Negative school perceptions and involvement in school bullying: A universal relationship across 40 countries

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ABSTRACT

Cross-national analyses explore the consistency of the relationship between negative school experiences and involvement in bullying across 40 European and North American countries, using the 2006 (40 countries $n = 197,502$) and 2002 (12 countries, $n = 57,007$) WHO–HBSC surveys. Measures include two Cumulative Negative School Perception (CNSP) scales, one based on 6 mandatory items (2006) and another including an additional 11 items (2002). Outcome measures included bullying perpetration, victimization and involvement as both bully and victim. Logistic regression analyses suggested that children with only 2–3 negative school perceptions, experience twice the relative odds of being involved in bullying as compared with children with no negative school perceptions. Odds Ratios ($p < 0.001$) increase in a graded fashion according to the CNSP, from about 2.2 to over 8.0. Similar consistent effects are found across gender and almost all countries. Further research should focus on the mechanisms and social context of these relationships.

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School violence in general, and bullying in particular, has received much attention in recent years as a world-wide behavioral problem and its short and long term impact on both the perpetrators and the victims of bullying have been widely documented (Due, Merlo, Harel-Fisch, & Damsgaard, 2009; Smokowski & Kopasz, 2005; Veenstra et al., 2005). Bullying has been defined as deliberate and repeated long-term exposure to negative acts performed by a person or group of persons regarded of higher status or greater strength than the victim (Harel, 1998; Olweus, 1993; Scheidt & Harel, 2001). It implies an imbalance of power (physically, psychologically or otherwise) between the bully and the victims (Olweus, 1991) and may involve verbal acts such as threats, insults and nicknames, physical acts such as assault or theft or social acts such as exclusion from the peer group (Due et al., 2005).

Both short-term and long-term effects of bullying have been documented. Bullying affects the physical health of young people, resulting in somatic symptoms such as headaches, stomach and back aches, (Due et al., 2005; Nansel, Craig, Overpeck, Saluja, & Ruan, 2004; Williams, Chambers, Logan, & Robinson, 1996) psychological distress, such as depression, bad temper, nervousness, loneliness and helplessness (Haynie et al., 2001; Kaltiala-Heino, Rimpela, Marttunen, Rimpela, & Rantanen, 1999; Peskin, Tortolero, Markham, Addy, & Baumler, 2007; Salmon, James, Cassidy, & Javaloyes, 2000) and long term patterns of problem behavior, such as aggression, violence, problem drinking and substance use (Farrington, 1989; Kaltiala-Heino, Rimpelae, Rantanen, & Rimpelae, 2000).

Studies on bullying suggest three separate groups involved in school violence – bullies, victims and those who are both bullies and victims, each group associated with differing, although overlapping, characteristics, genetic and environmental influences and implications (Ball et al., 2008; Haynie et al., 2001; Smokowski & Kopasz, 2005; Veenstra et al., 2005). Research shows such long term implications for both the bully and the victim of the bullying alike (Kaltiala-Heino et al., 2000, 1999; Salmon et al., 2000) with the greatest effects showed for those that are involved both as bullies and as victims. While bullies have been shown to exhibit higher levels of externalizing behavior and victims as showing higher levels of internalizing behavior, those who are classified as both bullies and victims have been shown to exhibit higher levels of both and lower levels of functioning (Hanish & Guerra, 2004; Menesini, Modena, & Tani, 2009; Nansel et al., 2004).

A "socio-ecological systems perspective" on bullying and victimization sees the phenomenon of bullying as encouraged or inhibited as a result of the complex relationships between the individual, the family, the peer group, the school, the community and culture (Benbenishty & Astor, 2005; Espelage & Swearer, 2003; Harel, 1999). In particular, recent literature has demonstrated the importance of the multi-dimensional daily experience of children in their school environment as pivotal in understanding the dynamics of school violence (Benbenishty & Astor, 2007). A participative life in school, as well as the perception of safety in schools, a feeling of belonging and bonding with teachers and pupils, are relevant factors both in well being and on academic success improvement (Bonny, Britto, Klostermann, Hornung, & Slap, 2000; Gonçalves & Matos, 2007; Matos, 2005; Matos et al., 2008; Simões, 2007). Brugman et al. (2003) emphasize the role of students perception of the moral atmosphere in their school as related to transgressive or prosocial behavior.

Within this complex system is the critical role of school climate and perceptions (Harel, 1999; Kasen, Berenson, Cohen, & Johnson, 2004; Kochenderfer & Ladd, 1996a, 1996b; Whitney & Smith, 1993), which have been found in previous research to be more significant in explaining school violence than either family or peer factors (Laufer & Harel, 2003b). Many existing studies show that negative school perceptions among youth predict higher likelihood of involvement in various risk behaviors, such as substance use, problem drinking, truancy and involvement in school bullying, fighting and weapon carrying (Harel, 1999; Kasen et al., 2004). Most of these studies use a general measure of negative school perception, namely either a single item measure or a multi-item mean-score covering several dimensions of school life (Nansel, Haynie, & Simons-Morton, 2003). Other studies use measures of more specific dimensions of school life taken from the school climate literature, such as "teacher–student relations", "rules and regulations", "achievement", "fellow–student relations", "school physical environment" and "fairness" (Laufer & Harel, 2003b; Samdal, Nutbeam, Wold, & Kannas, 1998).

Associations have been found between bullying and various elements of school experience. Negative relationships between both being bullied and bullying and school functioning and academic achievement have been well documented (Haynie et al., 2001; Laufer & Harel, 2003b; Schwartz, 2000). Bullying is associated with poorer grades, more absenteeism and lower school attendance (Eisenberg, Neumark-Sztainer, & Perry, 2003; Juvonen, Nishina, & Graham, 2000; Nishina, Juvonen, & Witkow, 2005; Pekel-Uludagli & Ucanok, 2005), although questions remain as to the direction of the causality in the relationship (Kochenderfer & Ladd, 1996a). A similar reciprocal relationship has been suggested in the relationship between bullying and acceptance/rejection in peer relationships and social adjustment where a "vicious cycle" leads to progressive increases in peer rejection and victimization (Boulton & Smith, 1994; Dijkstra, Lindenberg, & Veenstra, 2007, 2008; Harris, 2009; Juvonen, Nishina, & Graham, 2000; Kochenderfer-Ladd & Wardrop, 2001; Nansel et al., 2004; Pekel-Uludagli & Ucanok, 2005; Rigby & Slee, 1993; Schwartz, 2000). Peer rejection/acceptance can also to serve as a mediator between bullying and its impact on internalizing and externalizing behaviors (Hodges & Perry, 1999).

Similarly, associations have been found between measures of teacher–student relations and bullying, including the degree of support felt from teachers, classroom climate and teachers' attitudes towards students (Bacchini, Esposito, & Affuso, 2009; Cassidy, 2009; Doll, Song, & Siemers, 2004; Flaspohler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009; Hanish & Guerra, 2004; Holt & Keyes, 2004; Laufer & Harel, 2003a; Nation, Vieno, Perkins, & Santinello, 2008; Wei, Williams, Chen, & Chang, 2009). A school climate low in perceived student misconduct and high in adult monitoring has also been related to lower levels of school violence (Totura et al., 2009) as have school-level indicators of disorder (e.g., student–teacher ratio, concentration of student poverty, school size, suspension rate, and student mobility) (Bowes et al., 2009; Bradshaw, Sawyer, & O'Brennan, 2009). The degree to which a student "likes" school, feels happy at school and feels a sense of safety and belonging has also been found to contribute to the likelihood of involvement in bullying (Boulton & Underwood, 1992; Eisenberg et al., 2003; Harel, 1999; Laufer & Harel, 2003a; Rigby & Slee, 1993; Smith & Shu, 2000).

In sum, findings from existing studies have demonstrated two main points: (1) negative school perceptions and experiences are strongly associated with the probability of involvement in bullying (as a victim, as a perpetrator and as a bully/victim), and (2) single measures of specific dimensions of school life predict bullying and other risk behaviors, yet their respective associations with the outcome variables are not as strong as the more general or aggregated measures (Harel, 1999; Laufer & Harel, 2003a, 2003b).

While a strong relationship has been found to exist between school perceptions and bullying (Meyer-Adams & Conner, 2008), no one specific dimension in school life has been identified as responsible for this relationship. In this paper we suggest the role of *cumulative* negative perceptions as opposed to one specific dimension as explaining the strong relationship between school experience and involvement in bullying. Rutter (1979) verified that the existence of four stress factors would quadruplicate the probability of maladjustment, in what can be termed cumulative risk. In his seminal work (Rutter, 1979) he identified the existence of six risk factors correlated with child psychiatric disorder: severe marital discord, low social status, large family size, paternal criminality, maternal mental illness and foster placement and showed the increased effect of an accumulation of factors as opposed to the importance of a specific factor. Theories of cumulative stress (Masten et al., 1988; Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987) stress that it is the accumulation of stressors and not one single type of stress experience which must be understood in children's development (Dube et al., 2009; Morales & Guerra, 2006). Children can be exposed to stress in a multitude of forms e.g. physical stressors (poverty, poor housing, crowding, deprivation), psychosocial stressors (family difficulties, violence, divorce), transitions (e.g. immigration) as well as normative stressors of developmental periods. Greater cumulative stress has been found to lead to greater adjustment difficulties (Appleyard, Egeland, Dulmen, & Alan Sroufe, 2005), socio-emotional difficulties among children (Evans & English, 2002) and has been associated with the development of violence among adults (Margolin & Gordis, 2003).

