

Cyberbullying: Prevalence, Stability, and Risk Factors During Adolescence

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Abstract

Although research on cyberbullying has recently begun to emerge, few researchers have used longitudinal data to explore this phenomenon in Canada. Using 1-year longitudinal data from the *Health Behavior in School-Aged Children Study* conducted by the World Health Organization, we investigated the prevalence and stability and risk factors associated with cyberbullying, cybervictimization, and simultaneous cyberbullying and cybervictimization among 1,972 adolescents. Risk factors associated with cyberbullying included higher levels of antisocial behaviors and fewer prosocial peer influences. Risk factors associated with cybervictimization included being in the transition year for high school, as well as higher levels of traditional victimization and depression. Higher levels of traditional victimization were also associated with simultaneous cyberbullying and cybervictimization. Gender differences and implications of the findings are discussed.

Résumé

Depuis peu, on note l'émergence d'une recherche portant sur la cyberintimidation mais rares sont les chercheurs ayant étudié ce phénomène au Canada à partir de données longitudinales. Fondée sur les données longitudinales recueillies dans le cadre de l'étude *Health Behavior in School-Aged Children Study* menée par l'Organisation mondiale de la santé, notre recherche conduite auprès de 1972 adolescents porte sur la prévalence, la stabilité et les facteurs de risque associés à la cyberintimidation, à la cybervictimisation de même qu'à la présence simultanée de la cyberintimidation/cybevictimisation. Parmi les facteurs de risque associés à la cyberintimidation, on note un taux plus élevé de comportements antisociaux et une moindre influence prosociale

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de la part des pairs. Quand aux facteurs de risque associés à la cybervictimisation, citons l'année de transition menant aux études secondaires et une plus grande prévalence de la victimisation et de la dépression dites traditionnelles. Nous avons également établi un lien entre un taux élevé de victimisation traditionnelle et la présence simultanée de la cyberintimidation/cybervictimisation. Enfin, nous analysons la différence entre les sexes et les résultats obtenus.

Keywords

bullying, aggression, victimization, internet, peer relationships, risk factors

Similar to traditional forms of bullying, cyberbullying involves repeated hostile actions that take place within a relationship characterized by a power differential (Olweus, 1993; Pepler & Craig, 2000). Cyberbullying involves harassing, insulting, physically threatening, socially excluding, and/or humiliating others using electronic media such as email, Internet sites, instant Internet messaging, and cell phone text messages (Chisholm, 2006). Many youth who cyberbully choose to remain anonymous (Dehue, Bolman, & Vollink, 2008; Kowalski & Limber, 2007; Li, 2007a, 2007b; Smith et al., 2008; Ybarra & Mitchell, 2004a). This anonymity represents power, as the victimized youth cannot identify the source of the aggression. Cyberbullying is also ubiquitous, widening the scope of bullying beyond the school environment and leaving victimized youth without a safe haven (Patchin & Hinduja, 2006). In addition, cyberbullying has a great breadth of impact as youth who cyberbully can easily disseminate hurtful emails, webpage links, photographs, instant messages, or text messages to a large number of peers in seconds. Unlike traditional forms of bullying, the power inherent in cyberbullying is not socially constrained and can be exercised by any youth, regardless of his or her social standing or popularity at school.

Cyberbullying is common and harmful among adolescents. Victimization rates tend to range between 20% and 40% (see Tokunaga, 2010 for meta-synthesis), while perpetration rates range widely from 5% to 35% across studies, and dual involvement in both cyberbullying and cybervictimization ranges from 3% to 14% (Aricak et al., 2008; K. Brown, Jackson, & Cassidy, 2008; Kowalski & Limber, 2007; Li, 2006, 2007a, 2007b; Patchin & Hinduja, 2006; Slonje & Smith, 2008; Sourander et al., 2010; Ybarra, Diener-West, & Leaf, 2007; Ybarra, Espelage, & Mitchell, 2007; Ybarra & Mitchell, 2004a, 2007; Wade & Beran, 2011). Cyberbullying others is associated with hyperactivity, conduct problems, substance use, and physical symptoms including headaches (Sourander et al., 2010). Cybervictimization is associated with clinically significant social problems and depression, academic problems and school truancy, and physical symptoms such as headaches and abdominal pain, as well as substance use, weapon carrying, and aggression (Hinduja & Patchin, 2007; Didden et al., 2009; Katzer, Fetschenhauer, & Belschak, 2009; Mitchell, Ybarra, & Finkelhor, 2007; Sourander et al., 2010; Tokunaga, 2010; Ybarra, 2004; Ybarra et al., 2007;

Ybarra & Mitchell, 2004a, 2007; Ybarra, Mitchell, Wolak, & Finkelhor, 2006). Further, adolescents who report cyberbullying others or cybervictimization are more likely to report suicidal thoughts and suicide attempts than peers who are not involved (Hinduja & Patchin, 2010). The long-term consequences of chronic cybervictimization are not yet known; however, research on traditional forms of bullying indicate that repeated victimization can lead to reduced faith in oneself and others (Salmivalli, Ojanen, Haanpää, & Peets, 2005). As such, researchers and clinicians suggest that children who experience chronic victimization be referred to mental health agencies for support (Cummings, Pepler, Mishna, & Craig, 2006; Kaltiala-Heino, Rimpela, Marttunen, Rimpela, & Rantanen, 1999; Kumpulainen, Räsänen, & Puura, 2001).

