Consistency of gender differences in bullying in cross-cultural surveys

CONSISTENCY OF GENDER DIFFERENCES IN BULLYING IN CROSS-CULTURAL SURVEYS

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Abstract

Many studies have reported on gender differences in bully and victim rates, but with the majority of reports from a small number of countries. Here we report on such gender differences from five large cross-national data bases. We report on overall male:female (M:F) ratios, and variations in these by age (or grade), by survey time point, and by offline/online bullying. We also compare consistency of M:F ratios across countries, over the five surveys. The preponderance of male perpetrators of bullying is found consistently across surveys, and survey time point. It is also consistent by age, but HBSC data suggest a curvilinear trend in early adolescence. Males also tend to more frequently be victims of bullying, consistent across age and survey time point, but with variations by survey. There is some indication of a decrease in M:F ratio recently in mid-adolescence, possibly related to online bullying. At least relatively, females are more involved as victims of online than offline bullying. Comparing recent findings on M:F ratio across countries for the five surveys, correlations vary from high to near zero. Implications for the explanation of gender differences in different countries, the comparability of data from different surveys, and for gender-specific interventions, are discussed.

Keywords

Bully Victim Survey Gender Culture

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1. **Introduction**

The past 20 years have seen an enormous increase in publications on bullying, especially school bullying (Olweus, 2013; Zych, Ortega-Ruiz & del Rey, 2015; Volk, Veenstra, & Espelage, 2017); and in the last decade in publications on cyberbullying (Smith & Berkkun, 2017). Volk et al. (2017) reviewed the number of publications on PsycInfo using the search term bully* and found a steady increase, with over 5000 publications from the last 6 years.

There is not universal agreement on the definition of bullying, but there does exist some consensus that it is aggressive behaviour, intended to hurt or harm another, with two further criteria: repetition – the hurtful behaviour happens more than once; and power imbalance - it is difficult for the victim to defend himself or herself (Olweus, 1999; Smith, 2014). Major forms of bullying are physical, verbal, relational (rumour-spreading, social exclusion), and cyber (via mobile phones and the internet).

Bullying is an international phenomenon, but the majority of the research has been in North America, Europe and Australasia, and the Pacific Rim countries (Jimerson, Swearer, & Espelage, 2010; Smith, Kwak, & Toda, 2016). Zych et al. (2015) reported a systematic study of publications on bullying and cyberbullying, from 1978 to 2013. They used the Web of Science and selected the ten most cited journal articles in each year on school bullying (or all, if less than ten), resulting in 309 articles. These comprised 233 on traditional bullying and 76 on cyberbullying. Countries in North America (41%) and Northern Europe (38%) provided the most of these highly

cited articles, followed by Western Europe (8%) and Australia (6%), with only 7% for all other countries.

Smith and Berkkun (2017) also used Web of Science to search for articles on cyberbullying. They found a total of 538 eligible abstracts between 2000 to 2015, with a steady increase over this time period. North America and Europe provided the most contributions, with increasing contributions from Asian countries such as South Korea. The great majority (n=454) of articles provided original empirical data. Of these 163 (36%) mentioned gender differences in the abstract.

1.1 *Gender differences*

Gender differences, by role, age, type of bullying, and country, has been a topic of continuing interest. Cook, Williams, Guerra, Kim, and Sadek (2010) carried out a meta-analysis of 153 studies and reported correlations of gender with roles of bully, victim and bully/victim (those nominated or reporting as both bullies and victims). Gender differences in rates of bullying others appeared to be rather consistent and substantial. Cook et al. (2010) found a correlation of boy gender with bully rates of r=0.18. Gender differences in victim rates appeared to be less consistent and usually small, but overall more common in males; Cook et al. (2010) found a correlation of boy gender with victim rates of r=0.06. Gender differences in bully/victim rates are less often reported, but generally this role is also more common in males. Cook et al. (2010) found a correlation of boy gender with bully/victim rates of r=0.10.

One examination of gender differences in a range of countries was reported by Craig et al. (2009); they used data from 40 countries in the HBSC survey of 2005/06. There were large country variations, but boys were more involved as bullying others in every country. Gender differences in victim rates were not so uniformly consistent across countries, but Craig et al. (2009) reported this as higher for girls in 29 countries;

however this finding is because they separated out bully/victims as a separate category (for which boys scored higher in 34 countries). From the data available in Currie et al. (2008), it is clear that overall, in this survey victim rates for boys (14%) are greater than for girls (11%).

The Cook et al. (2010) meta analysis was carried out on studies from 1970 to mid-2006, so the great majority would have been on traditional or offline bullying. Gender differences can vary by type of traditional bullying, as the male predominance appears to be most present for physical bullying, and less so for relational bullying (Smith, 2014).

