



Empirically Based Classification of Peer Violence in a Nationally Representative Sample of Adolescents: a Latent Class Analysis

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Abstract

The aim of the study was to investigate the pattern of traditional- and cyberbullying, and fighting involvement and identify its most important correlates in a nationally representative sample. We analyzed the data of Hungarian 11–18-year-old adolescents in the framework of the Health Behaviour in School-aged Children Study. A latent class analysis was performed first and afterwards a multinomial logistic regression analysis to examine factors explaining class membership. Four latent classes were identified: “high probability involvement in all forms of violence”; “low involvement in any forms of violence”; “predominantly involved in traditional bullying and fighting”; “high engagement in online victimization”. As no clear victim or perpetrator group was identified, a high overlap between these violence involvement statuses is reinforced.

Keywords Bullying · Perpetration · Victimization · Cyberbullying · Latent class analysis · Psychosomatic symptoms

Bullying is a widespread phenomenon in schools around the world (Inchley et al. 2016; Kim et al. 2009). It is a repeated, hostile action, expressing power of the perpetrator over another student (Olweus 1991; Pepler and Craig 2000). It can take many forms, including physical, verbal, relational, or online using digital technology to insult others (Kowalski et al. 2012). The most important attributes of bullying are intentionality, repeatedness, and power imbalance (Kowalski et al. 2012; Olweus 1991); however, repeatedness can be also be interpreted as a high likelihood of being repeated (Gladden et al. 2014). In most of the studies, children who participate in bullying are classified as perpetrator, victim, or bully-victim. However, according to another perspective, children fall along a bully-victim continuum (Swearer et al. 2001). Although some research suggests that

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offline or “traditional” bullying has similar characteristics to those of electronic forms, other experts suggest that there are some important differences (Kowalski et al. 2012). Cyberbullying may be repeated over time; nevertheless, a single incident can be repeated if it is viewed by multiple people. The anonymity of perpetrator is another unique feature of cyberbullying (Dempsey et al. 2011). Nevertheless, both forms appear to cause psychological distress independently; however, the harm may be the greatest in students who experience both (Dempsey et al. 2011).

A distinct type of peer violence is physical fighting, which is another aggressive behavior, but the students involved are mainly the same age and equal strength (Molcho et al. 2004).

Based on the data of the Health Behaviour in School-aged Children (HBSC) study obtained in 2013/2014, in the participating 42 countries, at least 1–35% of the students have been bullied at least twice in the last couple of months prior to the data collection (Inchley et al. 2016). Similarly, 1–34% of children bullied others at least twice. Regarding cyberbullying data, 0–12% of 11-year-old students reported to have been cyberbullied by mean messages at least two or three times (Inchley et al. 2016). About fighting, we can state that 2–36% of 11-year-old students participated in a physical fight at least three times in the last 12 months.

Bullying and cyberbullying has adverse outcomes on health and social adjustment of all involved parties. Besides direct influences, long-term effects of bullying can span into later adolescence and adulthood (Bond et al. 2001). Fighting is often associated with substance use, intentional injury, and other problem behaviors (Molcho et al. 2004).

Examples of individual indicators that imply the problems of the emotional adaptation of those involved in bullying are psychosomatic symptoms, lower life satisfaction, and increased risk of substance use (Gini and Pozzoli 2009; Gobina et al. 2008; Vieno et al. 2011). Regarding peer-related correlates, several studies found a positive association between frequency of electronic media communication (EMC), face-to-face interactions (FTF), and risk behaviors, such as bullying involvement (Gommans et al. 2015). Association of school climate, school perception, and bullying are well documented: youth that had negative experiences in school (low perceived achievement and adverse school climate) tended to get involved in violence more often than other students (Laufer and Harel 2003). Some studies found relationships between parenting style, family environment, and bullying, suggesting those involved are more likely to come from unfavorable home environments (Nation et al. 2008). Young people involved in physical fighting are more likely to experience lower life satisfaction, poorer family, and peer relationships (Currie et al. 2014).