In the current study, we used 1-year longitudinal data to explore the prevalence and stability of cyberbullying and cybervictimization across time, as well as associated risk factors among a nationally representative sample of high school students across Canada. Although several longitudinal studies of cyberbullying have been conducted to date (Barlett & Gentile, 2012; Fanti, Demetriou, & Hawa, 2012; Raskauskas & Stoltz, 2007; Sumter, Baumgartner, Valkenburg, & Peter, 2012; Williams & Guerra, 2007), only one took place in Canada and included a small sample of middle school students from Calgary (Li, 2007a). This study is novel, as it is the first longitudinal, nationally representative study of cyberbullying among Canadian youth. Consistent with traditional bullying, we hypothesized that involvement in cyberbullying and/or cybervictimization would be stable across time for a small percentage of youth (Hanish & Guerra, 2000, 2004; Pepler, Jiang, Craig, & Connolly, 2008). This study is also novel in that we are investigating many psychosocial, academic, and contextual (i.e., parents, peers, and school environment) factors together during adolescence to explore the strength of their relative associations to cyberbullying and cybervictimization. We investigated factors that may place youth at risk for cyberbullying and cybervictimization during adolescence within a developmental-contextual perspective, whereby development is understood as unfolding through a combination of biological (i.e., individual) and contextual (i.e., interpersonal) experiences that interact to shape psychosocial functioning (Ford & Lerner, 1992).

Individual psychosocial and academic factors may shape youth involvement in cyberbullying others. During adolescence, girls and boys tend to relate to peers in different ways (Rose & Rudolph, 2006). Within the traditional bullying literature, researchers have consistently found that boys are more likely than girls to bully others and use physical forms of aggression, while girls are more likely to use social forms of aggression (Card, Stucky, Sawalani, & Little, 2008; Forero, McLellan, Rissel, & Bauman, 1999; Nansel et al., 2001). Findings are mixed with respect to cyberbullying, however, as some studies have indicated that boys are more likely than girls to cyberbully others (Dehue et al., 2008; Li, 2006, 2007b; Slonje & Smith, 2008), while others suggest no gender differences (Beran & Li, 2005; Hinduja & Patchin, 2008; Patchin & Hinduja, 2006; Smith et al., 2008; Williams & Guerra, 2007; Wade & Beran, 2011). Age and grade level may also influence the likelihood of cyberbullying others. Similar to traditional bullying, cyberbullying peaks in the middle school years and during the transition to high school, decreasing thereafter (Pepler et al., 2006; Wade & Beran,

2011; Williams & Guerra, 2007). In addition, frequent access to the necessary media (i.e., cell phone and/or Internet) likely places adolescents at increased risk for cyberbullying others (Aricak et al., 2008; Hinduja & Patchin, 2008; Ybarra, 2004; Ybarra & Mitchell, 2004a), as does involvement in other forms of antisocial behaviors. Cross-sectional research indicates that traditional forms of bullying, conduct problems, delinquency, and substance use are all related to cyberbullying behaviors (Haynie et al., 2001; Ivarsson, Broberg, Arvidsson, & Gillberg, 2005; Nansel et al., 2001; Sourander et al., 2010; Ybarra & Mitchell, 2004a). Finally, poor academic achievement has been associated with negative peer relationships and may impact youths' involvement in cyberbullying (Nansel et al., 2001). Consequently, we hypothesized that individual risk factors for cyberbullying others, as well as simultaneous cyberbullying and cybervictimization, would include gender (being a boy), grade (enrolment in Grade 9), frequency of Internet use, and lower academic achievement, as well as higher levels of involvement in traditional bullying, physical fighting, smoking (cigarettes and marijuana), alcohol consumption, and illicit substance use.

In addition to individual characteristics, certain contextual factors may place youth at increased risk for cyberbullying others. As the first and primary socialization agents, parents play a primary role in children's social development and understanding. As such, poor quality parent-child relationships have been associated with involvement in traditional and cyber forms of bullying (Pepler et al., 2008; Spriggs, Iannotti, Nansel, & Haynie, 2007; Ybarra & Mitchell, 2004a). Peer relationships are also highly valued during adolescence, and provide an important context for the development of close relationships and group norms (B. B. Brown, Eicher, & Petrie, 1986; Gavin & Furman, 1989). Having friends who engage in delinquent behaviors and/or limited connections with prosocial peers may place youth at risk for involvement in cyberbullying (Calvete, Orue, Estevez, Villardon, & Padilla, 2010; Haynie et al., 2001; Pepler et al., 2008). In addition, the school environment is central during adolescence. A negative school climate has been related to traditional and cyber forms of bullying others (Nansel et al., 2001; Williams & Guerra, 2007). Consequently, we hypothesized that contextual risk factors for cyberbullying others, as well as simultaneous cyberbullying and cybervictimization, would include lower quality of parent-child relationships, higher levels of peer delinquency, less exposure to prosocial peer behaviors, and more negative perceived school climate.

Individual psychosocial and academic factors may also shape youth involvement in cybervictimization. Within the traditional bullying literature, researchers have found that boys tend to be victimized more often than girls (Forero et al., 1999; Nansel et al., 2001). Some studies of cyberbullying have found similar results (Li, 2007a; Ybarra et al., 2007), while others have found that girls are victimized more often than boys (Dehue et al., 2008; Hinduja & Patchin, 2007; Kowalski & Limber, 2007; Li 2007b; Slonje & Smith, 2008; Smith et al., 2008; Wade & Beran, 2011) and a few indicate no gender differences (Beran & Li, 2005; Hinduja & Patchin, 2008; Li, 2006). Enrolment in Grade 9 may also place youth at risk for cybervictimization, which peaks along with cyberbullying during the transition to high school (Wade & Beran, 2011; Williams & Guerra, 2007). Also similar to cyberbullying, frequent Internet use places youth at risk

for cybervictimization (Aricak et al., 2008; Hinduja & Patchin, 2008; Ybarra, 2004; Ybarra & Mitchell, 2004a). Poor psychosocial adjustment may also place youth at risk for cybervictimization as research indicates that internalizing problems can be viewed as vulnerabilities by peers and are associated with traditional and cyber forms of victimization (Delfabbro et al., 2006; Fekkes, Pijpers, Fredriks, Vogels, & Verloove-Vanhorick, 2006; Mitchell et al., 2007; Ybarra & Mitchell, 2004a, 2007). Consequently, we hypothesized that individual risk factors for cybervictimization, as well as simultaneous cyberbullying and cybervictimization, would include grade (enrolment in Grade 9) and frequency of Internet use, as well as higher levels of anxious or depressive symptoms.