This study examines the relationship between bullying and school perception in 40 countries. In recent years, the importance of the subject has been reflected by research on bullying carried out in many different countries as well as cross-cultural studies (Due et al., 2005; Pereira, Mendonça, Neto, Valente, & Smith, 2004; Smith et al., 1999; Smith, Nika, & Papasideri, 2004). Both cross-cultural similarities and differences have been found. For example, increased physical and psychological symptom load was found to be related to greater exposure to bullying in 28 countries studied, but with a wide variability of prevalence between the countries (Due et al., 2005), suggesting that while rates of bullying vary across countries there may be similar cross-cultural patterns of the relationship between bullying and emotional well-being. Smith and Monks (2008) emphasize two different aspects of bullying which may differ in different cultural contexts: words and their meaning used for describing bullying and behavioral manifestations, while cross-cultural differences have also been found in the way parents define bullying (Smorti, Menesini, & Smith, 2003). Recent research (Due et al., 2009; Elgar, Craig, Boyce, Morgan, & Vella-Zarb, 2009) suggests that between country differences in prevalence rates may be connected to levels of income inequality in the country.

In this study, we propose that negative school experiences have a cumulative relationship with the developmental of school violence, such that it is the accumulation of negative school perceptions and not one specific perception or school experience which will be associated with bullying, being bullied or being a bully/victim. Concurrently, we should expect that: (1) The likelihood of involvement in bullying should increase as a function of the number of negative school perceptions (independent of the direction of causality) and (2) this association should be universal across countries.

The concept of school atmosphere or perception of school is hard to operationalize. To explore this idea, a cross-national comparative analysis was carried out using a Cumulative Negative School Perceptions (CNSP) scale that counts the number of negative school perceptions across various dimensions, enabling the investigation of the consistency of the relationships of school perceptions on school bullying across 40 countries.

Method

This study is based on data from the 2002 and the 2006 World Health Organization Health Behavior in School-Aged Children (HBSC) cross-national surveys conducted in 40 countries. The HBSC is a school-based survey of adolescent health behaviors and their psychosocial determinants, carried out every 4 years simultaneously in all participating countries, using an international standardized methodological protocol (Currie, Roberts, Morgan, & Smith, 2004; Currie, Samdal, Boyce, & Smith, 2001). The study base includes school children aged 11, 13 and 15 (6th, 8th and 10th grade students) in 40 countries in Europe and North America. According to the study protocol, data from each country are gathered from nationally representative samples that include at least 1500 sampled children in each of the three age groups, with national sample sizes of 4–6 thousand students per country. The sampling method is based on single classrooms as the sampling unit, where all students belonging to a sampled classroom are included. The clustering of the samples is taken into account both by the relatively large sample size and also during statistical analyses by inflating the confidence intervals by a design effect of 1.4 (Currie et al., 2001). The HBSC uses a standard, self-administered in-class questionnaire that includes both mandatory and optional items. A detailed description of the methods and instrument of the HBSC can be found in Currie et al (Currie, 2006; Currie, Molcho, Boyce, Holstein, & Torsheim, 2008; Currie et al., 2004).

The HBSC questionnaire includes 17 measures describing various dimensions of school perceptions (Table 1). Six of these items are mandatory, and were included in all 40 countries in 2006. An additional 11 items were offered optionally in the 2002 survey, and were included by 12 of the 40 countries [see Currie et al (Currie et al., 2001) for scientific rational for school perception item inclusion in the HBSC survey]. While the data for the mandatory items for all 40 countries is available for the 2006 survey, the cross-national dataset of the optional school package is only available for 2002. We therefore used both cross-national sets of data. Despite the complexity of using two data bases, we preferred to use the more up to date 2006 data for the 6 mandatory perceptions, but needed to use 2002 data to gain the richness of all 17 perceptions. In total, the 2006 survey was comprised of 197,502 students from 40 countries (national sample sizes ranged

Table 1
Bivariate logistic regression predicting involvement in bullying for each negative school perception for all countries combined.

	Dichotomized school perceptions (1 = negative, 0 = not negative)	Year of survey	No. of countries	Odds ratio					
				Bully only		Victim only		Bully victim	
Mandatory	1. Academic achievement	2002	12	2.9	(2.7, 3.3)	1.5	(1.3, 1.6)	3.1	(2.6, 3.6)
		2006	40	2.2	(2.1, 2.3)	1.5	(1.4, 1.6)	2.1	(2, 2.3)
	2. Liking school	2002	12	2.1	(1.9, 2.2)	1.7	(1.6, 1.8)	2.5	(2.2, 2.7)
		2006	40	1.9	(1.9, 2)	1.4	(1.4, 1.5)	1.9	(1.8, 2)
	3. Students being together	2002	12	1.4	(1.2, 1.6)	2.4	(2.2, 2.7)	2.5	(2.1, 2.9)
		2006	40	1.6	(1.5, 1.6)	2.2	(2.1, 2.3)	2.2	(2.1, 2.4)
	4. Students kind and helpful	2002	12	1.5	(1.4, 1.7)	3.2	(3, 3.4)	3.1	(2.7, 3.4)
		2006	40	1.6	(1.5, 1.6)	2.8	(2.7, 2.9)	2.5	(2.4, 2.7)
	5. Students accept me	2002	12	0.9	(0.8, 1)	7.2	(6.7, 7.7)	4.2	(3.7, 4.8)
		2006	40	0.9	(0.9, 1)	5.2	(5, 5.4)	2.8	(2.6, 3)
	6. Pressured by schoolwork	2002	12	1.3	(1.2, 1.4)	1.5	(1.5, 1.6)	1.9	(1.7, 2.1)
		2006	40	1.3	(1.2, 1.3)	1.4	(1.4, 1.5)	1.5	(1.4, 1.6)
Optional	7. Students take part in making rules	2002	12	1.6	(1.5, 1.7)	1.2	(1.1, 1.3)	1.5	(1.3, 1.7)
	8. Students treated too severely/strictly	2002	12	2.1	(2, 2.3)	1.2	(1.1, 1.2)	1.9	(1.7, 2.1)
	9. Rules are fair	2002	12	2.6	(2.4, 2.8)	1.1	(1.1, 1.2)	2.2	(2, 2.5)
	10. Teacher encourage students express views	2002	12	2.1	(1.9, 2.3)	1.5	(1.4, 1.6)	2.3	(2, 2.6)
	11. Teacher treat students fairly	2002	12	2.5	(2.3, 2.7)	1.2	(1.1, 1.3)	2.3	(2, 2.6)
	12. Extra help from teacher when needed	2002	12	2.5	(2.3, 2.8)	1.5	(1.4, 1.6)	2.2	(1.9, 2.5)
	13. Teacher interested in student	2002	12	2.0	(1.9, 2.2)	1.3	(1.2, 1.4)	1.7	(1.5, 1.9)
	14. School is nice place to be	2002	12	2.3	(2.2, 2.5)	1.7	(1.6, 1.8)	2.5	(2.2, 2.9)
	15. Feel I belong	2002	12	2.1	(1.9, 2.3)	2.5	(2.3, 2.7)	2.7	(2.4, 3.1)
	16. Feel safe	2002	12	2.0	(1.8, 2.1)	3.4	(3.1, 3.6)	3.5	(3, 4)
	17. Organize school events	2002	12	1.6	(1.5, 1.7)	1.4	(1.3, 1.5)	1.7	(1.5, 2)

Total *N* for 2002 is about 52,000 for 12 countries and for year 2006 about 195,000 for 40 countries.

from $N = 1283$ in Greenland[2] to $N = 9329$ in Iceland) and the 2002 data included 57,007 students from 12 countries (sample sizes ranged from $N = 3695$ in Wales to $N = 6249$ in Flemish Belgium).

Measures

Bullying

Following a reading of an abbreviated version of Olweus's questionnaire definition of bullying, the students responded to two questions (based on Olweus Bullying questionnaire – (Olweus, 1996; Solberg, Olweus, & Endresen, 2007)): 1) How often have you been bullied at school in the past couple of months? 2) How often have you taken part in bullying another student at school in the past couple of months? Response options were: 1- I haven't been bullied/been involved in bullying in school in the past couple of months; 2- it has only happened once or twice; 3- 3 times a month; 4- about once a week; and 5- several times a week. A cutoff point of *3 times or more* was used to indicate being involved in "chronic" bullying. (Dube et al., 2009; Harel, 1999; Laufer & Harel, 2003b). Dichotomized versions of the global questions (chronic versus not) have been shown to provide useful measures of prevalence with good psychometric properties (Solberg & Olweus, 2003).

School perceptions

School perceptions included six mandatory items around three areas used by all 40 countries in the 2006 survey: a) academic achievement (academic achievement and feeling pressured by school work); b) student social relationships (students are together, students are kind and helpful, and students accept me); and c) general school perception (liking school). Another 11 optional questions were used by 12 countries and related to 3 areas: a) rules and regulations (students take part in making rules, students are treated too severely, rules are fair, school events are organized), b) teacher–pupil relations (teachers encourage students to express views, teachers treat students fairly, extra help is gained from teacher when needed, teachers are interested in students) and c) general school perceptions (school is a nice place to be, I feel I belong, I feel safe). For all questions a five point Lickert scale was given ranging from 'strongly agree' to 'strongly disagree'. For each school perception a dichotomous variables was created for the existence or non-existence of a negative school perception, where the two lowest responses were considered to represent a negative school perception. For example, for the questions "students in my class enjoy being together", "most of the students in the class are kind and helpful" and "other students accept me as I am", answers of disagree or strongly disagree were considered to be negative school perceptions.

Each of the 17 individual items was used to explore item-specific relationships with bullying. This was done for all 17 items using the 2002 data, and for the 6 mandatory items using the more recent 2006 data. We then counted the number of negative perception responses each sampled child gave on each of the 6 (for 2006) or 17 (for 2002) school items, to create two scales of Cumulative Negative School Perceptions (CNSP). One scale was based on the six mandatory items

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[2] Greenland used their entire population, not a sample.

from 2006 ($n = 197,502$ children from 40 countries), and the second scale was based on all 17 items from 2002 ($n = 57,007$ children from 12 countries). Both scales show very high reliability scores of Cronbach Alpha $= 0.78$ (6 items) and 0.85 (17 items), with no single item deviations.