Studies so far focused mostly on traditional bullying, cyberbullying, and fighting involvement with conventional theoretical groups (e.g., victim, bully, cyberbully, cybervictim, and violent student), but the patterns of overlaps between these experience are less studied. Although some possible overlaps had already been investigated, predominantly between different victimization forms (Bradshaw et al. 2013; Wang et al. 2010), between victims and perpetrators (DeCamp and Newby 2015), between online and offline forms (Waasdorp and Bradshaw 2015; Cosma et al. 2020), or overlaps between fighting and physical bullying (Smith et al. 2003), there has been a gap in considering these features together. It is needed to look at specific patterns of both traditional and cyberbullying and fighting involvement, namely whether a student was a victim or a perpetrator, whether violence was face-to-face or online, and finally whether physical violence happened with power balance or imbalance. In the analysis, our primary goal is to identify classes of peer violence involvement using empirical data and statistical methods, namely latent class analysis (LCA) and to examine whether the conventional theoretical classes of bullying and fighting involvement can be empirically replicated. Our further aim was to study the effects of individual-, peer-, family-, and school-related factors on the latent classification and to investigate whether there were significant differences in emotional adaptation, peer relations, perceived

family support, and school adjustment among children not involved and children involved in bullying and/or cyberbullying and fighting. Therefore, we have selected variables that are widely documented in the bullying literature.

Materials and Methods

Participants and Procedure

Our analysis was performed on the Hungarian dataset of the HBSC collected in 2013/14. HBSC is a WHO collaborative cross-national health behavior study involving 49 countries, mostly from Europe and North America. The Hungarian study was designed and conducted according to HBSC guidelines and International Protocol (Currie et al. 2014; Inchley et al. 2016). The sample included nationally representative data of 5th-, 7th-, 9th-, and 11th-grade school students based on the actual educational statistics. The response rate was 82.4% and the final sample size is $N = 6153$. After excluding participants with missing data on bullying and other relevant items, this analysis included the data of 6088 respondents.

The participants answered the internationally standardized paper-based HBSC questionnaire in the classroom. Trained research assistants administered the survey during regular school hours. When students filled in the questionnaires, no school personnel was present. Participation was voluntary and anonymous, and prior to administration of the questionnaires, parents were informed about the significance of the survey and the opportunity to opt out. The design of the Hungarian survey was approved by the Scientific and Research Ethics Committee of the Medical Research Council (of Hungary).

Measures

All variables in the analysis were the part of the HBSC mandatory questionnaire (Currie et al. 2014). Bullying was measured by using the standard definition developed by Olweus, and then frequency questions both for bullying others and victimization (Olweus 1996). The item for bullying others is the following: “How often have you taken part in bullying another student(s) at school in the past couple of months?” The answer categories offered five options for different frequencies. The item for victimization: “How often have you been bullied at school in the past couple of months?” with the same 5-option answer categories.

The cyberbullying items were as follows: “How often have you been bullied at school in the following ways?” “Someone sent mean instant messages, wall postings, emails and text messages, or created a website that made fun of me” and “Someone took unflattering or inappropriate pictures of me without permission and posted them online.” The answer categories were also the same as above.

The question measuring the frequency of fighting is “During the past 12 months, how many times were you in a physical fight?”. And the possible answers presented 5 options for different frequencies.

The abovementioned items were transformed into dichotomous indicator variables measuring whether the participant (1) have bullied others at least once at school, (2) have been bullied by other students at least once at school, (3) have participated in a fighting, (4) have been bullied online by receiving rude messages, and (5) have been bullied online as embarrassing pictures were shared about him or her at least one occasion during the past couple of months. Transformation of the indicator variables to dichotomous measures was

motivated by two main reasons. First, several previous studies which attempted to identify empirically based typologies of peer violence also applied similar approach and discriminated subgroups based on dichotomous indicator variables (e.g., not involved at all vs. involved at least once) (Bradshaw et al. 2013; Lovegrove and Cornell 2014; Shao et al. 2014; Williford et al. 2011). Therefore, it was expected that application of a similar approach might promote comparison of the present and previous findings. Second, frequency distributions of responses on the selected indicator variables were excessively skewed, that is, on each item at least two-thirds of the participants reported absence of involvement of the given peer violence category. During the dichotomization of the indicator variables if respondents reported that they did not involve in the given peer violence indicator at all (response category 1 in each variables), responses were coded as 0, while if respondents reported that they involved in the given peer violence indicator at least one time (response categories 2–5 in each variables), responses were coded as 1.