In addition to individual characteristics, certain contextual factors may predispose youth to experience cybervictimization. Traditional and cyber forms of victimization are related to poor parent–child relationships (Spriggs et al., 2007; Ybarra & Mitchell, 2004a, 2004b). Since the role of peers in both socialization and bullying episodes is considerable (B. B. Brown et al., 1986), having close friends protects against traditional forms of victimization, while poor-peer relationships place youth at risk for traditional and cyber forms of victimization (Delfabbro et al., 2006; Forero et al., 1999; Nansel et al., 2001; Pellegrini & Bartini, 2000; Pellegrini, Bartini, & Brooks, 1999; Williams & Guerra, 2007). Experiencing traditional forms of victimization by peers and negative school climate also place youth at risk for being cybervictimized (Juvonen & Gross, 2008; Li, 2007b; Nansel et al., 2001; Raskauskas & Stoltz, 2007; Williams & Guerra, 2007). Consequently, we hypothesized that contextual risk factors for cybervictimization, as well as simultaneous cyberbullying and cybervictimization, would include lower quality of parent–child relationships, higher levels of traditional forms of victimization, fewer close friends, lower quality of communication with friends, and more negative perceptions of school climate.

Method

Participants and Procedure

Data for the proposed study were drawn from Canadian records of the *Health Behavior in School-Aged Children (HBSC) Study*, a cross-national study conducted by the World Health Organization (WHO). Research protocol for this study was reviewed by the Queen's University Research Ethics Board. Students were selected for the Canadian records of the HBSC study with a clustered sampling design, using class or school as the initial sampling unit, to obtain representative samples of adolescents across Canada. Within each province, samples were also stratified based on school size, location, language, and religion. Students attending private or special-needs schools, as well as street and incarcerated youth, were excluded from this study. Data collection was conducted across 16 schools according to a common international protocol (Currie, Nic Gabhainn, & Godeau, 2009). Informed consent was obtained from all students, as well as from parents for students under the age of 16. The Canadian records from the HBSC included 1,972 Canadian high school students,

with 881 boys and 1,091 girls. Two waves of school-based surveys were completed by students in the 2006 and 2007 spring semesters. Participants were enrolled in Grades 9, 10, and 11 during the first wave of data collection ($N = 1,080, 878, \text{ and } 14$, respectively) and in Grades 10, 11, and 12 during the second wave. Roughly 90% of the students were born in Canada and spoke English at home, and the majority of their mothers and fathers (75% and 73%, respectively) were also born in Canada.

In the current study, 19 students (12 boys and seven girls) only completed the questions regarding involvement in cyberbullying at Time 1 and 18 students (13 boys and five girls) only completed the questions regarding involvement in cybervictimization at Time 1. These students were not included in the analyses that required information about level of involvement in cyberbullying and cybervictimization at both time points. Reported levels of cyberbullying behaviors at Time 1 did not differ significantly between the group of students who reported their level of involvement in cyberbullying at both time points ($M = 1.07, SD = .25$) and the students who reported level of involvement at Time 1 only ($M = 1.11, SD = .32$). Reported levels of cybervictimization experiences at Time 1 did not differ significantly between the group of students who reported their level of cybervictimization involvement at both time points ($M = 1.07, SD = .26$) and the students who reported level of involvement at Time 1 only ($M = 1.06, SD = .24$).

Measures

The following items and scales were taken from the HBSC survey, a standard questionnaire that was developed by the HBSC international research network. For each scale, a composite score was calculated and exploratory factor analysis confirmed that the combination of items reflected one underlying construct.

Cyberbullying and Cybervictimization. Participants were provided with a standard definition of bullying including three main components: intention to harm, repetition, and power differential. They were then asked to report how often they were involved in cyberbullying and cybervictimization in the past 2 months. Two statements were given regarding cyberbullying: (a) "I bullied another student(s) using a computer or e-mail messages or pictures" and (b) "I bullied another student(s) using a mobile phone." Two statements were also given regarding cybervictimization: (a) "I was bullied using a computer or e-mail messages or pictures" and (b) "I was bullied using a mobile phone." For each statement, students were provided with five response options: never, once or twice, two or three times a month, about once a week, and several times a week. The alpha coefficients were .70 and .83 for the cyberbullying items and .59 and .72 for the cybervictimization items at Times 1 and 2, respectively. Based on their involvement in cyberbullying and/or cybervictimization, students were placed into the following groups at each time point: (a) not involved in cyberbullying or cybervictimization, (b) cyberbullying involvement only, (c) cybervictimization involvement only, and (d) simultaneous cyberbullying and cybervictimization involvement.

Traditional Bullying Behaviors. Participants were asked to report how often they bullied, and were bullied by others, at school in the past couple of months. Three statements addressed verbal bullying: (a) "I called another student(s) mean names, and made fun of, or teased him or her in a hurtful way," (b) "I bullied another student(s) with mean names and comments about his or her race or colour," and (c) "I bullied another student(s) with mean names and comments about his or her religion." One statement addressed physical bullying: "I hit, kicked, pushed, shoved around, or locked another student(s) indoors." Two statements addressed social bullying: (a) "I kept another student(s) out of things on purpose, excluded him or her from my group of friends, or completely ignored him or her," and (b) "I spread false rumours about another student(s) and tried to make others dislike him or her." As in the cyberbullying behaviors section, a complementary victimization statement accompanied each perpetration statement. Higher scores represented higher levels of bullying and victimization. The alpha coefficients were .79 and .80 for the traditional bullying items and .76 and .80 for the traditional victimization items at Times 1 and 2, respectively.

