Cyberbullying: Predicting Victimisation and Perpetration

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Cyberbullying: Predicting Victimisation and Perpetration

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The double-edged nature of modern technology, continuously balancing between risks and opportunities, manifests itself clearly in an emerging societal problem known as cyberbullying. To analyse the extent and nature of the issue in Belgium, 1318 adolescents were questioned explicitly about their involvement in cyberbullying, as well as implicitly about their experience with specific types of cyberbullying-related behaviour. This alternate questioning revealed higher victimisation and perpetration rates. The study also provides better insight into predictors associated with victimisation or perpetration in cyberbullying. Especially past involvement in cyberbullying and engaging in online risk behaviour increase the likelihood of victimisation; non-rejection of cyberbullying and online identity experimentation augment the likelihood of perpetration. Girls are more likely to become victims of cyberbullying, whereas boys are more inclined to engage in electronic bullying. Moreover, the incidence of cyberbullying increases slightly with age. Finally, teens spending much time on the Internet, reporting higher ICT expertise and owning a computer with privileged online access share an increased likelihood of online bullying behaviour. © 2009 The Author(s). Children & Society © 2009 National Children's Bureau and Blackwell Publishing Limited.

Introduction

The introduction of digital media into households means minors are now able to use ICT for the purpose of harming others. Hence the growing interest from academia in the phenomenon of cyberbullying. Several surveys have assessed the prevalence of cyberbullying among school-aged youngsters. These studies have yielded varying outcomes. A 2007 American study reported 17% of respondents to be victims of cyberbullying and 18% perpetrators (Patchin and Hinduja, 2008). Somewhat different estimates were obtained in Li's (2006) Canadian study, with 25% victims and 17% perpetrators. In a two-wave longitudinal study, Wolak and others (2007) found evidence of a 50%-increase in the prevalence of cyberbullying (from 6% in YISS1 to 9% in YISS2). While researchers' understanding of the extent of the phenomenon is improving, the predictive factors of victimisation and perpetration in cyberbullying remain elusive. Therefore, the aim of the present study was not only to assess the extent of cyberbullying in Belgian schools, but also to explore which variables predict online victimisation and perpetration.

Predicting victimisation and perpetration

A literature review of cyberbullying was conducted to determine which variables to include in the analyses. The following variables were retained: gender, age, culture, educational level, past involvement in cyberbullying, attitude towards cyberbullying, online risk behaviour, ICT use and expertise. Subsequently, for each of the selected variables, hypotheses were formulated and tested in the further analyses. The hypotheses were inspired by previous research results, as summarised below.

Gender

Research findings on gender differences in cyberbullying diverge somewhat. Several studies in the US and Sweden found that teenage girls are equally likely as boys to cyberbully (or to be cyberbullied) (Patchin and Hinduja, 2008; Raskauskas and Stoltz, 2007; Slonje and Smith, 2007; Williams and Guerra, 2007; Ybarra and Mitchell, 2004). A Canadian study observed no significant gender difference in victimisation, although more boys were found to be perpetrators (Li, 2006). According to a Turkish study, boys are more involved in cyberbullying, both as perpetrators and as victims (Aricak and others, 2008). However, other UK and US studies conclude that girls are more likely to be victimised, while boys are more likely to perpetrate (Dehue and others, 2008; Smith and others, 2008; Wang and others, 2009). This predominance of girls as cybervictims and boys as cyberbullies is confirmed in Belgian research (Vandebosch and others, 2006). For the purpose of the present study, it is therefore hypothesised on the basis of these last mentioned studies that boys are more likely to perform acts of cyberbullying, whereas girls are more likely to be victims of such acts.