For cyberbullying, the picture is more complicated. In a meta-analysis, Kowalski, Giumetti, Schroeder, and Lattanner (2014, p. 54) did not enter gender as a main predictor of cyber perpetrator or victim rates, but did conclude that "further research is needed in this area to understand the role that gender plays". They suggested that an interacting factor may be the type of technological resource by which the cyberbullying takes place. A meta-analysis by Guo (2016) of 25 studies of cyberbullying perpetration found a correlation with boy gender overall of r=0.23, while for 19 studies of cyberbullying victimization the correlation overall was with girl gender, r=0.12. The majority (86%) of these studies were from the USA and Europe. Another meta-analysis by Sun, Fan and Du (2016), on 39 studies of cyberbullying perpetration, also found males to be more involved, but did not examine age as a factor; however, they did find the gender difference in this to be highest in Asian countries, intermediate in North America, and least in European countries and Australia.

Another factor interacting with gender, may be age. In a review of 109 research articles, Barlett and Coyne (2014) found that overall males cyberbullied others more than females, but this varied by age: up to early adolescence females did more than

males, then in later adolescence males did more than females. However, the review by Guo (2016) did not find age to moderate either cyber perpetration or victim rates.

Studying gender differences is relevant for intervention strategies. A study carried out in Swedish schools by Flygare et al. (2011) compared the success of various components of anti-bullying programs. While some measures were equally effective for both genders, some were found to work better for girls, some for boys: for girls, monitoring school break times; and for boys, enhancing relationships, having clear rules, and using disciplinary strategies. The gender differences in bully and victim roles for different types of bullying may be associated with different intervention strategies to target specific types of behaviours and coping. For example, types of bullying that are particularly associated with girls (e.g. relational bullying) have been found to be taken less seriously by school staff (Bauman & Del Rio, 2006) implying that awareness raising strategies about this may be an effective measure. Discovering gender differences cross-nationally will further inform cross-national variation in the types of bullying that occur and have implications for intervention.

Several topics remain under-investigated as regards gender differences in bully and victim rates. Firstly, taking account of a wide range of countries, what gender differences are suggested by available cross-national surveys, in addition to HBSC? Second, how variable are gender differences by age (or grade)? Although characteristic age trends in bully and victim roles have been reported in the literature (e.g. Smith, Madsen, & Moody, 1999; Scheitauer, Hayer, Petermann, & Jugert, 2006), age changes in gender differences are inconsistent amongst the few available reviews (Barlett & Coyne, 2014; Guo, 2016). Third, how stable are gender differences over historical time? Sources of change here might include the shifting of gender roles generally, with a trend towards greater female rights and equality with males in many spheres of life; and

changes in forms of bullying over time, both in terms of what is recognised as bullying (e.g. relational forms: Björkqvist, Lagerspetz, & Kaukainen, 1992; Crick & Grotpeter, 1995), and in terms of opportunities (e.g. for cyberbullying). Fourth, how do gender differences vary between traditional (offline) and cyber (online) bullying? Here there are a number of studies, but little consensus.

1.2 *Data from cross-national surveys*

What empirical literature there is on gender differences in bullying has been dominated by studies from North America and some European countries, but there is available data on gender differences in bullying from five large-scale cross-national surveys:

Health Behaviour in School-age Children (HBSC) (www.hbsc.org), a World Health Organisation cross-national study, gathers data every 4 years;

EU Kids Online (EUKO) (www.eukidsonline.net) gathered data in 25 European countries from children who use the internet;

Global School Health Survey (GSHS), (www.who.int/chp/gshs/factsheets/en/index.html) gathers data on an irregular basis to help mainly developing countries measure and assess behavioural risk and protective factors in children;

Trends in International Mathematics and Science Study (TIMSS) (http://timssandpirls.bc.edu/timss2011/international-results_mathematics.html) provides international comparative assessments of student achievement in mathematics and science, also including school safety and bullying; although TIMSS reports started in 1995, the 1995 and 1999 reports do not contain items on bullying comparable with later surveys. The 2003 and 2007 surveys report data on 5 items, but do not provide scale scores. We use the 2011 and 2015 data seta, which are comparable with each other (based on 6 items) and report scale scores.

Program for International Student Assessment (PISA) (https://nces.ed.gov/surveys/pisa/) organised by the OECD, measures students' reading, mathematics, and science literacy. We use the most recent PISA results from 2015, which include pupil reports of being a victim of bullying.

These surveys provide an opportunity to investigate the above four areas, taking data from a very wide range of developed and developing countries. It also leads to a fifth topic: how consistent are gender differences by country across these cross-national surveys? Earlier studies of overall victim prevalence rates reported by HBSC, EUKO, TIMSS, GSHS and PISA found that the consensus on country differences varied from moderate to low to non-existent (Smith, Robinson, & Marchi, 2016; Smith & López-Castro, 2017); but this has not been investigated for gender differences in these prevalence rates.

2. Aims

We pursue five aims using data from these five surveys.

First, how consistent are overall gender differences in bully rates and victim rates between the different surveys (HBSC, EUKO, TIMSS, GSHS, PISA).

Second, how consistent (within a survey) are overall gender differences in bully rates and victim rates by age (or grade) (HBSC, TIMSS).

Third, how consistent (within a survey) are gender differences over survey time points (HBSC, TIMSS).