Individual Factors

Internet use. Participants were asked how many hours they spend using a computer (for chatting online, Internet, emailing, homework, etc.) each day during their free time. This question was asked twice, to index weekday and weekend use, with the following response options: none at all, about half an hour a day, about 1 hr a day, about 2 hr a day, about 3 hr a day, about 4 hr a day, about 5 hr a day, about 6 hr a day, and about 7 or more hr a day. Participants' scores on the two questions were combined to provide an overall measure of Internet use throughout the week, with higher scores representing more Internet use. Alpha coefficients for this scale were .90 and .89 for Times 1 and 2, respectively.

Anxiety and somatic symptoms. Participants were asked to rate anxiety and somatic symptoms (e.g., feeling nervous, feeling dizzy, and headache) experienced within the last 6 months. Students rated these symptoms on a 5-point Likert-type scale: rarely or never, about every month, about every week, more than once a week, and about every day. Higher scores represented higher levels of anxiety. Alpha coefficients for this scale were .79 and .79 for Times 1 and 2, respectively.

Depressive symptoms. Participants responded to statements related to depressed mood (e.g., "I often feel helpless" or "I often feel lonely") using a 5-point Likert-type scale that ranged from *strongly agree* to *strongly disagree*. Higher scores represented higher levels of depression. Alpha coefficients for this scale were .82 and .82 for Time 1 and 2, respectively.

Smoking cigarettes and marijuana. Participants were asked how often they smoked cigarettes and how often they smoked marijuana in the past 30 days. For these two questions, students responded with the following options: never, once or twice, three to five times, six to nine times, 10 to 19 times, 20 to 39 times, and 40 times or more. Higher scores represented more frequent cigarette and marijuana smoking.

Alcohol consumption. Participants were asked how often they drink beer, wine, liquor/spirits, coolers, and any other drinks containing alcohol. Students indicated the frequency of consumption for each alcohol drink with the following options: every day, every week, every month, rarely, and never. Higher scores represented higher levels of alcohol consumption. Alpha coefficients for this scale were .88 and .84 for Times 1 and 2, respectively.

Illicit substance use. Participants were asked whether they have ever used or taken the following substances: ecstasy, amphetamines, methamphetamine, heroin, medical drugs to get stoned, cocaine, glue, or solvent sniffing, LSD, magic mushrooms, Ritalin to get high, antibiotic steroids to improve body image or athletic performance, and other unlisted substances. Students indicated the frequency of use for each substance using the following options: never, once or twice, three to five times, six to nine times, 10 to 19 times, 20 to 39 times, and 40 times or more. Higher scores represented higher levels of substance use. Alpha coefficients for this scale were .91 and .92 for Times 1 and 2, respectively.

Physical fighting. Participants were asked how many times they had been involved in a physical fight in the past 12 months. The five response options were: I have not been in a physical fight, one time, two times, three times, and four times or more. Higher scores represented more frequent fighting behaviors.

Academic achievement. Participants were asked to indicate which of the following categories best described their academic achievement: excellent (mostly A letter grades, percentages above 85%), above average (mostly A and B letter grades, percentages between 70% and 85%), average (mostly B and C letter grades, percentages 60% and 70%), below average (mostly C letter grades, percentages between 50% and 60%), and poor (mostly failing letter grades, percentages below 50%). Higher scores originally represented higher levels of academic achievement; however, these scores were reverse coded so that higher scores represented lower academic achievement.

Contextual Factors

Parental trust and communication. To assess students' relationships with their mothers and fathers, participants were asked, "How easy is it for you to talk to the following persons about things that really bother you?" The five possible responses for mother and father were: very easy, easy, difficult, very difficult, and don't have or see this person. Participants were also asked to respond to the following statements using a 5-point Likert-type scale that ranged from *strongly agree* to *strongly disagree*: "My parents understand me," "I have a happy home life," and "My parents trust me." Higher scores originally represented higher levels of parent trust and communication; however, these scores were reverse coded so that higher scores represented lower levels of parent trust and communication. Alpha coefficients for this scale were .78 and .78 for Times 1 and 2, respectively.

Parental support and involvement with school. Participants responded to six statements assessing their parents' involvement and support regarding school functioning, using a 5-point Likert-type scale that ranged from *strongly agree* to *strongly disagree*: "If I have a problem at school, my parents are ready to help," "My parents are willing to come to school to talk to teachers," "My parents encourage me to do well at school," "My parents are interested in what happens to me at school," and "My parents are willing to help me with homework." Higher scores originally represented higher levels of parent support; however, these scores were reverse coded so that higher scores represented lower levels of parent support. Alpha coefficients for this scale were .82 and .83 for Times 1 and 2, respectively.

Quality of communication with friends. Participants were asked, "How easy is it for you to talk to the following persons about things that really bother you?" with respect to their best friend, friends of the same sex, and friends of the opposite sex. Responses were given via a 5-point Likert-type scale that ranged from *strongly agree* to *strongly disagree*. Higher scores originally represented higher quality communication; however, these scores were reverse coded so that higher scores represented lower quality communication. Alpha coefficients for this scale were .73 and .76 for Times 1 and 2, respectively.

Number of close friends. Participants indicated how many close male and female friends they had at present. Response options included none, one, two, or three or more. Higher scores originally represented a greater number of friends; however, these scores were reverse coded so that higher scores represented fewer friends.