In our analysis, we included variables of participants' age and gender. "Life satisfaction" was measured by the one-item 11-point scale of Cantril Ladder (Cantril 1965). "Drunkness lifetime prevalence" (as one indicator of substance use) was also measured through one item "Have you ever had so much alcohol that you were really drunk?" Responses were rated on a 5-point scale and were converted to a dichotomous variable (ever/never been drunk). "Psychosomatic symptoms" were evaluated based on the HBSC symptom checklist, and the average item score based on the combination of nine items was included in the analysis (Currie et al. 2014).

The original variable referring to "number of close male and female friends" offers four answer categories that were transformed in the analysis as having at least one male/female friend or having none of them. For measuring the "electronic media communication," we used three items that asks the frequency of contacting friends by the most popular online forms: phone or internet calls; chat or instant messaging, or via social media platforms. The average item score based on the combination of the three items was entered in the model. The "intensity of face-to-face contact with friends" was measured by two items with the frequency of meeting friends outside school before and after 8 o'clock in the evening and here again, the composite score of these two items were used. The variables of "perceived social support from friends and family" are part of the Multidimensional Scale of Perceived Social Support (Zimet et al. 1988; Currie et al. 2014). There are four peer support items where respondents need to indicate their agreement in a 7-point-Likert scale with certain statements about help, support, and attention from friends. Perceived family support is very similar: statements refer to help and support from family members. Average item scores based on four items which measure the perceived support from friends and family were applied in the analysis.

School engagement is measured by a single item measuring "students' connectedness to school" in terms of liking school with four answer options that were entered in the model as a dichotomous variable (does/does not like school). "Perceived school pressure" is measured by a single item which intends to measure the global feeling of being pressured by the demands of school work. The original item offered four answer option and were converted to a dichotomous variable (feels pressure only a little at most/some level of pressure at least) (Currie et al. 2014) (further details on original variables, answer options etc. see Supplementary Table 3.).

Data Analysis

A latent class analysis (LCA) was performed to classify participants based on their roles in school or cyber victimization and perpetration and fighting (Collins and Lanza 2009). The

previously mentioned dichotomous variables of bullying and fighting were used as indicator variables. Data were weighted by geographical location, type of habitation (e.g., capital city, city, and village), type of school (e.g., primary school, vocational school, and high school), and operator of school (e.g., municipal council and church). The effect of clustering was also taken into account to control for the non-independence between the participants within each class.

Each of the identified latent classes were described by item endorsement probabilities. The best fitting model were selected through a step-by-step process where models with growing number of latent classes were tested as long as the model fit indices showed that the inclusion of an additional latent class did not indicate a significantly better model fit. Various model fit indices were used to define the degree of model fit and to compare the models with each other. More adequate fit should be considered for the estimated model compared to other latent class model solutions if the index of Akaike information criterion (AIC), Bayesian information criterion (BIC), and sample size-adjusted Bayesian information criterion (SSA-BIC) presents lower values. In case of the Lo–Mendel–Rubin–adjusted likelihood ratio test (LMRT) a significant result ($p < 0.05$) implies that the involvement of an additional latent class contributes to a more sufficient fit for the estimated model compared to the previous model with lower number of latent classes. The classification accuracy of the models was measured by the indicator of entropy, where higher rates (e.g., values closer to 1) are desirable.

A multinomial logistic regression analysis was conducted to examine which factors explain the class membership for each of the identified latent classes. The analysis was performed by using the R3Step technique (Asparouhov and Muthén 2014). Participants were classified into subgroups based on their most likely latent class membership.

All analyses were performed by using the IBM SPSS Statistics 25 and Mplus 8.0 statistical software (Muthén and Muthén 2017).

Results

Descriptive Statistics

Supplementary Table 1 and Supplementary Table 2 present the prevalence rates related to the indicators measuring school and online bullying victimization and perpetration and fighting. Descriptive data represents gender- and grade-based item endorsement. The total sample of 24.5% has been reported as school bullying victimization. Online bullying victimization was also present as 9.7% of the respondents stated that they were shared with embarrassing pictures and 16.5% received rude messages. Girls received rude messages more frequently than boys (14.1 and 18.7%, respectively). School bullying perpetration and fighting were also frequently reported in the total sample (22.7% and 31.5%, respectively). Perpetration and fighting were more prevalent among boys than girls (for test statistics of the gender-based comparisons see Supplementary Table 1.).