Data analysis

Logistic regression models were used to quantify relationships between the individual school perception measures and involvement in bullying (as a perpetrator only, as a victim only and as a bully/victim). Crude and adjusted odds ratios and associated confidence limits were estimated, with consideration of a conservative design effect (calculated confidence intervals were inflated by 1.4) to account for the clustered nature of the data collection. The latter express the relative odds of involvement in bullying for those who reported a negative perception (scored "1" on the item), as compared to those who did not report a negative perception (scored "0"). Odds ratios for individual items are presented in Table 1. A design effect of 1.4 was used as accepted in epidemiological literature dealing with health related risk behaviors. The HBSC international survey protocol assumes a design factor of 1.2 and consequently most HBSC publications have used 1.4 as a conservative estimate to present findings which are scientifically accurate (Currie et al., 2001; King, Wold, Tudor-Smith, & Harel, 1996; Roberts, Francois, Batista-Foguet, & King, 2000).

Two versions of the Cumulative Negative School Perceptions (CNSP) scale were used that runs from "0" (no negative perceptions) to "6" (6 negative perceptions) for 2006, and from "0" to "17" (17 negative perceptions) for 2002. The intensity of the perceived negative daily experience at school is reflected by a higher CNSP score. Further logistic regression analyses were used to estimate the relative odds of bullying/being bullied associated with CNSP scores, relative to those who did not report any negative perceptions.

Results

Bivariate relationships were examined between each of the individual negative school perceptions, within five dimensions (achievement, social climate, teacher–pupil relations, rules and regulations and general school perceptions), with being involved in bullying –as a bully, as a victim and then as a bully-victim across all countries. The next stage of analyses focused on the relationship between the Cumulative Negative School Perception scales and the odds of involvement in bullying for all countries together, then for each individual country separately.

Individual negative school perceptions

Table 1 presents the bivariate logistic regression analyses. The findings suggest that each of the negative school perceptions is significantly related to all three groups involved in bullying (bully, victim and bully-victim). However, strong relationships were found between *being bullied* and (a) *student social relationship variables* such as students being together (OR $= 2.4/2.2$)[3], students being kind and helpful (OR $= 3.2/2.8$) and students accepting me (OR $= 7.2/5.2$), and for (b) *general school perception variables* such as feeling safe (OR $= 3.4$) and feeling that I belong (OR $= 2.5$). In addition, strong relationships were found between *bullying others* and (a) lower *academic achievement* (OR $= 2.9/2.2$), (b) *general school perception variables* such as liking school (OR $= 2.1/1.9$), school is a nice place to be (OR $= 2.5$), feeling I belong (OR $= 2.1$) and feeling safe (OR $= 2.0$), (c) *teacher–pupil relation variables* such as teacher encourages students to express views (OR $= 2.1$), teacher treats students fairly (OR $= 2.5$) and teachers give extra help when needed (OR $= 2.5$) and (d) *rules and regulations* variables such as rules are fair (OR $= 2.6$) and students are treated too severely/strictly (OR $= 2.1$). Lastly, strong relationships were found between *bully-victims* and (a) lower *academic achievement* (OR $= 3.1/2.1$), (b) *general school perception variables* such as liking school (OR $= 2.5/1.9$), feeling I belong (OR $= 2.7$) and feeling safe (OR $= 3.5$), (c) *teacher–pupil relation variables* such as teacher encourages students to express views (OR $= 2.3$), teacher treats students fairly (OR $= 2.3$) and teachers give extra help when needed (OR $= 2.2$) and (d) *rules and regulations* variables such as rules are fair (OR $= 2.2$) and (e) *student social relationship variables* such as students being together (OR $= 2.5/2.2$), students being kind and helpful (OR $= 3.1/2.5$) and students accepting me (OR $= 4.8/2.8$). As can be seen in Table 1, the bully-victim group showed a greater number of high odds ratios amongst individual negative school perceptions.

Cumulative negative school perceptions (CNSP)

Fig. 1 presents the sex-specific odds ratios of being involved in bullying by the cumulative number of school negative perceptions (CNSP) for both a 0–6 point scale[4] (2006 data; $n = 197,502$ from 40 countries) and for the 0–17 CNSP (2002 data, $n = 52,007$ from 12 countries). The findings (also shown in column "All" in Tables 2–4) suggest that for all three groups, the odds of being involved in bullying increase significantly for each unit in the CNSP scale, ranging for bully victims from 1.5 (1 negative perception) to 6 (4–6 negative perceptions), for bullies from 1.5 (1 negative perception) to 2.4 (4–6 negative perceptions) and for bully-victims from 1.6 (1 negative perception) to 5.3 (4–6 negative perceptions). Furthermore, the

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[3] The Odds ratios presented are for 2002 and then 2006 respectively.

[4] 4–6 negative school perceptions are shown together as one group due to the smaller numbers of adolescents for each additional negative perception.
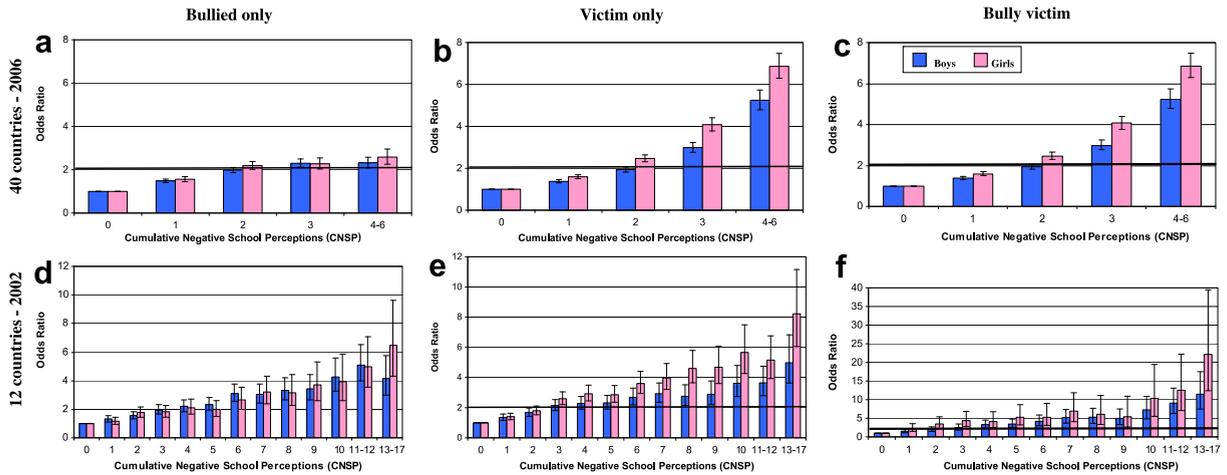
Fig. 1. Cumulative negative school perception (CNSP) and the probability of bullying by gender.

Table 2
Logistic regression analysis for cumulative mandatory school perceptions and bulling others 3 times or more, by country, 2006.