Age

Previous research findings regarding age differences in cyberbullying also diverge. Some studies suggest that cyberbullying occurs more frequently in lower secondary education. A Scandinavian study (Slonje and Smith, 2007) found 17.6% of pupils in lower secondary education to be online victims. This share dropped to 3.3% in higher secondary education (with perpetration dropping from 11.9% to 8.0%). This peak in cyberbullying rates during lower secondary education is confirmed in a Belgian study (Vandebosch and others, 2006). On the other hand, Ybarra and Mitchell (2004) found that older students (15+ years) are more often cyberbullies than younger students (10–14 years). Other research in the UK and the US observed no significant age differences (Patchin and Hinduja, 2008; Smith and others, 2008). As empirical findings paint a mixed picture, age differences in cyberbullying are further explored in the present study.

Culture

Research thus far is inconclusive on how culture and cultural values interact to affect bullying and victimisation. Various comprehensive reviews report large national and regional variations in bullying frequency (Stassen Berger, 2007). For instance, an intercultural study by Qing Li found that Chinese pupils were more likely to be victims, while Canadian students were about four times more likely to be cyberbullies (Li, 2007a, 2008). In Dutch-speaking Belgium, victimised pupils are outnumbered by perpetrating students, whereas in French-speaking Belgium more victims than bullies are reported (Craig and Harel, 2004). Although national and regional variations should be interpreted with caution due to

methodological issues, Stassen Berger (2007) suggests that culture, among other things, may underlie these variations. Therefore, culture was taken into consideration in our exploration of prevalence rates of cyberbullying in Belgium's Flemish and Francophone regions. As the two communities are characterised by different cultural backgrounds and educational systems, we expect to find significant discrepancies in the respective cyber-bullying estimates.

Educational level

The impact of educational level on cyberbullying behaviour in Flanders has previously been studied by Vandebosch and others (2006). It was found that the highest-level pupils (general secondary education) are significantly less involved in cyberbulling than pupils in other types of secondary education (technical, artistic and vocational training). On this basis, it is hypothesised that cyberbullying is more prevalent among pupils in lower educational levels than among those in the highest level.

Past involvement in cyberbullying

Previous research has found evidence that cyberbullies often become cybervictims them-selves. Similarly, cybervictimisation increases the likelihood of perpetration (Espelage and Swearer, 2003; Li, 2007b; Ybarra and Mitchell, 2004). It is therefore hypothesised in the present study that teenagers who have engaged in electronic bullying share an increased likelihood of being victimised. Conversely, victims are expected to exhibit a greater inclina-tion towards cyberbullying behaviour.

Attitude towards cyberbullying

Cyberbullies tend to minimise the gravity of their acts, while victimised students describe those acts as hurtful (Patchin and Hinduja, 2008). The three principal reasons for engaging in cyberbullying according to American youngsters admitting to such behaviour are 'revenge', 'he/she deserves it' and 'for fun' (Patchin and Hinduja, 2008). The same study stresses that most cyberbullies underestimate the harm they are causing. In the present study, it is hypothesised that teenagers who are less concerned about the possible impact of cyber-bullying are more likely to commit electronic aggression.

Online risk behaviour

Previous research has revealed that cyberbullies are more likely than non-bullying students to use instant messaging, blogs and chatrooms. Moreover, they tend to use such media in a risky way, posting personal information online (Kowalski and Witte, 2006; Vandebosch and others, 2006). In comparison with non-victims, targets engage more in e-mailing, Instant Messaging, authoring personal pages, online shopping, blogging, web surfing and gaming (Ybarra and others, 2006).

Therefore, teenagers using open and closed chat applications are expected to be more exposed to cyberbullying than teenagers not engaging in chatting. Furthermore, teenagers who chat with strangers are expected to be more likely to be victimised. The latter hypothesis is inspired by the previous research finding that many victimised pupils do not know the identity of the perpetrator (Kowalski and others, 2008).

It is further hypothesised that teenagers who post personal data (contact details, etc.) on a blog or profile page, as well as those who entrust sensitive information (passwords, etc.) to others, are more prone to victimisation than those who do not. Finally, teenagers who assume a different identity online ('identity fluidity') are expected to share an increased likelihood of perpetrating acts of cyberbullying.

