Bullying and Victimization among Majority and Minority Students: The Effects of Self- and Peer-Reported Ethnicity

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In this study, we investigate the association between ethnicity, bullying, and victimization among majority and minority secondary school students. We hypothesize that bullying occurs more likely between than within ethnic groups, and that minority students are more likely to be bullied by majority peers than majority students by minority peers. We emphasize the importance of measuring ethnicity as peer perception, and argue that not only self-declared ethnicity but the perception of others' ethnicity also plays a role in social relations. We analyse cross-sectional social network data from a Hungarian secondary school study conducted among Roma and non-Roma Hungarian students. We measure bullying and victimization from the perspectives of both the bullies and the victims, using dyadic peer nominations. Ethnicity is identified in two different ways: both self-identification and peers' perceptions are taken into account. We use exponential random graph models that describe the structure of bullying nominations in the classes. Results of the meta-analysis of 12 classes (347 students, 4 schools) show that after controlling for gender, socio-economic status, and structural characteristics of the bullying networks, self-declared ethnicity of the students does not show a significant association with the likelihood of bullying and victimization. If peer classification is being considered, however, students perceived as Roma by their peers are nominated as both bullies and victims more likely, than non-Roma students. This can be due to discrepancies between self-identifications and perceptions: being involved in bullying can increase the likelihood that someone is perceived as Roma by others.

Keywords: adolescence, bullying, ERGM, interethnic relations, social networks, victimization

Introduction

Bullying among students of different ethnic background is an extreme form of negative interethnic relations. Bullying is a frequent, ill-intentioned behaviour that occurs between one or more bullies and their victims, and is usually characterized by an imbalance in power (Olweus, 1993). If bullying crosses ethnic boundaries, it may have long-lasting negative consequences for both individuals and communities (Hanish & Guerra, 2000; McKenney, Pepler, Craig, & Connolly, 2006; Verkuyten & Thijs, 2002).

From an individual point of view, adolescence is considered as an important period of identity formation (Erikson, 1968), in which ethnic self-identification also develops (Hitlin, Brown, & Elder Jr., 2006; Phinney, 1993). Being bullied because of one's ethnic affiliation may be particularly detrimental to students' adjustment at this stage of identity development (McKenney et al., 2006). From the communities' point of view, if negative interethnic relations, including bully-victim relations, frequently occur, then intergroup contact can lead to negative experiences between the members of ethnic groups and increase intergroup conflict and prejudice (Pettigrew, 2008; Stark, Flache, & Veenstra, 2013). Therefore, interethnic bullying can undermine the positive effects of formal school desegregation on the social integration of minorities. Hence, it is essential to investigate the relationship between bullying and ethnicity in adolescent communities.

Previous studies have shown mixed findings on the association between ethnicity, bullying, and victimization (e.g., Fandrem, Strohmeier, & Roland, 2009; McKenney et al., 2006; Vitoroulis & Vaillancourt, 2014). An important limitation of these studies is that they only concentrated on the ethnic background of the bully ('who bullies') or of the victim ('who is bullied'), but did not take into account the combination of the two ('who bullies whom'). Since not only bullying behaviour of

majorities and minorities but also bullying within and between ethnic groups can be different, most of the previous research did not manage to identify a crucial aspect of the relationship between bullying and ethnicity, such as the dyadic nature of intra- and interethnic bullying.

Tolsma and his colleagues (2013) aimed to fill this gap and analysed dyadic peer nominations on bullying. This approach enables researchers to differentiate between same-ethnic and cross-ethnic dyads of peers; hence, the effects of individual characteristics can be disentangled from the effects of dyadic characteristics. Therefore, not only the question 'Which ethnic groups are more likely to bully/be victimized?' can be answered, but it can also be investigated whether bullying occurs more often within or between ethnic groups. Tolsma and his colleagues found on a Dutch primary school sample that interethnic bullying was just as common as bullying within the ethnic groups (Tolsma et al., 2013).

Our study extends previous research in two major ways. Most importantly, we apply two different aspects of ethnicity: students' ethnic self-identification and peers' perceptions of each other's ethnicity (Boda & Néray, 2015). Ethnic self-identification and perceptions of others often differ from each other (Ladányi & Szelényi, 2006; Messing, 2014; Telles & Lim, 1998). In such cases, perceptions of others' ethnicity are crucial when decisions about social relations are made. Analysing the two ethnicity aspects together can provide us with more detailed results on interethnic bullying.

Moreover, we use an innovative methodological approach, exponential random graph models (ERGMs, also called p* models, Lusher, Koskinen, & Robbins, 2013; Robins, Pattison, Kalish, & Lusher, 2007) for our analysis. ERGMs do not only allow us to investigate the effect of ethnicity of both the bully and the victim, but to also control for more complex structural characteristics of the bullying networks of the

classes (e.g., the tendency that certain bullies harass the same victims, or that some students are more likely to be victimized than other students, independently from their ethnicity).

Inter- and intra-ethnic bullying

Several studies have focused on inter- and intra-ethnic friendships and disliking relations among adolescents (e.g., Boda & Néray, 2015; Rambaran, Dijkstra, Munniksma, & Cillessen, 2015), but less is known about whether bullying is more likely to occur in same- or cross-ethnic peer relations. Based on social identity theory (Tajfel & Turner, 1979), interethnic bullying should be more prevalent than intra-ethnic bullying. As people aim to belong to a group with a positive identity and distance themselves from less desired group memberships, they positively attach to in-group attributes and establish distinctiveness from other social groups (Tajfel, 1982; Tajfel & Turner, 1979). Moreover, people perceived as similar to the individual along relevant dimensions are categorized as in-group members; people perceived as dissimilar are considered members of the out-group. Ethnicity is a salient dimension in most cultures, differences among ethnic groups are therefore often accentuated. In-group favouritism and bias toward out-group members might thus increase prejudice and tensions among groups (Tajfel, 1982). Prejudice and ethnic tensions may manifest themselves in discriminative and aggressive behaviour (Allport, 1954), leading to bullying among students.