	No negative perceptions	1 Perception		2 Perceptions		3 Perceptions		4–6 Perceptions		N
	OR	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	
All (N)	**1.0 (83,953)**	**1.5 (62,134)**	**(1,5, 1.6)**	**2.1 (31250)**	**(2.0, 2.2)**	**2.3 (12,317)**	**(2.2, 2.5)**	**2.4 (6,586)**	**(2.2, 2.6)**	**196,240**
Austria	1.0	1.7	(1.4, 2.2)	2.5	(1.9, 3.3)	1.8	(1.1, 3.1)	0.9	(0.3, 2.5)	4,758
Belgium Flemish	1.0	1.6	(1.1, 2.2)	2.0	(1.4, 2.9)	3.3	(2.1, 5)	3.1	(1.6, 5.7)	4,198
Belgium French	1.0	1.2	(0.9, 1.7)	1.7	(1.2, 2.4)	1.2	(0.6, 2.1)	0.8	(0.3, 2)	4,044
Bulgaria	1.0	1.3	(1, 1.8)	1.8	(1.3, 2.4)	1.8	(1.2, 2.6)	2.4	(1.6, 3.7)	4,736
Canada	1.0	1.3	(1, 1.7)	1.8	(1.3, 2.5)	1.9	(1.2, 2.9)	2.3	(1.4, 3.6)	5,795
Switzerland	1.0	1.8	(1.4, 2.3)	2.5	(1.9, 3.3)	3.0	(1.9, 4.8)	1.4	(0.6, 3.2)	4,469
Czech Republic	1.0	1.6	(1, 2.5)	1.5	(0.9, 2.6)	2.9	(1.6, 5.4)	3.1	(1.6, 6)	4,700
Germany	1.0	1.7	(1.4, 2)	2.1	(1.7, 2.8)	2.2	(1.5, 3.3)	2.3	(1.4, 3.7)	7,162
Denmark	1.0	2.1	(1.6, 2.8)	3.5	(2.6, 4.8)	4.3	(2.7, 6.7)	4.2	(2.4, 7.4)	5,668
Estonia	1.0	1.9	(1.5, 2.5)	2.3	(1.8, 3)	2.5	(1.8, 3.5)	1.5	(0.9, 2.4)	4,436
England	1.0	2.0	(1.3, 3)	5.5	(3.6, 8.3)	4.5	(2.6, 7.9)	5.0	(2.7, 9.3)	4,463
Spain	1.0	1.2	(0.9, 1.6)	2.2	(1.7, 2.9)	2.8	(2, 4)	1.6	(0.8, 3.2)	8,645
Finland	1.0	1.2	(0.8, 1.9)	2.6	(1.7, 4)	3.4	(2, 5.8)	2.8	(1.4, 5.6)	5,153
France	1.0	1.5	(1.2, 1.9)	2.2	(1.7, 2.8)	2.5	(1.8, 3.4)	2.1	(1.4, 3.3)	7,009
Greenland	1.0	1.6	(1.1, 2.4)	1.1	(0.6, 2)	1.0	(0.4, 2.7)	2.5	(1, 6.2)	1,280
Greece	1.0	1.5	(1.1, 1.9)	1.9	(1.4, 2.5)	1.4	(0.9, 2)	2.1	(1.3, 3.7)	3,639
Croatia	1.0	1.6	(1.1, 2.4)	2.5	(1.7, 3.7)	2.0	(1.1, 3.7)	5.7	(3, 10.9)	4,901
Hungary	1.0	1.7	(1.1, 2.6)	2.8	(1.8, 4.5)	3.0	(1.6, 5.5)	2.7	(1.2, 6.1)	3,434
Ireland	1.0	2.8	(1.7, 4.6)	4.6	(2.7, 7.7)	6.4	(3.5, 11.5)	11.7	(6.2, 21.9)	4,746
Israel	1.0	1.2	(1, 1.6)	1.5	(1.1, 2)	2.0	(1.4, 3)	2.0	(1.1, 3.3)	5,348
Iceland	1.0	2.0	(1.4, 2.8)	3.6	(2.5, 5.4)	4.4	(2.7, 7.2)	7.9	(4.9, 12.7)	9,246
Italy	1.0	1.2	(0.9, 1.8)	1.8	(1.3, 2.5)	1.8	(1.2, 2.9)	2.6	(1.6, 4.4)	3,909
Lithuania	1.0	1.5	(1.2, 1.8)	1.8	(1.4, 2.2)	1.8	(1.3, 2.3)	1.7	(1.3, 2.4)	5,473
Luxembourg	1.0	2.1	(1.6, 2.7)	1.8	(1.3, 2.5)	3.3	(2.2, 4.9)	2.4	(1.3, 4.6)	4,084
Latvia	1.0	1.1	(0.9, 1.4)	1.4	(1.1, 1.8)	1.2	(0.9, 1.5)	1.6	(1.2, 2.2)	4,166
Macedonia	1.0	1.4	(1.1, 1.8)	2.1	(1.6, 2.9)	3.1	(1.9, 5.1)	1.7	(0.7, 4.4)	5,254
Malta	1.0	0.9	(0.4, 1.9)	2.1	(1, 4.3)	2.8	(1, 7.6)	4.2	(0.9, 20.3)	1,305
Netherlands	1.0	1.7	(1.3, 2.3)	2.3	(1.6, 3.5)	1.8	(0.9, 3.6)	1.6	(0.5, 5.2)	4,187
Norway	1.0	1.7	(1.2, 2.4)	3.1	(2, 4.9)	5.2	(2.8, 9.5)	3.0	(1.2, 7.8)	4,564
Poland	1.0	1.7	(1.3, 2.2)	3.0	(2.3, 4)	2.7	(1.9, 3.8)	2.3	(1.4, 3.6)	5,467
Portugal	1.0	1.4	(1, 1.9)	2.0	(1.4, 3)	2.2	(1.2, 3.8)	3.6	(1.8, 7.5)	3,787
Romania	1.0	1.4	(1.2, 1.7)	1.9	(1.5, 2.4)	2.0	(1.4, 2.9)	1.6	(0.9, 3.1)	4,554
Russia	1.0	1.2	(1, 1.4)	1.2	(1, 1.5)	1.2	(1, 1.6)	1.2	(0.8, 1.6)	8,096
Scotland	1.0	1.7	(1.3, 2.4)	3.0	(2.1, 4.3)	2.8	(1.7, 4.5)	2.4	(1.3, 4.5)	5,943
Sweden	1.0	2.1	(1.3, 3.3)	3.9	(2.4, 6.5)	2.0	(0.7, 5.6)	11.8	(5.6, 25)	4,351
Slovenia	1.0	1.2	(0.9, 1.7)	1.8	(1.2, 2.6)	2.7	(1.6, 4.4)	3.7	(2, 6.8)	5,001
Turkey	1.0	1.2	(0.9, 1.6)	1.2	(0.9, 1.7)	1.5	(1, 2.2)	1.4	(0.7, 2.6)	5,295
Ukraine	1.0	1.6	(1.3, 2)	1.8	(1.4, 2.4)	2.1	(1.5, 2.8)	2.0	(1.4, 3)	4,938
USA	1.0	2.7	(2.6, 2.7)	4.0	(3.9, 4)	4.8	(4.7, 4.9)	4.5	(4.4, 4.5)	3,755
Wales	1.0	1.2	(0.7, 2.1)	2.9	(1.7, 4.9)	3.2	(1.7, 6.2)	2.6	(1.1, 6.2)	4,281

Table 3
Logistic regression analysis for cumulative mandatory school perceptions and been bullied 3 times or more, by country, 2006.

	No negative perceptions	1 Perception		2 Perceptions		3 Perceptions		4–6 Perceptions		N
	OR	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	
All (N)	**1.0 (83,953)**	**1.5 (62,134)**	**(1,4, 1.5)**	**2.2 (31250)**	**(2.1, 2.3)**	**3.5 (12,317)**	**(3.3, 3.7)**	**6.0 (6,586)**	**(5.7, 6.4)**	**196,240**
Austria	1.0	1.9	(1.6, 2.4)	2.8	(2.1, 3.6)	5.6	(3.8, 8.3)	6.4	(3.7, 11.2)	4758
Belgium Flemish	1.0	1.1	(0.8, 1.5)	2.3	(1.6, 3.2)	3.7	(2.5, 5.4)	9.4	(6.1, 14.6)	4198
Belgium French	1.0	1.2	(0.9, 1.5)	1.5	(1.1, 2)	2.6	(1.8, 3.7)	3.8	(2.5, 5.9)	4044
Bulgaria	1.0	1.8	(1.5, 2.3)	1.9	(1.5, 2.4)	1.8	(1.3, 2.5)	2.2	(1.5, 3.2)	4736
Canada	1.0	1.7	(1.4, 2.2)	2.6	(2, 3.3)	4.5	(3.3, 6)	7.8	(5.6, 10.7)	5795
Switzerland	1.0	1.4	(1.1, 1.8)	2.1	(1.5, 2.8)	3.5	(2.3, 5.5)	5.9	(3.4, 10.3)	4469
Czech Republic	1.0	1.3	(0.9, 1.9)	1.5	(0.9, 2.2)	3.0	(1.9, 4.8)	7.5	(5, 11.4)	4700
Germany	1.0	1.6	(1.3, 1.9)	3.1	(2.5, 3.9)	3.1	(2.2, 4.3)	8.1	(5.6, 11.6)	7162
Denmark	1.0	1.7	(1.3, 2.2)	3.4	(2.5, 4.6)	5.1	(3.4, 7.6)	11.8	(7.8, 17.9)	5668
Estonia	1.0	1.2	(0.9, 1.5)	1.3	(1, 1.6)	2.7	(2, 3.6)	5.1	(3.6, 7.1)	4436
England	1.0	2.3	(1.7, 3)	4.3	(3, 5.9)	6.6	(4.4, 9.9)	12.7	(8.4, 19.2)	4463
Spain	1.0	1.2	(0.8, 1.8)	2.5	(1.8, 3.6)	6.9	(4.7, 10)	14.5	(9.3, 22.5)	8645
Finland	1.0	1.1	(0.8, 1.6)	1.8	(1.3, 2.5)	3.7	(2.6, 5.4)	8.1	(5.6, 11.9)	5153
France	1.0	1.3	(1.1, 1.7)	2.3	(1.8, 2.8)	3.6	(2.7, 4.7)	7.9	(5.8, 10.7)	7009
Greenland	1.0	1.7	(1.2, 2.6)	2.1	(1.3, 3.6)	2.5	(1.2, 5.2)	2.1	(0.8, 5.8)	1280
Greece	1.0	1.2	(1, 1.5)	1.6	(1.3, 2.1)	1.8	(1.3, 2.5)	2.3	(1.4, 3.6)	3639
Croatia	1.0	1.2	(0.9, 1.7)	1.4	(1, 2)	3.9	(2.7, 5.8)	7.8	(4.7, 12.9)	4901
Hungary	1.0	1.4	(1, 2.1)	3.2	(2.1, 4.8)	5.1	(3.3, 8.1)	4.5	(2.5, 8.3)	3434
Ireland	1.0	2.0	(1.4, 2.7)	3.4	(2.4, 4.8)	6.3	(4.3, 9.2)	11.8	(7.7, 18.2)	4746
Israel	1.0	1.3	(1, 1.7)	2.3	(1.7, 3)	3.6	(2.5, 5.1)	6.7	(4.5, 10)	5348
Iceland	1.0	1.7	(1.2, 2.2)	5.8	(4.3, 7.9)	9.9	(7, 14)	23.3	(16.6, 32.7)	9246
Italy	1.0	1.3	(0.9, 2)	2.3	(1.6, 3.5)	4.6	(3, 7.2)	4.4	(2.6, 7.4)	3909
Lithuania	1.0	1.1	(0.9, 1.3)	1.8	(1.5, 2.2)	2.5	(2, 3.2)	4.0	(3.1, 5.2)	5473
Luxembourg	1.0	1.3	(1, 1.6)	2.2	(1.6, 2.9)	3.3	(2.3, 4.8)	6.5	(4.1, 10.5)	4084
Latvia	1.0	1.3	(1, 1.6)	1.9	(1.5, 2.5)	2.5	(1.9, 3.3)	3.7	(2.8, 5.1)	4166
Macedonia	1.0	1.9	(1.4, 2.5)	1.7	(1.2, 2.5)	4.1	(2.5, 6.8)	5.9	(3, 11.4)	5254
Malta	1.0	3.4	(1.4, 8.3)	3.8	(1.5, 9.9)	4.0	(1.1, 14.5)	14.9	(3.3, 66.2)	1305
Netherlands	1.0	2.1	(1.5, 2.8)	4.3	(3, 6.1)	4.9	(2.9, 8.2)	13.6	(7, 26.5)	4187
Norway	1.0	1.8	(1.3, 2.3)	3.4	(2.4, 4.8)	4.7	(2.8, 7.7)	12.2	(7.3, 20.5)	4564
Poland	1.0	1.8	(1.3, 2.5)	2.9	(2.1, 4.1)	5.0	(3.5, 7.2)	7.6	(5.1, 11.3)	5467
Portugal	1.0	1.3	(1, 1.7)	1.8	(1.3, 2.5)	3.1	(2, 4.8)	3.4	(1.8, 6.3)	3787
Romania	1.0	1.3	(1, 1.7)	1.4	(1.1, 2)	1.6	(1, 2.6)	2.3	(1.2, 4.7)	4554
Russia	1.0	1.1	(0.9, 1.4)	1.4	(1.1, 1.7)	1.7	(1.3, 2.1)	2.4	(1.9, 3.2)	8096
Scotland	1.0	1.5	(1.2, 2)	2.5	(1.9, 3.3)	4.1	(3, 5.7)	6.9	(4.9, 9.8)	5943
Sweden	1.0	1.6	(1.1, 2.4)	2.5	(1.6, 4)	3.3	(1.6, 6.6)	6.7	(3.2, 14.3)	4351
Slovenia	1.0	1.1	(0.8, 1.5)	1.6	(1.2, 2.3)	3.4	(2.2, 5)	4.4	(2.6, 7.4)	5001
Turkey	1.0	1.3	(1.1, 1.6)	1.5	(1.2, 1.8)	2.2	(1.7, 2.9)	3.0	(2.1, 4.3)	5295
Ukraine	1.0	1.5	(1.2, 1.9)	2.1	(1.7, 2.7)	3.0	(2.3, 4)	3.0	(2.1, 4.4)	4938
USA	1.0	1.4	(1.4, 1.4)	2.0	(2, 2)	3.9	(3.9, 4)	8.4	(8.3, 8.6)	3755
Wales	1.0	1.4	(1.1, 1.8)	2.1	(1.6, 2.8)	4.4	(3.1, 6.1)	8.6	(5.9, 12.5)	4281

