



# Bullying victimization: time trends and the overlap between traditional and cyberbullying across countries in Europe and North America

Alina Cosma<sup>1,2</sup> · Sophie D. Walsh<sup>3</sup> · Kayleigh L. Chester<sup>4</sup> · Mary Callaghan<sup>5</sup> · Michal Molcho<sup>5</sup> · Wendy Craig<sup>6</sup> · William Pickett<sup>7</sup>

Received: 27 February 2019 / Revised: 30 May 2019 / Accepted: 4 December 2019 / Published online: 16 December 2019

© Swiss School of Public Health (SSPH+) 2019

## Abstract

**Objectives** This study explores recent cross-national trends over time (2002–2014) in the occurrence of victimization by bullying; then it documents the overlap between cybervictimization and traditional bullying in 2014 among adolescents in 37 countries.

**Methods** Data from four cycles (2002, 2006, 2010, and 2014) of the cross-national Health Behavior in School-Aged Children study were included ( $N = 764,518$ ). Trends in traditional victimization were evaluated using logistic regression models in 37 countries. Prevalence of cybervictimization and the overlap between cybervictimization and traditional victimization were estimated.

**Results** Linear decreases in bullying victimization were observed in 21 countries among boys, and in 12 countries among girls. The prevalence of cybervictimization was systematically lower than traditional victimization. Overall across all countries, 45.8% of those who reported cybervictimization also reported traditional victimization (46.5% for boys and 45.3% for girls), but wide country variations were observed.

**Conclusions** These indicate the need for a more holistic perspective to intervention and prevention that considers all expressions of bullying, traditional or online. Public health programs and policies could focus on addressing bullying more broadly, rather than focusing on behaviors that happen in a particular context.

**Keywords** Bullying · Victimization · Cybervictimization · Adolescence · HBSC

## Introduction

Bullying or bullying victimization is defined as “repeated aggressive behavior, with an imbalance of power between the aggressor and the victim” (Olweus 1997). Bullying can take many forms: physical, verbal, and social, and it can be direct or indirect. Recent national and international analyses have reported declines in such traditional forms of bullying victimization over time (Chester et al. 2015; Cosma et al. 2015; Waasdorp et al. 2017). Some have attributed these observed declines in bullying victimization to increased public awareness about the importance of eliminating violence and aggression and the need for its prevention (Waasdorp et al. 2017). An alternative explanation, however, is that a shift has occurred in the contexts in which bullying occurs, shift that parallels the societal

✉ Alina Cosma  
alina.cosma@hbsc.org

<sup>1</sup> Department of Interdisciplinary Social Science, Faculty of Social and Behavioural Sciences, Utrecht University, P.O. Box 80.140, 3508 TC Utrecht, The Netherlands

<sup>2</sup> Department of Psychology, Babes Bolyai University, Cluj Napoca, Romania

<sup>3</sup> Department of Criminology, Bar Ilan University, Tel Aviv, Israel

<sup>4</sup> Centre for Research in Public Health and Community Care, University of Hertfordshire, Hertfordshire, United Kingdom

<sup>5</sup> National University of Ireland Galway, Galway, Ireland

<sup>6</sup> Department of Psychology, Queen’s University at Kingston, Kingston, Canada

<sup>7</sup> Department of Public Health Sciences, Queen’s University at Kingston, Kingston, Canada

move to more virtual social environments in child populations (Kowalski et al. 2018).

Cyberbullying or cybervictimization is defined as bullying involving threats, insults, and other degrading actions that occur in virtual environments (Smith et al. 2008). Increased access to electronic devices and decreased adult supervision online has given rise to new opportunities for its occurrence (Mishna et al. 2012). Different types of cyberbullying have therefore emerged with the evolution of virtual social contexts (i.e., emerging social media networks), and involvement in these experiences tend to peak during early adolescence (Jones et al. 2013; Kowalski et al. 2014; Livingstone et al. 2018). What is not fully clear, however, is the extent to which cybervictimization has evolved during recent years among adolescent populations, as the more traditional forms of bullying have begun to decline (Sinclair et al. 2012).

The last decade has seen much debate about the differences between traditional bullying and cyberbullying (e.g., Antoniadou and Kokkinos 2015). Despite similarities between these two behaviors (notably as acts of aggression, involving a power imbalance and repetition) (Kowalski et al. 2014), there are some important distinctions. Some of the most noted ones include aspects of cyberbullying such as perpetrators “perceived anonymity and the potential for a broad audience, as well as moving beyond school setting.” As such, temporality and location are relative in cyberbullying, as well as the support made available for victims (Kowalski et al. 2018). For both traditional and cyberbullying, there is high variability among studies regarding the prevalence. This variability is likely due to methodological issues, such as differences in sample, differences in the cutoffs regarding involvement, and demographic characteristic of the samples (Kowalski et al. 2018). For example, a recent review indicated that the prevalence rates of cybervictimization in the last 10 years ranged from 1% to 61.1% depending on the study (Brochado et al. 2017). These criticisms also are true for studies that examined prevalence in traditional victimization (Smith et al. 2019). Nonetheless, for traditional victimization, it seems that, across studies, boys are more likely to report being bullied (though this gender difference is less systematic and strong as compared to perpetration rates) (Smith et al. 2019), and overall victim prevalence tends to decrease with age during adolescence (Smith et al. 1999). On the other hand, for cybervictimization, girls are more likely to report victimization (Kowalski et al. 2018), and the prevalence increases with increasing age. Such a wide range suggests that further research is needed to understand prevalence of cybervictimization cross-nationally.

Victimization by bullying in all its forms has important health consequences (Arseneault et al. 2010; Moore et al. 2017; Takizawa, Maughan, and Arseneault 2014). These

can include anxiety and depression (Turner et al. 2013), self-harm (Fisher et al. 2012), suicidal ideation (Bannink et al. 2014), and other destructive externalizing symptoms and behaviors (Vaillancourt et al. 2013). Mental health problems among cybervictims are widespread and can even be more severe than those of face-to-face bullying (Blais et al. 2008). Moreover, there is evidence that cybervictims are more likely to report mental health problems even after controlling for traditional victimization (Law et al. 2012). However, others have not found as strong associations (Przybylski and Bowes 2017).