As bullies aim to gain status and affection in the group (Faris & Ennett, 2012; Faris & Felmlee, 2014; Sijtsema, Veenstra, Lindenberg, & Salmivalli, 2009); they often bully peers who are rejected by significant others (Veenstra, Lindenberg, Munniksma, & Dijkstra, 2010). Significant others, whose opinions matter, may belong to the same ethnic group, since friendship networks in school classes are usually segmented by

ethnicity (Moody, 2001; Mouw & Entwisle, 2006; Quillian & Campbell, 2003). If same-ethnic friends dislike and reject students from the ethnic out-group (Boda & Néray, 2015; Griffiths & Nesdale, 2006; Rodkin, Wilson, & Ahn, 2007), interethnic bullying might be more prevalent than intra-ethnic bullying. Based on social identity theory and previous research findings on interethnic relations, we expect that *interethnic bullying occurs more likely than intra-ethnic bullying (Hypothesis 1).*

Ethnic differences in bullying and victimization

Bully-victim relations are usually characterized by an imbalance of power (Olweus, 1993). Differences in power also exist between majority and minority groups in society (McKenney et al., 2006; Vervoort, Scholte, & Overbeek, 2010). Minority groups often find themselves in a marginalized social and economic position in the society, and have to face exclusion and discrimination in many areas of life. This marginalized social position of minority groups and the prejudicial attitudes shared by the members of the majority society towards the ethnic minority (Griffiths & Nesdale, 2006; Kézdi & Surányi, 2009) may encourage majority students to bully their minority peers. Bullying others based on their ethnic background or identity is a special form of harassment called *ethnic bullying*, which may include racist name-calling, social exclusion of minority students or more direct forms of aggressive behaviour (Fandrem et al., 2009; Monks, Ortega-Ruiz, & Rodríguez-Hidalgo, 2008; Verkuyten & Thijs, 2002).

Besides the importance of status struggles within a community, the social misfit theory (Wright, Giammarino, & Parad, 1986) suggests that bullying might be especially frequent toward minority students if their cultural norms differ considerably from the dominant culture (Tolsma et al., 2013; Vervoort et al., 2010). Individuals who deviate from the group norm might be rejected by their peers, and rejected students are often the targets of bullying (Knack, Tsar, Vaillancourt, Hymel, & McDougall, 2012; Veenstra et

al., 2010). Since ethnicity can serve as a signal for difference (Tolsma et al., 2013; Vervoort et al., 2010), ethnic minority students may be at greater risk of victimization than the members of the ethnic majority group. Based on these arguments, we expect that *minority students are more likely to be bullied by majority peers than majority students by minority peers (Hypothesis 2).*

Self-declared ethnic identification and peers' perceptions of ethnicity

In contemporary sociology, ethnic and racial categories are mostly regarded as social constructs (American Sociological Association, 2003; Brubaker, 2009). It implies that in different countries and communities, different opinions exist on where ethnic and racial boundaries lie, and who belongs to the certain categories. Not only different societies, but groups or people within the same society might also lack consensus about ethnic and racial categorization (Harris, 1970; Telles & Paschel, 2014). Moreover, ethnic and racial self-identification of individuals might change in different contexts and over time (Ladányi & Szelényi, 2006; Saperstein & Penner, 2012; Telles & Paschel, 2014).

Survey results indicate that people's ethnic self-identification and classification by others often provide different information on individuals' ethnicity (Ladányi & Szelényi, 2006; Messing, 2014; Telles & Lim, 1998). The inclusion of peer perceptions of ethnicity in the analysis can reveal mechanisms that would remain hidden if only self-declared ethnic identification were analysed. Boda and Néray (2015) found that majority students rejected those classmates whom they perceived as minorities. Moreover, they found that discrepancies between someone's ethnic self-identification and their peers' perceptions had serious consequences: minority students tended to dislike those classmates whom they perceived as minorities, but who, at the same time, identified themselves as members of the majority group. Furthermore, Penner and

Saperstein (2015) showed that racial disparities in young adults' arrest rates in the US were more closely associated with how they were racially perceived by others than with their racial self-identification. In this study, we thus analyse different classification systems and expect that *ethnic perceptions play a more important role in bullying relations than self-identifications (Hypothesis 3).*

The present study

The present study makes use of a dataset analysed in other recent studies as well (Boda & Néray, 2015; Grow, Takacs, & Pal, 2016; Lőrincz, 2016; Pál, Stadtfeld, Grow, & Takács, 2015).This study focuses on bullying relations between Roma and non-Roma Hungarian students. We analyse cross-sectional dyadic peer nomination data from 12 secondary school classes (347 students from 4 schools) using exponential random graph models (Lusher, Koskinen, & Robbins, 2013; Robins, Pattison, Kalish, & Lusher, 2007). ERGMs provide statistical models for social networks and allow us to take into account the intra- and interethnic nature of bullying, while controlling for the structural characteristics of the bullying networks. Controlling for endogenous network processes is necessary to avoid the overestimation of the effect of ethnicity. Moreover, we highlight the difference between different aspects of ethnicity and examine how students' self-declared ethnicity and dyadic peer perceptions about others' ethnic belonging play a role in bullying relations.

Method

Procedure

We analysed the second wave of a four-wave panel study conducted between 2010 and 2013 in Hungarian secondary schools. Second wave data were gathered in the spring of

2011 in 44 classes of 7 schools (N=1378), representing the three different secondary training programmes in Hungary (vocational, technical, and grammar schools). Students were enrolled in the 9th grade, which is the first year of secondary education in the Hungarian education system. Students and parents received an information letter describing the aim and procedure of the research. Parents were asked to return the consent form if they did not want their child to participate in the study. Students who had been granted parental permission (99.3%) filled out a self-administered paper questionnaire during regular school lessons, under the supervision of a trained research assistant. Students were assured that their answers would be kept confidential and would be used for research purposes exclusively. They were also allowed to refuse to participate in the study.

Participants

We selected those classes from the sample where the response rate reached 80%, and where the rate of minority students was at least 10%. Our initial subsample consisted of 17 classes. Later, five more classes had to be excluded from the analysis due to convergence problems during the analysis (see details in the online Supplementary Materials). The final subsample comprised 12 classes from four schools with a mean class size of 29 students (SD=3.93). Three classes were vocational classes (N=78), which do not provide the possibility to enter tertiary education. Eight classes were technical school classes (N=233), and only one class was a grammar school class (N=36). 211 girls (60.8%) and 136 boys (39.2%) with a mean age of 16.0 (SD=0.73) attended these classes. More girls than boys participated in the research because a lot of vocational and technical school classes in the sample provided education for professions that are more likely to be chosen by female students than by male students (e.g., pastry-cook). 31.1% of the students declared being Roma. 22.2% of the pupils reported that the

highest educational attainment of the father was not higher than 8 years of primary education; this figure is 30.5% for the mothers. 13.0% of the students were missing in the second wave of the research, but their answers were imputed, using different imputation methods (see more details about the imputation in the online Supplementary Materials).