Prosocial peer behaviors. Participants responded to the following statements related to prosocial behaviors exhibited by their friends: "My friends like school," "My friends think getting good marks at school is important," and "My friends get along with their parents." These statements were rated as: none, a few, some, most, and all. Higher scores originally represented higher levels of prosocial peer behaviors; however, these scores were reverse coded so that higher scores represented lower levels of prosocial peer behaviors. Alpha coefficients for this scale were .70 and .70 for Times 1 and 2, respectively.

Peer delinquency. Participants were asked to respond to statements related to antisocial behaviors exhibited by friends (e.g., "My friends carry weapons, like knives" and "my friends use drugs to get stoned"). These statements were rated as: none, a few, some, most, and all. Alpha coefficients for this scale were .75 and .73 for Times 1 and 2, respectively.

Perceived school climate. Participants rated statements about their school climate, including statements about student involvement in everyday life (e.g., "In our school the students take part in making rules"), feelings of safety and belonging (e.g., "I feel safe at this school"), peer attitudes toward each other and the school (e.g., "Students in my classes enjoy being together"), as well as teacher behaviors with students in

Table 1. Prevalence Rates of Cyberbullying and Cybervictimization Across a 1-Year Period, by Gender and Grade.

Level of student involvement across Time 1 and Time 2	Prevalence rates (%)				
	Boys (n = 807)	Girls (955)	Grade 9 (953)	Grade 10 (809)	All students (1,762)
<i>Cyberbullying</i>					
Never involved	88.9	88.1	87.8	89.2	88.4
Involved at Time 1 only	5.3	4.7	5.1	4.6	4.9
Involved at Time 2 only	4.7	4.8	5.1	4.1	4.7
Involved at both times	1.2	2.5	1.8	2.1	1.9
<i>Cybervictimization</i>					
Never involved	91.8	82.3	84.9	88.4	86.5
Involved at Time 1 only	4.7	7.9	5.4	4.7	5.1
Involved at Time 2 only	2.9	6.8	7.8	4.9	6.1
Involved at both times	0.6	3.0	1.9	1.9	1.9
<i>Simultaneous cyberbullying and cybervictimization</i>					
Never involved	96.4	93.5	95.1	94.6	95.4
Involved at Time 1 only	0.8	3.2	1.6	2.5	1.4
Involved at Time 2 only	2.2	3.1	3.0	2.3	2.7
Involved at both times	0.6	0.2	0.3	0.6	0.5

general (e.g., “Our teachers treat us fairly”) and with the participant in particular (e.g., “When I need extra help, I can get it”). These statements were rated on 5-point Likert-type scales that ranged from *strongly agree* to *strongly disagree*. Higher scores originally represented more positive school climate; however, these scores were reverse coded so that higher scores represented less positive school climate. Alpha coefficients for this scale were .74 and .79 for Times 1 and 2, respectively.

Results

Prevalence and Stability

Students reported rates of involvement in cyberbullying across Times 1 and 2 as follows: 88.4% never, 4.9% at Time 1 only, 4.7% at Time 2 only, and 1.9% at both time points. Students reported rates of involvement in cybervictimization across Times 1 and 2 as follows: 86.5% never, 5.1% at Time 1 only, 6.5% at Time 2 only, and 1.9% at both time points. Students reported rates of simultaneous involvement in cyberbullying and cybervictimization across Times 1 and 2 as follows: 95.4% never, 1.4% at Time 1 only, 2.7% at Time 2 only, and 0.5% at both time points.

Three 2×2 χ^2 tests were conducted to examine the associations between gender and cyberbullying, cybervictimization, and simultaneous cyberbullying and cybervictimization at Time 2. Gender was not significantly related to cyberbullying involvement, $\chi^2 = 0.31$, $df = 1$, $p = .58$, or simultaneous cyberbullying and cybervictimization involvement, $\chi^2 = 2.88$, $df = 1$, $p = .09$. Gender was significantly related to cybervictimization, $\chi^2 = 20.39$, $df = 1$, $p < .001$, as a significantly larger proportion of girls than boys reported cybervictimization involvement. See Table 1 for the cyberbullying

Table 2. Descriptive Statistics for Associated Factors in Logistic Regression Analyses.

Associated factors	<i>n</i>	Range	Mean	SD
Individual factors				
Lower grade level	1,786	9-11	9.47	0.51
Frequency of Internet use	1,725	1-9	4.17	1.99
Traditional bullying	1,761	0-5	1.17	0.37
Anxious and somatic symptoms	1,774	1-5	2.29	0.73
Depressive symptoms	1,754	1-4.83	2.41	0.75
Physical fighting	1,757	1-5	1.68	1.15
Cigarette smoking	1,758	1-7	1.19	0.76
Marijuana smoking	1,745	1-7	1.34	1.07
Alcohol use	1,751	1-5	1.71	0.73
Illicit substance use	1,758	1-7	1.07	0.36
Lower academic achievement	1,779	1-3	2.04	0.67
Contextual factors				
Traditional victimization	1,762	0-5	1.21	0.38
Peer delinquency	1,750	1-5	1.94	0.75
Fewer prosocial peers	1,739	1-5	2.81	0.77
Fewer close male friends	1,757	1-4	3.52	0.87
Fewer close female friends	1,752	1-4	1.48	0.87
Lower quality of friendships	1,749	1-5	1.98	0.72
Less parental support with school	1,775	1-5	1.77	0.61
Less parental trust and communication	1,749	1-4.60	2.24	0.70
More negative perceived school climate	1,774	1.44-3.94	2.57	0.36

and cybervictimization involvement by gender and grade. Only 14 students were in Grade 11 during the first wave; therefore, these students were combined with the grade below (Grade 10) in Table 1 to create two groups (i.e., Grades 9 and 10).

Associated Factors

Binary logistic regression analyses were conducted to examine the prediction of (a) cyberbullying involvement, (b) cybervictimization involvement, and (c) simultaneous cyberbullying and cybervictimization involvement by each covariate. Descriptive statistics for the scales used to index associated factors are provided in Table 2.