Previous studies argued that there is continuity in victimization experiences across contexts, that is, victims of traditional bullying also tend to be victims of cyberbullying (Lazuras 2017; Olweus and Limber 2018). Both cross-sectional (Hinduja and Patchin 2008) and longitudinal research (Lazuras et al. 2017) on the continuity of victimization across traditional and cybercontexts further highlights the importance of studying the overlap between contexts. High degrees of overlap could be indicative of an escalation or reinforcement of being bullied at school, and often by the same perpetrator(s) (Ybarra et al. 2007). This polyvictimization inflicted by the same perpetrators stands even when controlling for the interaction patterns between the victim and perpetrator (i.e., mutual cyberbullying) (Wegge et al. 2014). On the other hand, low levels of overlap may suggest that cybervictims may have different characteristics to traditional victims (e.g., being physically strong and therefore less susceptible to traditional bullying). Moreover, other studies that have explored the degree of overlap between traditional and cybervictimization offer inconsistent findings (Kubiszewski et al. 2015; Olweus and Limber 2018) and are limited to national and regional analyses with limited sample sizes.

One major limitation of the previous studies is the sampling bias as the samples used often are (nationally or regionally) non-representative which may lead to distorted estimates of prevalence of both bullying and cybervictimization (Modecki et al. 2014). Therefore, using cross-country national representative data allows research to explore the universality of the problem and commonalities across countries. Moreover, it provides the ability then to compare and learn from countries with low base rates. We had a unique opportunity to address these gaps in evidence by: (1) first exploring recent cross-national trends over time (2002–2014) in the occurrence of victimization by bullying among adolescents in 37 countries; then (2) documenting the overlap between cybervictimization and traditional forms of bullying in 2014 alone across 37 countries. From a public health perspective, this analysis allowed us to identify whether different children are being bullied in separate contexts or whether there is a group of children, who may be of particular concern, who are being bullied in

multiple contexts. Few cross-national studies of these overlaps have been conducted, and such analyses have great potential to inform public health theory, interventions, and practice.

## Methods

### Participants

Data from the four most recent survey cycles (2002, 2006, 2010, and 2014) of the cross-national Health Behavior in School-Aged Children (HBSC) study were included. HBSC is a study of adolescent health behaviors conducted using a standardized international research protocol that specifies sampling methods and questionnaire content across 44 participating countries and (Currie et al. 2014). For each survey round, country teams studied a nationally representative sample of 11-, 13-, and 15-year-olds. Participants were recruited via multi-stage stratified random cluster sampling, with the school or the school class as the sampling unit.

In all four rounds, eligible and consenting adolescents completed questionnaires in classroom settings, with all data provided remaining anonymous. Questionnaires were translated from English into respective national languages with back-translation checks for accuracy under international supervision. A total of 37/44 HBSC countries that had participated in at least three out of the four survey cycles were included in our analyses (Iceland, Luxembourg, Romania and Russian Federation had collected data in only three survey cycles, whereas all the remaining countries collected data in all four). In line with recommendations from the literature, it needs at least 3 measurement points in order to calculate a trend (Schnohr et al. 2015). Therefore, all participating countries that collected data in at least three surveys have been included in the analysis. A total of 764,518 individual participants were included, of whom 49% were boys and 51% were girls (Table 1).

### Measures

#### Traditional bullying victimization (all four survey cycles)

An adapted version of the Olweus (1997) bullying victimization questionnaire was used in each survey year. Participants were presented with a definition of bullying that emphasized its intentionality, power imbalance, and repetition as defining characteristics. After reading a definition, they were asked to indicate whether they have been bullied at school in the past couple of months with the following response options: 1 = “I haven’t been bullied”,

**Table 1** Description of international study sample, Health Behavior in School-Aged Children (HBSC) study, 2002 to 2014

Descriptor	No.	(%)
Number of countries	37	
Total participants— weighted no. (%)		
All survey cycles	764,518	(100.0)
2002 cycle	158,024	(20.7)
2006 cycle	193,050	(25.3)
2010 cycle	202,589	(26.5)
2014 cycle	210,855	(27.6)
By gender— weighted no. (%)		
Boys	374,853	(49.0)
Girls	389,665	(51.0)
By age-group— weighted no. (%)		
11 years	247,266	(32.6)
13 years	260,077	(34.3)
15 years	251,660	(33.2)

2 = “1–2 times”, 3 = “2–3 times a month”, 4 = “About once a week”, 5 = “Several times a week”. Based on precedent (Chester et al. 2015), we grouped those who reported being victimized at least 2–3 times a month versus those that indicated a lesser frequency for analysis purposes.

#### Cybervictimization (2014 survey cycle only)

Only in the 2014 HBSC survey, participants were asked to indicate how often in the past couple of months they had experienced the following: ‘Someone sent mean instant messages, wall postings, emails and text messages or created a website that made fun of me’ and ‘Someone took unflattering or inappropriate pictures of me without permission and posted them online’. The response options were 1 = “I haven’t been bullied”, 2 = “1–2 times”, 3 = “2–3 times a month”, 4 = “About once a week”, 5 = “Several times a week (unlike the traditional measure, “at school” was not specified as a context for this bullying). The cybervictimization items followed the traditional bullying items in all national surveys. Details about the psychometric properties of these items are available in Cappadocia, Craig and Pepler (Cappadocia et al. 2013). For consistency with the traditional bullying item, for each of the two items, we grouped those who reported being victimized at least 2–3 times per month versus those that indicated a lesser frequency. We then created a composite variable of cybervictimization by combining all

participants who have indicated being cyberbullied via either or both of the two methods at least 2–3 times per month.