Fourth, how consistent are gender differences by offline and online type of bullying (HBSC, EUKO).

Fifth, how consistent are gender differences in victim rates across countries (comparing HBSC, EUKO, TIMSS, GSHS, and PISA).

2.1 *The five surveys*

All five surveys have common features: notably all used self-report data from school-age children. All have large sample sizes, usually of more than 1,000 respondents in each country. Most used school based surveys, but EUKO gave a face-to-face interview in survey format. Details of each survey are given in Table 1.

Table 1 about here

All surveys ask about frequency of being bullied (or of experiencing behaviours representative of being bullied) and HBSC and EUKO also ask about bullying others. However frequency measures and time reference periods vary. For HBSC, the frequency criterion reported in the two earliest surveys was that it happened at least once (1993/94), or once or more (1997/98), in a school term; but in the more recent four surveys it has been at least twice (2005/06; 2009/10), or at least 2 or 3 times (2001/02; 2013/14), in the past couple of months. For EUKO, the country data reported are for being bullied at all, or bullying others at all, over the past 12 months. For TIMSS, frequency measures are reported without a time reference period; we have taken a scale score measure as reported on the TIMSS database, based on 6 types of bullying. For GSHS, we have also taken their scale score, corresponding to being bullied in at least 1 of 7 different ways during the past 30 days. For PISA, the measure is of being bullied by any of 8 types of bullying acts at least a few times a month, over the past 12 months. This index had an average Cronbach alpha reliability of 0.83 (range across countries 0.71 to 0.90) (OECD, 2017, p.253).

Although TIMSS, GSHS and PISA ask about different types of bullying, none of these include cyberbullying. Until recently only EUKO asked explicitly about cyberbullying. HBSC just asked a global question, but the latest (2013/14) survey did include two questions on cyberbullying (Inchley et al., 2016). Only one (shown in Table 1) was used and reported on in their main analyses.

3. Method

Data were obtained from the websites of the surveys; plus for EUKO, from Livingstone, Haddon, Görzig, and Ólafsson (2011) supplemented by additional data from the EuKidsOnline team. We analysed the ratio of male rates to female rates, for being a victim (all 5 surveys) and a bully (HBSC, EUKO). A male:female (M:F) ratio of 1 would signal equality, more than 1 a male preponderance, and less than 1 a female preponderance. The TIMSS scale score (unlike all other measures reported here) is high for low rates of being bullied, so we took the female/male ratio instead of male/female ratio. We selected surveys to address each of the five aims.

Aim 1: we examine the M:F ratio (whether males or females predominate in bully rates and victim rates) overall, taking all five surveys from around 2010 (see Table 1, with HBSC data from 2009/10, TIMSS from 2011). For HBSC and TIMSS, when averaging across years, we first averaged male and female scores, then computed the ratio.

Aim 2: we examine whether M:F ratio in bully rates and victim rates varies by age (or grade). We used all HBSC data available (11, 13 and 15 years, from 1994, 1998, 2002, 2006, 2010, 2014), data from EUKO (9-16 years; 2010), from TIMSS (4^{th} and 8^{th} grade; from 2011, 2015), from GSHS (13-15 years old; surveys between 2003 and 2011), and from PISA (15 years; 2013-14).

Aim 3: we used the same data sets from HBSC, and TIMSS, as in Aim 2, to examine whether M:F ratio varies by survey time point (see dates above).

Aim 4: we used data from HBSC (2013/2014) and EUKO to examine whether M:F ratio varies between offline and online types of bullying.

Aim 5: we examined whether country differences in M:F ratio for victim rates are consistent across the five surveys (HBSC, EUKO, TIMSS, GSHS and PISA), using the same data sets as for Aim 1.

Significance of M:F differences is calculated by paired t tests. Pearsons correlations are reported in Aim 5.

4. Results

4.1 *Overall gender differences from all 5 surveys*

Table 2 shows overall data from HBSC (2009/10; averaged rates for 11, 13 and 15 year olds), EUKO (overall bullied), TIMSS (2011; averaged for 4th and 8th graders), GSHS, and PISA. Bully rates from HBSC show a substantial preponderance of male involvement. For EUKO, this was present but smaller in magnitude. For victim involvement, four surveys find males are more likely to be victims than females; the exception here is EUKO where girls are more often (but non-significantly) reported as victims.

Table 2 about here

4.2 *The consistency of overall gender differences in bully rates and victim rates by age/grade*

Table 3(a) shows variations in the M:F ratio for bullying others, from HBSC data, for 11, 13 and 15 year olds, at 6 survey time points. All are significantly different from unity, but there is a consistent pattern: in every survey, the ratio is highest at 15 years, and lowest at 13 years (in 1997/98, equal with 11 years). Relatively speaking, the male predominance in bullying decreases from 11 to 13 years, but increases between 13 and 15 years.

Table 3 about here

Table 4(a) shows the corresponding analyses for HBSC victim rates. Here there is a male predominance, but no consistent age pattern found across the six survey time points

. Table 4 about here

Table 5(a) shows the analyses for TIMSS victim rates, comparing grade 4 and grade 8 at the two survey time points. Unlike HBSC, there is some variation in countries sampled in TIMSS across grades, so only data from countries in common were considered. The difference between the genders (males more often victims than females) is small, but very consistent between grades.