Cyberbullying. Binary logistic regression analyses were conducted to investigate whether students with elevated scores on Time 1 covariates were more likely to report increased involvement in cyberbullying over the 1-year period (i.e., at Time 2). Gender and cyberbullying at Time 1 were controlled within these analyses. The model was significant, $\chi^2 = 60.00$, $df = 16$, $p < .001$, and results are provided in Table 3. Students who reported higher levels of traditional bullying behaviors at Time 1 were two times more likely than peers to be involved in cyberbullying at Time 2, while those who

Table 3. Binomial Logistic Regression of Associated Factors for Cyberbullying Group ($n = 62$) Versus No Involvement ($n = 1,567$) Group.

Associated factors	B	SE	Wald	Exp(B)
Individual factors				
Lower grade level	0.31	0.27	1.33	1.36
Frequency of Internet use	0.05	0.07	0.51	1.05
Traditional bullying	0.76	0.31	6.04	2.14*
Physical fighting	0.05	0.11	0.16	1.05
Cigarette smoking	0.17	0.16	1.07	1.18
Marijuana smoking	-0.17	0.14	1.53	0.84
Alcohol use	0.58	0.20	8.71	1.79**
Illicit substance use	-0.86	0.44	3.89	0.42
Lower academic achievement	0.28	0.21	1.82	1.32
Contextual factors				
Peer delinquency	0.28	0.24	1.34	1.32
Fewer prosocial peers	0.46	0.20	5.40	1.58*
Less parental support with school	0.41	0.23	3.08	1.50
Less parental trust and communication	-0.40	0.23	2.92	0.67
More negative perceived school climate	0.24	0.40	0.38	1.28

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

reported higher levels of alcohol drinking at Time 1 were almost two times more likely than peers to be involved in cyberbullying at Time 2. Students who reported fewer prosocial peers at Time 1 were roughly 50% more likely than other peers to be involved in cyberbullying at Time 2.

Cybervictimization. Binary logistic regression analyses were conducted to investigate whether students with elevated scores on Time 1 covariates were more likely to report increased involvement in cybervictimization over the 1-year period (i.e., at Time 2). Gender and cybervictimization at Time 1 were controlled in these analyses. The model was significant, $\chi^2 = 96.92$, $df = 13$, $p < .001$, and results are provided in Table 4. Students who reported higher levels of traditional victimization, higher levels of depression, or lower grade level (i.e., Grade 9) at Time 1 were more likely to be involved in cybervictimization at Time 2. Students who reported higher levels of depression or lower grade level (i.e., Grade 9) at Time 1 were about 50% more likely than peers to be involved in cybervictimization at Time 2. Students who reported traditional victimization at Time 1 were three times more likely than peers to report cybervictimization at Time 2.

Cyberbullying and Cybervictimization. Binary logistic regression analyses were conducted to investigate whether students with elevated scores on Time 1 covariates were more likely to report increased involvement in both cyberbullying and cybervictimization over the 1-year period (i.e., at Time 2). Gender, cyberbullying at Time 1, and cybervictimization at Time 1 were controlled in these analyses. The model was significant, $\chi^2 = 68.58$, $df = 23$, $p < .001$, and results are provided in Table 5. Students who reported traditional

Table 4. Binomial Logistic Regression of Associated Factors for Cybervictimization Group ($n = 95$) Versus No Involvement ($n = 1,599$) Group.

Associated factors	B	SE	Wald	Exp(B)
Individual factors				
Lower grade level	0.47	0.23	4.31	1.61*
Frequency of Internet use	0.10	0.06	3.29	1.11
Anxious and somatic symptoms	-0.04	0.17	0.07	0.96
Depressive symptoms	0.39	0.19	4.31	1.47*
Contextual factors				
Traditional victimization	1.10	0.26	17.24	2.99***
Fewer close male friends	-0.16	0.15	1.14	0.86
Fewer close female friends	-0.22	0.20	1.23	0.80
Lower quality of friendships	-0.11	0.19	0.34	0.90
Less parental support with school	0.33	0.19	2.96	1.40
Less parental trust and communication	-0.16	0.19	0.66	0.86
More negative perceived school climate	0.40	0.34	1.42	1.49

* $p < .05$, *** $p < .001$.

Table 5. Binomial Logistic Regression of Associated Factors for Simultaneous Cyberbullying and Cybervictimization Group ($n = 54$) Versus No Involvement Group ($n = 1,544$).

Associated factors	B	SE	Wald	Exp(B)
Individual factors				
Lower grade level	0.32	0.30	1.13	1.38
Frequency of Internet use	0.00	0.08	0.00	1.00
Traditional bullying	-0.53	0.44	1.48	0.59
Anxious and somatic symptoms	-0.07	0.24	0.09	0.93
Depressive symptom	0.08	0.25	0.11	1.09
Physical fighting	0.13	0.12	1.23	1.14
Cigarette smoking	0.08	0.18	0.18	1.08
Marijuana smoking	0.13	0.16	0.69	1.14
Alcohol use	-0.12	0.25	0.22	0.89
Illicit substance use	-0.78	0.44	3.14	0.46
Lower academic achievement	0.21	0.22	0.88	1.23
Contextual Factors				
Traditional victimization	1.35	0.29	21.59	3.86***
Peer delinquency	0.29	0.26	1.26	1.34
Fewer prosocial peers	0.09	0.21	0.19	1.10
Fewer close male friends	0.03	0.19	0.03	1.03
Fewer close female friends	0.19	0.19	0.94	1.21
Lower quality of friendships	-0.42	0.26	2.54	0.66
Less parental support with school	0.26	0.25	1.07	1.30
Less parental trust and communication	0.10	0.25	0.16	1.11
More negative perceived school climate	-0.22	0.46	0.23	0.80

*** $p < .001$.

victimization at Time 1 were almost four times more likely than peers to report simultaneous cyberbullying and cybervictimization at Time 2.