## Statistical analysis

### Trends analysis

Data analyses were conducted using SPSS 24 (SPSS IBM). Descriptive analyses were used to characterize the international sample. The prevalence of traditional bullying victimization was estimated by survey cycle in subgroups defined by age and gender. The prevalence of cybervictimization (individual items by photograph and text and in composite prevalence) was estimated only for the 2014 survey cycle. Age-/gender-standardized prevalence rates were then estimated by survey cycle for each of the 37 participating countries using the entire study population as the standard. Next, we evaluated age- and gender-adjusted trends in reports of bullying victimization over time within each country using logistic regression analyses that modeled traditional bullying victimization (“being bullied at least 2–3 times in past couple of months” at school, versus “no and 1–2 times”) as the dependent variable, and year of the survey cycle as the independent variable. All models were run separately for each country and for each age and gender combination. By using the Complex Sample package in SPSS, all models accounted for the clustered nature of the sampling scheme, with individuals nested within schools.

### Overlap between cybervictimization and traditional bullying victimization

Finally, for the HBSC 2014 data only, degrees of overlap between cybervictimization and traditional bullying victimization were calculated for both genders, as well as for each age and gender combination. Analyses were weighted by sample sizes within each country.

## Results

### Linear time trends in traditional victimization

Among boys (combining all three age-groups), we observed statistically significant linear decreases ( $p < 0.05$ ) in reports of traditional victimization at school in 21 countries and regions with the strongest effects seen in Germany ( $\beta = -0.072$ ;  $p < 0.001$ ) and Italy ( $\beta = -0.078$ ;  $p < 0.001$ ) (Table 2). Linear increases from 2002 to 2014 were observed in six countries (Belgium (French), Hungary, Russian Federation, Scotland,

Slovenia, and Wales). No significant linear change over time was seen in ten countries. Overall for girls (combining all three age-groups), significant linear decreases in traditional bullying victimization from 2002 to 2014 were observed in 12 countries. Linear increases in traditional bullying victimization for girls were observed in 8 countries (whereas no significant change was reported in 17 countries (Table 2).

While similar patterns were observed across gender and age-groups in most countries, there were countries in which the trend over time for boys and girls followed different patterns (Table 2). For example, in Finland, no change over time was observed for boys, whereas increases over time were identified for girls. Similar patterns were observed in Latvia and Malta. In Sweden, a linear decrease over time was observed for boys, whereas an increase was observed for girls.

### Cybervictimization

Based on the HBSC 2014 survey, 4% of the sample reported having been cyberbullied by either text and/or by photograph. There was a wide variation in cybervictimization prevalence/rates across countries and gender (Table 3). Among boys, those reporting cybervictimization by text ranged from 0.8% in the Netherlands to 10.5% in Greenland. Those reporting cybervictimization by photograph ranged from 0.7% in Germany and France to 8.2% in Israel. Among girls, the prevalence of cybervictimization by photograph ranged from 0.8% in Greece to 8.5% in Greenland, whereas estimates of cybervictimization by text ranged from 0.2% in Greece to 5.4% in the Russian Federation.

In less than half of the countries, statistically significant ( $p < 0.05$ ) differences emerged in the reported prevalence of cybervictimization values by gender. Patterns varied by country. Girls were more likely to report cybervictimization in Canada, Germany, England, Finland, France, Ireland, Netherlands, Sweden, Scotland, and Wales. Boys were more likely to report cybervictimization in Greece, Croatia, Israel, Lithuania, North Macedonia, and Spain.

### Degree of overlap between cybervictimization and traditional victimization in HBSC 2014 survey cycle

Overall across all countries, 45.8% of those who reported cybervictimization also reported traditional victimization (46.5% for boys and 45.3% for girls). For boys, this ranged from 48.5% for 13-year-old boys to 42.7% for 15-year-old boys (Table 4). A lower degree of overlap among 15-year-old girls (40%) compared to 13-year-olds (47.8%) was observed. Moreover, for both genders, the percentage of

**Table 2** Age-standardized rate of reported traditional victimization and linear time trends Health Behavior in School-Aged Children (HBSC) study 2002–2014

	Boys						Girls							
	2002	2006	2010	2014	B	Sig	2002	2006	2010	2014	B	Sig		
Linear decline	Belgium (Flemish)	14	9	12	9	-0.034	<0.001	Denmark	11	8	6	6	-0.054	<0.001
	Canada	16	15	15	12	-0.023	0.001	France	13	13	13	11	-0.013	0.036
	Croatia	12	9	8	9	-0.028	0.002	Germany	11	13	10	10	-0.043	<0.001
	Denmark	11	8	7	6	-0.061	<0.001	Greece	7	23	8	7	-0.043	<0.001
	England	14	11	10	11	-0.031	<0.001	Greenland	26	25	14	12	-0.125	<0.001
	Estonia	22	24	21	18	-0.021	0.003	Israel	11	-	7	5	-0.065	<0.001
	Germany	15	15	11	9	-0.072	<0.001	Italy	8	7	3	5	-0.077	<0.001
	Greece	9	23	9	6	-0.055	<0.001	Lithuania	32	27	23	26	-0.026	<0.001
	Greenland	22	23	18	16	-0.055	0.032	Norway	10	7	8	6	-0.035	0.003
	Iceland	-	6	7	5	-0.023	0.03	Romania	-	14	15	9	-0.054	<0.001
	Israel	21	-	14	16	-0.028	0.001	Spain	7	4	4	4	-0.040	<0.001
	Italy	12	10	5	6	-0.078	<0.001	Ukraine	18	21	17	14	-0.063	<0.001
	Lithuania	36	28	29	32	-0.017	0.001	Austria	13	12	14	14	-0.002	0.493
	Netherlands	11	10	8	8	-0.035	<0.001	Belgium (Flemish)	10	9	10	8	-0.010	0.329
	Norway	11	10	10	7	-0.041	<0.001	Canada	14	14	13	14	0.003	0.657
	Portugal	24	16	17	15	-0.04	<0.001	Croatia	7	7	6	7	-0.005	0.598
	Romania	-	20	20	14	-0.051	<0.001	Czech Republic	6	5	5	5	-0.003	0.773
	Spain	10	5	8	6	-0.027	0.001	Estonia	16	19	16	15	-0.013	0.099
	Sweden	6	5	4	4	-0.031	0.006	North Macedonia	9	7	5	7	-0.026	0.051
Switzerland	16	14	15	11	-0.029	<0.001	England	11	9	11	11	-0.005	0.558	
Ukraine	18	19	18	15	-0.043	<0.001	Iceland	-	4	5	4	0.009	0.475	
No change	Austria	20	20	22	18	-0.005	0.510	Ireland	7	7	7	8	0.016	0.132
	Czech Republic	7	6	5	6	-0.016	0.151	Luxembourg	-	14	12	13	-0.007	0.575
	Finland	10	9	12	11	0.011	0.163	Netherlands	10	8	7	9	0.013	0.150
	France	13	14	15	13	-0.001	0.824	Poland	8	8	8	10	0.013	0.150
	North Macedonia	12	12	11	12	0	0.977	Portugal	13	13	11	12	-0.013	0.128
	Ireland	10	10	11	8	-0.016	0.128	Russian Federation	17	16	17	17	0.009	0.456
	Latvia	24	23	21	24	-0.001	0.841	Slovenia	7	7	6	7	-0.005	0.605
	Luxembourg	-	14	14	12	-0.019	0.128	Switzerland	12	10	12	12	0.002	0.745
	Malta	9	9	-	10	0.008	0.567	Belgium (French)	11	12	17	16	0.037	<0.001
	Poland	13	11	13	14	0.011	0.145	Finland	8	7	10	10	0.027	0.001