Table 5 about here

4.3 *The consistency of overall gender differences in bully rates and victim rates by survey time point*

The number of countries sampled by HBSC, and by TIMSS, varies somewhat at different survey time points. To control for this, we analysed M:F ratios just using those countries in common at all time points. For the six HBSC surveys there were 22 countries in common. The M:F ratios averaged for these are shown for bullying others in Table 3(b). While all are significantly above unity, it is apparent there is a marked increase in the M:F ratio between the 93/94 and 97/98 surveys, and the four later ones. The two earlier surveys essentially asked about bullying at least once, while the later ones asked about bullying two or three times or more.

The corresponding HBSC analysis for victims across the 22 countries in common is shown in Table 4(b). Here there is no very substantial change by survey time point, although the M:F ratio does become non-significant for 13 and 15 year olds in the 2013/14 survey.

For TIMSS the comparison for the countries in common is shown in Table 5(b). It yielded virtually the same ratios as in Table 5a. There is no trend over survey time point.

4.4 *The consistency of overall gender differences in victim rates by offline or online bullying*

Table 6 shows the data from HBSC 2013/14 for cyber victims. The ratios are substantially less than for overall victim rates (taken from the HBSC overall question; we do not have HBSC data specifically for offline victimisation). Online, males are significantly more often victims at 11 years, but this reverses at 13 years (though the higher rate for females is not significant) and is very small and non-significant at 15 years. If the data for the three HBSC year groups are averaged, the M:F ratio for cyber victims is 1.04. Table 6 also shows data from EUKO separated by online (cyber) and face-to-face victimisation. Girls are significantly and appreciably more likely to be online victims, than boys. For offline bullying the difference is reversed but not significant.

Table 6 about here

4.5 *The consistency across countries of overall gender differences in victim rates in the five main surveys.*

Despite overall trends, there are some large country differences in M:F ratio. For example taking HBSC 2013-14 data at 11 years, the ratio is very high in Israel (2.71) and Romania (1.78), equal in Scotland (1.00), and below unity in Ireland (0.89) and the Netherlands (0.83).

To examine consistency in cross-country differences, we took M:F ratios for victim rates from each survey: HBSC for 2009/10, separately for 11, 13 and 15 year olds; EUKO (overall bullied); TIMSS for 2011, separately for 4^{th} and 8^{th} graders;

GSHS; and PISA. We then correlated these M:F ratios across surveys for those countries they had pairwise in common. There were insufficient countries in common to compare HBSC or EUKO with GSHS in this way.

Table 7 shows correlations of HBSC with TIMSS, EUKO and PISA. Most correlations are small and non-significant. However PISA has an appreciable and significant correlation with HBSC at 15 years, this being the appropriate age comparison.

Table 7 about here

Table 8 shows correlations of PISA with EUKO, TIMSS (4^{th} grade and 8^{th} grader) and GSHS. Correlations are mainly moderate, but substantial between TIMSS and PISA, especially for TIMSS 8^{th} grade (the best age match with PISA); and between GSHS and PISA. There is a substantial negative correlation between EUKO and TIMSS (8^{th} grade), but non-significant with only 9 countries in common.

Table 8 about here

5. Discussion

5.1 *Bullying others*

Our first aim was to examine overall gender differences across a wide range of countries. For bullying others thus was available from HBSC, and EUKO (Table 2). The preponderance of male perpetrators of bullying is found consistently across the two surveys, although more marked in HBSC than in EUKO.

The male preponderance in bullying others is consistent by age at all HBSC survey points (Table 3a), but the data suggest a curvilinear trend in early adolescence. This male predominance in bullying decreases between 11 and 13 years, but then increases between 13 and 15 years, so that the M:F ratio has a minimum around 13 years (although still with boys higher). A likely explanation here is that girls reach

puberty a year or so earlier than boys, and the increases in bullying others can be expected to be associated with this. For example, Ellis et al. (2012) have linked the advent of puberty to increased risk-taking and antisocial behaviors, such as bullying others.

The male preponderance in bullying others is also consistent across the six HBSC survey dates, even examining just countries in common (n=22; Table 3b). There is a marked increase in the M:F ratio between the first two and latter four surveys, but these surveys differ in terms of whether bullying others just once, is or is not counted. Thus it may be that (in the earlier surveys) females are (relative to males) more willing to admit bullying someone once, or less willing to admit to doing it several times. One explanation may be linked to social desirability; bullying once may be seen as more acceptable than doing it several times, and this might affect females more than males. There is some evidence for social desirability effects being higher in girls than boys (Dalton & Ortegren, 2011; Wardle & Beales, 1986). It may also be that different types of behaviours are considered when applying different frequency criteria (cf. Schwarz & Oyserman, 2001) and there are gender differences in the behaviours implied.