Latent Class Analysis

During the iterative model estimation procedure, models with two to five latent classes were tested. Table 1 demonstrates model fit indices related to the models containing different number of latent classes. Based on the values of AIC, BIC, and sample size-adjusted BIC, the four-class solution showed the closest fit to the data. The LMRT displayed significant result for the model with four latent classes compared to the three-class solution. The result

implied that the inclusion of an additional subgroup over three latent classes provided significantly better model fit. Therefore, a model with four latent classes were retained and selected for further analyses.

The average latent class probabilities for the most likely latent class membership were 0.71, 0.84, 0.89, and 0.76, respectively (Table 2). Participants assigned into class 1 were characterized as “primarily victims of online bullying”. Latent class 2 was labeled as a “not affected” subgroup. Participants in class 3 were predominantly “involved in school-based bullying and fighting”. Finally, members of class 4 showed moderate-high probability to be “involved in both school and online bullying and fighting” (Fig. 1).

Significant differences were presented between the groups in terms of psychosocial variables. Members of the “Not affected” subgroup reported the highest level of perceived support from family and friends, life satisfaction, and lowest frequency of face-to-face contact with friends. The classes of “Primarily victims of online bullying” and “Involved in both school and online bullying” showed the highest level of online contact frequency with friends and psychosomatic symptoms.

Predictors of Latent Classes: a Multinomial Logistic Regression

Multinomial logistic regression was performed to explore the relationship between the identified latent classes and individual-, peer-, family- and school-related factors. Table 3 displays the results of the multinomial logistic regression. Compared to the “Not affected” (class 2) having at least one male friend, higher frequency of online contact with friends, lower level of perceived support received from family and friends, and higher rates of psychosomatic symptoms predicted class 1 membership. Being male, higher frequency of contact with friends (online friends for class 4 and face-to-face for class 3), lower level of perceived support received from family and friends, at least one occasion of drunkenness in lifetime, and higher rates of psychosomatic symptoms predicted the membership of class 3 and 4. Class 1, 3, 4 memberships were all predicted by higher rates of psychosomatic symptoms and lower levels of social support.

Discussion

We identified classes of traditional bullying, cyberbullying, and fighting involvement using empirical data and to see whether conventional theoretical classes can be replicated. We have found four distinct classes.

Table 1 Fit indices for the latent class analysis models based on variables measuring school and online bullying victimization and perpetration and fighting, Health Behaviour in School-aged Children Study, Hungary, 2013/2014

Models	AIC	BIC	SSA-BIC	Entropy	LMRT	p
2 classes	29,033.78	29,107.68	29,072.72	0.508	1206.18	< 0.001
3 classes	28,745.35	28,859.55	28,805.53	0.652	294.80	< 0.001
4 classes	28,688.81	28,843.32	28,770.23	0.659	67.26	0.001
5 classes	28,698.30	28,893.12	28,800.96	0.775	2.46	0.813

AIC, Akaike information criterion; BIC, Bayesian information criterion; SSA-BIC, sample size-adjusted Bayesian information criterion; LMRT, Lo–Mendel–Rubin adjusted likelihood ratio test

Table 2 Class-based probability of endorsing each school and online bullying victimization and perpetration and fighting items and comparison of latent classes, Health Behaviour in School-aged Children Study, Hungary, 2013/2014

	Class “Primarily victims of online bullying” <i>N</i> = 771 (12.6%)	Class 2 “Not affected” <i>N</i> = 3727 (61.0%)	Class 3 “Involved in school-based bullying” <i>N</i> = 1272 (20.8%)	Class 4 “Involved in both school and online bullying” <i>N</i> = 339 (5.5%)	Wald-test (<i>p</i>)
School bullying victimization	0.32	0.11	0.42	0.66	
School bullying perpetration	< 0.01	< 0.01	0.64	1.00	
Fighting	0.32	0.16	0.57	0.59	
Online bullying victimization: receiving rude messages	0.67	0.04	0.08	0.81	
Online bullying victimization: sharing embarrassing pictures	0.37	0.03	0.06	0.41	
Average latent class probabilities for the most likely latent class membership	0.71	0.84	0.89	0.76	
Comparisons of latent classes*					
Age mean (SE)	15.56a (0.18)	15.42a (0.18)	14.41b (0.18)	15.05a (0.26)	53.66 (< 0.001)
Online contact with friends, mean (SE)	3.18a (0.04)	2.76b (0.03)	2.74b (0.04)	3.12a (0.06)	97.42 (< 0.001)
Face-to-face contact with friends, mean (SE)	2.73a (0.05)	2.47b (0.03)	2.62a (0.04)	2.79a (0.08)	35.26 (< 0.001)
Perceived support from family, mean (SE)	5.62a (0.09)	6.21c (0.04)	5.88b (0.06)	5.32a (0.16)	75.47 (< 0.001)
Perceived support from friends, mean (SE)	5.89a (0.08)	6.13b (0.04)	5.76a (0.06)	5.59a (0.14)	52.72 (< 0.001)
Life satisfaction, mean (SE)	6.75a (0.13)	7.50c (0.06)	7.27b (0.09)	6.64a (0.21)	35.24 (< 0.001)
Psychosomatic symptoms, mean (SE)	2.85a (0.06)	2.13c (0.03)	2.40b (0.04)	2.89a (0.08)	163.24 (< 0.001)