Table 2 continued

Linear increase	Boys										Girls				
	2002	2006	2010	2014	B	Sig	2002	2006	2010	2014	B	Sig			
	Belgium (French)	20	22	28	25	0.026	< 0.001	Hungary	6	7	7	9	0.028	0.011	
Hungary	6	6	9	10	0.054	< 0.001	Latvia	16	19	18	22	0.025	< 0.001		
Russian Federation	-	17	18	21	0.035	0.002	Malta	4	4	-	6	0.039	0.038		
Scotland	9	9	10	12	0.036	< 0.001	Sweden	4	4	4	5	0.026	0.037		
Slovenia	7	11	8	10	0.022	0.011	Scotland	9	10	9	15	0.046	< 0.001		
Wales	9	11	9	13	0.03	0.002	Wales	10	12	8	14	0.029	0.003		
Total	14	13	13	12	- 0.014	< 0.001	Total	11	11	10	10	- 0.006	0.309		

“-” No data collected

overlap is relatively similar for 11-year-olds and 13-year-olds, but much lower for 15-year-olds.

Figure 1 illustrates the prevalence by gender of those who reported both cybervictimization and traditional victimization at least 2–3 times in the last couple of months. The highest prevalence was observed in Lithuania (6.5% boys and 5.1% girls), whereas the lowest was in Greece (0.6% boys and 0.5% girls).

## Discussion

Combining data from more than 700,000 school children over 12 years (2002–2014), this large cross-national study investigated both the trends over time in traditional bullying victimization in 37 countries, and then the overlap between cybervictimization and traditional victimization in the last survey cycle (2014 HBSC survey). Although linear decreases or no linear trends were observed in the vast majority of countries, the data highlighted fewer linear decreases across countries in bullying among girls than among boys. These results point to a need for school violence prevention programs to be prioritized at country level and also these could be designed while having a gender perspective in mind (Espelage and Swearer 2011) meaning strategies to target specific type of behaviors as well as coping strategies might need to be gender specific. Furthermore, the observed trends in traditional face-to-face bullying victimization complement previous findings on trends in bullying victimization either at national level (e.g., Cosma et al. 2017; Vieno et al. 2015) or international level (Chester et al. 2015). Nonetheless, considering that the aim of the current study was to map an overall picture of the trends across countries in Europe and North America and an analysis of country-specific patterns was beyond the scope of the current paper, future research is needed to examine between-country differences, incorporating variables such as cultural acceptability of violence, country levels of aggressive behaviors and country levels of prevention programs.

Our analysis was unique in that we examined the degree of overlap between cybervictimization and bullying victimization across 37 countries and regions in 2014. The degree of overlap was generally lower than those reported in other studies (Olweus and Limber 2018), with considerable variation by age-group, gender, and country. Overall, these results show a significant number of young people (around 50% of those experiencing cybervictimization) have been exposed to traditional bullying victimization as well. Moreover, similar to other studies (Modecki et al. 2014; Olweus and Limber 2018), the prevalence of cybervictimization across all countries was systematically lower than the traditional victimization rates, but despite this, the overlap