While other explanations may be possible for the changes in age, and survey period, they are unlikely to be due to other methodological issues; these changes are not observed in the corresponding analyses of victim rates (see below). Bullies are usually the agents and may initiate the bullying act at a time consistent with their current developmental status whilst victims may be the recipient of those bullying acts independent of their own developmental needs or progress. Hence, we may not see similar age patterns for victim rates.

5.2 *Being a victim of bullying*

While the general picture is also of male preponderance in victim rates, this is both smaller than for bullying others, and less universal. While HBSC, TIMSS, GSHS and PISA all report a male preponderance overall, EUKO does not (Table 2). We suggest two possible reasons for this. One is that (unlike the other 4 surveys) EUKO employed face-to-face interviews with young people. Whilst this section of the EUKO questionnaire was instructed to take place as self-completion due to the sensitive nature of the questions, the parent or carer had refused to leave the room for these kind of questions in 51% of the cases (ranging from 15% in Norway to 72% in Spain) (cf. Görzig, 2012). A common finding is that boys are less willing to tell about being a victim in the sense of seeking help (Hunter & Boyle, 2004), and this might also mean that they are less willing to admit it face-to-face with an adult, than in an anonymous questionnaire. Another difference is that the EUKO samples only drew on children who used the internet. Given that online bullying is relatively more frequent in girls (Table 6 and below), this might skew ratios somewhat in favour of girls.

The HBSC surveys at all six time points (despite some small measurement variations) suggest that there are no consistent trends by age for M:F ratios in victim rates between 11, 13 and 15 years (Table 3); nor is this found in TIMSS comparing 4th and 8th grades (Table 5a). Although overall victim prevalence tends to decrease with age (Smith et al., 1999), this decrease seems to affect boys and girls approximately equally.

Comparing survey time points, the HBSC findings (Table 4b) suggest that there are no consistent trends for M:F ratios between 1993 and 2013; nor is this found in TIMSS comparing 2011 and 2015 (Table 5b). Despite possible temporal shifts in gender roles, there is little evidence of this affecting M:F ratios in being a victim. However, one exception may be noted in Table 4b; this is the lack of significance for M:F ratios in the last, 2013/14, HBSC survey, only for 13 and 15 year olds. A possible explanation for

this is the increase in cyberbullying and its explicit recognition in the latest HBSC survey. Given a relatively greater involvement of females in online bullying (Table 6), and that cyberbullying peaks somewhat later than traditional bullying (Kowalski et al., 2014), this could explain the drop in M:F ratio (i.e. relatively more female involvement) at this time point and only in the older age groups.

Despite differences between HBSC and EUKO, Table 6 demonstrates that at least relative to males, females are more involved as victims of online compared to offline bullying. For EUKO, there is a significant reverse, with girls more involved as online victims. For HBSC, there is a (non-significant) reversal at 13 years, and the online M:F ratios are less (and less significant) than for overall victimisation. Discussion of this possible gender shift is not totally new (Görzig & Ólafsson, 2013; Smith, 2014; Whittaker & Kowalski, 2015), but it has not been demonstrated before to hold significantly across a range of countries and to show similar patterns across surveys.

5.3 *Implications for risk and protective factors*

These findings have implications for considering risk and protective factors, and interventions, as they apply to boys and girls. Although the overall finding, consistent with previous research, is that boys are more at risk of bullying others, and both genders about equally at risk of being victims (with boys slightly more being the most usual finding), such generalisations must be tempered by considerations of age, type of bullying, country/culture, and historical period. This would be consistent with the sociocultural approach to considering bullying, advocated by Maunder and Crafter (2018).

Gender differences in bullying and victimization are often interpreted in terms of gender socialization and normative expectations of behaviour in boys and girls, Felix

and Green (2010) consider this in terms of the way children are socialized to perceive and use power in relationships. Traditionally, the more physical way in which aggression and bullying has been conceived of provides one explanation of the greater risk for involvement by boys. In addition, greater empathy in girls might be a protective factor (Topcu & Erdur-Baker, 2012), and greater competitive risk-taking in boys at puberty (Archer, 2009) a risk factor in bullying perpetration.

Such theories need to be viewed in a cultural and historical context. Conceptions of what is aggression and bullying vary culturally and historically (Maunder & Crafter, 2018), and girls too are interested in the exercise of social power during adolescence (Duncan & Owens, 2011). The advent of widespread use of the internet over the last decade has provided greater opportunity for the kinds of relational aggression and bullying possible on social networking sites. Girls especially are attracted to social networking sites, and this may mean greater risk of being a victim of cyberbullying amongst girls in recent years (Table 4b) as well as greater involvement in cyberbullying perpetration among girls who engage with social networking sites (Görzig & Ólafsson, 2013). Again measurement aspects may be important, as boys are more interested in internet gaming (Smith, 2016) and more assessment of risks in this domain is needed. The types of bullying that girls or boys are predominantly involved in will have implications for the development of prevention and intervention methodologies when wanting to target those towards specific behaviours and coping strategies.

