CHING CHANG, DrPH<sup>a</sup> CHING-MEI LEE, PhD<sup>b</sup> CHIUNG-HUI CHIU, PhD<sup>c</sup> WEN-YUN HSI, MEd<sup>d</sup> TZU-FU HUANG, MEd<sup>e</sup> YUN-CHIEH PAN, MEd<sup>f</sup>

---

**ABSTRACT**

---

**BACKGROUND:** This study examined the relationships among cyberbullying, school bullying, and mental health in adolescents.**METHODS:** In 2010, a total of 2992 10th grade students recruited from 26 high schools in Taipei, Taiwan completed questionnaires.**RESULTS:** More than one third of students had either engaged in cyberbullying or had been the target (cybervictim) of it in the last year. About 18.4% had been cyberbullied (cybervictim); 5.8% had cyberbullied others (cyberbully); 11.2% had both cyberbullied others and been cyberbullied (cyberbully-victim). About 8.2% had been bullied in school (victim); 10.6% had bullied others (bully); and, 5.1% had both bullied others and had been bullied in school (bully-victim). Students with Internet risk behaviors were more likely to be involved in cyberbullying and/or cybervictimization; students who had cyberbullying or victimization experiences also tended to be involved in school bullying/victimization. After controlling for sex, academic performance, and household poverty, cyber/school victims and bully-victims were more likely to have lower self-esteem, and cyber/school victims, bullies and bully-victims were at a greater risk for serious depression.**CONCLUSIONS:** Both cyberbullying and school bullying and/or victimization experiences were independently associated with increased depression.**Keywords:** school bullying; cyberbullying; mental health.**Citation:** Chang F-C, Lee C-M, Chiu C-H, Hsi W-Y, Huang T-F, Pan Y-C. Relationships among cyberbullying, school bullying, and mental health in Taiwanese adolescents. *J Sch Health*. 2013; 83: 454-462.

Received on August 31, 2011

Accepted on June 8, 2012

With the exponential growth of information technology during the past decade, young people have tended to spend more time in the cyber world. Young people in the United States spend 7.5 hours daily viewing media.<sup>1</sup> In Taiwan, adolescents spend 43.7 hours per week viewing media, and the Internet is the leading medium that adolescents use.<sup>2</sup> The cyber world offers information and social

networking opportunities, but also cyber risks such as cyberbullying, Internet addiction, gambling, health risks, illegal sales, and sexual exploitation that can hurt and distort a child's development. Pediatricians advocate for a safer media environment for children and adolescents.<sup>3</sup>

School bullying is defined as aggressive behavior where one or more pupils intend to harm the victim

---

<sup>a</sup>Associate Professor, (fongchingchang@ntnu.edu.tw), Department of Health Promotion and Health Education, National Taiwan Normal University, 162, Ho-Ping E. Road, Sec.1, Taipei 10610, Taiwan.

<sup>b</sup>Professor, (t09007@ntnu.edu.tw), Department of Health Promotion and Health Education, National Taiwan Normal University, 162, Ho-Ping E. Road, Sec.1, Taipei 10610, Taiwan.

<sup>c</sup>Professor, (cchui@ntnu.edu.tw), Graduate Institute of Information and Computer Education, National Taiwan Normal University, 162, Ho-Ping E. Road, Sec.1, Taipei 10610, Taiwan.

<sup>d</sup>Graduate Student, (698050083@ntnu.edu.tw), Department of Health Promotion and Health Education, National Taiwan Normal University, 162, Ho-Ping E. Road, Sec.1, Taipei 10610, Taiwan.

<sup>e</sup>Graduate Student, (gh52025@hotmail.com), Department of Health Promotion and Health Education, National Taiwan Normal University, 162, Ho-Ping E. Road, Sec.1, Taipei 10610, Taiwan.

<sup>f</sup>Graduate Student, (750823@gmail.com), Department of Health Promotion and Health Education, National Taiwan Normal University, 162, Ho-Ping E. Road, Sec.1, Taipei 10610, Taiwan.

Address correspondence to: Fong-Ching Chang, Associate Professor, (fongchingchang@ntnu.edu.tw), Department of Health Promotion and Health Education, National Taiwan Normal University, 162, Ho-Ping E. Road, Sec.1, Taipei 10610, Taiwan.

This work was supported by a research grant from Taiwan National Science Council (NSC 99-2511-S-003-029-MY2). We thank 3 anonymous reviewers for their helpful comments and suggestions. Many thanks go to the participant schools and students.

psychologically, verbally, or physically repeatedly over time, and in a situation where there is a power imbalance between the victim and the bully (ie, spreading rumors, saying nasty things, taking the victim's belongings, or physical violence).<sup>4,5</sup> The prevalence of school bullying as bullies, victims, or bully-victims varied dramatically across countries, ranging from 9% to 54% of adolescents.<sup>6</sup> The difference in the types of behaviors being studied also contributed to the disparity in reported prevalence rates of school bullying across studies.<sup>7</sup> For example, Wang, Iannotti, and Nansel's study<sup>8</sup> indicated that in the United States the prevalence of having been bullied or having bullied others in school at least once in the previous 2 months among 6th-10th grade students were 20.8% physically, 53.6% verbally, 51.4% socially, and 13.6% electronically. In addition, Vieno, Gini, and Santinello<sup>9</sup> found that the prevalence of school bullying among middle school students in Italy was 11.6% physical, 52% verbal, 47.9% social, 18.5% sexual, 19.4% electronic, and 9.4% racial. Another study published by Kim, Koh, and Leventhal<sup>10</sup> found that the prevalence of victims, perpetrators, and victim-perpetrators among middle school students in Korea was 14%, 17%, and 9%, respectively.