**Table 3** Age-standardized rate of cybervictimization 2014 trends Health Behavior in School-Aged Children (HBSC) study

	Age-standardized rate per 100 children						
	Boys			Girls			
	By text	By photograph	Either text and/or photograph	By Text	By Photograph	Either text and/or photograph	
Greenland	10.5	5.5	11.0	Russian Federation	5.4	7.3	9.0
Lithuania	8.2	6.4	10.7	Lithuania	3.7	6.7	8.2
Israel	7.0	8.2	10.3	Scotland	4.0	6.0	7.9
Russian Federation	7.6	7.3	10.1	Wales	2.3	4.9	6.3
Latvia	5.5	4.1	7.0	Greenland	2.0	8.5	6.1
Ukraine	5.0	3.9	6.4	Ireland	4.0	3.5	6.1
Estonia	4.6	4.0	5.6	Canada	2.7	4.5	6.0
Croatia	4.7	4.2	5.5	Latvia	3.3	4.5	5.9
Spain	5.3	5.2	5.1	England	2.8	3.6	5.8
Slovenia	3.2	2.0	4.8	Ukraine	2.7	4.2	5.1
North Macedonia	2.7	3.8	4.6	Estonia	3.1	3.6	4.7
Scotland	3.3	2.5	4.3	Malta	2.5	3.3	4.6
Poland	3.1	2.4	4.2	Denmark	3.0	2.6	4.4
Belgium (French)	2.9	2.5	4.1	Poland	1.9	3.3	4.2
Wales	3.2	1.9	4.0	Israel	2.4	2.9	4.1
Romania	3.4	1.6	3.9	Belgium (French)	1.4	3.5	4.0
Malta	2.5	2.8	3.9	Croatia	2.2	3.4	3.9
Ireland	2.1	2.5	3.8	Norway	2.5	2.5	3.9
Luxembourg	2.7	2.6	3.5	Spain	2.5	2.8	3.7
Portugal	2.6	2.7	3.5	Finland	1.8	2.4	3.6
Denmark	2.2	2.5	3.5	Luxembourg	1.7	3.0	3.4
Italy	1.7	1.6	3.4	Slovenia	1.2	2.9	3.3
Hungary	2.7	1.2	3.4	Portugal	1.3	2.7	3.2
Canada	2.4	2.0	3.4	Netherlands	1.1	2.5	3.2
Iceland	2.6	2.6	3.2	Romania	1.3	2.8	3.2
Austria	2.4	1.9	3.0	Switzerland	0.9	2.9	3.2
England	1.7	1.7	2.5	Iceland	1.7	2.3	3.2
Norway	1.7	1.4	2.4	Hungary	0.8	2.9	3.2
Switzerland	2.1	1.3	2.4	Belgium (Flemish)	1.1	2.7	3.1
Finland	1.7	1.8	2.3	Sweden	1.1	2.4	3.0
Belgium (Flemish)	1.6	1.2	2.2	Germany	1.0	2.3	2.7
Czech Republic	1.4	1.8	2.2	France	0.7	2.2	2.7
Greece	1.3	1.2	1.9	Italy	0.9	2.2	2.7
Netherlands	0.8	1.2	1.8	Czech Republic	1.0	1.8	2.4
Sweden	1.1	1.0	1.6	Austria	1.1	1.8	2.2
Germany	1.1	0.7	1.5	North Macedonia	1.4	1.4	2.1
France	1.3	0.7	1.5	Greece	0.2	0.8	1.0
Total	3.2	2.8	4.3	Total	3.2	2.0	4.2

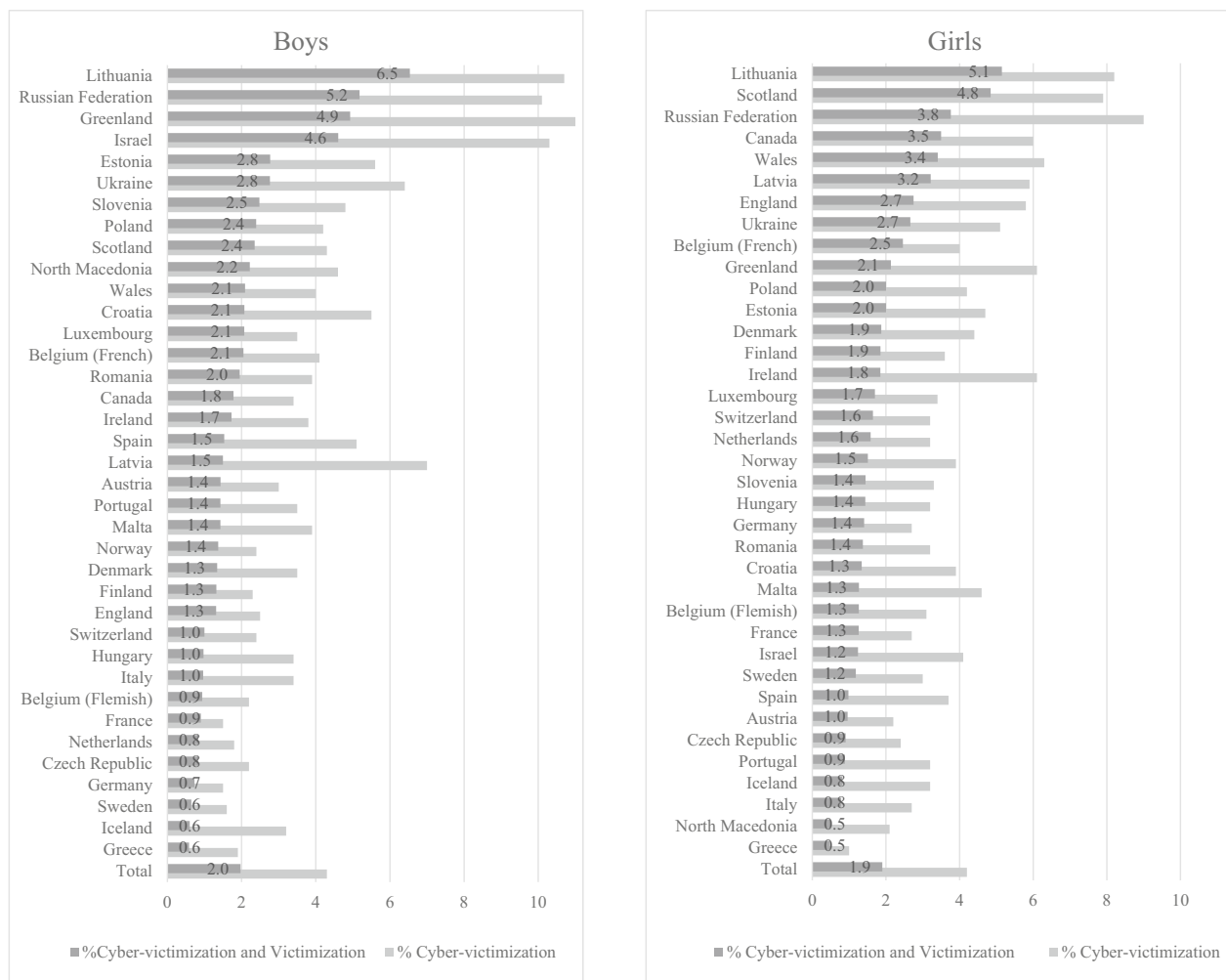
For each gender separately, the countries are listed based on the largest rates (%) for reporting any cybervictimization