ICT use and expertise

Cyberbullies and cybervictims are generally heavy Internet users (Kowalski and others, 2008; Vandebosch and others, 2006; Ybarra and Mitchell, 2004). Over 50% of cyberbullies claim to be expert Internet users, compared to just one-third of bully free pupils (Ybarra and Mitchell, 2004). Most cyberbullies and cybervictims attach great importance to the Internet. In an American study, approximately one in three bullying-involved pupils rated the Internet as extremely important in their lives, compared to just one in six among bully free youngsters (Ybarra and Mitchell, 2004). In the present study, it is expected that teenagers are more likely to engage in cyberbullying as their Internet use intensifies and their self-reported ICT expertise increases.

Finally, the study examines whether teenagers with Internet connectivity in their bedrooms are more likely to engage in cyberbullying. Conversely, it explores whether teenagers sharing a computer with other household members in a family room are less likely to become involved in cyberbullying.

Method

Participants

The survey was conducted among 1318 twelve- to eighteen-year-old secondary school pupils in Belgium. As education is a regional competency in Belgium, a stratified random sample of 28 schools was drawn in both the Francophone and the Flemish communities. Three classes per school were included (one from each grade). The following sampling criteria were used: educational cycles (first, second and third, each encompassing two years) and the three schooling types (general secondary education, i.e. 'ASO' in Flemish and 'Enseignement Général' in French; technical or artistic training, i.e. 'TSO' and 'KSO' in Flemish, 'Enseignement Technique'/Artistique' in French; and vocational training, i.e. 'BSO' in Flemish, 'Enseignement Professionnel' in French). Neither the number of students in each class, nor the proportion of girls and boys among the respondents could be postulated. Consequently, an overrepresentation of girls, students in vocational training, and French-speaking respondents was observed. Therefore, all results discussed below were weighted according to the population proportions for these characteristics. The basic characteristics of the sample are summarised in Table 2.

Questionnaire

The survey focused on pupils' personal experiences with cyberbullying, and respondents were not asked to identify either bullies or victims. The survey was first tested for comprehensibility and question clarity in a class of 12–13-year-olds. Subsequently, some terminology was briefly defined and certain questions were rephrased. Cyberbullying was simply defined as bullying over the Internet or mobile phone, so that the two electronic devices

used most commonly by children for bullying others were included (Li, 2006; Slonje and Smith, 2007).

The selection of variables covered by the questionnaire is based on previous research, as outlined in the literature overview. Five direct types of cyberbullying were considered, as summarised in Table 1 (Vandebosch and others, 2006). The respondents were asked explicitly about previous involvement with bullying over the Internet or mobile phone, and how often they had been victims or perpetrators (never, seldom, once in a while, often). In addition, the pupils were implicitly sounded out by presenting them with brief descriptions of situations and asking them how often they had perpetrated or undergone the acts described. Aalsma and Brown (2008) suggest that explicit questioning through self-reporting or interviewing could lead to underreporting, as endorsing the label of 'bullying victim' may be emotionally difficult for some youngsters. Therefore, a behaviour-based measure, whereby respondents are asked merely to identify situations experienced, without the need to endorse a specific label, is arguably more appropriate. Hence, in addition to an explicit question about involvement as either a cyberbully or victim, descriptions of concrete cyberbullying acts were included.

Questionnaires had to be completed within one class hour. Due to time restraints, pupils were not queried about their involvement in indirect forms of cyberbullying or offline forms of bullying. Prior to their answering the questions on cyberbullying, the respondents were asked to provide demographic details (gender, age, education). One part of the questionnaire was dedicated to ICT use. Frequency of online activities, computer skills and Internet dependency were gauged. Frequency was expressed in daily hours spent on the Internet. To probe the respondents' online skills, a list of eight competences was presented (Vandebosch and others, 2006). For each skill, the respondents were asked to indicate their level of proficiency.