findings presented in Fig. 1 show that the effect of CNSP on bullying is stronger for girls than it is for boys. Fig. 1d–f show that a similar relation is found when using all 17 school items. Namely, the higher the number of negative perceptions, the higher the odds of being involved in bullying, a relationship that here too is shown to be stronger for girls than for boys, especially among victims and bully-victims.

Tables 2–4 present the results of logistic regression analyses for all 40 countries over the six mandatory school perceptions based on the 2006 data. Findings presented in all three tables show quite convincingly that the strong relationships between the cumulative number of negative school perceptions and the involvement in bullying are universal across almost all 40 countries. This relationship was especially strong for the victim and bully-victim groups. Second, in the majority of countries, having only three negative school perceptions was associated with twice the relative odds of being involved in bullying, as compared to students with no negative perceptions. In 38 out of the 40 countries, odds ratios increased for each unit increase in CNSP. As school perceptions cumulate, the odds of being bullied rise to peaks of 23.3 (Iceland), the odds of bullying others rise to peaks of 11.8 (Sweden) and for bully-victims to 24.8 (Sweden) in 2006 for 4–6 perceptions. Similar findings were identified for the 12-country analysis that employed the 17-item version of the CNSP. Additional analyses carried out for this study showed that the findings presented above are applicable to all three age groups and both genders respectively.

Discussion

In this novel, cross-national analysis we explored relationships between negative school perceptions and being involved in bullying, as a perpetrator, as a victim of bullying or as both a bully-victim. Unlike previous research which has tended to

Table 4
Logistic regression analysis for cumulative mandatory school perceptions and both bullying and being bullied 3 times or more, by country, 2006.

	No negative perceptions	1 Perception		2 Perceptions		3 Perceptions		4–6 Perceptions		N
	OR	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	
All (N)	1.0 (83,953)	1.6 (62,134)	(1.5, 1.7)	2.4 (31250)	(2.3, 2.6)	3.6 (12,317)	(3.3, 3.9)	5.3 (6,586)	(4.8, 5.8)	196,240
Austria	1.0	1.4	(1, 2)	3.3	(2.3, 4.7)	3.4	(1.9, 6.1)	11.7	(6.4, 21.2)	4,758
Belgium Flemish	1.0	3.0	(1.4, 6.4)	6.1	(2.8, 13.1)	5.7	(2.2, 14.5)	10.2	(3.6, 28.5)	4,198
Belgium French	1.0	1.3	(1, 1.8)	1.6	(1.1, 2.3)	3.0	(1.9, 4.6)	4.3	(2.6, 7)	4,044
Bulgaria	1.0	1.4	(1, 2)	2.1	(1.5, 3.1)	2.3	(1.5, 3.6)	3.3	(2, 5.3)	4,736
Canada	1.0	1.2	(0.8, 1.9)	2.6	(1.7, 4.1)	6.1	(3.8, 9.9)	9.3	(5.7, 15.2)	5,795
Switzerland	1.0	1.3	(0.9, 2)	1.5	(0.9, 2.4)	2.8	(1.4, 5.5)	8.3	(4.2, 16.2)	4,469
Czech Republic	1.0	0.8	(0.3, 2.1)	1.0	(0.4, 2.9)	3.6	(1.4, 9.2)	6.1	(2.6, 14.7)	4,700
Germany	1.0	1.7	(1.2, 2.5)	3.1	(2, 4.7)	5.5	(3.3, 9.1)	6.3	(3.4, 11.6)	7,162
Denmark	1.0	1.7	(0.9, 3)	3.1	(1.6, 5.9)	4.5	(1.9, 10.6)	6.5	(2.6, 16.2)	5,668
Estonia	1.0	1.3	(1, 1.8)	1.8	(1.3, 2.5)	2.7	(1.8, 4)	3.5	(2.2, 5.5)	4,436
England	1.0	1.3	(0.6, 2.9)	1.7	(0.6, 4.7)	8.6	(3.7, 20)	5.6	(1.9, 16.3)	4,463
Spain	1.0	2.9	(1.7, 5.1)	2.8	(1.6, 5.1)	6.0	(3.2, 11.6)	12.1	(5.8, 25.2)	8,645
Finland	1.0	2.0	(0.9, 4.2)	3.1	(1.4, 6.6)	4.7	(2, 11.2)	10.1	(4.3, 23.8)	5,153
France	1.0	2.3	(1.6, 3.2)	2.7	(1.9, 4)	4.7	(3.1, 7.1)	7.3	(4.6, 11.7)	7,009
Greenland	1.0	1.0	(0.7, 1.5)	1.8	(1.1, 2.9)	0.8	(0.3, 2.1)	1.9	(0.8, 4.8)	1,280
Greece	1.0	1.7	(1.2, 2.4)	2.4	(1.6, 3.4)	4.0	(2.6, 6.2)	7.5	(4.4, 12.6)	3,639
Croatia	1.0	1.6	(0.9, 2.7)	2.4	(1.4, 4.3)	5.0	(2.6, 9.6)	15.5	(7.8, 30.9)	4,901
Hungary	1.0	3.3	(1.1, 9.8)	5.3	(1.7, 16.8)	5.0	(1.2, 20.9)	3.2	(0.4, 27.2)	3,434
Ireland	1.0	2.1	(1, 4.5)	3.6	(1.6, 7.8)	7.0	(3.1, 16.1)	17.4	(7.8, 39.1)	4,746
Israel	1.0	1.1	(0.8, 1.5)	2.2	(1.6, 3)	3.4	(2.3, 5)	3.3	(1.9, 5.6)	5,348
Iceland	1.0	1.7	(0.9, 3.2)	5.1	(2.6, 10)	9.0	(4.4, 18.8)	10.7	(4.8, 23.5)	9,246
Italy	1.0	2.0	(1, 3.8)	2.2	(1.1, 4.3)	3.5	(1.6, 7.5)	7.2	(3.4, 15.3)	3,909
Lithuania	1.0	1.2	(1, 1.5)	1.6	(1.3, 2.1)	2.0	(1.5, 2.7)	2.3	(1.7, 3.2)	5,473
Luxembourg	1.0	1.0	(0.6, 1.5)	1.3	(0.8, 2.3)	2.8	(1.5, 5.1)	8.0	(4.3, 15)	4,084
Latvia	1.0	1.6	(1.1, 2.3)	3.0	(2.1, 4.3)	3.1	(2.1, 4.6)	4.7	(3.1, 7.1)	4,166
Macedonia	1.0	1.8	(1.3, 2.6)	2.4	(1.6, 3.7)	4.1	(2.1, 7.7)	7.7	(3.6, 16.4)	5,254
Malta	1.0	2.6	(0.8, 7.9)	1.0	(0.2, 4.6)	2.9	(0.5, 16.2)	13.9	(2.3, 82.3)	1,305
Netherlands	1.0	3.0	(1.6, 5.6)	6.2	(3.1, 12.2)	5.2	(1.7, 15.3)	19.0	(6.8, 53.1)	4,187
Norway	1.0	3.1	(1.6, 6)	6.4	(3, 13.6)	7.7	(2.7, 21.5)	16.6	(6.2, 44)	4,564
Poland	1.0	1.9	(0.9, 3.9)	5.2	(2.6, 10.2)	6.5	(3.1, 13.7)	11.0	(5.1, 23.8)	5,467
Portugal	1.0	2.1	(1.4, 3.3)	4.7	(3, 7.5)	7.1	(4, 12.5)	10.9	(5.4, 22.2)	3,787
Romania	1.0	1.3	(1, 1.7)	2.0	(1.5, 2.7)	3.3	(2.2, 5)	3.5	(1.8, 6.7)	4,554
Russia	1.0	1.0	(0.8, 1.3)	1.6	(1.2, 2)	1.3	(1, 1.9)	2.1	(1.5, 2.9)	8,096
Scotland	1.0	1.8	(0.9, 3.5)	2.5	(1.2, 5.3)	5.8	(2.7, 12.6)	7.6	(3.3, 17.2)	5,943
Sweden	1.0	1.3	(0.5, 3.6)	2.0	(0.6, 6.4)	7.3	(2.3, 23.6)	24.8	(8.7, 70.5)	4,351
Slovenia	1.0	2.1	(1.2, 3.7)	3.8	(2.2, 6.7)	5.5	(2.7, 11.1)	7.7	(3.4, 17.6)	5,001
Turkey	1.0	1.2	(0.9, 1.5)	1.3	(1, 1.7)	1.9	(1.3, 2.7)	1.6	(0.9, 2.7)	5,295
Ukraine	1.0	1.5	(1.1, 2.1)	2.0	(1.5, 2.8)	3.4	(2.4, 4.8)	4.3	(2.8, 6.5)	4,938
USA	1.0	1.7	(1.7, 1.8)	4.0	(3.8, 4.1)	4.3	(4.1, 4.4)	6.9	(6.7, 7.1)	3,755
Wales	1.0	2.5	(0.9, 7.2)	5.5	(2, 15.3)	9.2	(3.1, 27.7)	16.6	(5.5, 50.1)	4,281