**Table 4** Overlaps cybervictimization (C-V) and traditional victimization (V) 2014 trends Health Behavior in School-Aged Children (HBSC) study

Age-group	Sex	% Average overlap C-V and V	% minimum overlap	% maximum overlap
11	M	47.5	12.5 (Hungary)	82.7 (Netherlands)
13	M	48.5	18.8 (Greece)	70.0 (Greenland)
15	M	42.7	14.3 (Italy)	61.9 (Luxembourg)
11	F	48.0	9.1 (Croatia)	80.0 (Greece)
13	F	47.8	16.7 (Czech Republic)	65.3 (Scotland)
15	F	40.0	0.1 (Greece)	66.7 (Belgium (Flemish))

rates between cybervictimization and traditional bullying victimization varied across countries. For girls even more so than boys, there was a decrease in the overlap between two forms of victimization with increasing age. Therefore, it could be that these profiles may become more distinct with increasing age. More research is needed to explore these patterns, as they may relate to the tendency for girls to be more engaged in relational bullying, and this may become more sophisticated utilizing virtual domains as they get

older. Cybervictimization for older adolescent girls may go on within the context of relationships while traditional bullying may remain in the domain of socially excluded girls or those with low social status. Moreover, these findings could feed into the debate whether there might be a shift in the expression of bullying from in-person to more virtual forms which according to some authors could imply that cyberbullying might be a new form—perhaps a reconfiguration—of traditional bullying (Livingstone et al. 2018).



**Fig. 1** Prevalence of cybervictimization and the overlap cybervictimization and traditional victimization by gender in 2014 Health Behavior in School-Aged Children (HBSC) study



While many in the health promotion community have attributed the declines in adolescent risk behaviors (including bullying victimization) to the effectiveness of public health efforts (Creamer et al. 2015), our findings may challenge these conclusions both through the inconsistent trends found over time and the large cross-country variation in the overlap between traditional and cyberforms of victimization in 2014. Young people are increasingly living in a virtual world (Livingstone et al. 2018) meaning that today's generation of adolescents are involved more in online forms of social interaction (Wood et al. 2016), and thus potentially there are more opportunities to engage or be involved in bullying (Kowalski et al. 2018). This development also might mean that the boundary between the face-to-face versus the online world for today's generation might be less clear as all converge to a single social world. Such shifts are important to understand, as well as their potential impacts on young people's development. Future research requires focus on the risk and protective factors associated with those young people who are at risk for polyvictimization (face-to-face and cybervictimization), especially considering the high variation in this overlap observed across countries.

Strengths of our study include the opportunity to examine such large, diverse and representative samples of young people over a 12-year time period. A strength of HBSC is the depth and breadth of indicators available to study the health of young people at critical and sensitive periods of transition in their lives, i.e., during early and mid-adolescent years. Moreover, all countries collected data using the same study protocol (Currie et al. 2014), and the bullying measures used have been widely tested and employed in population health studies (Vessey et al. 2014). Also, this is one of the first studies to present cross-country variations in cybervictimization and most importantly focus on the overlap between cybervictimization and face-to-face victimization. Our analyses point to a need to widen the focus from traditional face-to-face bullying to include virtual environments as locations of health risk behaviors, including those involving violence and aggression. Such evidence is vital for public health planning, locally and internationally. Moreover, given the high degree of overlap between cybervictimization and traditional victimization, more research is needed to examine the degree to which risk and protective factors may be unique to cybervictimization above and beyond traditional victimization (Kowalski et al. 2018).

Limitations of our study also warrant comment. The HBSC study is reliant on self-reported indicators of health risk behaviors, including perpetration and victimization by bullying. While there is a long history of use and testing of the items used to document such behaviors (e.g., Olweus 1997; Vessey et al. 2014), it is impossible to validate these

in the truest sense, beyond our required tests for face validity and reliability. Second, the position of the bullying items in the questionnaire are known to affect the prevalence rates as providing participants with a definition of bullying increases the prevalence rates for traditional victimization (Modecki et al. 2014), and surveys that measure both traditional and cyberbullying tend to report lower rates of the latter. Across all HBSC national surveys, the traditional bullying items are introduced by a clear definition that outlines power imbalance, intention to harm, and repetition as main characteristics of bullying. Cybervictimization items are required to be ordered following the traditional bullying items. Third, our inclusion of the cyberbullying items only became mandatory to countries in the 2014 cycle. It is possible that these virtual forms of victimization are not accounted for in earlier years, making our trends analysis subject to criticism. However, access to social media through smartphones peaked after 2010 (Hasebrink 2014; Livingstone et al. 2018). Finally, this analysis is based on cross-sectional survey data, and our findings require confirmation via other more robust study designs.

The present results have relevance on a policy and school intervention level. While much of the intervention work that has been implemented around peer violence has been done through schools and may focus on behaviors at school (Olweus 1997), our findings show that there is a need for a more holistic perspective which includes not only schools, but community, families, and the larger social media context. Considering the high degree of overlap between the two forms of victimization, but also that traditional victimization remains still more prevalent than cyber, school programs and policies could focus on addressing bullying more broadly rather than focusing on behaviors that happen in a particular context (Modecki et al. 2014). That is, prevention and intervention programs need to focus on both traditional and cyberbullying—their commonalities and differences to be effective. Also, those working with adolescents (e.g., school counsellors) should be aware of different modalities and profiles of victims. Our analysis cannot explain the country differences, nor the demographic (age and gender) differences, that were evident but provides an initial descriptive profile of the problem and its trends. Future research could conduct more in-depth etiological analyses of the origins of trends and their variation across countries and cultures, as well as the effects of intervention efforts that have occurred in some but not all populations.