Interactions Between Individual and Contextual Variables. Interaction variables representing each combination of individual and contextual variables were investigated for each of the three regressions above. Due to the large number of interactions and sample size in this study, we were concerned that trivial interactions may present as significant; therefore, we only probed significant interactions if the odds ratio for the interaction term was at or above two. This decision was made based on a formula provided by Kline (2004), who suggested that an odds ratio of two is slightly smaller than the small effect size guideline given by Cohen (1988). None of the interaction terms was significant in any of the three regressions. As a result of the very large number of interactions within each regression, as well as the fact that none was significant, these interaction terms are not included in the results tables provided.

Discussion

The vast majority of high school students were not involved in cyberbullying. Roughly 10% of students reported involvement in each of cyberbullying and cybervictimization and 5% reported simultaneous involvement in both. Among students who reported cyberbullying or cybervictimization, 20% reported consistent involvement over the 1-year period. Among students who reported simultaneous cyberbullying and cybervictimization involvement, 10% reported consistent involvement over 1 year.

For some students, involvement in cyberbullying was inconsistent across the 1-year period. A small group of adolescents (about 5%) did not report cyberbullying peers at the first time point, in the spring semester of either Grade 9 or 10, but began to cyberbully by the spring semester of the following year. Another 5% of students reported cyberbullying peers at the first time point, but had stopped by the next year. These findings may reflect the developmental pattern of general instability of antisocial behaviors during adolescence. Moffitt (1993) noted that a normative period of delinquency begins and ends during adolescence for most youth. Only a very small number of students within the total sample (2%) reported consistent cyberbullying across the 1-year period. This finding is consistent with longitudinal research in the traditional bullying literature (Pepler et al., 2008). It appears that most adolescents who cyberbully peers at school or via electronic media eventually desist, perhaps as a result of developing an awareness of the harm they are causing and/or the injustice of their behaviors.

Boys and girls reported similar rates of cyberbullying, but girls reported more involvement in cybervictimization than boys. These results contrast the robust finding within the traditional bullying literature that boys bully others and are victimized more often than girls (Forero et al., 1999; Nansel et al., 2001). The current study findings may reflect similarities between cyberbullying and social forms of traditional bullying (e.g., spreading rumors, gossiping, excluding certain people, etc.). Traditional bullying research focusing on social bullying indicates gender differences that are similar to the

current study (i.e., social bullying perpetration rates are similar between genders while victimization rates are slightly higher among girls; Card et al., 2008; Crick & Bigbee, 1998; Woods & White, 2005). Both cyber and social forms of bullying are covert and nonphysical, and can be perpetrated from afar without having to interact with the person being victimized. For these reasons, adolescents who would not have the confidence or social status to victimize peers directly are able to perpetrate cyber and social forms of bullying.

We investigated several psychosocial, academic, relationship, and school factors that may be associated with involvement in cyberbullying and cybervictimization. The inclusion of these individual and contextual factors reflects a developmental-contextual perspective for understanding problematic behaviors, as well as previous findings in the traditional bullying and cyberbullying literatures. To our knowledge, this study is the first to investigate these factors together during adolescence to explore the strength of their relative associations with cyberbullying and cybervictimization.

Traditional bullying and alcohol drinking represented psychosocial risk factors for cyberbullying. Students who reported traditional bullying behaviors or higher levels of alcohol drinking were roughly two times more likely than peers to be involved in cyberbullying. Cyberbullying behaviors appear to be part of a constellation of antisocial behaviors exhibited by some adolescents. Similar to traditional forms of bullying, these aggressive behaviors do not occur in isolation (Pepler, Craig, Connolly, & Henderson, 2002). Cyberbullying may represent a critical indicator for antisocial processes; specifically, the assertion of interpersonal power through aggression within the context of a relationship and with the power of the Internet (Pepler et al., 2006). Youth who are exhibiting problem behaviors (in this case, traditional bullying and high levels of alcohol drinking) may be more likely to initiate cyber forms of power and aggression in relationships.

Exposure to fewer prosocial peer behaviors emerged as the only contextual risk factor for cyberbullying. Students who reported fewer prosocial peer behaviors were about 50% more likely than other youth to be involved in cyberbullying. It is interesting that fewer prosocial peer behaviors, but not higher levels of peer delinquency, represented a risk factor for cyberbullying. Perhaps these youth are not members of a peer group or, if they are, they have fewer prosocial peers in their group to provide modelling of positive behaviors and/or feedback for negative behaviors than other students who tend not to cyberbully others.

Higher levels of depression and enrolment in the transition year for high school (i.e., Grade 9) represented individual risk factors for cybervictimization. Students who reported higher levels of depression or enrolment in Grade 9 at Time 1 were about 50% more likely than peers to be involved in cybervictimization. Internalizing problems including depressive symptoms have been identified as predictors of traditional forms of victimization (Fekkes et al., 2006; Haynie et al., 2001). Peers may target adolescents who exhibit internalizing problems, viewing these psychological problems as vulnerabilities to be exploited through bullying and cyberbullying. Enrolment in Grade 9 was expected to be a risk factor, since previous research

indicates that both traditional and cyber forms of bullying peak during the transition to high school and decrease thereafter (Pepler et al., 2006; Williams & Guerra, 2007).

Experience with traditional forms of victimization represented the only contextual risk factor for both cybervictimization and simultaneous cyberbullying and cybervictimization. Students who reported traditional victimization were almost four times more likely than peers to report cybervictimization or simultaneous cyberbullying and cybervictimization. It appears that traditional forms of victimization tend to precede cyber forms. Youths' experiences with traditional forms of victimization may represent a risk factor for cybervictimization because aggressive peers have already identified these youth as vulnerable and extend their victimization to include cyber forms. Experience with traditional victimization may also reflect social isolation and an inability to escape from this abusive interaction pattern.