Table 1: Frequency of cyberbullying (n = 1282; explicit questioning and implicit questioning)

	Frequency							
	Perpetrator				Victim			
	No	Yes			No	Yes		
	Never (%)	Seldom (%)	Once in a while (%)	Often (%)	Never (%)	Seldom (%)	Once in a while (%)	Often (%)
Explicit questioning								
Bullying via Internet or mobile phone	78.8	14.8	4.4	2.0	65.8	21.5	10.4	2.4
Implicit questioning								
Sending unwanted e-mails or mobile text messages	88.6	8.0	2.3	1.1	54.6	25.3	14.8	5.4
Excluding other persons online	80.9	11.6	5.4	2.1	88.1	9.2	1.7	1.0
Uploading embarrassing images without notice nor consent	91.2	5.7	2.2	0.9	86.8	9.2	3.5	0.6
Breaking into the e-mail or MSN account and sending messages to the contacts	88.7	7.4	2.8	1.0	82.4	13.2	3.3	1.2
Breaking into the e-mail or MSN account and changing the password	84.6	10.6	3.2	1.7	79.5	16.0	3.4	1.1

Exploratory factor analysis was conducted to identify latent variables within the eight competences. Subsequently, confirmatory factor analysis (CFA) using maximum likelihood estimation resulted in a one-factor solution (Lisrel, Scientific Software International Inc.). Cronbach's alpha was calculated to assess internal consistency of the scale 'online skills'. The reliability coefficient was 0.774 (>0.70: reliable scale) (Mortelmans and Dehertogh, 2008).

Furthermore, a number of variables were integrated with regard to the teenagers' degree of autonomy in Internet use. The respondents were asked whether or not they share their home computer with other household members and whether they access the Internet in the privacy of their bedroom or study, or in a family room.

The pupils were also questioned about their chatting behaviour, and particularly whether they engaged in 'open chat', where anyone can join in, or 'closed chat', such as Instant Messaging, where a user has to accept someone's request to be added to the contact list.

Questions were asked to measure the incidence of various types of behaviour that may increase the likelihood of negative online experiences, such as sharing contact details online or passing on e-mail or Instant Messaging passwords to others. Identity fluidity was incorporated as a possible strategy for bullies to mask their identity online and during bullying in particular.

Finally, pupils' attitudes towards cyberbullying were gauged by asking respondents whether they considered specific types of behaviour by peers to be slightly or seriously annoying.

Procedure

Data were collected through anonymous questionnaires distributed in the classrooms. Formal consent was sought by the school principal and supervising teachers and it was made clear at the beginning of the survey that the youngsters were under no obligation, either explicitly or implicitly, to participate. The literature suggests that this is important, as youngsters may perceive researchers as figures of authority whom they must obey (Mahon and Glendinning, 1996). The youngsters' parents were informed about the survey and their collaboration was requested. The survey purpose and procedure were explained by two researchers. The students were assured verbally that their responses were anonymous and confidential, and that no information would be passed on to teachers, parents or fellow pupils. Provisions were made to guarantee the participants' privacy and confidentiality during the administration of the questionnaire by proceeding in much the same way as during a classroom test. To minimise test anxiety, it was however emphasised that there were no right and wrong answers. Pupils and teachers were free to ask questions individually. The purpose of the survey, procedure and contact details were also summarised on a separate sheet.

Analysis

The analyses were performed with SPSS/PC (SPSS Inc., Chicago, IL, USA). Univariate and bivariate statistics were used to explore the nature and the extent of cyberbullying. Logistic regressions were applied to explore the predictive value of the selected variables. As dichotomisation of the dependent variable is a prerequisite for logistic regression, an 'ever/never' approach was taken.