Measures

Bullying and victimization

Similarly to other studies (Faris & Felmlee, 2014; Tolsma et al., 2013; Veenstra et al., 2007), we measured the occurrence of bullying behaviour from the perspectives of both the bullies and the victims. In the questionnaire, children saw a list of all classmates and had to put an 'X' to those students to whom they felt the statement applied. From the perspective of the bullies, students were asked to answer the questions *1. "Who have you beaten up?"; 2. "About whom do you tell bad things to others?"; 3. "Who do you mock?"* and *4. "Who have you deliberately humiliated?"* For the purpose of analysis, these four items were combined into one variable: a bullying relationship between two classmates was established if a student nominated the other student at least once to any of the above-mentioned four questions. We created adjacency matrices, in which we coded dyads in which student *i* (sender) nominated student *j* (receiver) as 1 and dyads where there were no nominations from *i* to *j* as 0. This bullying network was used as the dependent variable in Model 1. From the perspective of the victims, similarly, we asked *1. "Who have beaten you up?"; 2. "Who tells bad things about you to others?"; 3. "Who mocks you?"* and *4. "Who have humiliated you deliberately?"* Then, we created a combined victimization variable based on these four items and used the adjacency matrix as the dependent variable in Model 2 in the same way as described before.

As incoming nominations (in-ties) of students who were missing in the second wave (13.0%) are known from their classmates' nominations, outgoing nominations (out-ties) of these students were imputed, using data from the first and third waves. The exact strategies used for the treatment of missing data and detailed descriptive analysis of the nominations can be found in the online Supplementary Materials.

Ethnicity

Students' ethnic self-identification was measured by asking students to classify themselves as 'Hungarian', 'Roma', 'both Hungarian and Roma', or members of 'another ethnicity'. We recoded students belonging to the 'Hungarian' or 'other ethnicity' as non-Roma (N=239), and students belonging to the 'Roma' or 'both Roma and Hungarian' category as Roma (N=108). Missing second-wave data on students' self-declared ethnicity (14.7%) were imputed, using data from the other waves.

We included the classification made by the peers as the measure of ethnic peer perceptions in the models. Students were provided a list of all classmates and they were asked to nominate whom they consider Roma. Thus, we have a Roma perception network where, for each dyadic relation, 1 indicates that the respondent (sender) classified the given classmate (receiver) as Roma, and 0 indicates that the respondent did not consider the receiver Roma. As incoming nominations (in-ties) of students who were missing in the second wave (13.0%) are known from their classmates' nominations, outgoing nominations (out-ties) of these students were imputed, using data from the first and third waves.

Control variables

Previous research indicated that gender plays a crucial role in the structure of bullying relations in classrooms. Compared to girls, boys are usually more likely to bully their

peers (Rodkin & Berger, 2008; Veenstra et al., 2007), and this gender difference is especially pronounced if physical aggression is under investigation (Card, Stucky, Sawalani, & Little, 2008; Olweus, 1993). Therefore, we controlled for the gender of both the sender and receiver, and for the interaction between the sender's and receiver's gender.

Socio-economic status may be a relevant factor explaining bullying and victimization among students (Tippett & Wolke, 2014). Furthermore, low SES is often associated with the minority status of pupils, so it is particularly important to control for it if ethnicity is in the focus of the research. Thus, we controlled for the socio-economic status of both the sender and receiver. Difference in socio-economic status of the pairs was also included in the models. We calculated SES scores based on students' reports about their mother's highest education and the number of books families have at home, using categorical principal component analysis (CATPCA, Linting, Meulman, Groenen, & van der Koojj, 2007). Missing second-wave data on mother's education (12.1%) and number of books (12.4%) were imputed, using data from the other waves.

Structural effects

Previous studies revealed several characteristics of tie formation in bullying networks of school classes. Besides the afore-mentioned attribute effects, we aimed to control for these structural effects in our models (see the online Supplementary Materials for a detailed description).

Analytical strategy

We analysed our data using exponential random graph models (Lusher et al., 2013; Robins et al., 2007), which provide statistical models for social networks. ERGMs explicitly model the dependence among ties by conditioning the likelihood of the

presence of a tie on the presence or absence of other ties in the network (Lusher et al.,

2013). We found ERGMs suitable to examine bullying among students of different

ethnic background because previous studies have indicated that bullying nominations

among a set of actors constitute social networks characterized by certain typical

mechanisms of tie formation (Huitsing et al., 2012; Huitsing, Snijders, Van Duijn, &

Veenstra, 2014; Huitsing & Veenstra, 2012). The effect of ethnicity might be

overestimated if we used other types of models which do not control for endogenous

structural network processes.

Model specification

To estimate our ERG models, we used the MPNet program (Wang, Robins, Pattison, &

Koskinen, 2014). MPNet estimates the parameters via Monte Carlo maximum

likelihood methods (Snijders, 2002). The estimation procedure converges if the

simulated networks are similar enough to the observed graph, which is expressed by a t-

ratio. After convergence is reached, the Goodness of Fit (GOF) measures of the models

are assessed (Lusher et al., 2013).

First, we estimated ERG models with the configurations described before for

each class separately. In some classes, some of the parameters had to be excluded or

additional parameters had to be included to achieve a better fit of the model. Then, we

undertook a meta-analysis to estimate the parameters and the standard errors of the

separate models based on the procedure described by Snijders and Baerveldt (2003). We

tested whether the values of the parameters significantly differed from 0, indicating

general tendencies in the networks. More detailed information about exponential

random graph models and our model specification can be found in the online

Supplementary Materials.

In Model 1A and 2A, the self-declared ethnicity of the sender and the receiver, and the interaction between these two variables were included. In Model 1B and 2B, the self-declared ethnicity of the sender was included, and we used the Roma perception network as a dyadic covariate to capture the ethnicity of the receiver. We also included an interaction term between the self-declared ethnicity of the sender and the perceived ethnicity of the receiver. In Model 1C and 2C, the self-declared ethnicity of both the sender and the receiver, the perceived ethnicity of the receiver, and the interactions between these variables were included. Table S4 graphically represents the parameters measuring the effect of self-declared and perceived ethnicity of the receiver in our models.

Results

Prevalence of bullying

Students were more likely to report that they bully their peers than to report being bullied. This tendency is observable among boys as well as among girls, and among both Roma and non-Roma students (see Table 1 for details). On average, students nominated almost two classmates they bully, and one student by whom they were bullied. Overall in the 12 classes, there were 598 nominations made by bullies, 6.4% of all possible ties. Victims reported 374 bullying relations, 4.0% of all possible ties. In 175 cases, there was an agreement between the self-reported bullies and victims that a bully-victim relation indeed existed. Examining the different types of bullying behaviour, gossiping about the classmates and mocking them occurred more frequently than humiliation and physical aggression (see Table S1 for details).

According to the bullies, 41.1% of the bullying relations were between students of different ethnic background based on students' self-declared ethnicity. According to

the victims, they were bullied by a student of a different ethnicity in 37.7% of the cases. Examining the bullying relations based on peers' perceptions of receivers' ethnicity, 39.0% of the bullying nominations were between ethnic groups based on bullies' reports, and 30.5% of the bullying nominations were between ethnic groups based on victims' reports.