focus on particular dimensions of school perceptions or to examine general measures of school perception (Benbenishty & Astor, 2007; Harel, 1999; Laufer & Harel, 2003b; Nansel et al., 2003; Samdal et al., 1998), our analysis examines a wide range of school perceptions in five different key areas: academic achievement, student social relationships, teacher–student relations, rules and regulations, and general school perceptions. When examined cumulatively, the CNSP measures were both strongly and consistently associated with the occurrence of bullying, as a perpetrator, as a victim or as a combined bully-victim.

Based on previous studies of these relationships that provided inconsistent findings (Benbenishty & Astor, 2007; Harel, 1999; Laufer & Harel, 2003b; Samdal et al., 1998), and a hypothesis of the cumulative impact of negative school experiences, we postulated two main hypotheses: (1) The likelihood of bullying would increase as a function of the number of school negative perceptions (independent of the direction of causality), and (2) this association would be universal across countries. Results strongly support both hypotheses.

Findings related to specific dimensions of daily school experience

Negative perceptions of the school experience were strongly and consistently associated with bullying, with being a victim of bullying and being a bully-victim. This finding is consistent with research showing the centrality of school "connectedness" and school "bonding" as shown through feelings of attachment and commitment to school, on a variety of problem and positive behaviors (Catalano, Haggerty, Oesterle, Fleming, & Hawkins, 2004). The more that a child feels a sense of belongingness, pleasance, liking, and safety, the less chance they will be involved in bullying, either as perpetrator or victim (Ahmed

& Braithwaite, 2004; Eisenberg et al., 2003; Laufer & Harel, 2003a; Rigby & Slee, 1993). The reciprocity of this relationship should be noted: namely, the more a child is involved in bullying, the more his or her perceptions of school experience are negative. Either way, the strong association between these two phenomenons can be utilized to reduce bullying involvement by means of improvement of school experience.

In addition to these more general observations, differences exist in the factors associated with victimization as opposed to perpetration of bullying. While victimization is significantly related to variables of fellow–student relationships (e.g. students being together, students being kind and helpful, students accepting others), being a *perpetrator of bullying* is related more to the teacher–student relationship items and to the variables related to rules and regulations (teachers encourage students to express views, teachers treat students fairly, extra help is given by teachers when needed, rules are fair, students are treated too strictly or severely). Interestingly, being a bully-victim (i.e. involvement both as a bully and as a victim) was significantly associated with the greatest number of negative school perceptions in different areas. In addition, negative experiences regarding academic achievement are significantly related to the probability of being a bully (both a bully only and a bully-victim) – a relationship that is both strong and universal across countries. Although both peer relations and teacher–student relations have been shown to be relevant to the dynamics of school violence in the past (Boulton & Underwood, 1992; Demaray & Malecki, 2003; Nansel et al., 2004, 2003; Schwartz, 2000), our findings suggest that peer relations are more pivotal for leading to (or being influenced by) victimization, while a lack of achievement and relationships with teachers may be more critical for becoming a bully.

The results point to the uniqueness of the bully-victim group (i.e. those involved in both bullying and as victims). Being a bully-victim was associated with negative school perceptions in both the areas associated for bullies (e.g. academic achievement and teacher relations) and those associated with victims (e.g. student peer relations). As such, it appears that being a bully-victim may be associated with the most negative school experience in a wide number of areas. These results emphasize the importance of examining these three different groups involved in school violence (Ball et al., 2008; Haynie et al., 2001; Smokowski & Kopasz, 2005; Veenstra et al., 2005).

Our findings are based upon cross-sectional analyses, and causality therefore cannot be inferred, and the temporal direction of these relationships is open to question. It seems logical both that poor relationships with students would lead to a child being chosen as a victim for bullying, and also for a child who is being bullied to perceive their relationships with their fellow peers as negative. As such, Hodges and Perry's (1999) suggestion that the dynamic of a "vicious cycle" leads to progressive increases in both peer rejection and victimization, may indeed be helpful for making sense of these relationships. A similar model of an "irritability loop" was suggested by Harel (1988) to explain the relationship between negative home and school experiences and the probability of problem behaviors associated with injuries. Interestingly, recent analysis of archive data using structural equation modeling has suggested that involvement in bullying may be a negative predictor of psychosocial atmosphere of the school (Meyer-Adams & Conner, 2008).

The strong relationships observed between perpetration of bullying and both negative perceptions of teacher–student relationships and rules and regulations are noteworthy. Children who feel that they are being treated badly or unfairly by teachers, may in turn treat other children badly, either as a way of relieving their hurt or frustration or as a way of re-taking a sense of relationship control through the construction of a relationship where they have power and control – in contrast to the relationship with the teacher. Previous research has shown that perpetrators often use bullying as a means to establish dominance (Carney & Merrell, 2001; Pellegrini, Bartini, & Brooks, 1999; Roberts Jr & Morotti, 2000) and have emphasized the negative relationships bullies often have with their teachers and other adults (Smokowski & Kopasz, 2005). Our research findings suggest that in order to reduce bullying in schools, we need to understand how the "bully" perceives their relationships with teachers and their place in the school environment. While we do not know whether it is the negative relationships of the child with their teacher which lead to bullying, or whether both factors represent a consequence of high levels of existing aggressiveness in the child (Carney & Merrell, 2001; Olweus, 1993) or of aggression and power-assertive parenting brought to school from the home environment (Haynie et al., 2001; Kochenderfer & Ladd, 1996a; Perry, Hodges, & Egan, 2001; Unnever, 2005), speculatively, our findings imply that any intervention strategy aimed at reducing school violence must include the whole school experience.

Results examining the relationship between the number of negative school perceptions and bullying demonstrate a cumulative relationship where an increase in negative school perceptions is related to an increase in both bullying and victimization. One should be aware that using the type of methodology used in this study leaves us open to the possibility of reciprocal relationships, namely that children who are experiencing repetitive bullying may well develop more negative school perceptions. However the findings do indicate that children who bully others also report having more accumulated negative school perceptions than non-bullies. The reporting of only three negative school perceptions significantly increases the odds of being involved in school violence as compared with students who do not report any negative perceptions. Our study is one of the first to look at the effect of the accumulation of negative school perceptions and suggests the importance of taking a holistic perspective looking at all dimensions of school life, including student–teacher relations, peer social relations, rules and regulations, academic achievement and general school perceptions, when trying to address issues of bullying. Bullying clearly does not occur in a vacuum but rather among children for whom school is not experienced as a positive place to be. As such, the results would suggest that interventions aimed at reducing bullying would benefit from encompassing a wide range of areas. Bullying can not be addressed in isolation from the whole school experience.

Findings related to the universal consistency of effects

The universal pattern observed in our results is notable. Similar patterns were seen across almost all of the 40 participating countries. The few countries that had inconsistent findings regarding the associations between bullying and school perceptions are of interest. In Greenland, for example, no significant association was found for both bullying others and for bully-victims. For Turkey (which has a relatively high rate of bullying – about 30%, ranking 3rd highest out of 40 countries) however, the relationship between CNSP and bullying was strong for victimization only while for Austria, no significant association was found with being a bully. Differences in available sample size, as well as variations in daily circumstances and the social context of schooling might explain the lack of association. These patterns require more in-depth study.

Strength and limitations

Major strengths of this study include its size and the diversity of countries involved. This allowed us to investigate and identify relationships that may be universal in nature. The cross-cultural nature of the research and the translation of the questionnaires into a large number of languages may have led to some information bias. Definitions and perceptions of bullying may vary by cultural setting and contribute to observed cross-national variations (Due et al., 2005; Harel, 1999).

As with all HBSC analyses that are based upon cross-sectional data we are not able to test or confirm the direction of causality. The results show a strong school perception – bullying association but clearly this association can go in more than one direction: (1) a negative school experience can be a direct cause of involvement in bullying, (2) conversely, involvement in bullying may cause negative school perceptions, and (3) both the behaviors and the school environment are part of an underlying state or "factor" that has multiple components, including bullying, victimization and negative school perceptions that influence each other. Further studies, including longitudinal ones are required to tease out the direction of this relationship.

Another limitation of the research relates to the use of the odds ratio method. Odds ratios are affected by cross-tabulation that is highly skewed, leaving edge cells with a very small number of cases. We addressed this issue by combining 4–6 perceptions together, in order to increase the numbers in this group. Also, because bullying is not a rare outcome, odds ratios should be interpreted as estimates of relative odds, rather than relative risk. Care has been taken not to infer measures of risk in the interpretation of these effect estimates. The strength of using OR as the main effect coefficient, however, is that (a) it is widely utilized in the public health and social science literature, (b) it is easily interoperable and (c) it is an effective way to investigate universal versus non-universal patterns of determinants, as used for this study (Due et al., 2005).