Cyberbullying has emerged as a new form of bullying and has become an emerging public health problem.<sup>11</sup> Cyberbullying is defined as bullying or harassment through the Internet, cell phones, or other electronic devices (ie, sending insulting messages, posting digitally altered photos, online fighting, aggressive comments, sharing someone's embarrassing information, or sending messages that include threats of harm through e-mail, instant messaging, in a chat room, on a Website, or sent to a cell phone).<sup>11,12</sup> Kowalski and Limber<sup>12</sup> found that 11% of 6th-8th grade US students had been cyberbullied at least once in the previous 2 months (cybervictim); 4% had cyberbullied someone (cyberbully); 7% had cyberbullied others and had also been cyberbullied (cyberbully-victim). The common methods for cyberbullying involved the use of instant messaging, chat rooms, and e-mail, while half of the cyberbullying victims reported not knowing the perpetrator's identity.<sup>12</sup>

Children and adolescents who had experienced bullying were at risk for psychosomatic symptoms that are potentially harmful for development. Several studies<sup>5,13-16</sup> suggest that victims of bullying were significantly more likely to report negative psychological health symptoms such as depression and thoughts of suicide compared with those who reported not being bullied. In addition, bullies had mainly externalizing symptoms such as delinquency, whereas bully-victims had both externalizing and internalizing symptoms as well as high levels of suicide.<sup>17</sup>

School bullying is a seriously underreported problem in Taiwan. A national survey<sup>18</sup> showed about

one fifth of elementary and middle school students reported experiencing school bullying, and one tenth reported experiencing cyberbullying. However, only .06% of the total school bullying cases were reported (about 3000 of 5 million school students) in Taiwan. School bullying cases that were reported showed only the tip of the iceberg, because both students and school administrators were reluctant to make an official report. Taiwan culture stresses interpersonal harmony values, and students are taught to increase self-control and tolerance. Most victimized youth do not report it to parents or teachers, and school administrators also fail to report school bullying. In addition, more school bullying scenes have been caught on mobile phones and posted on the Internet. As electronic information has become so easily disseminated, the effect of cyberbullying has been more widespread and often indelible. Studies in Japan<sup>19</sup> and Taiwan<sup>20,21</sup> indicated that youth school bullying victimization has been associated with depression, suicidal idealization, and suicide attempts.

Despite studies documenting the negative influence of school bullying and/or victimization (bullying/victimization) on the psychological well-being of children and adolescents, limited research has examined the extent, nature, correlations, and psychological effects of youth cyberbullying. The relationships among youth cyberbullying, school bullying, and mental health in Taiwan remains unclear. This study assessed the prevalence of cyberbullying and school bullying and examined the relationship among cyberbullying, school bullying, and mental health (self-esteem, depression) in 10th grade students in Taiwan. Adolescent characteristics related to youth cyberbullying, school bullying, and psychological effects (self-esteem and depression) also were examined.

## METHODS

### Participants

In 2010, a total of 72,327 10th grade high school students attended 122 high schools (including vocational high schools) in Taipei City and New Taipei City, Taiwan. On the basis of the sampling frame, which was a list of schools and their 10th grade student enrollments, a probability-proportionate-to-size sampling method was used to draw a systematic random sample of schools. Three to 4 classes were randomly selected from each school.

Following class selection, consent forms were taken home by students to give to parents requesting their consent to allow the children to participate in the survey. After the parental consent forms were collected, researchers visited the schools to conduct the self-administered survey and address students' questions about it. Students were assured the information would remain confidential. In 2010, a

total of 2992 10th grade students from 102 classes in 26 sample schools completed the questionnaire. Of all participating students, 52% were male, and 48% were female. One fifth of parents and students declined to participate in this study. The response rate was 80%.

Data for this study were collected as a part of the "Needs Assessment of Adolescent Digital and Media Literacy and Health Impact Study" survey. A questionnaire was developed to assess media use, digital media literacy, Internet risk behavior, cyberbullying, school bullying, risk behaviors, mental health, and prevention education needs.

### Instruments

The self-administered questionnaire was developed based on previous studies<sup>12,22</sup> such as the US Youth Risk Behavior Surveillance System,<sup>23</sup> and the Youth Internet Safety Survey.<sup>24,25</sup> A group of 10 experts were invited to assess the content validity of the questionnaire. The experts specialized in fields such as school bullying, information science technology, digital literacy, health education, and computer education. Experts reviewed the draft questionnaire and gave comments and suggestions for improvements. In addition, the pilot survey was conducted at 2 schools to examine the students' responses to the survey and to evaluate the reliability of the data yielded by the questionnaire. Cronbach's  $\alpha$  for the self-esteem scale for the pilot sample was .87; Cronbach's  $\alpha$  of the depression scale for the pilot sample was .86.