Meta-analysis of the Exponential Random Graph Models

Table 2 presents the results of the meta-analysis of the separate ERGMs based on the nominations reported by bullies. The results obtained from the analysis of victims' nominations are shown in Table 3. Hereby, we concentrate on the interpretation of the association between ethnicity and bullying. Further results are presented in the online Supplementary Materials.

We expected that bullying occurs more likely between than within ethnic groups (Hypothesis 1). Thus, we assumed that Roma–non-Roma and non-Roma–Roma nominations are more likely than Roma–Roma and non-Roma–non-Roma nominations. The difference between interethnic nominations and non-Roma–non-Roma nominations are directly modelled in our analysis with the Roma sender and receiver/perception parameters. We also calculated the conditional odds ratios for each kind of dyads compared to the non-Roma–non-Roma reference category (see Tables 4 and 5). The parameters in Table 2 and the conditional odds ratios in Table 4 show that, consistently with our hypothesis, non-Roma students are more likely to report that they bully peers they perceive as Roma, than to bully peers they perceive as non-Roma (OR=1.52, p<0.05, Model 1B, Table 4; OR=1.67, p<0.05 for non-Roma – "only perceived" Roma nominations in Model 1C, Table 4). From the perspective of the victims, non-Roma students are more likely to report that they are bullied by a classmate they perceive as Roma, than by a classmate they perceive as non-Roma (OR=2.06, p<0.001, Model 2B,

Table 5; OR=1.71, p<0.01 for non-Roma – "consistent" Roma and OR=2.12, p<0.01 for non-Roma – "only perceived" Roma nominations in Model 2C, Table 5). Roma–non-Roma nominations, however, are not significantly more likely than non-Roma–non-Roma nominations in any of our models. Similarly, cross-ethnic nominations are not more likely to occur than nominations between non-Roma students if ethnicity is measured as self-identification.

The difference between cross-ethnic nominations and Roma–Roma nominations are not directly modelled in our analysis. In Tables 2 and 3, nominations between non-Roma represent the reference category, but differences between any other categories can also be calculated with additional Wald-tests. Therefore, we calculated Wald-tests to see whether non-Roma–Roma and Roma–non-Roma nominations are more likely than nominations between Roma students. The results of the tests show that contrary to our expectations, Roma students are more likely to report that they are bullied by classmates they perceive as Roma, than by classmates they perceive as non-Roma (1.12, p<0.01, Model 2B; 0.89, p<0.05, Model 2C). From the perspective of the bullies, however, Roma–non-Roma nominations are not significantly more likely, than Roma–Roma nominations (0.27, p=0.10, Model 1B; 0.32, p=0.08, Model 1C). Based on the results of the Wald-test, non-Roma–Roma nominations are not significantly more likely than nominations between Roma students in any of our models (0.08, p=0.37, Model 1B; 0.07, p=0.55, Model 1C; 0.33, p= 0.41, Model 2B; -0.13, p=0.79, Model 2C). Similarly, self-declared ethnicity does not show a significant relationship with bullying controlling for the other parameters included in our analysis.

We also expected that minority students are more likely to be bullied by majority peers than majority students by minority peers (Hypothesis 2). In other words, we expected that from the perspective of the bullies, non-Roma–Roma nominations are

more likely than Roma–non-Roma nominations, whereas from the perspective of the victims, Roma–non-Roma nominations are more likely than non-Roma–Roma nominations. As this difference is not directly modelled in our analysis, we ran additional Wald-tests to test this assumption. Based on nominations from bullies' perspective, non-Roma–Roma nominations are not significantly more likely to occur than Roma–non-Roma nominations (0.17, p=0.35, Model 1B; 0.46, p=0.06, Model 1C). Based on nominations from victims' perspective, however, non-Roma students are more likely to report that they are bullied by classmates they perceive as Roma, than Roma students to report that they are bullied by classmates they perceive as non-Roma (0.78, p<0.01, Model 2B; 1.07, p<0.001, Model 2C). Self-declared ethnicity is not significantly associated with bullying in any of our models.

The conditional odd ratios suggest, moreover, that compared to non-Roma–non-Roma nominations, Roma students are significantly more likely to report that they are bullied by peers who are consistently classified as Roma (OR=3.26, p<0.05, Model 2C, Table 5). In contrast, they are significantly more likely to report that they bully peers they perceive as Roma, but who do not identify themselves as Roma (OR=1.64, p<0.05, Model 1C, Table 4).

We assumed that ethnic perceptions play a more important role in bullying relations than self-identifications (Hypothesis 3). In line with our hypothesis, students' self-declared ethnicity does not show a significant relationship with bullying in any of our models controlling for gender, socio-economic status, and structural characteristics of the networks. Peer perception of ethnicity, however, has a significant effect on bullying both from the perspectives of bullies and victims, even after controlling for self-declared ethnicity of pupils (0.42, p<0.05, Model 1B, Table 2; 0.51, p<0.05, Model 1C, Table 2; 0.72, p<0.001, Model 2B, Table 3; 0.75, p<0.01, Model 2C, Table 3).

Discussion

In this study, we examined whether bullying occurs more likely between students of different ethnic background than between same-ethnic students (Hypothesis 1), and whether minority students are more likely to be bullied by majority peers than majority students by minority peers (Hypothesis 2). We argued that ethnicity is a social construct; therefore, there can be differences in the ways people classify themselves and are classified by others. We highlighted the difference between these two aspects of ethnicity and tested whether ethnic perceptions play a more important role in bullying relations than ethnic self-identifications (Hypothesis 3). Our findings do not unequivocally support the first two hypotheses but are in line with the third hypothesis.

We have found that while students' self-declared ethnicity is not significantly associated with the likelihood of bullying, perceptions about the classmates' ethnicity show a relationship with bullying. Our results suggest that students perceived as Roma are significantly more likely to be nominated both as victims and bullies by their peers than students perceived as non-Roma. More specifically, non-Roma students are more likely to report that they bully peers they perceive as Roma and that they are bullied by peers they perceive as Roma, than bullying peers and being bullied by peers they perceive as non-Roma. Roma students are also more likely to report that they are bullied by classmates they perceive as Roma, than by classmates they perceive as non-Roma.

However, it is important to emphasize that while it is more likely that non-Roma students report bullying peers and being bullied by peers they perceive as Roma compared to classmates they perceive as non-Roma, self-declared Roma students do not report bullying peers and being bullied by non-Roma peers more likely, than non-Roma students do. This can be due to the discrepancies between self-identifications and

perceptions: being involved in bullying can increase the likelihood that someone is perceived as Roma by others.