Results

Nature and extent of cyberbullying at Belgian Schools

In the first instance, respondents were asked *explicitly* about their involvement as perpetrators or victims of cyberbullying. Approximately one-third (34.2%) had been a target of online bullying, while one-fifth (21.2%) admitted to having cyberbullied others. As Table 1 shows, only a small proportion of youngsters report systematic perpetration (2.0%) or victimisation (2.4%). Involvement in cyberbullying was further gauged *implicitly* by confronting respondents with examples of deviant ICT uses classified as or related to cyberbullying. Nearly six in ten teens (64.3%) had experienced one or several of the situations described, while four in ten (39.9%) had perpetrated at least one. The frequency of specific cyberbullying situations is summarised in Table 1.

Table 2 shows that pupils in French-language education report higher perpetration and victimisation rates than their Flemish counterparts. Further, a significant age difference is observed, as bullies are found to be slightly older than non-bullies. The data reveal no significant gender differences among perpetrators, but girls are significantly more likely to be victimised. As for educational level, our data show that cyberbullying (victimisation and perpetration) is an issue mostly in vocational and in artistic/technical training, though pupils in the highest level (general secondary education) can also become involved. As regard ICT use, results show perpetrators to be heavy Internet users, while both victims and perpetrators claim great Internet expertise.

A possible concordance was analysed between cyberbullying on the one hand and chatting and risk behaviour on the other. Teens engaging in open chat are significantly more involved as victims or perpetrators. The same holds for respondents engaging in chat with peers and older persons they know only online, and for those disclosing passwords of their e-mail or Instant Messaging accounts. Youngsters who reveal personal details on a blog or profile page are significantly more involved in cyberbullying perpetration and victimisation. Finally, among pupils venturing into identity fluidity, there are significantly more cyberbullies.

Attitudes towards cyberbullying were also gauged. The respondents would strongly condemn a hack into their e-mail or Instant Messaging account and the subsequent sending of bogus messages to their contacts or resetting of passwords (respectively 96.5% and 96.3% condemn such acts).

The posting of illicitly taken photographs or videos on the web (89.1%), the delivery of unsolicited messages (83.6%) and exclusion from online discussions (76.7%), were rated as slightly less negative.

Predicting victimisation and perpetration

Logistic regression is applied to a dependent dichotomous variable to predict the probability that an observation belongs to each of the two groups. In this instance: perpetrators of cyberbullying or not, victims or not. The measurement of probability is expressed by an odds ratio. The more the odds ratio differs from 1, the stronger the association. In this exploratory research, direct logistic regressions were performed, i.e. all the predictors were entered into

Table 2: Perpetrator and victim of cyberbullying, descriptive results (n = 1318)