**Cyberbullying/victimization.** Cyberbullying and cybervictimization were measured using 12 items (6 items each for cyberbullying and cybervictimization). For cybervictimization, participants were asked the following questions: How often has someone: (1) made or posted rude comments to or about you online; (2) posted embarrassing or nude photos of you online; (3) spread rumors about you online; (4) made threatening comments to hurt you online; (5) asked you to talk about sex online when you did not want to; or (6) asked you to do something sexual online that you did not want to? For cyberbullying, participants were asked the following questions: How often have you ever: (1) made rude comments to anyone online; (2) sent or posted others' embarrassing photos online; (3) spread rumors about someone online; (4) made threatening comments to hurt someone online; (5) asked someone to talk about sex online when they did not want to; or (6) asked someone to do something sexual online when they did not want to? Response options for each item included the following options: "never," "happened a year ago," "a few times within a year," "a few times a month," and "a few times a week." If participants answered "a few times within a year" or more frequently for any of the cybervictim items, they were first coded as cybervictims. Similarly, if participants answered "a few times within a year" or

more frequently for any of the cyberbully items, they were first coded as a cyberbully. Participants were then categorized into 1 of 4 groups of cyberbullying: (1) cybervictim-only group, which involved being cyberbullied only; (2) cyberbully-only group, which involved cyberbullying others only; (3) cyberbully-victim group, which involved both cyberbullying others and being cyberbullied; and (4) noninvolved group, which meant the respondent was not involved in cyberbullying others or in being cyberbullied.

**School bullying/victimization.** School bullying and victimization were measured using 9 items. Participants were asked the following questions: How often has someone: (1) hit you in school or outside school; (2) excluded you from their group because they were angry at you; (3) made threats to you; (4) threatened or injured you with a weapon in school or outside school; or (5) stole or damaged your property in school? In addition, school bullying was measured using 4 items. Participants were asked the following questions: How often have you ever: (1) pushed, kicked, or hit classmates; (2) teased or said mean things to classmates; (3) spread rumors or excluded classmates from your group; or (4) threatened someone with a weapon? Response options included the following: "never," "happened a year ago," "a few times within a year," "a few times a month," and "a few times a week." If participants answered "a few times within a year" or more frequently for any item of school bullying victim items, they were first coded as school bullying victims. Similarly, if participants answered "a few times within a year" or more frequently for any item of school bullying items, they were first coded as a school bully. Participants were then categorized into 1 of 4 groups of school bullying: (1) victim-only group, which involved being bullied only; (2) bully-only group which involved bullying others only; (3) bully-victim group, which involved both bullying others and being bullied; and (4) noninvolved group, which meant the respondent was neither involved in bullying nor being bullied in school.

**Self-esteem.** Self-esteem was assessed using the Rosenberg self-esteem scale.<sup>26</sup> The Rosenberg self-esteem scale contains 10 items that provide a general measure of global self-esteem. For example, participants were asked whether they agree or disagree with a statement like: "On the whole, I am satisfied with myself," "I am able to do things as well as others," or "I take a positive attitude toward myself." Each item was evaluated on a 4-point Likert-type scale from "strongly agree" to "strongly disagree." The total score of the scale ranged from 0 to 30, and a higher score indicated higher self-esteem. Cronbach's  $\alpha$  of the self-esteem scale for the present sample was .87.

**Depression.** Depression was measured using the Center for Epidemiologic Studies Depression Scale (CES-D).<sup>27</sup> The CES-D is a 20-item scale that evaluates

the presence of depressive symptoms. Participants were asked how often they felt like, "I was bothered by things that don't usually bother me," or "I did not feel like eating; my appetite was poor." Response options for each item included the following: "rarely or none of the time (<1 day)," "some or a little of the time (1-2 days)," "occasionally or a moderate amount of the time (3 days)," or "most or all of the time (5-7 days)." The total score of the scale ranged from 0 to 60, and a higher score indicated greater depression. Cronbach's  $\alpha$  of the CES-D scale for the sample was .91.

**Adolescent characteristics.** Demographic characteristics obtained in this study included sex, academic performance (average or above vs below average), household poverty (yes vs no), and Internet risk behavior such as sending or posting personal information (ie, name, telephone, age, school name, home address), posting pictures online, or using a Webcam to chat with strangers (yes vs no).

#### Data Analysis

SAS software was used to perform the statistical analysis. Percentages and means were calculated for all variables. A series of univariate logistic regression analyses were performed to identify adolescent characteristics (ie, gender, academic performance, household poverty, and Internet risk behavior) related to adolescents' cyberbullying, school bullying, self-esteem, and depression. Analysis included *t* tests and *F* statistics to test the differences in self-esteem and depression scores across adolescent characteristics and different cyber/school bullying categories (bully, victim, bully-victim). Regression models were conducted to understand how adolescent characteristics, cyberbullying, and school bullying were related to self-esteem and depression.

## RESULTS

### Prevalence and Correlate of Cyberbullying/Victimization

More than one third of students had been involved in cyberbullying and/or cybervictimization a few times or more frequently during the last year. Of the students, 18.4% had been cyberbullied (cybervictim); 5.8% had cyberbullied others (cyberbully); 11.2% had cyberbullied others and also had been cyberbullied (cyberbully-victim). The most frequent type of cyberbullying victims reported experiencing was unwanted sexual solicitation. About one fifth of students had been asked to talk about sex online a few times or more frequently during the last year, while 7.5% had been asked to do something sexual online that they did not want to do. In addition, 12.8% had been the objects of rude comments online, and 7.1% had been the objects of rumors. The most frequent type of cyberbullying was verbal bullying. For example, 13.3% of students reported that they had made rude comments to others a few times or more frequently on the Internet during last year.

