

Bullying Victimization: time trends and the overlap between traditional and cyber bullying across countries in Europe and North America

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Abstract

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

Methods Data from four cycles (2002, 2006, 2010, 2014) of the cross-national Health Behaviour in School-Aged Children (HBSC) study were included (N= 764,518). Trends in traditional victimization were evaluated using logistic regression models in 37 countries. Prevalence of cyber-victimization and the overlap between cyber-victimization 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 cyber-victimization was systematically lower than traditional victimization. Overall across all countries, 45.8% of those who reported cyber-victimization 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 programmes and policies could focus on addressing bullying more broadly, rather than focusing on behaviours that happen in a particular context.

Key words: Bullying; Victimization; Cybervictimization; Adolescence; HBSC

1. Introduction

Bullying or bullying victimization is defined as “repeated aggressive behaviour, 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, Róbert, and Băban 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; shifts that parallel the societal move to more virtual social environments in child populations (Kowalski, Limber, and McCord 2018).

Cyberbullying or cyber-victimization 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. 2011). 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, Mitchell, and Finkelhor 2013; Kowalski et al. 2014; Livingstone, Mascheroni, and Staksrud 2018). What is not fully clear; however, is the extent to which cyber-victimization 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 behaviours (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 cyber bullying 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 cyber bullying, 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 cut-offs regarding involvement, and demographic characteristic of the samples (Kowalski et al. 2018). For example, a recent review indicated that the prevalence rates of cyber-victimization in the last ten years ranged from 1% to 61.1% depending on the study (Brochado, Soares, and Fraga 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 differences 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, Madsen, and Moody 1999). On the other hand, for cyber-victimization, girls are more likely to report victimization (Kowalski et al. 2018), and the prevalence increase 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, Bowes, and Shakoor 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 behaviours (Vaillancourt et al. 2013). Mental health problems among cyber-victims are widespread and can even be more severe than those of face-to-face bullying (Blais Ae et al. 2008). Moreover, there is evidence that cyber-victims 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, Barkoukis, and Tsorbatzoudis 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 cyber contexts 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, Diener-West, and Leaf 2007). This poly-victimization inflicted by the same perpetrators stands even when controlling for the interaction patterns between the victim and perpetrator (i.e. mutual cyberbullying) (Wegge, Vandebosch, and Eggermont 2014). On the other hand low levels of overlap may suggest that cyber-victims 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 cyber-victimization 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 cyber-victimization (Modecki et al. 2014). Therefore by 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: (i) first exploring recent cross-national trends over time (2002 to 2014) in the occurrence of victimization by bullying among adolescents in 37 countries; then (ii) documenting the overlap between cyber-victimization 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.

2. Methods

Participants

Data from the four most recent survey cycles (2002, 2006, 2010, 2014) of the cross-national Health Behaviour in School-aged Children (HBSC) study were included. HBSC is a study of adolescent health behaviours 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 3 out of the 4 survey cycles were included in our analyses (Iceland, Luxembourg, Romania and Russian Federation had collected data in only 3 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 3 survey 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*).

-----*Insert Table 1 about here*-----

Measures

Traditional bullying victimization (all four survey cycles).

An adapted version of the Olweus (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 if they have been bullied at school in the past couple of months with the following response options: 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*”. 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.

Cyber-victimization (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 cyber-victimization 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, Craig, and Pepler 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 cyber-victimization 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 cyber-victimization (individual items by photo 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 modelled 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 cyber-victimization and traditional bullying victimization

Finally, for the HBSC 2014 data only, degrees of overlap between cyber-victimization 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.

3. 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.