Means sharing the same letter are not different at $p < .05$ level

*BCH method was used in the comparison (Asparouhov and Muthén 2014)

The class of primarily victims of online bullying (class 1) and the class of students involved in school-based bullying (class 3) represent distinct online and offline types of violence supporting the traditional distinction between these two forms of bullying and providing us

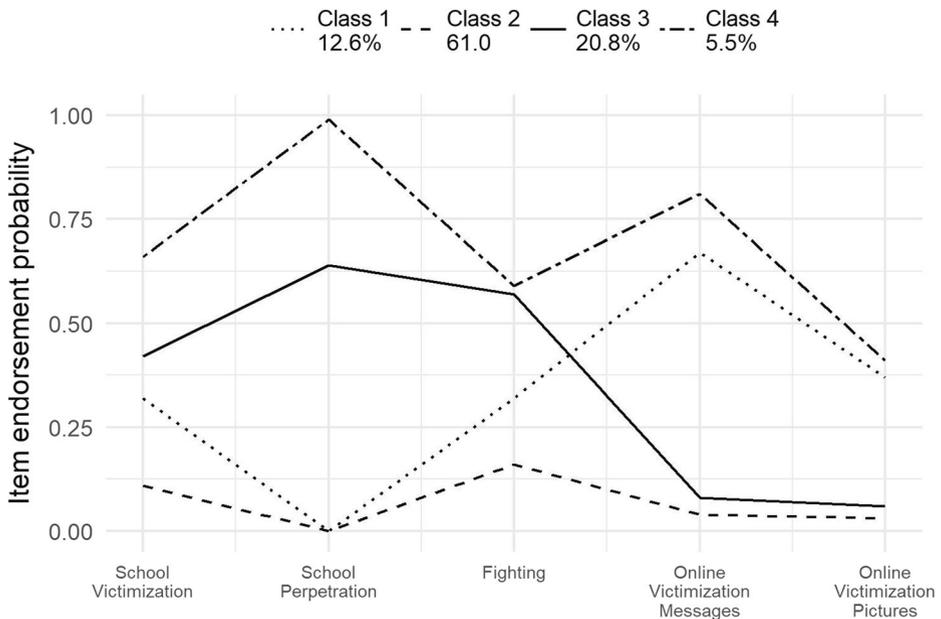


Fig. 1 Class-based probability of endorsing each school and online bullying victimization and perpetration items and fighting, Health Behaviour in School Aged Children Study, Hungary, 2013/2014

evidence for differentiation the traditional bullying from cyberbullying. Furthermore, these groups represent large proportion, almost one-third of students.

Fighting behavior goes along with two classes where face-to-face bullying is present (class 3 and 4). Class 4, namely students involved in both school and online bullying, covers children that are affected by all kind of aggression no matter the form (online, offline), the power relations (equal or not equal), and the role (victim/bully). The identification of class 4 is in line with the proposition that adolescents' behaviors can be clustered according to their frequency and not type of aggression (Dempsey et al. 2011).

Our classification did not reveal the conventional classes of either victims or perpetrators/fighters. However, not being able to identify exclusive victim and perpetrator/fighter class might be explained by overlaps between traditional bullying and cyberbullying, substantial overlap between perpetration/victimization, and physical bullying and fighting (Schultze-Krumbholz et al. 2015; Williford et al. 2011).