The prevalence of cyberbullying (7.0%) and cyberbullying-victimization (16.3%) among males was higher than prevalence of cyberbullying (4.5%) and cyberbullying-victimization (5.8%) among females (Table 1). According to univariate logistic regression analysis, results showed that males were more likely to be involved in cyberbullying (OR = 1.57, 95% CI = 1.15-2.16) and cyberbullying/victimization (OR = 3.17, 95% CI = 2.44-4.10) than females. In addition, students with lower academic performance were more likely to be cyberbully-victims (OR = 1.69, 95% CI = 1.34-2.15). Furthermore, students who had Internet risk behaviors (ie, posting personal information, photos, and using a Webcam to chat with strangers) were more likely to be cyberbullies (OR = 1.87, 95% CI = 1.28-2.73), cybervictims

Table 1. Prevalence of Cyberbullying by Adolescent Demographic Characteristics

	Cybervictim Only			Cyberbully Only			Cyberbully-Victim		
	%	OR	95% CI	%	OR	95% CI	%	OR	95% CI
Sex									
Female	17.2	1		4.5	1		5.8	1	
Male	19.6	1.17	0.98-1.41	7.0	1.57	1.15-2.16	16.3	3.17	2.44-4.10
Academic performance									
Average or above	18.5	1		5.9	1		9.7	1	
Below average	18.4	0.99	0.81-1.22	5.5	0.93	0.65-1.31	15.3	1.69	1.34-2.15
Household poverty									
No	17.4	1		6.0	1		10.6	1	
Yes	20.2	1.21	1.00-1.46	5.5	0.91	0.66-1.26	12.5	1.20	0.95-1.52
Internet risk behavior									
No	14.0	1		3.7	1		3.8	1	
Yes	20.4	1.58	1.28-1.96	6.8	1.87	1.28-2.73	14.6	4.28	3.00-6.10

OR, odds ratio; 95% CI, 95% confidence interval.

Total N = 2992; Cyberbullying victim only N = 551; Cyberbully only N = 174; Cyberbully-victim N = 336; Noninvolved N = 1931. Univariate logistic regression analysis.

**Table 2. Prevalence of School Bullying by Adolescent Demographic Characteristics**

	School Victim Only			School Bully Only			School Bully-Victim		
	%	OR	95% CI	%	OR	95% CI	%	OR	95% CI
Sex									
Female	7.4	1		6.1	1		2.2	1	
Male	8.9	1.22	0.94-1.59	14.7	2.64	2.04-3.42	7.7	3.79	2.53-5.66
Academic performance									
Average or above	7.7	1		10.0	1		4.0	1	
Below average	9.6	1.27	0.96-1.68	12.1	1.25	0.97-1.61	7.8	2.05	1.47-2.86
Household poverty									
No	6.9	1		11.1	1		4.8	1	
Yes	10.6	1.64	1.23-2.09	9.9	0.88	0.69-1.13	5.4	1.13	0.81-1.59
Internet risk behavior									
No	7.5	1		8.8	1		3.1	1	
Yes	8.5	1.15	0.86-1.53	11.4	1.35	1.03-1.75	5.9	1.98	1.31-2.99
Cyberbullying									
Noninvolved	17.1	1		4.3	1		7.1	1	
Victim only	32.4	2.53	1.87-3.42	4.9	1.47	1.06-2.02	13.5	2.40	1.45-3.98
Bully only	18.0	1.12	0.61-2.07	14.5	4.56	3.13-6.66	23.0	5.60	3.13-10.02
Bully-victim	17.2	1.64	1.10-2.46	11.9	3.52	2.58-4.81	45.0	12.31	8.14-18.62

OR, odds ratio; 95% CI, 95% confidence interval.

Total N = 2992; School bullying victim only N = 244; Bully only N = 317; Bully-victim N = 151; Noninvolved N = 2280. Univariate logistic regression analysis.

(OR = 1.58, 95% CI = 1.28-1.96), and cyberbully-victims (OR = 4.28, 95% CI = 3.00-6.10).

### Prevalence and Correlation of School Bullying/Victimization

One fourth of the students had been involved in school bullying and/or victimization a few times or more frequently during the last year. Of the students, 8.2% had been bullied in school (victims); 10.6% had bullied others in school (bullies); and 5.1% had both been bullied and bullied others in school (bully-victim). The most frequent type of school bullying that victims reported experiencing was social bullying. For example, 7.1% of students had been excluded from groups during the last year. The most frequent type of school bullying was verbal bullying. About 13% of students had teased or said mean things to classmates. In addition, 6.4% of students had pushed, kicked, or hit classmates a few times or more frequently during the last year. The prevalence of school bullying (14.7%) and bullying-victimization (7.7%) among males was higher than the prevalence of school bullying (6.1%) and bullying-victimization (2.2%) among females (Table 2).

Univariate logistic regression analysis results showed that males were more likely to have experienced school bullying (OR = 2.64, 95% CI = 2.04-3.42) and bullying-victimization (OR = 3.79, 95% CI = 2.53-5.66) than females (Table 2). In addition, students with lower academic performance were more likely to be school bully-victims (OR = 2.05, 95% CI = 1.47-2.86). In addition, students from low social-economic status were more likely to be school victims (OR = 1.64, 95% CI = 1.23-2.09). Moreover, students

who reported Internet risk behaviors were more likely to be bully-victims at school (OR = 1.98, 95% CI = 1.31-2.99), as well as on the Internet.