We have also found that Roma students are likely to report that they bully peers they perceive as Roma, but who do not identify themselves as Roma. This findings is in line with Boda and Néray's (2015) results who have found that Roma students tended to exclude those classmates whom they perceived as Roma, but who, at the same time, identified themselves with the Hungarian group. These findings suggest that not only interethnic relations are relevant to study but minority students' relations towards peers with inconsistent ethnic classification is also an important issue for future research.

Another interesting finding of our research is that students were more likely to report that they bully others, than to report being bullied by others. Previous studies comparing self-reports on bullying and victimization have mostly found the opposite tendency: students were more likely to report being victimized (Faris & Felmlee, 2014; Salmivalli, Lagerspetz, Björkqvist, Österman, & Kaukialnen, 1996; Tolsma et al., 2013; Veenstra et al., 2007). A possible explanation might be that there are cultural differences in the inclination of admitting victimization and bullying behaviour. To test these assumptions further research is needed in Hungarian schools. In line with our findings, however, another study conducted in 186 Hungarian primary and secondary school classes have also shown that students were more likely to report being aggressive towards other students than being victims of others' aggressive behaviour (Hajdu & Sáska, 2009). The largest difference between the admitted victimization and aggressive behaviour was found in vocational schools, and the smallest difference was found in grammar schools. As the social status of students is, on average, the lowest in vocational schools and the highest in grammar schools, these findings suggest that there might be an association between social status and attitudes towards aggression and

bullying. Our sample overrepresented students from low status families that might explain students' inclination to more frequently report bullying others than being victimized.

Finally, some limitations of our study need to be considered. First, we analysed data from Roma and non-Roma Hungarian secondary school students. The situation of Roma minority differs in several aspects from the situation of other minorities and immigrant groups in Hungary or in other countries. Contrary to immigrants, the Roma people were born in Hungary, are Hungarian citizens and most of them (including those in our sample) speak Hungarian as mother tongue (Hungarian Central Statistical Office, 2011). The ethnic self-identification and perception of these people may be considerably different from those of people born outside of their host country or living in an immigrant family. Moreover, surveys indicate that from all minority groups, including historical minorities as well as immigrants, the Roma have to face the strongest discrimination and prejudice in Hungary (Bernát, Juhász, Krekó, & Molnár, 2012). Thus, ethnicity may be more salient in social interactions if Roma people are involved, compared with members of other minorities. For these reasons, our findings may not be generalizable to other minorities inside and outside of Hungary. However, we think that the inclusion of peer perception of ethnicity would yield interesting results in other social settings as well.

Furthermore, the student population in the selected schools does not represent the Roma student population in Hungary. Large regional differences exist in the history, cultural characteristics, assimilation processes, and socio-economic status of the different Roma groups (Kemény, Janky, & Lengyel, 2004). Interethnic bullying and classification processes might therefore show different patterns in other areas in Hungary than in the sample of the study.

Second, we measured bullying and victimization with four different items in our questionnaire. There are several forms of bullying, however, that were not included in our questionnaire (e.g. social exclusion, cyberbullying). It would have also been possible to ask students whom they bully, leaving the interpretation of the word 'bullying' to students, or indicating some examples to help to answer the question. Further work is needed to check how robust our findings are, using different measures of bullying behaviour.

Third, the questionnaire did not contain any questions with regard to ethnic bullying. Students were not asked whether they are bullied by others explicitly because of their ethnic background (experiencing racist name calling, for instance). We think, however, that by examining bullying in general among students we were able to unravel mechanisms underlying interethnic relations that might not be explicitly expressed in the community.

Despite these limitations, our study offers a unique contribution to research on bullying. Our data provided a unique opportunity to analyse the effect of peer perceptions of classmates' ethnicity on bullying behaviour in secondary schools. Our findings suggest that future studies should indeed focus more on ethnic perceptions when examining interethnic relations. A major advantage of the employed social network analysis is that we had the possibility to analyse interethnic bullying without explicitly ask students about their attitudes and prejudice. Thus, we were able to avoid potential bias due to social desirability.

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References

Allport, G. W. (1954). *The Nature of Prejudice*. Cambridge: Addison-Wesley.

American Sociological Association. (2003). *The Importance of Collecting Data and Doing Social Scientific Research on Race*. Washington, DC: American Sociological Association.

Bernát, A., Juhász, A., Krekó, P., & Molnár, C. (2012). A radikalizmus és cigányellenesség gyökerei a szélsőjobboldal szimpatizánsai körében [The roots of radicalism and anti-Gypsism among extreme right-wing supporters]. In T. Kolosi & I. G. Tóth (Eds.), *Társadalmi riport 2012*. Budapest: TÁRKI.

Boda, Z., & Néray, B. (2015). Inter-ethnic friendship and negative ties in secondary school. *Social Networks*, *43*, 57–72. http://doi.org/10.1016/j.socnet.2015.03.004

Brubaker, R. (2009). Ethnicity, Race, and Nationalism. *Annual Review of Sociology*, *35*, 21–42. http://doi.org/10.1146/annurev-soc-070308-115916

Card, N. A., Stucky, B. D., Sawalani, G. M., & Little, T. D. (2008). Direct and Indirect Aggression During Childhood and Adolescence: A Meta-Analytic Review of Gender Differences, Intercorrelations, and Relations to Maladjustment. *Child Development*, *79*(5), 1185–1229. http://doi.org/10.1111/j.1467-8624.2008.01184.x

Erikson, E. H. (1968). *Identity, youth, and crisis*. New York: W. W. Norton.

Fandrem, H., Strohmeier, D., & Roland, E. (2009). Bullying and Victimization Among Native and Immigrant Adolescents in Norway The Role of Proactive and Reactive Aggressiveness. *The Journal of Early Adolescence*, *29*(6), 898–923. http://doi.org/10.1177/0272431609332935

Faris, R., & Ennett, S. (2012). Adolescent aggression: The role of peer group status motives, peer aggression, and group characteristics. *Social Networks*, *34*(4), 371–378. http://doi.org/10.1016/j.socnet.2010.06.003

Faris, R., & Felmlee, D. (2014). Casualties of Social Combat School Networks of Peer

    Victimization and Their Consequences. *American Sociological Review*, *79*(2), 228–257.

    http://doi.org/10.1177/0003122414524573

Griffiths, J. A., & Nesdale, D. (2006). In-group and out-group attitudes of ethnic majority and

    minority children. *International Journal of Intercultural Relations*, *30*(6), 735–749.

    http://doi.org/10.1016/j.ijintrel.2006.05.001

Grow, A., Takacs, K., & Pal, J. (2016). Status Characteristics and Ability Attributions in

    Hungarian School Classes: An Exponential Random Graph Approach. *Social Psychology*

    Quarterly, *79*(2), 156–167. http://doi.org/10.1177/0190272516643052

Hajdu, G., & Sáska, G. (2009). *Iskolai veszélyek. Az oktatási jogok biztosának vizsgálata [Risks*

    az school]. Budapest: Oktatási Jogok Biztosának Hivatala.