The group differences uncovered that students who are not affected by any type of bullying reported the highest degree of family and friend support, the highest life satisfaction, and lowest level of sign of distress. Any form of bullying was associated with indicators of less social support, lower life satisfaction, and higher distress similarly to previous reports (Due et al. 2005; Gobina et al. 2008). Furthermore, those who are victims of online bullying (class 1 and class 4) perceived less family and peer support and reported more online contacts. The lower degree of social support may push them to the online world exposing them to the risk of bullying (Leung 2011). A multivariate comparison of groups revealed that being male increased the odds to become a member of a group where traditional bullying and fighting is specific, and confirms previous findings as boys appear to be more involved in bullying than girls (Scheithauer et al. 2006). Interestingly, psychosomatic symptoms, as possible signs of psychosocial stressors, are increased in all classes compared to the non-affected group. In case

Table 3 Multinomial logistic regression analysis to predict class membership: odds ratios (95% confidence intervals). Health Behaviour in School-aged Children Study, Hungary, 2013/2014

	Class 1 (12.6%) “Primarily victims of online bullying” OR [95% CI]	Class 3 (20.8%) “Involved in school-based bullying” OR [95% CI]	Class 4 (5.5%) “Involved in both school and online bullying” OR [95% CI]
Gender ¹	0.861 [0.599–1.237]	<i>3.007 [2.277–3.972]</i>	<i>2.147 [1.336–3.450]</i>
Age	<i>0.910 [0.830–0.998]</i>	<i>0.728 [0.670–0.790]</i>	<i>0.693 [0.604–0.795]</i>
Number of close male friends ²	<i>3.501 [1.256–9.758]</i>	1.340 [0.899–1.999]	1.439 [0.592–3.497]
Number of close female friends ²	0.687 [0.351–1.346]	1.404 [0.914–2.156]	0.792 [0.372–1.685]
Online contact with friends ³	<i>1.925 [1.507–2.460]</i>	1.059 [0.887–1.263]	<i>2.040 [1.503–2.770]</i>
Face-to-face contact with friends ⁴	1.091 [0.872–1.364]	<i>1.324 [1.137–1.543]</i>	1.083 [0.823–1.425]
Perceived support from family ⁵	<i>0.839 [0.728–0.969]</i>	<i>0.870 [0.774–0.979]</i>	<i>0.828 [0.706–0.970]</i>
Perceived support from friends ⁶	<i>0.859 [0.739–0.999]</i>	<i>0.868 [0.784–0.961]</i>	<i>0.811 [0.696–0.945]</i>
General school perception: Liking school ⁷	1.095 [0.716–1.676]	0.881 [0.676–1.148]	0.987 [0.657–1.484]
Perceived school pressure ⁸	1.257 [0.815–1.939]	1.388 [0.997–1.933]	1.395 [0.783–2.487]
Life satisfaction ⁹	0.943 [0.851–1.044]	0.967 [0.901–1.037]	0.886 [0.768–1.022]
Drunkenness lifetime prevalence ¹⁰	1.008 [0.633–1.604]	<i>1.528 [1.057–2.209]</i>	<i>3.290 [1.603–6.755]</i>
Psychosomatic symptoms ¹¹	<i>2.175 [1.736–2.725]</i>	<i>1.655 [1.390–1.971]</i>	<i>2.270 [1.743–2.958]</i>

Reference group is Class 2 (“Not affected”). Age is controlled in the analysis. Italicized odds ratios are significant at least $p < 0.05$ level. 1 – gender: 0 = female, 1 = male; 2 – number of close male or female friends: 0 = none, 1 = at least one; 3 – online contact frequency with friends: average item score based on the combination of the three most frequent online, electronic media platforms (phone or internet calls, chat or instant messaging, social media); 4 – face-to-face contact frequency with friends: composite score of two items which measure the frequency of meeting with friends before and after 8 PM; 5 – perceived support from family: average item score based on four items which measure the perceived support from family; 6 – perceived support from friends: average item score based on four items which measure the perceived support from friends; 7 – general school perception, liking school: 0 = does not like school; 1 = likes school; 8 – perceived school pressure: 0 = feels pressure only a little at most; 1 = feels some level of pressure at least; 9 – life satisfaction: measured by Cantril Ladder, ordinal scale from 1 (worst possible life) to 10 (best possible life); 10 – drunkenness lifetime prevalence: 0 = never been drunken; 1 = ever been drunken; 11 – psychosomatic symptoms: average item score based on the combination of nine items which measure various psychosomatic symptoms

of victims, the overt refusal of the peer group may lead to feelings of frustration. Research suggests that victims of bullying may lack skills in emotional regulation (Mahady Wilton et al. 2000). Consequently, it is tempting to conclude that maladaptive emotion regulation processes may contribute to the development of subjective health complaints in the three groups: being bullied might be a source of stress and stress could mediate between victimization and psychosomatic symptoms (Eisenberger and Lieberman 2004). Less is known about emotional regulation of perpetrators. Because the level of life satisfaction did not differentiate between

any classes when other variables are controlled, we can suspect complex relationships among the class predictors.