5.4 *Consistency of country differences across surveys*

Finally, we compared how consistent the five surveys were in their assessment of country differences. Previously, it has been shown that four surveys (HBSC, EUKO, GSHS and TIMSS) showed generally rather poor agreement in victim prevalence rates across countries (Smith, Robinson, & Marchi, 2016). However just because there is

poor agreement on overall prevalence rates does not necessarily imply poor agreement on the ratio of male to female prevalence rates.

In fact, Table 8 shows rather high levels of agreement between PISA and TIMMS, and especially for PISA with TIMSS 8th grade (the most age appropriate match). Similarly, PISA agrees well with GSHS. Correlations of GSHS with TIMSS are moderate, surprisingly higher with TIMSS 4th grade (as 8th grade is a closer age match). Nevertheless, given some differences in questions asked, time reference period, and other methodological factors (Smith, Robinson, & Marchi, 2016), these correlations are encouraging and suggest some external validity to the M:F ratios being assessed.

The HBSC correlations are less substantial (Table 7). They are low, near zero or even slightly negative with TIMSS and EUKO. There is a clear pattern of correlations with PISA however, increasing with age and significant at 15 years (as noted, the best age match with PISA).

The EUKO correlations are generally low and in fact 4 of the 6 are negative (Tables 7, 8). These correlations are surprising and disappointing, especially as there are 20 countries in common between EUKO and HBSC, and 23 between EUKO and PISA (all European). However, a lack of agreement on overall prevalence rates between HBSC and EUKO has previously been noted (Smith, Robinson, & Marchi, 2016) and it appears that this lack of agreement carries over to comparisons of M:F ratios across countries. Possible reasons include anonymous vs. face-to-face data collection, sampling (restricted to children on the internet in EUKO), definitions given (power imbalance not mentioned in EUKO), and translation issues (what term was used to translate 'bullying' in HBSC surveys in non-English speaking countries) (Smith, Gőrzig, & Robinson, 2018).

5.5 *Strengths and limitations*

This study is the first to compare these five large cross-national data sets. HBSC in particular provides a rich source for examining age trends and survey point trends. Besides confirming known patterns (e.g. preponderance of males in bullying others), it has suggested a curvilinear trend in M:F ratios in early adolescence (lower at 13 than at 11 or 15 years), and a possible decline in M:F ratios in recent years at mid-adolescence, perhaps related to the influence of cyberbullying. These trends need to be validated by further research.

This study also confirms the *relatively* greater involvement in girls as online or cyber victims. It is clear that the M:F ratio for victims is dependent on context: age, survey point, and type of bullying.

A limitation of this research is that, at least for GSHS, TIMMS and PISA, it is not possible to separate out bully/victims from pure bullies, as was done for one HBSC survey by Craig et al. (2009). Separate consideration of the bully/victim category is important for considerations of intervention; but the actual proportion of bully/victims varies very much by defining criteria (e.g. frequency of being a bully or victim; Yang & Salmivalli, 2013). Bully/victims are victimised just as are pure victims, and victim prevalence rates and the bully/victim ratio have an intrinsic importance and validity.

Further research should also consider using statistical modelling techniques which would allow taking into consideration the full variance of the sample beyond the countries' point estimates (Rabe-Hesketh & Skrondal, 2008; Raudenbush & Bryk, 2002). This could reveal more detailed patterns of variations as well as further statistically significant findings that here have been limited by the sample size being confined to number of countries instead of respondents.

The differences in M:F ratios between countries also deserves further study. Explanations for country differences (in prevalence or in M:F ratio) could be sought in,

for example, the EU Kids Online model, which considers cultural values, education systems, technological infrastructure, regulatory framework, and socio-economic stratification (Livingstone et al., 2011). For example, it could be predicted that M:F ratios would be higher in countries with more macho or masculine values (e.g. Hofstede, Hofstede, & Minkov, 2010). However, while country agreement on M:F ratios between PISA, TIMSS and GSHS is encouraging, it is less so for HBSC and EUKO. In fact, marked country discrepancies between HBSC and EUKO clearly need further investigation and discussion; this could try to uncover what methodological or other aspects are responsible for disagreement, and ultimately improve the way in which these large cross-national surveys are implemented.

5.6 *Implications for interventions*

The current findings indicate that the prevalence of certain types of bullying may vary with cultural and gender norms and that M:F ratios may vary accordingly. From this we can conclude that successful targeted prevention and intervention factors by gender may not be universal. From a long-standing tradition of research on self-concepts (Cross & Madson, 1997; Markus & Kitayama, 2010) we know that gender as well as culture are associated with relatedness or interdependence on the one hand or uniqueness or independence on the other. Gender in combination with cultural norms will lead to girls being more vulnerable to relational types of bullying and on internet platforms associated with relational interactions (e.g. social networking sites) whilst boys may be more vulnerable to types of bullying where uniqueness and independence can be expressed via direct aggression and fights or competition on internet gaming sites. It appears that the type of bullying which is more prevalent may vary with the strength of gender and cultural norms, i.e. bullying which is conducted within the domains of these norms is more likely. Hence, interventions may try to target the factors that occur within

those specific normative contexts. Interventions that target whole schools as well as address the role of bystanders (i.e., those who witness the bullying taking place) have been proven to be most effective (Menesini & Salmivalli, 2017). In both cases anti-bullying norms on the school or classroom level are addressed by enhancing awareness, empathy and self-efficacy to defend the bullied victim. Intervention programs should consider how the different elements of the program could be targeted towards the types of bullying displayed within the specific gender distribution and cultural norms in the population that is being addressed.