Approximately one third of cyberbullies reported that they have been bullied in school during the last year, and about half of the cyberbully-victims reported that they had bullied others and had been bullied in school (Table 2). Compared to noninvolved students, cyberbullies were also more likely to be bullies (OR = 4.56, 95% CI = 3.13-6.66) and bully-victims (OR = 5.60, 95% CI = 3.13-10.02) in school, while cyberbully-victims were more likely to be bullies (OR = 3.52, 95% CI = 2.58-4.81), victims (OR = 1.64, 95% CI = 1.10-2.46), and bully-victims (OR = 12.31, 95% CI = 8.14-18.62) in school (Table 2).

### Correlates of Youth Mental Health

The results of univariate analysis showed that females had lower self-esteem and higher depression as did students with lower academic performance and students living in poverty (Table 3). Moreover, cyber or school bully-victims had the lowest levels of self-esteem and the highest levels of depression of the subgroups. Cyberbullies and cyberbully-victims were more likely to have lower self-esteem than noninvolved students. School bullying victims and bully-victims were more likely to have lower self-esteem and higher depression than either bullies or noninvolved students.

Multivariate analysis results revealed that after controlling for sex, academic performance, and household poverty, cyber/school victims and bully-victims were significantly more likely to have lower self-esteem. In addition, after controlling for sex, academic

**Table 3. Means of Self-Esteem and Depression by Adolescent Demographic Characteristics**

	Self-Esteem				Depression			
	Mean	SD	t/F	Scheffe's	Mean	SD	t/F	Scheffe's
Sex			-4.75***				4.58***	
Female	17.60	4.74			19.29	10.49		
Male	18.46	5.03			17.51	10.51		
Academic performance			4.34***				-4.85***	
Average or above	18.29	4.89			17.79	10.27		
Below average	17.41	4.96			19.92	11.13		
Household poverty			5.07***				-5.07***	
No	18.38	4.90			17.65	10.46		
Yes	17.43	4.88			19.71	10.62		
Cyberbullying			5.69***				47.49***	
Noninvolved	18.28	4.85		1 > 2***	16.86	9.86		2 > 1***
Victim only	17.52	4.99		1 > 4***	20.38	10.99		4 > 1***
Bully only	18.39	4.83			18.96	10.44		4 > 2***
Bully-victim	17.40	5.09			23.48	11.46		4 > 3***
School bullying			10.58***				73.50***	
Noninvolved	18.25	4.73		1 > 2***	17.14	9.86		2 > 1***
Victim only	16.78	5.46		1 > 4***	24.44	11.47		2 > 3***
Bully only	18.16	5.40		3 > 2***	18.56	10.56		4 > 1***
Bully-victim	16.67	5.15		3 > 4***	27.07	11.70		4 > 3***

\*\*\*p < .001.

t test and ANOVA test with Scheffe's test.

performance, and household poverty, cyber/school victims, bullies, and bully-victims were significantly more likely to have higher levels of depression (Table 4).

## DISCUSSION

We found that the prevalence among 10th grade students of cybervictims (18.4%) and cyberbully-victims (11.2%) was about twice the prevalence of school bullying victims (8.2%) and school bully-victims (5.1%). Similar to Western countries<sup>28-30</sup> cyberbullying has become the main type of bullying among adolescents in Taiwan. This may be due to the increase in Internet and cell phone use and the

convenience and anonymity of the cyber world. In addition, we found that the most frequent type of cybervictimization was unwanted sexual solicitation, and the most frequent type of school bullying was social bullying. These results show that cyberspace has become another world for sexual harassment. Ybarra, Espelage, and Mitchell<sup>31</sup> found that involvement in Internet harassment and unwanted sexual solicitation was associated with psychosocial problems including substance use, offline victimization, and perpetration of social, physical, and sexual aggression among adolescents. Similarly, we found that involvement in cyberbullying was associated with school bullying experiences. Students more frequently playing violent online games may transfer their aggressive behavior

**Table 4. Factors Associated With Youth Self-Esteem and Depression**

	Self-Esteem			Depression		
	β	SD	p	β	SD	p
Intercept	18.37	0.16	<.001	16.76	0.33	<.001
Sex (Male = 1; Female = 0)	1.15	0.19	<.001	-3.34	0.38	<.001
Academic performance (Below average = 1; Average or above = 0)	-0.85	0.20	<.001	1.80	0.42	<.001
Household poverty (Yes = 1; No = 0)	-0.85	0.19	<.001	1.58	0.39	<.001
Cyberbullying						
(Cybervictim = 1; No = 0)	-0.62	0.24	.009	2.95	0.49	<.001
(Cyberbully = 1; No = 0)	0.17	0.40	.675	1.60	0.81	.049
(Cyberbully-victim = 1; No = 0)	-0.67	0.31	.029	5.41	0.63	<.001
School bullying						
(Victim = 1; No = 0)	-1.25	0.33	<.001	6.51	0.69	<.001
(Bully = 1; No = 0)	-0.26	0.30	.396	1.23	0.63	.049
(Bully-victim = 1; No = 0)	-1.53	0.44	<.001	8.46	0.91	<.001

Multivariate regression analysis. Self-esteem model N = 2903; Depression model N = 2871.

at school. A meta-analytic study<sup>32</sup> indicated that exposure to violent video games is a causal risk factor for increased aggressive cognition and behavior.