Respondents' characteristics	All respondents (n = 1318)	Perpetrator of cyberbullying			Victim of cyberbullying		
		No	Yes	P-value	No	Yes	P-value
Cyberbullying		78.8%	21.2%		65.8%	34.2%	
Demographics							
French community	45.2%	68.5%	31.5%	0.000	45.1%	54.9%	0.000
Flemish community	54.8%	87.1%	12.9%		82.4%	17.6%	
Male	50.5%	78.4%	21.6%	NS	73.8%	26.2%	0.000
Female	49.5%	79.2%	20.8%		57.5%	42.5%	
Age (M : SD)	15.1 (1.9)	14.99 (1.85)	15.34 (2.02)	0.006	15.01 (1.82)	15.13 (2.02)	NS
Education level*							
Vocational training (FR)	7.0%	62.5%	37.5%	0.000	42.7%	57.3%	0.000
Artistic/technical (FR)	9.4%	48.7%	51.3%		35.8%	64.2%	
General-Theoretic (FR)	28.4%	76.3%	23.7%		48.3%	51.7%	
Vocational training (FL)	13.4%	83.5%	16.5%		83.6%	16.4%	
Artistic/technical (FL)	20.1%	91.4%	8.6%		83.6%	16.4%	
General-Theoretic (FL)	21.8%	84.9%	15.1%		80.6%	19.4%	
ICT use							
Online frequency (hours/day) [M[SD]]	2.35 (1.39)	2.27 (1.41)	2.66 (1.44)	0.000	2.37 (1.41)	2.29 (1.33)	NS
Online expertise (M[SD])	5.70 (2.10)	5.59 (2.11)	6.31 (1.74)	0.000	5.60 (2.11)	6.01 (1.95)	0.001
Own PC	18.3%	17.7%	20.1%	NS	16.6%	21.67%	0.027
PC in private room	56.1%	55.2%	59.1%	NS	55.0%	58.1%	NS
Open chat	44.4%	41.2%	56.4%	0.000	40.8%	51.3%	0.000
Closed chat	93.6%	93.0%	95.4%	NS	93.6%	93.2%	NS
Chat risks							
Chatting with peer virtual contact	53.2%	49.0%	68.8%	0.000	46.2%	66.4%	0.000
Chatting with older virtual contact	27.2%	23.4%	42.5%	0.000	23.1%	35.2%	0.000
Disclosing password to peers	45.2%	42.4%	55.9%	0.000	42.6%	49.7%	0.017
Identity fluidity	21.7%	19.1%	31.5%	0.000	20.4%	24.1%	NS
Disclosing personal data on blog	40.8%	36.9%	52.7%	0.000	31.4%	57.5%	0.000
Disclosing personal data on a personal profile page	63.8%	61.8%	71.3%	0.004	59.0%	72.7%	0.000

M, mean; SD, standard deviation; NS, not significant.
*Education level is differentiated into three levels in both communities; FR, French and FL, Flemish community education.

the equation simultaneously. This type of logistic regression is recommended when no specific hypotheses about the order or importance of predictor variables can be formulated (Tabachnick and Fidell, 2007). Hosmer and Lemeshow (in Tabachnick and Fidell, 2007) recommend a criterion for inclusion of a predictor variable that is less stringent than 0.05, suggesting that an alpha ranging between 0.15 and 0.20 is more appropriate to ensure the entry of variables with coefficients different from zero. Two out of nine variables have an alpha score that is higher than 0.05 (and lower than 0.20). They were retained in explaining and predicting perpetration of cyberbullying.

The proportion of correct classification of the cyberbullying perpetration cases is 73.0%. The different goodness-of-fit measures indicate a good model fit (model χ^2: 170.336, $P = 0.000$; Nagelkerke R^2: 0.381). For online victims, the proportion of correct classification of the cases is 72.0%. The different goodness-of-fit measures indicate a good model fit (model χ^2: 214.598, $P = 0.000$; Nagelkerke R^2: 0.232). In the following two paragraphs, the predictors are discussed in descending order of importance.

Victimisation

Results in Table 3 suggest that the most important predictor of victimisation is previous involvement in cyberbullying as a perpetrator. Cyberbullies are six times more likely to be victimised. Other influential predictors are chatting with older online acquaintances and passing on passwords of e-mail and Instant Messaging accounts to others. Teens who publish personal information on a blog also share an elevated likelihood of becoming an online victim. As regards gender, our data indicate that female Internet users are more likely to be cyberbullied than their male counterparts. Both chatting in open and closed chatrooms induces a greater risk of being victimised.

Table 3: Determinants of victimisation ($n = 1185$)

Variables	Beta	Odds ratio	Wald's χ^2	Sig.
Gender (male/female)	0.437	1.548	9.790	0.002
Cyberbullying perpetration	1.897 (1)	6.668	48.798	0.000
Using closed chat	0.518	1.678	3.877	0.049
Using open chat	0.400	1.492	7.307	0.007
Chatting with unfamiliar older online partners	0.850 (2)	2.339	15.331	0.000
Personal data in own blog	0.548	1.730	13.269	0.000
Entrust password	0.609 (3)	1.839	17.399	0.000
Constant	−0.825	0.438	10.103	0.001

Model summary: Model χ^2: 214.598, $P = 0.000$; Nagelkerke R^2: 0.232; Correct classification of cases: 72.0%.