Further insights and implications for intervention

Findings of this study show the importance of children's daily experiences at school and their association with bullying behavior. While it is impossible from this study to determine causality, it is probable that there is a mutual relationship between bullying and negative perceptions whereby once a vicious cycle is created both elements continue to impact on each other. The results suggest the importance of providing a better daily school experience for students to bring about behavioral change. Recent years have seen the development of intervention programs focusing on and/or including multi-dimensional aspects of the school climate (Allen, 2009; Knoff, 2007; Orpinas & Horne, 2006) and these results emphasize the importance of continuing this direction.

Two main findings from this study can inform the content and targeting of preventive interventions: (1) it only takes 2–3 negative perceptions to double the odds of bullying, and these perceptions are not necessarily anchored in particular school dimensions, and (2) factors causing negative experiences in one school might be very different than those reported in other schools. It is therefore recommended that any school based intervention aimed at reducing bullying should focus at identifying the unique circumstances and experiences that produce negative school perceptions. The latter can become the focus of school-specific interventions that can then be tailored and monitored. Windle (1999) saw resilience as successful adaptation following negative events or situations. Bernard (1997) claims that the characteristics of family and community can change the consequences of negative life events, and help build resiliency. Following Rutter (1987) he refers to: 1) Caring relationships in significant social contexts (including with parents, siblings, friends, teachers); 2) High expectations and the feeling that others expect positive performances; and 3) Meaningful participation in socially significant contexts such as school, family and community life. Internal resources (e.g. cooperation and communication skills, empathy, or self-efficacy) can also act as protective factors (Gore & Eckenrode, 1994; Werner & Smith, 2001).

Although this study focused primarily on the role of school negative experience in bullying behavior, evidence has shown that determinants of bullying are also embedded in other social settings and social circumstances such as the family, the community, peer relationships outside of the school context, and even unique circumstances in the macro-level social environment (Benbenishty & Astor, 2005; Due et al., 2005; Harel & Abdeen, in press; Laufer & Harel, 2003b). More comprehensive models are needed to enable the establishment of a more complete picture of bullying determinants among adolescent school children.

Appendix 1. Logistic regression analysis for cumulative school perceptions and bully only, by country, 2002.

School perceptions	Belgium Flemish		Canada		Denmark		Estonia		Finland		Germany	
No negative perceptions	1.0		1.0		1.0		1.0		1.0		1.0	
1 Perception	1.4	(0.9, 2.2)	1.4	(0.9, 2.3)	1.3	(0.9, 1.8)	1.9	(0.9, 3.8)	1.8	(0.9, 3.4)	1.0	(0.9, 1.3)
2 Perceptions	2.7	(1.8, 4.2)	1.7	(1, 2.8)	2.2	(1.6, 3.2)	3.5	(1.8, 6.8)	2.9	(1.5, 5.3)	1.2	(0.9, 1.5)
3 Perceptions	2.2	(1.4, 3.5)	2.6	(1.6, 4.3)	3.0	(2.1, 4.4)	3.7	(1.9, 7.3)	3.1	(1.6, 5.9)	1.6	(1.2, 2.2)
4 Perceptions	3.7	(2.3, 5.9)	3.4	(2, 5.7)	2.3	(1.4, 3.5)	4.4	(2.2, 8.9)	5.1	(2.7, 9.6)	1.7	(1.2, 2.5)
5 Perceptions	3.5	(2.2, 5.7)	3.4	(2, 5.9)	3.2	(2, 5)	5.9	(2.9, 11.8)	4.3	(2.2, 8.4)	1.5	(0.9, 2.7)
6 Perceptions	5.3	(3.3, 8.5)	4.9	(2.9, 8.4)	3.5	(2.1, 5.8)	5.6	(2.7, 11.6)	5.7	(2.9, 11.4)	5.2	(3.1, 8.6)
7 Perceptions	5.4	(3.3, 8.9)	6.0	(3.5, 10.3)	3.0	(1.7, 5.3)	5.4	(2.5, 11.5)	6.8	(3.3, 14.1)	3.6	(1.7, 7.6)
8 Perceptions	5.2	(3, 8.9)	5.3	(2.9, 9.7)	3.8	(2.1, 6.7)	6.4	(2.9, 14.1)	9.2	(4.5, 18.8)	2.3	(0.8, 6.3)
9 Perceptions	8.6	(5.2, 14.2)	5.8	(2.9, 11.3)	2.8	(1.4, 5.6)	8.6	(3.8, 19.7)	11.4	(5.5, 23.4)	1.0	(0.2, 4.6)
10 Perceptions	8.2	(4.6, 14.6)	4.1	(1.7, 9.9)	7.6	(4.2, 13.9)	6.4	(2.6, 16)	10.0	(4.4, 23.1)	2.9	(0.8, 11.2)
11–12 Perceptions	11.1	(6.7, 18.4)	8.8	(4.6, 16.8)	4.8	(2.6, 8.9)	10.5	(4.7, 23.6)	11.7	(5.3, 25.9)	3.1	(1, 10.1)
13–17 Perceptions	9.8	(4.9, 19.4)	8.9	(4.3, 18.4)	2.0	(0.6, 6.8)	4.2	(1.3, 13.8)	13.7	(5.3, 35.5)	3.9	(0.7, 21.5)
N	**6,224**		**4,277**		**4,634**		**3,979**		**5,283**		**5,553**	

School perceptions	Hungary		Norway		Sweden		England		Scotland		Wales	
No negative perceptions	1.0		1.0		1.0		1.0		1.0		1.0	
1 Perception	1.4	(0.8, 2.4)	2.0	(1.3, 3.2)	0.7	(0.3, 1.8)	1.5	(0.5, 4.1)	2.2	(1.1, 4.4)	0.9	(0.4, 2)
2 Perceptions	2.3	(1.3, 4)	2.5	(1.5, 4)	2.8	(1.3, 5.9)	3.9	(1.6, 9.9)	2.0	(1, 4.2)	1.1	(0.5, 2.4)
3 Perceptions	2.3	(1.2, 4.2)	2.6	(1.6, 4.4)	4.0	(1.8, 9)	4.6	(1.8, 11.7)	3.2	(1.6, 6.7)	2.0	(0.9, 4.5)
4 Perceptions	2.7	(1.4, 5.4)	3.9	(2.3, 6.5)	5.9	(2.6, 13.5)	6.7	(2.6, 17)	3.0	(1.4, 6.7)	1.2	(0.4, 3.4)
5 Perceptions	3.7	(1.9, 7)	3.6	(2, 6.5)	5.4	(2.2, 13)	6.1	(2.3, 15.7)	3.1	(1.3, 7.2)	2.7	(1.1, 6.6)
6 Perceptions	5.7	(2.9, 11.1)	5.3	(3, 9.3)	7.1	(2.9, 17.8)	4.8	(1.8, 13.4)	2.5	(1, 6.5)	4.1	(1.7, 9.9)
7 Perceptions	3.2	(1.4, 7.2)	4.6	(2.4, 9)	5.9	(1.8, 18.7)	10.0	(3.8, 26.1)	7.2	(3.3, 15.9)	3.6	(1.3, 9.6)
8 Perceptions	4.8	(2.1, 11)	4.5	(2.1, 9.6)	3.6	(0.8, 16.3)	12.1	(4.6, 31.9)	9.1	(4, 20.9)	2.0	(0.6, 7.6)
9 Perceptions	0.9	(0.1, 7)	2.8	(1, 8.3)	6.2	(1.3, 29.1)	8.7	(3.1, 24.4)	6.8	(2.7, 17.3)	5.4	(1.6, 17.9)
10 Perceptions	2.6	(0.6, 11.4)	6.6	(2.8, 15.6)	20.7	(7.3, 58.9)	12.3	(4.4, 34.5)	7.7	(2.9, 20.7)	7.1	(2.5, 20.3)
11–12 Perceptions	3.7	(1.1, 12.8)	8.2	(3.6, 18.8)	10.3	(2.8, 38.6)	14.1	(5.2, 38.4)	8.5	(3.4, 21.1)	6.9	(2.4, 19.8)
13–17 Perceptions	4.4	(1, 19.6)	10.7	(4.6, 24.9)	20.0	(5.1, 78.2)	23.4	(8.6, 63.5)	10.0	(3.5, 28.5)	4.0	(0.8, 19.3)
N	**4,135**		**4,938**		**3,794**		**5,855**		**4,315**		**3,675**	

Appendix 2. Logistic regression analysis for school perceptions and victim only, by country, 2002.