Hanish, L. D., & Guerra, N. G. (2000). The Roles of Ethnicity and School Context in Predicting

    Children's Victimization by Peers. *American Journal of Community Psychology*, *28*(2),

    201–223. http://doi.org/10.1023/A:1005187201519

Harris, M. (1970). Referential Ambiguity in the Calculus of Brazilian Racial Identity.

    Southwestern Journal of Anthropology, *26*(1), 1–14. http://doi.org/10.2307/3629265

Hitlin, S., Brown, J. S., & Elder Jr., G. H. (2006). Racial Self-Categorization in Adolescence:

    Multiracial Development and Social Pathways. *Child Development*, *77*(5), 1298–1308.

    http://doi.org/10.1111/j.1467-8624.2006.00935.x

Huitsing, G., Snijders, T. A. B., Van Duijn, M. A. J., & Veenstra, R. (2014). Victims, bullies, and

    their defenders: a longitudinal study of the coevolution of positive and negative

    networks. *Development and Psychopathology*, *26*(3), 645–659.

    http://doi.org/10.1017/S0954579414000297

Huitsing, G., van Duijn, M. A. J., Snijders, T. A. B., Wang, P., Sainio, M., Salmivalli, C., &

    Veenstra, R. (2012). Univariate and multivariate models of positive and negative

networks: Liking, disliking, and bully–victim relationships. *Social Networks*, *34*(4), 645–657. http://doi.org/10.1016/j.socnet.2012.08.001

Huitsing, G., & Veenstra, R. (2012). Bullying in Classrooms: Participant Roles From a Social Network Perspective. *Aggressive Behavior*, *38*(6), 494–509. http://doi.org/10.1002/ab.21438

Hungarian Central Statistical Office. (2011). Népszámlálás 2011. Retrieved from http://www.ksh.hu/nepszamlalas/tables_regional_00?lang=en

Kemény, I., Janky, B., & Lengyel, G. (2004). *A magyarországi cigányság 1971-2003 [The Roma in Hungary 1971-2003]*. Budapest: Gondolat – MTA Etnikai-nemzeti Kisebbségkutató Intézet.

Kézdi, G., & Surányi, É. (2009). *A Successful School Integration Program. An Evaluation of the Hungarian National Government's School Integration Program 2005-2007*. Budapest: Roma Education Fund. Retrieved from http://www.romaeducationfund.hu/sites/default/files/publications/a_succesful_school_integration_kezdi_suranyi.pdf

Knack, J. M., Tsar, V., Vaillancourt, T., Hymel, S., & McDougall, P. (2012). What Protects Rejected Adolescents From Also Being Bullied by Their Peers? The Moderating Role of Peer-Valued Characteristics. *Journal of Research on Adolescence*, *22*(3), 467–479. http://doi.org/10.1111/j.1532-7795.2012.00792.x

Ladányi, J., & Szelényi, I. (2006). *Patterns of Exclusion: Constructing Gypsy Ethnicity and the Making of an Underclass in Transitional Societies of Europe*. New York: Columbia University Press.

Linting, M., Meulman, J. J., Groenen, P. J. F., & van der Kooij, A. J. (2007). Nonlinear principal components analysis: introduction and application. *Psychological Methods*, *12*(3), 336–358. http://doi.org/10.1037/1082-989X.12.3.336

Lőrincz, L. (2016). Interethnic dating preferences of Roma and non-Roma secondary school students. *Journal of Ethnic and Migration Studies*, 1–19. http://doi.org/10.1080/1369183X.2016.1160769

Lusher, D., Koskinen, J., & Robbins, G. (2013). *Exponential random graph models for social networks : theories, methods, and applications*. Cambridge ; New York: Cambridge University Press.

McKenney, K. S., Pepler, D., Craig, W., & Connolly, J. (2006). Peer victimization and psychosocial adjustment: The experiences of Canadian immigrant youth. *Electronic Journal of Research in Educational Psychology*, *4*, 1696–2095.

Messing, V. (2014). Methodological puzzles of surveying Roma/Gypsy populations. *Ethnicities*, *14*(6), 811–829. http://doi.org/10.1177/1468796814542180

Monks, C. P., Ortega-Ruiz, R., & Rodríguez-Hidalgo, A. J. (2008). Peer victimization in multicultural schools in Spain and England. *European Journal of Developmental Psychology*, *5*(4), 507–535. http://doi.org/10.1080/17405620701307316

Moody, J. (2001). Race, School Integration, and Friendship Segregation in America. *American Journal of Sociology*, *107*(3), 679–716. http://doi.org/10.1086/338954

Mouw, T., & Entwisle, B. (2006). Residential Segregation and Interracial Friendship in Schools. *American Journal of Sociology*, *112*(2), 394–441. http://doi.org/10.1086/506415

Olweus, D. (1993). *Bullying at School: What We Know and What We Can Do*. Oxford: Wiley.

Pál, J., Stadtfeld, C., Grow, A., & Takács, K. (2015). Status Perceptions Matter: Understanding Disliking Among Adolescents. *Journal of Research on Adolescence*, n/a-n/a. http://doi.org/10.1111/jora.12231

Penner, A. M., & Saperstein, A. (2015). Disentangling the Effects of Racial Self-identification and Classification by Others: The Case of Arrest. *Demography*, *52*(3), 1017–1024. http://doi.org/10.1007/s13524-015-0394-1

Pettigrew, T. F. (2008). Future directions for intergroup contact theory and research. *International Journal of Intercultural Relations*, *32*(3), 187–199. http://doi.org/10.1016/j.ijintrel.2007.12.002

Phinney, J. S. (1993). A three-stage model of ethnic identity development in adolescence. In M. E. Bernal & G. P. Knight (Eds.), *Ethnic identity: Formation and transmission among Hispanics and other minorities* (pp. 61–79). New York: State University of New York Press.