Perpetration

Online victimisation is the key predictor of future perpetration in cyberbullying. The logistic regression analysis indicates that cybervictims are nine times more likely to engage in cyberbullying. Second, Table 4 shows that approval of bullying has significant predictive value in respect of perpetration. Teenagers who disapprove of electronic bullying are significantly less inclined to perpetrate. Third comes identity fluidity, i.e. youngsters assuming different identities online are more likely to commit acts of electronic bullying. Other significant predictors of perpetration are gender and age: boys are more inclined than girls to engage in electronic

Table 4: Determinants of cyberbullying perpetration ($n = 1185$)

Variables	Beta	Odds ratio	Wald's χ^2	Sig.
Gender (female/male)	0.447	1.563	4.215	0.040
Age	0.178	1.195	6.745	0.009
Online frequency	0.172	1.187	5.121	0.024
Online expertise	0.065	1.067	2.715	0.099
Cyberbullying victim	2.235 (1)	9.348	67.670	0.000
Gravity cyberbullying	−1.376 (2)	0.253	15.421	0.000
Place PC	0.387	1.473	2.305	0.129
Own PC	0.481	1.617	4.323	0.038
Identity fluidity	1.116 (3)	3.053	16.464	0.000
Constant	−3.749	0.024	27.410	0.000

Model summary: Model χ^2: 170.336, $P = 0.000$; Nagelkerke R^2: 0.381; Correct classification of cases: 73.0%.

bullying, and the incidence of cyberbullying increases slightly with age. Frequent Internet users are more likely to perpetrate acts of cyberbullying. Teens with a computer and Internet connection in their bedroom or study are also more likely to cyberbully than youngsters with less private computer access. Finally, our data suggest that teenagers with higher self-reported ICT expertise share a greater likelihood of engaging in cyberbullying.

Discussion

With approximately one-third of the respondents having experienced online victimisation and one-fifth having perpetrated acts of cyberbullying, the phenomenon of cyberbullying is widespread in Belgium.

The discrepancy between the responses to explicit and implicit questions regarding cyber-bullying suggests that an exclusively explicit approach will systematically underestimate the problem. Further inquiry into youngsters' experiences with specific types of online aggression may provide valuable information for assessing the extent of cyberbullying. Similar discrepancies were, for that matter, found in an American study (Patchin and Hinduja, 2008).

The present study demonstrates that, as was suggested by Stassen Berger (2007), cultural factors may underlie variations in cyberbullying prevalence. The victimisation and perpetra-tion rates among pupils in French-language education are approximately three times greater than among those in Flemish schools. These regional variations should be interpreted with caution due to methodological issues. It should be taken into account that the corresponding surveys were formulated respectively in French and in Dutch. This may have impacted on the results. Moreover, the divergent responses may be attributable to differences in anti-bullying policies in Francophone and Dutch-speaking Belgium. The two communities have different educational systems and, as Vettenburg (1999) has ascertained, the issue of bullying has attracted greater attention in the Flemish schools. Moreover, several large-scale sensitisation initiatives have been taken in Flanders (Deboutte, 2009). Future research might therefore focus not only on cultural factors that potentially determine differences in the prevalence of cyberbullying, but also on dissimilarities in terms of the policy response.

As regards educational level, the findings confirm that cyberbullying is mainly an issue in vocational and technical/artistic education. Still, while this information might be

helpful in determining a strategic response to cyberbullying in secondary education, pol-
icy-makers should keep in mind that the phenomenon also occurs in the highest educa-
tional level.