The current findings indicate that traditional forms of bullying and victimization are associated with involvement in cyberbullying and cybervictimization, respectively. Previous researchers have also found this pattern of involvement (Dehue et al., 2008; Li, 2007b; Raskauskas & Stoltz, 2007; Smith et al., 2008). Cyberbullying may represent a new context for bullying to occur in, due to evolving technology and access to that technology. Hence, the ability to use electronic media to communicate with peers represents one more tool for aggressive and/or antisocial youth to use to control and distress others. In this study, we also found that traditional victimization, but not traditional bullying perpetration, represented a risk factor for simultaneous involvement in cyberbullying and cybervictimization. This finding lends support to the belief that traditional victimization is related not only to cybervictimization, but also to cyberbullying perpetration. Youth who are bullied via traditional forms may retaliate against their attackers via electronic media because they perceive it as less risky (i.e., they can do it anonymously) compared to face-to-face confrontation (Konig, Gollwitzer, & Steffgen, 2010; Ybarra & Mitchell, 2004a).

Many of the hypothesized individual and contextual risk factors investigated in this study were not significantly related to cyberbullying or cybervictimization. These findings were surprising and underscore the need to continue to examine potential relevant contextual factors related to cyberbullying and cybervictimization. The inclusion of these risk factors was largely based on the traditional bullying literature; the unique aspects of cyberbullying may be associated with risk factors that are specific to the use of electronic media. For example, research on traditional bullying indicates that having few friends represents a risk factor for victimization, as youth are more likely to be victimized when they are perceived as lacking a support system (Pellegrini & Bartini, 2000; Pellegrini, Bartini, & Brooks, 1999). Since cybervictimization often occurs outside the school environment when the youth is isolated from friends, however, a lack of friends or support system may not be considered by the youth who is cyberbullying, and therefore, may not be protective. It does appear that peer context plays a more salient role than the family context with respect to experiences of aggression and victimization using this

medium. Aggression may be related to a lack of positive peer norms (e.g., empathy for others) while victimization may be related to a generalization of experiences of being marginalized within the peer group. More research is required to identify relevant risk factors for involvement in cyberbullying and cybervictimization. Nonetheless, given that previous research has identified the overlap between traditional and cyber forms of bullying (Dehue et al., 2008; Li, 2007b; Raskauskas & Stoltz, 2007; Smith et al., 2008), traditional bullying prevention programs may also influence cyberbullying involvement.

Research Limitations

Using a large, nationally representative sample of Canadian high school students, this research focused on involvement in cyberbullying over a 1-year period. There are, however, several limitations in the present research. The WHO HSBC survey is a comprehensive assessment of health behaviors and does not focus specifically on cyberbullying. Survey questions tapped only the presence or absence of cyberbullying and cybervictimization, without further probing about the times and places at which these activities occur, as well as associated feelings and responses. In addition, the measure of cybervictimization had low reliability at Time 1; however, reliability was higher at Time 2 and we wanted to have comparable predictors and outcomes.

This investigation was based on self-report survey data. Self-report surveys include closed-answer questions, without allowing for further qualitative exploration. Also, findings based solely on self-report data need to be interpreted with caution because of shared method variance, given that students were the only ones reporting their own behavior. Despite the stated limitations, self-report data are effective for assessing high school students' behaviors, feelings, and opinions. Victimization in particular represents a private experience that many students do not report to others. Consequently, self-report data are essential for indexing these experiences.

Future Directions

Future research on cyberbullying should include prospective data that index stability and change over several data points across 1 year, as well as over the important developmental stage of adolescence. Research on the role of bystanders in cyberbullying is also needed. The traditional bullying literature suggests that youth who witness bullying are integral in exacerbating or stopping the bullying episodes (Craig & Pepler, 1995). In addition, reliability and validity studies for cyberbullying assessment tools are needed.

There is also a need for future research that focuses on cyberbullying and cybervictimization in more detail with an investigation of whether multiple forms of cyberbullying exist, as is seen with traditional bullying (i.e., verbal, physical, social, etc.). Cyberbullying behaviors can range from gossip to exclusion, insults, and physical threats; however, the presence of distinct forms has not been investigated.

Finally, research is needed to understand the role of adults in monitoring and intervening in cyberbullying. Traditional bullying research indicates that principals are

integral for the successful implementation of bullying intervention programs, and that teachers are the key agents for change within these programs (Olweus, 2004; Pepler, Smith, & Rigby, 2004). In addition, higher levels of parental monitoring are associated with lower levels of traditional bullying perpetration (Gage, Overpeck, Nansel, & Kogan, 2005; Haynie et al., 2001). A greater understanding of what adults know about cyberbullying and how they respond to reports of cyberbullying can inform cyberbullying prevention and intervention efforts. It is unknown whether adults in the school environment feel it is their responsibility to help youth who are being cyberbullied outside the school environment. Research is needed to index the opinions of school principals and teachers, to find out what they are doing to help youth who are involved in cyberbullying and/or cybervictimization.

Conclusion

Research on cyberbullying is emerging as youth find new ways to use their power aggressively to control and distress others. In this study, we have examined trends of cyberbullying and cybervictimization over a 1-year period during adolescence, along with associated individual and contextual factors. Cyberbullying was associated with antisocial behaviors and few prosocial peer influences, and cybervictimization was associated with grade level (i.e., enrolment in the transition year for high school), higher levels of depression, and greater involvement in traditional forms of victimization. Simultaneous involvement in cyberbullying and cybervictimization was associated with greater involvement in traditional victimization. Many of the hypothesized contextual risk factors including the family and school environment were not significantly related to cyberbullying or cybervictimization.

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