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Table 1. Characteristics of five large cross-national surveys

	EU Kids Online	GSHS	TIMSS	HBSC	PISA
What is measured	Being bullied and bullying others	Being bullied	Being bullied	Being bullied and bullying others	Being bullied
Age range (years); Gender	9 to 16	11 to 18	4th and 8th grades (about 10 and 14)	11, 13 and 15; boys and girls separately	Between 15 and 16 years of age
Number of countries surveyed	25	79	Around 60 (varies by survey year, and grade)	Around 40 (varies by survey year)	52
Sample size per country	About 1,000 who used the internet	Variable but more than 2,000	5,000-6,000	Minimum 1,500	Average of 7,500
Dates of survey	2010	2005 to 2012	2011/2015	1993/94, 1997-98, 2001/02, 2005/06, 2009/10, 2013/14	2015
How administered	Interview given face-to-face in child's home; parents may be in vicinity.	School-based survey	School-based survey	School-based survey	School-based survey (computer based, paper option available)
Definition	Sometimes children or teenagers say or do nasty or hurtful things to someone and this can often be quite a few times on different days over a	Bullying occurs when a student or group of students say or do bad and unpleasant things to another student. It is also bullying	None	We say a student is being bullied when another student, or a group of students, say or do nasty and unpleasant things to him or her. It is also bullying when a	None

	period of time, for example. This can include: Teasing someone in a way this person does not like; Hitting, kicking or pushing someone around; Leaving someone out of things.	when a student is teased a lot in an unpleasant way or when a student is left out things on purpose. It is not bullying when two students of about the same strength or power argue or fight or when teasing is done in a friendly and fun way.		student is teased repeatedly in a way he or she does not like or when he or she is deliberately left out of things. But it is not bullying when two students of about the same strength or power argue or fight. It is also not bullying when a student is teased in a friendly and playful way.	
Power imbalance	Not mentioned	Yes	Not mentioned	Yes	Not mentioned
Types of bullying asked about	Face-to-face (in person); by mobile phones (calls, texts, image/video texts); on the internet (social networking site, instant messaging, email, gaming website, chat room, some other way on internet).	Hit, kicked, pushed, shoved around, or locked indoors; made fun of because of my race or colour; made fun of because of my religion; made fun of with sexual jokes, comments, or gestures; left out of activities on purpose or	Made fun of or called names; left out of games or activities by other students; someone spread lies about me; something was stolen from me; hit or hurt by other student(s) (e.g. shoving, hitting, kicking);	No specific types, but 2 questions on cyberbullying in 2013-14 survey: Have you been a victim through someone sending mean instant messages, wall-postings, emails and text message or had created a website that made fun of	Called names by other students; picked on by other students; other students left me out of things on purpose; other students made fun of me; threatened by other students; other students

		completely ignored; made fun of because of how my body or face looks; bullied in some other way.	made to do things I didn't want to do by other students.	them.	took away or destroyed things that belonged to me; hit or pushed around by other students; other students spread nasty rumours about me.
Form of question and time reference period	Has someone acted in this kind of hurtful or nasty way to you in the past 12 months?	During the past 30 days, on how many days were you bullied?	During this year, how often have any of the following things happened to you at school?	How often have you been bullied at school in the past couple of months?	During the past 12 months, how often did you have the following experiences at school?
Frequency	Every day or almost every day; once or twice a week; once or twice a month; less often; never; don't know. [Country scores reported for 'less often' or more]	0 days; 1 or 2 days; 3 to 5 days; 6 to 9 ds; 10 to 19 days; 20 to 29 days; all 30 days. [Country scores reported for each frequency]	At least once a week; once or twice a month; a few times a year; never. [Country scores compiled over 6 types and summarised as almost never, about monthly, about weekly, and average scale score]	I have not been bullied at school in the past couple of months; it has only happened once or twice; 2 or 3 times a month; about once a week; several times a week. [Country scores reported for '2 or 3 times a month' or more]	Never or almost never; a few times a year; a few times a month; once a week or more.

Table 2. M:F ratios for bullying others, and being bullied, from 5 surveys (n=number of countries)

	HBSC 2009-10 n=38	EUKO 2010 n=25	TIMSS 2011 n=35	GSHS 2003-2011 n=78	PISA 2015 n=55
Bullying others	2.02*** t=12.48	1.16** t=3.07	na	na	na
Being bullied	1.27*** t=6.67	0.96 t= -1.41	1.04*** t=11.00	1.12*** t=5.21	1.25*** t=7.32

na = not available **= p<0.01 ***= p<0.001

Table 3. M:F ratios for bullying others from HBSC, (a) comparing across ages (n=number of countries), and (b) comparing across survey time point (22 countries in common).