The data show that cybervictims and cyberbullies are generally heavy Internet users and that
they generally report higher online skills than other students. These findings confirm the
image of the ICT savvy cyberbully (Kowalski and others, 2008; Vandebosch and others,
2006; Ybarra and Mitchell, 2004). Finally, perpetrators are significantly older than
non-bullies. These results correspond partly with Ybarra and Mitchell's (2004) finding that
online aggressors are older than their targets and bully free pupils.

In line with earlier studies, individual's previous experience with cyberbullying was found to
be a key predictor of perpetration (Kowalski and Limber, 2007; Li, 2007a; Patchin and Hin-
duja, 2008; Slonje and Smith, 2007; Vandebosch and others, 2006). This suggests that the
cyberbullies' hostility may be fuelled by their own experiences of victimisation. Insofar as
victimisation is concerned, this key predictor is followed by engagement in other kinds of
online risk behaviour, such as chatting with peers and unfamiliar older Internet users, dis-
closure of (e-mail or instant messaging) passwords, or posting of personal details on a blog.

In comparison with predictors for victimisation, the second order predictors of perpetration
are slightly different. Especially the perceived gravity of cyberbullying and experimentation
with different online identities are important. This concurs with a finding in a previous study
that bullies find their behaviour humourous rather than offensive (Patchin and Hinduja,
2008) and with the observation in earlier research that the majority of the victims do not
know the identity of the offender (Kowalski and Limber, 2007; Patchin and Hinduja, 2008;
Vandebosch and others, 2006). Girls are found to be significantly more likely to be
victimised, which ties in with previous research (Li, 2006, 2007a; Smith and others, 2008;
Vandebosch and others, 2006).

In addition, our study found that cyberbullies are more likely to use their own computer in
a study or bedroom than a shared device in a family room. A possible explanation is that
cyberbullying is an activity that typically slips under the adult radar.

In conclusion, most findings of this study seem to correspond with empirical evidence from
previous research. However, it should be noted that the present study exhibits some weak-
nesses. For one thing, other online experiences besides cyberbullying were integrated into
the survey. Hence, due to time restraints, the survey focused exclusively on direct forms of
cyberbullying, while ignoring indirect forms or offline bullying. Also, no in-depth questions
were asked about victims' perception of and coping strategies for cyberbullying. Despite
these limitations, the current study provides some insight into the profiles of victims and
perpetrators, and it pinpoints the relationship between cyberbullying and other online risk
behaviours.

Future studies need to explore in greater depth the possible relationship between cyberbully-
ing involvement, reporting, coping and parenting styles in general as well as parents' com-
mitment to their children's ICT use. More research is urgently needed into the association
between cyberbullying and other (online and offline) teenage risk behaviours. Although some
research focuses on the co-occurrence of cyberbullying and offline (verbal and physical)
bullying at school (Kowalski and Limber, 2007; Li, 2007a; Patchin and Hinduja, 2008; Slonje

and Smith, 2007; Vandebosch and others, 2006), further in-depth research should explore the relationship with school context variables, such as teachers' and pupils' views on the acceptability of bullying. Many authors support the call for the inclusion of electronic bullying prevention in conventional anti-bullying programmes (Campbell, 2005; Kowalski and others, 2008; Williams and Guerra, 2007). A *whole-school approach* involving pupils, teachers and parents has been recommended as a core intervention by several authors on anti-bullying projects (Deboutte, 2009; Olweus, 1994; Peterson and Rigby, 1999; Stassen Berger, 2007; Vreeman and Aaron, 2007). Within this approach, interventions must be directed at the entire school context rather than just at individual bullies (Smith and others, 2004; Stevens and others, 2000). The authors support the call for cross-national scientific co-operation and argue that an advancing harmonisation of research methodology could ameliorate the insights into cyberbullying. In this context, the European Co-operation in the field of Scientific and Technical research (COST) regarding cyberbullying is promising, as it allows researchers to share their expertise.

Finally, we encourage policy, research and prevention programmes to remain flexible, as the convergence of Internet applications and mobile telephony may well impact on the evolution of cyberbullying as a societal problem.

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