Given the negative implications of cyber as well as traditional types of bullying, our findings prompt public health specialists, researchers and practitioners to monitor both traditional bullying behaviors and online bullying and the potential continuity between contexts. Our findings

confirm that almost half of the adolescents reporting cybervictimization have experienced traditional victimization, but also recognizes a high cross-country variation. Public health should prioritize further evaluation and creative intervention designs aimed at tackling bullying.

**Funding** The Canadian HBSC study is financially supported by the Public Health Agency of Canada (Contract Number CD016-123071-001/SS). HBSC Ireland was funded by the Health Promotion Policy Unit, Department of Health, Ireland. There was no involvement in the conduct of the research or preparation of the article by the study funders.

### Compliance with ethical standards

Consent procedures required by ethical authorities for this type of survey were followed by each individual country. Institutional ethical consent was gained according to the requirements in each participating country, with schools, parents, and adolescents each providing informed consent or assent, either active or passive according to local requirements. Only those adolescents who volunteered to participate and whose parents did not object to their participation were included in the current study.

**Conflict of interest** The authors declare that they have no conflict of interests.

**Informed consent** Informed consent was obtained from all individual participants included in this study.

### References

- Antoniadou N, Kokkinos C (2015) A review of research on cyberbullying in Greece. *Int J Adolesc Youth* 20(2):185–201. <https://doi.org/10.1080/02673843.2013.778207>
- Arseneault L, Bowes L, Shakoor S (2010) Bullying victimization in youths and mental health problems: ‘much ado about nothing’? *Psychol Med* 40(05):717. <https://doi.org/10.1017/S0033291709991383>
- Bannink R, Broeren S, van de Looij- Jansen PM, de Waart FG, Raat H (2014) Cyber and traditional bullying victimization as a risk factor for mental health problems and suicidal ideation in adolescents edited by Y. Xia. *PLoS ONE* 9(4):e94026. <https://doi.org/10.1371/journal.pone.0094026>
- Blais A, Julie J, Craig WM, Debra AE, Pepler A, Connolly J (2008) Adolescents online: the importance of internet activity choices to salient relationships. *J Youth Adolesc* 37(5):522–536. <https://doi.org/10.1007/s10964-007-9262-7>
- Brochado S, Soares S, Fraga S (2017) A scoping review on studies of cyberbullying prevalence among adolescents. *Trauma Violence Abus* 18(5):523–531. <https://doi.org/10.1177/1524838016641668>
- Cappadocia MC, Craig WM, Pepler D (2013) Cyberbullying. *Can J School Psychol* 28(2):171–192. <https://doi.org/10.1177/0829573513491212>
- Chester KL, Callaghan M, Cosma A, Donnelly P, Craig WM, Walsh S, Molcho M (2015) Cross-national time trends in bullying victimization in 33 countries among children aged 11, 13 and 15 from 2002 to 2010. *Eur J Public Health* 25(suppl 2):61–64. <https://doi.org/10.1093/eurpub/ckv029>
- Cosma A, Balázi R, Băban A (2015) Time trends in bullying involvement among Romanian school aged children from 2006 to 2014. *Procedia Soc Behav Sci* 209:17–24
- Cosma A, Whitehead R, Neville F, Currie D, Inchley J (2017) Trends in bullying victimization in Scottish adolescents 1994–2014: changing associations with mental well-being. *Int J Public Health* 62(6):639–646. <https://doi.org/10.1007/s00038-017-0965-6>
- Creamer MR, Perry CL, Harrell MB, Diamond PM (2015) Trends in multiple tobacco product use, among high school students. *Tob Regul Sci* 1(3):204–214
- Currie C, Inchley J, Molcho M, Lenzi M, Veselska Z, Wild F (2014) Health Behaviour in School-Aged Children (HBSC) study protocol: background, methodology and mandatory items for the 2013/14 Survey—University of St Andrews. edited by W. F. Currie C, Inchley J, Molcho M, Lenzi M, Veselska Z. St Andrews: CAHRU, University of St Andrews
- Espelage DL, Swearer SM (2011) *Bullying in North American Schools*, 2nd edn. Routledge, New York
- Fisher HL, Moffitt TE, Houts RM, Belsky DW, Arseneault L, Caspi A (2012) Bullying victimisation and risk of self harm in early adolescence: longitudinal cohort study. *BMJ (Clin Res Ed)* 344:e2683
- Hasebrink U (2014) Children’s changing online experiences in a longitudinal perspective. *EU Kids Online*, London, UK. <http://eprints.lse.ac.uk/60083/>
- Hinduja S, Patchin JW (2008) Cyberbullying: an exploratory analysis of factors related to offending and victimization. *Deviant Behav* 29(2):129–156. <https://doi.org/10.1080/01639620701457816>
- Jones LM, Mitchell KL, Finkelhor D (2013) Online harassment in context: trends from three youth internet safety surveys (2000, 2005, 2010). *Psychol Violence* 3(1):53. <https://doi.org/10.1037/a0030309>
- Kowalski RM, Giumetti GW, Schroeder AN, Lattanner MR (2014) Bullying in the digital age: a critical review and meta-analysis of cyberbullying research among youth. *Psychol Bull* 140(4):1073–1137. <https://doi.org/10.1037/a0035618>
- Kowalski RM, Limber SP, McCord A (2018) A developmental approach to cyberbullying: prevalence and protective factors. *Violent Behav, Aggress*. <https://doi.org/10.1016/J.AVB.2018.02.009>
- Kubiszewski V, Fontaine R, Potard C, Auzoult C (2015) Does cyberbullying overlap with school bullying when taking modality of involvement into account? *Comput Hum Behav* 43:49–57. <https://doi.org/10.1016/J.CHB.2014.10.049>
- Law DM, Shapka JD, Hymel S, Olson BF, Waterhouse T (2012) The changing face of bullying: an empirical comparison between traditional and internet bullying and victimization. *Comput Hum Behav* 28(1):226–232. <https://doi.org/10.1016/j.techsoc.2016.12.001>
- Lazuras L, Barkoukis V, Tzorbatzoudis H (2017) Face-to-face bullying and cyberbullying in adolescents: trans-contextual effects and role overlap. *Technol Soc* 48:97–101
- Livingstone S, Mascheroni G, Staksrud E (2018) European research on children’s internet use: assessing the past and anticipating the future. *New Media Soc* 20(3):1103–1122. <https://doi.org/10.1177/1461444816685930>
- Mishna F, Khoury-Kassabri M, Gadalla T, Daciuk J (2012) Risk factors for involvement in cyber bullying: victims, bullies and bully-victims. *Child Youth Serv Rev* 34(1):63–70. <https://doi.org/10.1016/j.childyouth.2011.08.032>
- Modecki KL, Minchin J, Harbaugh AG, Guerra NG, Runions KC (2014) Bullying prevalence across contexts: a meta-analysis measuring cyber and traditional bullying. *J Adolesc Health* 55(5):602–611. <https://doi.org/10.1016/j.jadohealth.2014.06.007>