Moreover, we found that students who had Internet risk behaviors were more likely to be involved in cyber/school bullying/victimization. In addition, both the present and previous studies<sup>16,28,30</sup> found that students who had cyber bullying/victimization experiences tended to be involved in school bullying/victimization. Dowell's study<sup>24</sup> showed that US students aged 9 to 15 who posted their pictures online were more likely to have sent their pictures to someone, made rude comments to others, and harassed or embarrassed someone. Other studies<sup>9,28</sup> also indicated that Internet risk behaviors correlated with other risk behaviors such as substance abuse and antisocial behaviors.

In addition, the results of this study were consistent with previous studies<sup>23,33-35</sup> that found males were more likely to engage in school bullying than females. However, some studies<sup>9,12</sup> have found that females were more likely to be involved in cyberbullying and cybervictimization than males. Other studies<sup>8,36</sup> found that girls were more involved in relational bullying, while boys were more involved in physical or verbal bullying. Perhaps males were more often portrayed by the media to be involved in direct aggressive behavior, and females were more likely to use indirect methods such as spreading rumors or excluding someone from their group through the Internet or in school. In addition, both this study and a Taiwan national survey<sup>37</sup> found that females were less likely to engage in any forms of school and cyberbullying than males. This may be due to a Taiwan cultural context wherein bullying, in particular physical bullying, was less socially acceptable for females than for males.

We found that students with household poverty were more likely to be bullied in school, but cyberbullying is neither higher nor lower among the students in poverty. According to Jansen's study,<sup>38</sup> children from low socioeconomic status families were more likely to be bullies, victims, or bully-victims. Due et al<sup>39</sup> found that bullying increased the risk of depression for people with a lower socioeconomic status. Thus, bullying is a possible pathway through which social adversity in childhood may influence inequalities in adult health. In addition, a survey conducted by the Taiwan Network Information Center<sup>40</sup> found that about four fifths of households had Internet access, therefore, lower income youth may not have less cyber access.

O'Moore and Kirkham's study<sup>41</sup> and a Yang et al study<sup>35</sup> found a relatively consistent link between victimization and lower self-esteem among adolescents, while some studies found an inconsistent relationship between bullies and lower self-esteem. Similarly, this study and Patchin's study<sup>42</sup> found

that victims of cyberbullying were more likely to have lower levels of self-esteem. In addition, bully-victims had the lowest self-esteem of the subgroups.<sup>6,41</sup> Moreover, the present study, as well as Karatzias's study<sup>43</sup> found that cyber/school bullies did not have lower self-esteem than noninvolved students, but school bullies had higher self-esteem than victims and bully-victims. However, these results were inconsistent with other studies<sup>42,44</sup> that found cyber/school bullies had lower levels of self-esteem. Whether bullies have lower self-esteem remains a controversial point.

Our study and previous studies<sup>5,16,33,45-47</sup> found that cyber/school bullying and victimization were risk factors for depression among adolescents. Depression may also impair an adolescent's social skills and self-esteem so that the adolescent becomes victimized by peers.<sup>5</sup> In addition, the present study, along with other studies,<sup>16,48</sup> found that cyberbullies reported higher depression than cyberbullies. We also found that cyberbully-victims reported higher depression than cyberbullies or cyberbullies. These results were consistent with Nansel's review<sup>6</sup> and Sourander's study<sup>28</sup> that found cyber/school bully-victims had greater psychiatric and psychosomatic problems.

### Limitations

Our research had some limitations. First, social desirability bias may influence the truthfulness of reports by adolescents of bullying through the Internet or in school. These might have led to an underestimation of the prevalence of the cyber/school bullying in which students engaged. However, confidentiality was emphasized, and trained investigators collected the questionnaires immediately. Second, approximately one fifth of the parents and students refused to participate in this study, which could mean these students may be at higher risk. Hence, potential biases from the selection and refusal to participate must be considered. Third, the measures of cyberbullying and school bullying vary from study to study, and caution should be used when comparing the prevalence of cyber/school bullying and victimization across studies and countries. Fourth, the number of questions for school bullying victims (5 items) was not equal to the number of questions for school bullying (4 items). This could cause an imbalance in assessing the prevalence of different types of school bullying and victimization. Finally, our study is cross-sectional; thus, it precludes causal inferences. We were unable to establish whether experience with cyber/school bullying causes poor mental health, or students with adverse mental health are more likely to be involved in cyber/school bullying. Further study is needed to explicate the longitudinal impact of cyber/school bullying/victimization on adolescent mental health (ie, self-esteem, depression, and

suicide attempts). Despite these limitations, our study adds to the limited amount of literature that addresses the extent, nature, correlations, and psychological effects of cyberbullying/victimization and school bullying/victimization within Taiwanese culture.

## Conclusions

In conclusion, more than one third of the students were involved in cyber bullying/victimization during the previous year, and one fourth had been involved in school bullying/victimization. Students who had high Internet risk behaviors were more likely to be involved in cyber/school bullying/victimization, and students who had cyber bullying/victimization experiences were more likely to be involved in school bullying/victimization. Multivariate analysis results revealed that cyber/school victims and bully-victims were more likely to have low self-esteem, and cyber/school victims, bullies and bully-victims were more likely to have high levels of depression.

## IMPLICATIONS FOR SCHOOL HEALTH

Our study indicated school bullying in Taiwan was common. The Taiwan government started an anti-bullying program in 2010 after a series of middle and high school bullying incidents. Prior studies<sup>49,50</sup> indicated that school-wide bullying prevention programs through parent/community partnerships were effective in reducing school bullying. The implementation and enforcement of school anti-bullying policies are important to create a positive school climate and encourage students to report bullying incidents. In addition, anti-bullying and cyberbullying prevention legislation are also critical to enforce school responsibility to report bullying incidents and implement anti-bullying programs.