Quillian, L., & Campbell, M. E. (2003). Beyond Black and White: The Present and Future of Multiracial Friendship Segregation. *American Sociological Review*, *68*(4), 540–566. http://doi.org/10.2307/1519738

Rambaran, J. A., Dijkstra, J. K., Munniksma, A., & Cillessen, A. H. N. (2015). The development of adolescents' friendships and antipathies: A longitudinal multivariate network test of balance theory. *Social Networks*, *43*, 162–176. http://doi.org/10.1016/j.socnet.2015.05.003

Robins, G., Pattison, P., Kalish, Y., & Lusher, D. (2007). An introduction to exponential random graph (p*) models for social networks. *Social Networks*, *29*(2), 173–191. http://doi.org/10.1016/j.socnet.2006.08.002

Rodkin, P. C., & Berger, C. (2008). Who bullies whom? Social status asymmetries by victim gender. *International Journal of Behavioral Development*, *32*(6), 473–485. http://doi.org/10.1177/0165025408093667

Rodkin, P. C., Wilson, T., & Ahn, H.-J. (2007). Social integration between African American and European American children in majority black, majority white, and multicultural elementary classrooms. *New Directions for Child & Adolescent Development*, *2007*(118), 25–42. http://doi.org/10.1002/cd.199

Salmivalli, C., Lagerspetz, K., Björkqvist, K., Österman, K., & Kaukialnen, A. (1996). Bullying as a Group Process: Participant Roles and Their Relations to Social Status Within the Group.

Aggressive Behavior, *22*(1), 1–15. http://doi.org/10.1002/(SICI)1098-
2337(1996)22:1<1::AID-AB1>3.0.CO;2-T

Saperstein, A., & Penner, A. M. (2012). Racial Fluidity and Inequality in the United States.
American Journal of Sociology, *118*(3), 676–727. http://doi.org/10.1086/667722

Sijtsema, J. J., Veenstra, R., Lindenberg, S., & Salmivalli, C. (2009). Empirical test of bullies'
status goals: assessing direct goals, aggression, and prestige. *Aggressive Behavior*,
35(1), 57–67. http://doi.org/10.1002/ab.20282

Snijders, T. A. B. (2002). Markov Chain Monte Carlo Estimation of Exponential Random Graph
Models. *Journal of Social Structure*, *3*(2). Retrieved from
http://www.cmu.edu/joss/content/articles/volume3/Snijders.pdf

Snijders, T. A. B., & Baerveldt, C. (2003). A Multilevel Network Study of the Effects of
Delinquent Behavior on Friendship Evolution. *Journal of Mathematical Sociology*,
27(2), 123–151. http://doi.org/10.1080/00222500390213119

Stark, T. H., Flache, A., & Veenstra, R. (2013). Generalization of positive and negative attitudes
toward individuals to outgroup attitudes. *Personality & Social Psychology Bulletin*,
39(5), 608–622. http://doi.org/10.1177/0146167213480890

Tajfel, H. (1982). Social Psychology of Intergroup Relations. *Annual Review of Psychology*, *33*,
1–39. http://doi.org/10.1146/annurev.ps.33.020182.000245

Tajfel, H., & Turner, J. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S.
Worchel (Eds.), *The Social Psychology of Intergroup Relations* (pp. 33–47). Monterey:
Brooks/Cole.

Telles, E. E., & Lim, N. (1998). Does it Matter Who Answers the Race Question? Racial
Classification and Income Inequality in Brazil. *Demography*, *35*(4), 465.
http://doi.org/10.2307/3004014

Telles, E. E., & Paschel, T. (2014). Who Is Black, White, or Mixed Race? How Skin Color, Status, and Nation Shape Racial Classification in Latin America. *American Journal of Sociology*, *120*(3), 864–907. http://doi.org/10.1086/679252

Tippett, N., & Wolke, D. (2014). Socioeconomic Status and Bullying: A Meta-Analysis. *American Journal of Public Health*, *104*(6), e48–e59. http://doi.org/10.2105/AJPH.2014.301960

Tolsma, J., van Deurzen, I., Stark, T. H., & Veenstra, R. (2013). Who is bullying whom in ethnically diverse primary schools? Exploring links between bullying, ethnicity, and ethnic diversity in Dutch primary schools. *Social Networks*, *35*(1), 51–61. http://doi.org/10.1016/j.socnet.2012.12.002

Veenstra, R., Lindenberg, S., De Winter, A. F., Zijlstra, B. J. H., Verhulst, F. C., & Ormel, J. (2007). The Dyadic Nature of Bullying and Victimization: Testing a Dual-Perspective Theory. *Child Development*, *78*(6), 1843–1854. http://doi.org/10.1111/j.1467-8624.2007.01102.x

Veenstra, R., Lindenberg, S., Munniksma, A., & Dijkstra, J. K. (2010). The complex relation between bullying, victimization, acceptance, and rejection: giving special attention to status, affection, and sex differences. *Child Development*, *81*(2), 480–486. http://doi.org/10.1111/j.1467-8624.2009.01411.x

Verkuyten, M., & Thijs, J. (2002). Racist victimization among children in The Netherlands: the effect of ethnic group and school. *Ethnic and Racial Studies*, *25*(2), 310–331. http://doi.org/10.1080/01419870120109502

Vervoort, M. H. M., Scholte, R. H. J., & Overbeek, G. (2010). Bullying and Victimization Among Adolescents: The Role of Ethnicity and Ethnic Composition of School Class. *Journal of Youth and Adolescence*, *39*(1), 1–11. http://doi.org/10.1007/s10964-008-9355-y

Vitoroulis, I., & Vaillancourt, T. (2014). Meta-analytic results of ethnic group differences in peer victimization. *Aggressive Behavior*, n/a-n/a. http://doi.org/10.1002/AB.21564

Wang, P., Robins, G., Pattison, P., & Koskinen, J. (2014). *MPNet, Program for the Simulation and Estimation of (p*) Exponential Random Graph Models for Multilevel Networks*. Melbourne, Australia: Melbourne School of Psychological Sciences, The University of Melbourne.

Wright, J. C., Giammarino, M., & Parad, H. W. (1986). Social status in small groups: Individual–group similarity and the social 'misfit.' *Journal of Personality and Social Psychology*, *50*(3), 523–536. http://doi.org/10.1037/0022-3514.50.3.523

Table 1. Descriptive statistics of bullying and victimization among non-Roma, Roma, boys, and girls.

	Total		Non-Roma		Roma		Girls		Boys	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Self-reported bullying (bullying outdegree)	1.73	2.63	1.61	2.51	1.99	2.86	1.78	2.56	1.65	2.75
Nominated bullying (victimization indegree)	1.08	1.34	0.98	1.31	1.29	1.37	1.08	1.40	1.07	1.24
Self-reported victimization (victimization outdegree)	1.08	1.97	1.18	2.06	0.85	1.73	1.18	2.01	0.93	1.90
Nominated victimization (bullying indegree)	1.72	1.80	1.72	1.82	1.71	1.76	1.56	1.81	1.97	1.76

Note: Difference in group means between Roma and non-Roma students is only significant for nominated bullying (p<0.05). Difference in group means between girls and boys is only significant for nominated victimization (p<0.05). N=347

Table 2. Meta-analysis of exponential random graph models based on bullies' nominations.