Drunkness lifetime prevalence was associated with in all type of bullying involvement and traditional school bullying involvement group (class 3 and 4). These groups are characterized by higher level of overt aggression (like bullying perpetration and fighting), and it is in line with evidence demonstrating that aggressive children are at an increased risk of being engaged in externalizing behaviors such as substance use and drunkness (Cook et al. 2010).

From peer-related correlates, we focused on two variables as others were either non-significant or associated to only one of the classes. The “intensity of the online contact with friends” was in significant relation with involvement in classes where online victimization was present (class 1 and 4). With other words, online bullying is associated with online friends. This finding is in line with the literature: children exposed to cyberbullying, whether as a cyberbully, cybervictim, or both, spent more time on computer-based social activities (Sticca et al. 2013). The other peer-related association that we would emphasize that perceived low peer support was significantly associated with all classes: the higher peer support decreased the odds for being involved in any class of peer violence. This is true for family support as well. It is in line with literature that high level of parental support appears to offer protection against maladjustment caused by peer victimization (Stadler et al. 2010). When taking together of the results of perceived peer and family support, it is confirmed that social support and integration are protective against violence.

Contradictory to our expectation, school-related variables were not in relationship with peer violence; however, it is a widely supported fact that liking school is protective against bullying (Wang et al. 2013). In our qualitative study, we have found that Hungarian students rather attribute the origin of bullying to family features than school-related factors. However, this finding requires further investigations.

In sum, our latent class analysis performed on variables of traditional bullying, cyberbullying, and fighting revealed four classes of violence involvement that are different from the theoretical classes. Thus, our results question the ecological validity of conventional classes. This problem may be rooted in children having different interpretation of bullying or violence than researchers (or questionnaires) do. Several studies concluded that students do not necessarily consider repeatedness or power imbalance as a crucial criteria for bullying (Vaillancourt et al. 2008; Hopkins et al. 2013). It is especially in Hungarian language that has no single word for bullying. For effective prevention and intervention, it is essential to see groups of peer violence and roles clearly in order to formulate adequate messages for involved parties and bystanders.

Limitations

One of the limitations of our study is that by collapsing the original answer categories of bullying involvement to a dichotomous variable, a bias is created regarding the frequency of either victimization or perpetration. Moreover, our bullying classification could have been more precise if we had had data on cyberbullying perpetration as well, although according to Menesini et al. (2011) cyberbullying is unidimensional and continuous regarding severity (Menesini et al. 2011). There is also the possibility that the comparison between classification models were limited due to measurement-related differences.

A further limitation is that the analysis is based on cross-sectional data which does not allow making causal conclusions. This means that when interpreting predictors of bullying we

cannot determine the direction of causality. Based on our study design, a causal relationship cannot be established whether the negative consequences attributed to bullying (depression, aggression, mental health problems) were not present before the bullying occurred and are rooted in individual characteristics, family factors, or some other factors.

Another objection might be that we used self-reported data to determine bullying status: there might be over- or underreporting in the prevalence of bullying. For example, bullies may be proud of their successful attacks and therefore over report their bullying actions, whereas victims may be ashamed or afraid that could lead to underreporting their exposure (Hopkins et al. 2013).

It is also possible that children have insecure understanding of peer violence. Indeed, research suggests that children are failing to accurately identify cases of bullying, and there are inconsistencies between the understandings held by academics compared to young people (Hopkins et al. 2013). Several studies confirmed that young participants did not consistently report the criteria of repeated behaviors, intentionality, nor a power imbalance, and students are more likely to mention the behaviors involved rather than the criteria by which they define these behaviors (Vaillancourt et al. 2008).

Besides the limitations, our study contributed to understand that involvement in peer violence has different patterns than conventional theoretical classes.

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Compliance with Ethical Standards

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

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