School perceptions	Belgium Flemish		Canada		Denmark		Estonia		Finland		Germany	
No negative perceptions	1.0		1.0		1.0		1.0		1.0		1.0	
1 Perception	0.9	(0.7, 1.3)	1.1	(0.8, 1.6)	1.4	(1, 2.1)	1.1	(0.8, 1.6)	1.4	(0.9, 2)	1.2	(0.9, 1.5)
2 Perceptions	1.1	(0.8, 1.6)	1.7	(1.2, 2.4)	1.4	(0.9, 2.2)	1.1	(0.7, 1.6)	1.7	(1.2, 2.6)	1.8	(1.3, 2.3)
3 Perceptions	1.7	(1.2, 2.4)	1.9	(1.3, 2.7)	2.2	(1.5, 3.4)	1.6	(1.1, 2.3)	1.6	(1, 2.5)	2.9	(2.2, 4)
4 Perceptions	2.0	(1.4, 2.8)	2.5	(1.7, 3.7)	3.2	(2.1, 5)	1.9	(1.2, 2.8)	1.9	(1.2, 3)	2.3	(1.5, 3.5)
5 Perceptions	1.7	(1.2, 2.5)	2.2	(1.4, 3.4)	3.9	(2.4, 6.2)	1.5	(0.9, 2.3)	2.5	(1.6, 3.9)	2.0	(1.1, 3.8)
6 Perceptions	1.4	(0.9, 2.1)	3.0	(2, 4.7)	3.4	(2, 5.8)	1.6	(1, 2.5)	3.2	(2, 5.1)	1.1	(0.4, 2.7)
7 Perceptions	1.7	(1.1, 2.7)	3.0	(1.9, 4.7)	6.3	(3.9, 10.3)	2.0	(1.3, 3.3)	4.2	(2.5, 6.9)	3.2	(1.3, 7.8)
8 Perceptions	2.0	(1.2, 3.2)	2.7	(1.6, 4.6)	6.4	(3.7, 11)	2.4	(1.4, 4.1)	3.4	(1.9, 5.9)	0.7	(0.1, 4.9)
9 Perceptions	1.9	(1.1, 3.2)	4.2	(2.5, 7.4)	4.0	(2.1, 7.9)	1.8	(1, 3.5)	3.4	(1.9, 6.3)	4.2	(1.3, 13.1)
10 Perceptions	2.6	(1.5, 4.5)	5.7	(3.1, 10.7)	4.2	(2, 8.8)	3.4	(1.9, 6.2)	4.4	(2.3, 8.6)	3.0	(0.6, 14.2)
11–12 Perceptions	1.4	(0.8, 2.5)	2.7	(1.4, 5.1)	9.3	(5.3, 16.4)	2.2	(1.2, 4.2)	4.9	(2.6, 9.3)	1.1	(0.1, 8.1)
13–17 Perceptions	1.5	(0.6, 3.5)	3.7	(1.8, 7.3)	20.2	(9.6, 42.5)	3.3	(1.6, 6.8)	6.0	(2.7, 13.3)		
N	**6,224**		**4,277**		**4,634**		**3,979**		**5,283**		**5,553**	

School perceptions	Hungary		Norway		Sweden		England		Scotland		Wales	
No negative perceptions	1.0		1.0		1.0		1.0		1.0		1.0	
1 Perception	1.9	(1.2, 3.2)	1.6	(1.2, 2.3)	2.6	(1.4, 4.8)	1.5	(0.9, 2.4)	1.4	(0.9, 2.2)	1.5	(0.9, 2.6)
2 Perceptions	2.5	(1.5, 4.3)	1.8	(1.2, 2.6)	2.5	(1.3, 4.9)	2.2	(1.4, 3.5)	2.1	(1.3, 3.2)	2.0	(1.2, 3.3)
3 Perceptions	3.0	(1.7, 5.2)	2.4	(1.6, 3.5)	5.7	(2.9, 11)	2.8	(1.8, 4.4)	2.2	(1.4, 3.6)	3.1	(1.8, 5.3)
4 Perceptions	3.5	(1.9, 6.4)	3.0	(2, 4.5)	5.7	(2.7, 11.8)	2.5	(1.5, 4)	2.9	(1.7, 4.8)	2.9	(1.6, 5.2)
5 Perceptions	3.2	(1.7, 6)	3.0	(1.9, 4.7)	7.0	(3.4, 14.3)	3.3	(2, 5.3)	2.0	(1.1, 3.6)	4.0	(2.2, 7.2)
6 Perceptions	4.8	(2.5, 9.5)	2.9	(1.8, 4.7)	4.6	(1.9, 11.5)	5.9	(3.7, 9.5)	4.2	(2.4, 7.1)	4.4	(2.4, 8.2)
7 Perceptions	4.5	(2.2, 9.2)	3.2	(1.8, 5.5)	6.8	(2.6, 17.9)	4.7	(2.8, 7.7)	2.6	(1.4, 4.9)	4.5	(2.3, 8.8)
8 Perceptions	5.0	(2.3, 11.1)	6.0	(3.5, 10.3)	7.0	(2.5, 20)	4.2	(2.4, 7.2)	2.7	(1.3, 5.6)	5.1	(2.5, 10.5)
9 Perceptions	5.7	(2.2, 14.4)	3.7	(1.8, 7.6)	12.9	(4.4, 37.5)	5.9	(3.5, 10)	2.1	(0.9, 4.9)	4.7	(1.9, 11.8)
10 Perceptions	6.5	(2.4, 18)	6.0	(3, 11.8)	12.4	(4.3, 36.2)	5.7	(3.2, 10.1)	2.8	(1.2, 6.6)	5.3	(2.3, 12.2)
11–12 Perceptions	3.4	(1, 11.7)	6.4	(3.2, 12.8)	17.2	(6.2, 47.6)	6.8	(4, 11.8)	5.1	(2.6, 10)	5.9	(2.6, 13.2)
13–17 Perceptions	8.9	(2.8, 27.8)	5.9	(2.7, 12.8)	47.5	(16.3, 138.3)	7.8	(4.3, 14.2)	10.4	(5, 21.5)	11.3	(4.6, 27.6)
N	**4,135**		**4,938**		**3,794**		**5,855**		**4,315**		**3,675**	

School perceptions	Belgium Flemish		Canada		Denmark		Estonia		Finland		Germany	
No negative perceptions	1.0		1.0		1.0		1.0		1.0		1.0	
1 Perception	1.9	(0.9, 3.9)	4.2	(1.4, 12.6)	2.5	(1, 5.8)	0.7	(0.3, 1.5)	2.4	(0.7, 7.8)	1.4	(0.9, 2)
2 Perceptions	2.0	(0.9, 4.3)	6.7	(2.3, 19.6)	3.8	(1.6, 9)	2.1	(1.1, 3.9)	4.1	(1.3, 12.8)	2.0	(1.2, 3.1)
3 Perceptions	1.9	(0.9, 4.3)	10.4	(3.6, 30.2)	7.9	(3.4, 18)	2.7	(1.4, 5.2)	3.8	(1.1, 12.6)	1.6	(0.9, 2.9)
4 Perceptions	2.1	(0.9, 4.8)	4.5	(1.3, 15.5)	5.9	(2.4, 14.9)	1.8	(0.8, 3.8)	8.4	(2.7, 25.8)	3.9	(2.2, 7)
5 Perceptions	1.8	(0.7, 4.5)	7.4	(2.3, 24.2)	10.3	(4.2, 25.3)	3.2	(1.6, 6.5)	6.0	(1.8, 20)	7.2	(3.7, 13.9)
6 Perceptions	4.8	(2.2, 10.6)	6.0	(1.7, 21.5)	8.3	(3.1, 22.3)	4.2	(2.1, 8.3)	9.8	(3, 32.1)	4.3	(1.7, 10.5)
7 Perceptions	6.3	(2.9, 13.7)	21.0	(6.9, 63.7)	12.9	(5, 33.3)	3.1	(1.4, 6.6)	12.4	(3.7, 41.5)	0.0	
8 Perceptions	4.6	(1.9, 11.2)	16.7	(5.2, 54.2)	11.4	(4.1, 32.2)	5.0	(2.3, 10.8)	5.5	(1.2, 25)	13.0	(4.6, 36.9)
9 Perceptions	5.7	(2.4, 13.6)	9.7	(2.4, 39.3)	4.1	(0.9, 19.6)	4.4	(1.8, 10.5)	13.8	(3.8, 49.6)	5.9	(1.3, 26.6)
10 Perceptions	4.9	(1.7, 13.6)	20.3	(5.3, 78.1)	7.9	(2, 30.4)	7.5	(3.3, 17.3)	10.4	(2.3, 47.2)	16.5	(4.2, 64.7)
11–12 Perceptions	9.3	(4.1, 21.1)	24.1	(7.1, 81.9)	21.5	(8, 57.5)	6.3	(2.8, 14.3)	9.9	(2.2, 44.9)	12.0	(3.2, 44.8)
13–17 Perceptions	6.3	(1.9, 20.6)	70.9	(22.3, 224.8)			2.6	(0.7, 9.5)	43.2	(11.7, 159.4)	22.0	(3.9, 123.9)
N	**6,224**		**4,277**		**4,634**		**3,979**		**5,283**		**5,553**	

School perceptions	Hungary		Norway		Scotland		Wales	
No negative perceptions	1.0		1.0		1.0		1.0	
1 Perception	1.7	(0.4, 7.4)	1.6	(0.8, 3.1)	4.0	(0.5, 34)	1.9	(0.2, 18.4)
2 Perceptions	2.7	(0.6, 11.9)	1.4	(0.6, 3)	4.2	(0.5, 37.5)	4.9	(0.6, 41.2)
3 Perceptions	2.0	(0.3, 11.8)	1.3	(0.5, 3.2)	7.9	(0.9, 67.7)	6.6	(0.8, 56.4)
4 Perceptions	4.6	(0.9, 22.9)	3.0	(1.4, 6.4)	18.9	(2.4, 152.1)	16.6	(2.1, 133.7)
5 Perceptions	8.4	(2, 35.3)	2.6	(1.1, 6.4)	15.2	(1.8, 131.1)	10.7	(1.2, 96.1)
6 Perceptions	5.6	(0.9, 33.8)	4.1	(1.8, 9.4)	19.6	(2.3, 168.9)	3.6	(0.2, 57.7)
7 Perceptions	12.4	(2.8, 56.2)	6.1	(2.7, 13.9)	4.6	(0.3, 73.6)	4.9	(0.3, 79.7)
8 Perceptions	18.7	(4.1, 84.7)	0.9	(0.1, 6.8)	7.0	(0.4, 112)	6.8	(0.4, 109)
9 Perceptions	0.0		4.1	(1.2, 14.4)	8.7	(0.5, 140.2)	26.1	(2.3, 293.4)
10 Perceptions	32.6	(6.4, 167.3)	12.9	(5.1, 32.5)	47.1	(5.2, 427.4)	10.8	(0.7, 175.6)
11–12 Perceptions	65.3	(15.7, 271.4)	3.5	(0.8, 15.7)	29.1	(3, 282.6)	21.7	(1.9, 242.8)
13–17 Perceptions	35.6	(5.7, 223.8)	9.3	(3, 29.1)	52.2	(5.3, 511.7)	41.0	(3.6, 465.8)
N	**4,135**		**4,938**		**4,315**		**3,675**	

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