(a)	1993/94 n=24	1997/98 n=29	2001/02 n=35	2005/06 n=39	2009/10 n=38	2013/14 n=42
11 yrs	1.51*** t=11.54	1.49*** t=14.19	2.06*** t=10.50	1.89*** t=9.81	2.06*** t=12.18	2.10*** t=9.76
13 yrs	1.46*** t=11.17	1.49*** t=14.25	1.97*** t=13.09	1.80*** t=10.23	1.93*** t=10.02	1.74*** t=7.80
15 yrs	1.69*** t=14.75	1.61*** t=15.26	2.26*** t=12.42	2.19*** t=11.94	2.09*** t=11.41	2.15*** t=11.02
(b)	1993/94	1997/98	2001/02	2005/06	2009/10	2013/14
11 yrs	1.49*** t=10.60	1.45*** t=11.92	2.07*** t=8.13	2.01*** t=6.81	2.06*** t=8.29	2.02*** t=5.73
13 yrs	1.44*** t=10.45	1.41*** t=13.87	1.88*** t=9.91	1.82*** t=6.47	2.00*** t=7.02	1.86*** t=5.89
15 yrs	1.65*** t=14.05	1.54*** t=12.64	2.11*** t=8.72	2.24*** t=11.05	2.07*** t=9.19	2.15*** t=7.59

***= $p<0.001$

Table 4. M:F ratios for being a victim of bullying, from HBSC, (a) comparing across ages (n=number of countries), and (b) comparing across survey time point (22 countries in common).

(a)	1993/94 n=24	1997/98 n=29	2001/02 n=35	2005/06 n=39	2009/10 n=38	2013/14 n=42
11 yrs	1.23*** t=6.53	1.18*** t=7.00	1.31*** t=4.36	1.22*** t=5.00	1.25*** t=5.65	1.27*** t=5.77
13 yrs	1.21*** t=6.32	1.21*** t=6.63	1.28*** t=5.74	1.18*** t=4.72	1.24*** t=5.00	1.15** t=3.36
15 yrs	1.31*** t=6.50	1.22*** t=5.00	1.24*** t=4.80	1.31*** t=4.18	1.33*** t=5.74	1.17** t=3.37
(b)	1993/94	1997/98	2001/02	2005/06	2009/10	2013/14
11 yrs	1.23*** t=5.90	1.14*** t=5.75	1.24** t=2.84	1.20*** t=3.74	1.22*** t=3.67	1.20** t=3.61
13 yrs	1.20*** t=5.89	1.16*** t=5.35	1.24*** t=4.52	1.16* t=2.77	1.22** t=3.51	1.12 t=2.03
15 yrs	1.27*** t=5.94	1.19*** t=5.80	1.17** t=2.87	1.22** t=3.04	1.34*** 4.44	1.09 t=1.61

*=p<0.05 **= p<0.01 ***= p<0.001

Table 5. M:F ratios for being a victim of bullying, from TIMSS, (a) comparing across grades (n = countries in common across grade at same survey point); and (b), comparing across survey time point (n = countries in common across survey points at same grade).

(a)	2011 n=35	2015 n= 33
Grade 4	1.04*** t=12.12	1.05*** t=11.27
Grade 8	1.04*** t=8.78	1.04*** t=5.61
(b)	2011	2015
Grade 4 n = 42	1.04*** t=13.35	1.04*** t=8.97
Grade 8 n = 34	1.05*** t=13.17	1.04*** t=5.93

***p<0.001

Table 6. M:F ratios for online and offline victim rates, HBSC 2013-2014 (42 countries in common) and EUKO

	Online	Offline	Overall [online or offline]
HBSC 11 years	1.22* t=2.41		1.27*** t=5.77
HBSC 13 years	0.88 t= -1.44		1.15** t=3.36
HBSC 15 years	1.06 t=0.68		1.17** t=3.37
EUKO 9-16 years	0.78*** t= -4.78	1.07 t=1.80	0.96 t= -1.41

*=p<0.05 **= p<0.01 ***= p<0.001

Table 7. Correlations of M:F ratio across countries for HBSC with TIMSS, EUKO, and PISA (n=number of countries in common)

HBSC	TIMSS 4th (n=25)	TIMSS 8th (n=15)	EUKO (n=20)	PISA (n=27)
11 yrs	-0.05	-0.30	-0.11	-0.08
13 yrs	0.21	0.07	-0.18	0.37
15 yrs	0.12	0.28	-0.08	0.55**

**= $p<0.01$

Table 8. Correlations of M:F ratio across countries for TIMSS with EUKO, GSHS and PISA (n=number of countries in common)

TIMSS	EUKO	GSHS	PISA
4th Grade	0.02 (n=18)	0.64* (n=11)	0.61*** (n=33)
8th Grade	-0.48 (n=9)	0.33 (n=15)	0.83*** (n=23)
EUKO	-	-	0.02 (n=23)
GSHS	-	-	0.76* (n=10)

*p<.05 ***p<.001