In addition, the present study found that cyberbullying was more prevalent than school bullying. Cyberbullying was often a warning sign of the co-occurrence of school bullying. More school-based interventions should take place to reduce cyber/school bullying in Taiwan. The implementation of Internet safety/digital citizenship instruction is important to educate students on how to avoid cyberbullying and how to respond to and report cyberbullying. Efforts are needed to improve respect norms and culture in the cyber world and at school. School bullying prevention may also have an impact on cyberbullying, if done well.

According to Juvonen and Gross,<sup>30</sup> most youth reported not telling adults about cyberbullying incidents, and one third of the sample reported that the reason was fear that their parents might restrict their Internet use. School personnel and parental training are needed to increase awareness of what cyberbullying is, how to prevent it, and how to

deal with cyberbullying that has already occurred. In addition, parents should be more aware of their adolescents' online activities, and should teach them to not give out personal information, and should restrict their online game playing time to reduce violent and sexual media exposure.

We found that cyber/school victims and bully-victims tended to have lower self-esteem and higher depression. Psychiatric referrals are needed for victims of bullying and students displaying psychiatric symptoms in Taiwan. These results suggest the importance of implementing cyberbullying prevention programs as a part of school bullying prevention intervention to promote the health of adolescents and decrease psychosocial problems.

## Human Subjects Approval Statement

The study protocol was approved by the institutional review board of the Taipei Medical University.

## REFERENCES

1. Rideout VJ, Foehr UG, Danal FR. *Generation M2: Media in the Lives of 8- to 18-Year-Olds*. Washington, DC: US Kaiser Family Foundation; 2009.
2. Wu TJ. *National Youth Media use Survey*. Taipei, Taiwan: Center for Media Literacy in Taiwan, National Chengchi University; 2009.
3. American Academy of Pediatrics. From the American Academy of Pediatrics: policy statement-media violence. *Pediatrics*. 2009;124(5):1495-1503.
4. Olweus D. What is bullying? Available at: <http://www.olweus.org/public/bullying.page>. Accessed January 5, 2011.
5. Kaltiala-Heino R, Fröjd S, Marttunen M. Involvement in bullying and depression in a 2-year follow-up in middle adolescence. *Eur Child Adolesc Psychiatry*. 2010;19(1):45-55.
6. Nansel TR, Craig W, Overpeck MD, Saluja G, Ruan WJ. Cross-national consistency in the relationship between bullying behaviors and psychosocial adjustment. *Arch Pediatr Adolesc Med*. 2004;158(8):730-736.
7. Borntrager C, Davis JL, Bernstein A, Gorman H. A cross-national perspective on bullying. *Child Youth Care Forum*. 2009;38(3):121-134.
8. Wang J, Iannotti RJ, Nansel TR. School bullying among adolescents in the United States: physical, verbal, relational, and cyber. *J Adolesc Health*. 2009;45(4):368-375.
9. Vieno A, Gini G, Santinello M. Different forms of bullying and their association to smoking and drinking behavior in Italian adolescents. *J Sch Health*. 2011;81(7):393-399.
10. Kim YS, Koh YJ, Leventhal BL. Prevalence of school bullying in Korean middle school students. *Arch Pediatr Adolesc Med*. 2004;158(8):737-741.
11. David-Ferdon C, Hertz MF. Electronic media, violence, and adolescents: an emerging public health problem. *J Adolesc Health*. 2007;41(6 Suppl 1):S1-5.
12. Kowalski RM, Limber SP. Electronic bullying among middle school students. *J Adolesc Health*. 2007;41(6 suppl 1):S22-30.
13. Owusu A, Hart P, Oliver B, Kang M. The association between bullying and psychological health among senior high school students in Ghana, West Africa. *J Sch Health*. 2011;81(5):231-238.
14. Young Shin K, Yun-Joo K, Leventhal B. School bullying and suicidal risk in Korean middle school students. *Pediatrics*. 2005;115(2):357-363.