-----*Insert Table 2 about here*-----

Cyber-victimization

Based on the HBSC 2014 survey, 4% of the sample reported having been cyberbullied by either text and/or by photo. There was a wide variation in cyber-victimization prevalence/rates across countries and gender (Table 3). Among boys, those reporting cyber-victimization by text ranged from 0.8% in the Netherlands to 10.5% in Greenland. Those reporting cyber-victimization by photo ranged from 0.7% in Germany and France to 8.2% in Israel. Among girls, the prevalence of cyber-victimization by photo ranged from 0.8% in Greece to 8.5% in Greenland, whereas estimates of cyber-victimization 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 cyber-victimization values by gender. Patterns varied by country. Girls were more likely to report cyber-victimization in Canada, Germany, England, Finland, France, Ireland, Netherlands, Sweden, Scotland and Wales. Boys were more likely to report cyber-victimization in Greece, Croatia, Israel, Lithuania, North Macedonia, and Spain.

-----Insert Table 3 about here-----

Degree of overlap between cyber-victimization and traditional victimization in HBSC 2014 survey cycle

Overall across all countries, 45.8% of those who reported cyber-victimization 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 % of overlap is relatively similar for 11-year-olds and 13-year-olds, but much lower for 15-year-olds.

-----Insert Table 4 about here-----

Figure 1 illustrates the prevalence by gender of those who reported both cyber-victimization 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).

4. Discussion

Combining data from more than 700,000 school children over 12 years (2002 to 2014), this large cross-national study investigated both the trends over time in traditional bullying victimization in 37 countries, and then the overlap between cyber-victimization 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 programmes 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 behaviours 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 behaviours and country levels of prevention programs.

Our analysis was unique in that we examined the degree of overlap between cyber-victimization 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 cyber-victimization) 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 cyber-victimization across all countries was systematically lower than the traditional victimization rates but despite this the overlap rates between cyber-victimization 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 utilising virtual domains as they get older. Cyber-victimization 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).

While many in the health promotion community have attributed the declines in adolescent risk behaviours (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 cyber forms 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, Bukowski, and Lis 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 poly-victimization (face-to-face and cyber-victimization), 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 cyber-victimization and most importantly focus on the overlap between cyber-victimization 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 behaviours, 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 cyber-victimization and traditional victimization, more research is needed to examine the degree to which risk and protective factors may be unique to cyber-victimization 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 behaviours, including perpetration and victimization by bullying. While there is a long history of use and testing of the items used to document such behaviours (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 cyber-bullying 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. Cyber-victimization items are required to be ordered following the traditional bullying items. Third, our inclusion of the cyber-bullying 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 behaviours 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 programmes and policies could focus on addressing bullying more broadly rather than focusing on behaviours 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 a 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 behaviours and online bullying and the potential continuity between contexts.. Our findings confirm that almost half of the adolescents reporting cyber-victimization have experienced traditional victimization, but also recognizes a high cross-country variation. Public health should prioritise further evaluation and creative intervention designs aimed at tackling bullying.

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

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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.

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

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Table 1. Description of international study sample, Health Behaviour 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. (%) | | |
| 11years | 247,266 | (32.6) |
| 13years | 260,077 | (34.3) |
| 15years | 251,660 | (33.2) |

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Table 2. Age-standardized rate of reported traditional victimization and linear time trends Health Behaviour in School-aged Children (HBSC) study 2002 to 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 | 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 | Russia | 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 |
| Linear increase | 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

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Table 3. Age-standardized rate of cyber-victimization 2014 trends Health Behaviour in School-aged Children (HBSC) study

| Age-standardized rate per 100 children | | | | | | | |
|--|---------|----------|--------------------------|-------------------|----------|--------------------------|-----|
| Boys | | | Girls | | | | |
| | By text | By photo | Either text and/or photo | By Text | By Photo | Either text and/or photo | |
| Greenland | 10.5 | 5.5 | 11.0 | Russia 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 |

* Note: For each gender separately, the countries are listed based on the largest rates (%) for reporting any cyber-victimization

Table 4. Overlaps cyber-victimization (C-V) and traditional victimization (V) 2014 trends Health Behaviour 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)) |

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Figure 1 Prevalence of cyber-victimization and the overlap cyber-victimization and traditional victimization by gender in 2014 Health Behaviour in School-aged Children (HBSC) study