- Moore SE, Norman RE, Suetani S, Thomas HJ, Sly PD, Scott JG (2017) Consequences of bullying victimization in childhood and adolescence: a systematic review and meta-analysis. *World J Psychiatry* 7(1):60–76. <https://doi.org/10.5498/wjp.v7.i1.60>
- Olweus D (1997) Bully/victim problems in school: facts and intervention. *Eur J Psychol Educ* 12:495–510. <https://doi.org/10.2307/23420286>
- Olweus D, Limber SP (2018) Some problems with cyberbullying research. *Curr Opin Psychol* 19:139–143. <https://doi.org/10.1016/j.copsyc.2017.04.012>
- Przybylski AK, Bowes L (2017) Cyberbullying and adolescent well-being in England: a population-based cross-sectional study. *Lancet Child Adolesc Health* 1(1):19–26. [https://doi.org/10.1016/S2352-4642\(17\)30011-1](https://doi.org/10.1016/S2352-4642(17)30011-1)
- Schnohr CW, Molcho M, Rasmussen M et al (2015) Trend analyses in the health behaviour in school-aged children study: methodological considerations and recommendations. *Eur J Public Health* 25(suppl 2):7–12. <https://doi.org/10.1093/eurpub/ckv010>
- Sinclair KO, Bauman Poteat PV, Koenig B, Russell ST (2012) Cyber and bias-based harassment: associations with academic, substance use, and mental health problems. *J Adolesc Health* 50(5):521–523. <https://doi.org/10.1016/j.jadohealth.2011.09.009>
- Smith PK, Madsen KC, Moody JC (1999) What causes the age decline in reports of being bullied at school? towards a developmental analysis of risks of being bullied. *Educ Res* 41(3):267–285. <https://doi.org/10.1080/0013188990410303>
- Smith PK, Mahdavi J, Carvalho M, Fisher S, Russell S, Tippett N (2008) Cyberbullying: its nature and impact in secondary school Pupils. *J Child Psychol Psychiatry* 49(4):376–385. <https://doi.org/10.1111/j.1469-7610.2007.01846.x>
- Smith PK, López-Castro L, Robinson S, Görzig A (2019) Consistency of gender differences in bullying in cross-cultural surveys. *Aggress Violent Behav* 45:33–40. <https://doi.org/10.1016/j.avb.2018.04.006>
- Takizawa R, Maughan B, Arseneault L (2014) Adult health outcomes of childhood bullying victimization: evidence from a five-decade longitudinal British birth cohort. *Am J Psychiatry* 171(7):777–784. <https://doi.org/10.1176/appi.ajp.2014.13101401>
- Turner MG, Exum ML, Brame R, Holt TJ (2013) Bullying victimization and adolescent mental health: general and typological effects across sex. *J Crim Justice* 41(1):53–59. <https://doi.org/10.1016/j.jcrimjus.2012.12.005>
- Vaillancourt T, Brittain HL, McDougall P, Duku E (2013) Longitudinal links between childhood peer victimization, internalizing and externalizing problems, and academic functioning: developmental cascades. *J Abnorm Child Psychol* 41(8):1203–1215. <https://doi.org/10.1007/s10802-013-9781-5>
- Vessey J, Strout TD, DiFazio RL, Walker A (2014) Measuring the youth bullying experience: a systematic review of the psychometric properties of available instruments. *J School Health* 84(12):819–843. <https://doi.org/10.1111/josh.12210>
- Vieno A, Lenzi M, Gini G, Pozzoli T, Cavallo F, Santinello M (2015) Time trends in bullying behavior in Italy. *J School Health* 85(7):441–445. <https://doi.org/10.1111/josh.12269>
- Waasdorp TE, Pas ET, Zablotzky B, Bradshaw CP (2017) Ten-year trends in bullying and related attitudes among 4th-to 12th-graders. *Pediatrics* 139(6):20162615. <https://doi.org/10.1542/peds.2016-2615>
- Wegge D, Vandebosch H, Eggermont S (2014) Who bullies whom online: a social network analysis of cyberbullying in a school context. *Communications* 39(4):415–433. <https://doi.org/10.1515/commun-2014-0019>
- Wood MA, Bukowski WM, Lis E (2016) The digital self: how social media serves as a setting that shapes youth's emotional experiences. *Adolesc Res Rev* 1(2):163–173. <https://doi.org/10.1007/s40894-015-0014-8>
- Ybarra ML, West MD, Leaf PJ (2007) Examining the overlap in internet harassment and school bullying: implications for school intervention. *J Adolesc Health* 41(6):S42–S50. <https://doi.org/10.1016/j.jadohealth.2007.09.004>

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.