15. Kumpulainen K. Psychiatric conditions associated with bullying. *Int J Adolesc Med Health*. 2008;20(2):121-132.
16. Perren S, Dooley J, Shaw T, Cross D. Bullying in school and cyberspace: associations with depressive symptoms in Swiss and Australian adolescents. *Child Adolesc Psychiatry Ment Health*. 2010;4:28.
17. Ivarsson T, Broberg AG, Arvidsson T, Gillberg C. Bullying in adolescence: psychiatric problems in victims and bullies as measured by the Youth Self Report (YSR) and the Depression Self-Rating Scale (DSRS). *Nord J Psychiatry*. 2005;59(5):365-373.
18. The Child Welfare League Foundation. Taiwan school bullying survey press release. Available at: <http://www.children.org.tw/news.php?id=2451>. Accessed March 15, 2012.
19. Hidaka Y, Operario D, Takenaka M, Omori S, Ichikawa S, Shirasaka T. Attempted suicide and associated risk factors among youth in urban Japan. *Soc Psychiatry Psychiatr Epidemiol*. 2008;43(9):752-757.
20. Wang RH, Lai HJ, Hsu HY, Hsu MT. Risk and protective factors for suicidal ideation among Taiwanese adolescents. *Nurs Res*. 2011;60(6):413-421.
21. Chen J-K, Wei H-S. The impact of school violence on self-esteem and depression among Taiwanese junior high school students. *Soc Indic Res*. 2011;100(3):479-498.
22. Solberg ME, Olweus D. Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. *Aggress Behav*. 2003;29(3):239-268.
23. Eaton DK, Kann L, Kinchen S, et al. Youth risk behavior surveillance—United States, 2009. *MMWR Surveill Summ*. 2010;59(5):1-142.
24. Dowell EB, Burgess AW, Cavanaugh DJ. Clustering of Internet risk behaviors in a middle school student population. *J Sch Health*. 2009;79(11):547-553.
25. Ybarra ML, Mitchell KJ. Prevalence and frequency of Internet harassment investigation: implications for adolescent health. *J Adolesc Health*. 2007;41(2):189-195.
26. Rosenberg M. *Society and the Adolescent Self-image*. Princeton, NJ: Princeton University Press; 1965.
27. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas*. 1977;1:385-401.
28. Sourander A, Brunstein Klomek A, Ikonen M, et al. Psychosocial risk factors associated with cyberbullying among adolescents: a population-based study. *Arch Gen Psychiatry*. 2010;67(7):720-728.
29. Slonje R, Smith PK. Cyberbullying: another main type of bullying? *Scand J Psychol*. 2008;49(2):147-154.
30. Juvonen J, Gross EF. Extending the school grounds?—Bullying experiences in cyberspace. *J Sch Health*. 2008;78(9):496-505.
31. Ybarra ML, Espelage DL, Mitchell KJ. The co-occurrence of Internet harassment and unwanted sexual solicitation victimization and perpetration: associations with psychosocial indicators. *J Adolesc Health*. 2007;41(6):S31-41.
32. Anderson CA, Shibuya A, Ihori N, et al. Violent video game effects on aggression, empathy, and prosocial behavior in eastern and western countries: a meta-analytic review. *Psychol Bull*. 2010;136(2):151-173.
33. Seals D, Young J. Bullying and victimization: prevalence and relationship to gender, grade level, ethnicity, self-esteem, and depression. *Adolescence*. 2003;38(152):735-747.
34. Carlyle KE, Steinman KJ. Demographic differences in the prevalence, co-occurrence, and correlates of adolescent bullying at school. *J Sch Health*. 2007;77(9):623-629.
35. Yang SJ, Kim JM, Kim SW, Shin IS, Yoon JS. Bullying and victimization behaviors in boys and girls at South Korean primary schools. *J Am Acad Child Adolesc Psychiatry*. 2006;45(1):69-77.
36. Crick NR, Grotpeter JK. Relational aggression, gender, and social-psychological adjustment. *Child Dev*. 1995;66(3):710-722.
37. The Child Welfare League Foundation. *Bullyin at Taiwan's Schools: Risk Factors for Bullying*. Taipei, Taiwan: The Child Welfare League Foundation; 2011.
38. Jansen DE, Veenstra R, Ormel J, Verhulst FC, Reijneveld SA. Early risk factors for being a bully, victim, or bully/victim in late elementary and early secondary education. The longitudinal TRAILS study. *BMC Public Health*. 2011;11:440.
39. Due P, Damsgaard MT, Lund R, Holstein BE. Is bullying equally harmful for rich and poor children? A study of bullying and depression from age 15 to 27. *Eur J Public Health*. 2009;19(5):464-469.
40. Taiwan Network Information Center. *Taiwan Internet Use Annual Report*. Available at: <http://www.twnic.net.tw/download/200307/1107c.pdf>. Accessed January 6, 2012.
41. O'Moore M, Kirkham C. Self-esteem and its relationship to bullying behaviour. *Aggress Behav*. 2001;27(4):269-283.
42. Patchin JW, Hinduja S. Cyberbullying and self-esteem. *J Sch Health*. 2010;80(12):614-621 quiz 622-624.
43. Karatzias A, Power KG, Swanson V. Bullying and victimisation in Scottish secondary schools: same or separate entities? *Aggress Behav*. 2002;28(1):45-61.
44. Frisén A, Jonsson A-K, Persson C. Adelecn's perception of bullying: who is the victim? who is the bully? what can be done to stop bullying? *Adolescence*. 2007;42(168):749-761.
45. Hemphill SA, Kotevski A, Herrenkohl TI, et al. Longitudinal consequences of adolescent bullying perpetration and victimisation: a study of students in Victoria, Australia. *Crim Behav Ment Health*. 2011;21(2):107-116.
46. Mishna F, Cook C, Gadalla T, Daciuk J, Solomon S. Cyber bullying behaviors among middle and high school students. *Am J Orthopsychiatry*. 2010;80(3):362-374.
47. Fitzpatrick KM, Dulin A, Piko B. Bullying and depressive symptomatology among low-income, African-American youth. *J Youth Adolesc*. 2010;39(6):634-645.
48. Wang J, Nansel TR, Iannotti RJ. Cyber and traditional bullying: differential association with depression. *J Adolesc Health*. 2011;48(4):415-417.
49. Olweus D, Limber SP. Bullying in school: evaluation and dissemination of the Olweus Bullying Prevention Program. *Am J Orthopsychiatry*. 2010;80(1):124-134.
50. Schroeder BA, Messina A, Schroeder D, et al. The implementation of a statewide bullying prevention program: preliminary findings from the field and the importance of coalitions. *Health Promot Pract*. 2012;13(4):489-495.

Copyright of Journal of School Health is the property of Wiley-Blackwell and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.