Self-Reported Bullying Networks	Model 1A					Model 1B					Model 1C					N
	Est,	SE		95 % CI		Est,	SE		95 % CI		Est,	SE		95 % CI		
Structural parameters																
Arc	-4.749	0.221	***	-5.182	-4.316	-4.815	0.196	***	-5.199	-4.431	-4.782	0.203	***	-5.180	-4.384	12
Reciprocity	1.213	0.342	***	0.543	1.883	1.204	0.339	***	0.540	1.868	1.208	0.334	***	0.553	1.863	2
In-ties spread (AinS)	0.462	0.123	***	0.221	0.703	0.463	0.120	***	0.228	0.698	0.453	0.126	***	0.206	0.700	12
Out-ties spread (AoutS)	1.040	0.130	***	0.785	1.295	1.014	0.136	***	0.747	1.281	1.015	0.138	***	0.745	1.285	12
Shared in-ties (A2P-D)	0.173	0.017	***	0.140	0.206	0.169	0.016	***	0.138	0.200	0.172	0.017	***	0.139	0.205	12
Shared out-ties (A2P-U)	0.148	0.047	**	0.056	0.240	0.173	0.045	***	0.085	0.261	0.143	0.052	**	0.041	0.245	12
Roma ethnicity																
Roma Sender	0.062	0.136		-0.205	0.329	0.088	0.122		-0.151	0.327	0.077	0.126		-0.170	0.324	12
Roma Receiver (self-declared)	-0.017	0.202		-0.413	0.379						-0.283	0.222		-0.718	0.152	12
Roma Sender*Receiver (self-declared)	-0.170	0.366		-0.887	0.547						0.059	0.368		-0.662	0.780	9
Roma Receiver (peer perceived)						0.418	0.169	*	0.087	0.749	0.514	0.244	*	0.036	0.992	12
Roma Sender*Receiver (peer perceived)						-0.142	0.329		-0.787	0.503	-0.096	0.577		-1.227	1.035	7
Control variables																
Boy Sender	-0.828	0.157	***	-1.136	-0.520	-0.803	0.151	***	-1.099	-0.507	-0.809	0.162	***	-1.127	-0.491	10
Boy Receiver	-0.440	0.128	***	-0.691	-0.189	-0.412	0.126	**	-0.659	-0.165	-0.419	0.128	***	-0.670	-0.168	11
Boy Sender*Receiver	1.645	0.397	***	0.867	2.423	1.637	0.417	***	0.820	2.454	1.616	0.431	***	0.771	2.461	8
SES Sender	0.072	0.039		-0.004	0.148	0.068	0.040		-0.010	0.146	0.074	0.041		-0.006	0.154	12
SES Receiver	0.082	0.139		-0.190	0.354	0.101	0.099		-0.093	0.295	0.086	0.138		-0.184	0.356	12
SES Difference	0.065	0.064		-0.060	0.190	0.049	0.063		-0.074	0.172	0.070	0.066		-0.059	0.199	12

Note: In Model 1A, students' self-declared ethnicity was included; in Model 1B, dyadic peer nominations representing peers' perceptions of their classmates' ethnicity were used. In Model 1C, both self-identification and peers' perceptions were taken into account. *p<0.05, **p<0.01, ***p<0.001. N= 347

Table 3. Meta-analysis of exponential random graph models based on victims' nominations.

Self-Reported Victimization Networks	Model 2A					Model 2B					Model 2C					N
	Est,	SE		95 % CI		Est,	SE		95 % CI		Est,	SE		95 % CI		N
Structural parameters																
Arc	-4.621	0.179	***	-4.972	-4.270	-4.701	0.199	***	-5.091	-4.311	-4.699	0.223	***	-5.136	-4.262	12
Reciprocity	1.239	0.451	**	0.355	2.123	1.279	0.464	**	0.370	2.188	1.309	0.464	**	0.400	2.218	4
In-ties spread (AinS)	0.402	0.168	*	0.073	0.731	0.519	0.163	**	0.200	0.838	0.447	0.166	**	0.122	0.772	12
Out-ties spread (AoutS)	1.079	0.140	***	0.805	1.353	1.086	0.139	***	0.814	1.358	1.098	0.142	***	0.820	1.376	12
Shared in-ties (A2P-D)	0.174	0.024	***	0.127	0.221	0.171	0.025	***	0.122	0.220	0.161	0.028	***	0.106	0.216	11
Shared out-ties (A2P-U)	0.201	0.050	***	0.103	0.299	0.177	0.057	**	0.065	0.289	0.181	0.057	**	0.069	0.293	11
Roma ethnicity																
Roma Sender	-0.198	0.150		-0.492	0.096	-0.097	0.129		-0.350	0.156	-0.256	0.163		-0.575	0.063	12
Roma Receiver (self-declared)	0.192	0.311		-0.418	0.802						-0.216	0.303		-0.810	0.378	12
Roma Sender*Receiver (self-declared)	0.586	0.360		-0.120	1.292						0.838	0.436		-0.017	1.693	9
Roma Receiver (peer perceived)						0.720	0.203	***	0.322	1.118	0.751	0.237	**	0.286	1.216	12
Roma Sender*Receiver (peer perceived)						0.666	0.626		-0.561	1.893	0.065	0.821		-1.544	1.674	10
Control variables																
Boy Sender	-0.569	0.158	***	-0.879	-0.259	-0.585	0.164	***	-0.906	-0.264	-0.564	0.161	***	-0.880	-0.248	11
Boy Receiver	-0.539	0.287		-1.102	0.024	-0.560	0.283		-1.115	-0.005	-0.507	0.281		-1.058	0.044	10
Boy Sender*Receiver	1.781	0.412	***	0.973	2.589	1.761	0.380	***	1.016	2.506	1.761	0.376	***	1.024	2.498	8
SES Sender	0.142	0.102		-0.058	0.342	0.183	0.113		-0.038	0.404	0.169	0.115		-0.056	0.394	12
SES Receiver	0.184	0.099		-0.010	0.378	0.184	0.095		-0.002	0.370	0.200	0.108		-0.012	0.412	12
SES Difference	-0.083	0.097		-0.273	0.107	-0.084	0.090		-0.260	0.092	-0.069	0.097		-0.259	0.121	12

Note: In Model 2A, students' self-declared ethnicity was included; in Model 2B, dyadic peer nominations representing peers' perceptions of their classmates' ethnicity were used. In Model 2C, both self-identification and peers' perceptions were taken into account. *p<0.05, **p<0.01, ***p<0.001. N=347

Table 4. The effect of ethnicity on bullying based on bullies' nominations.

		Receiver's ethnicity			
	Sender's ethnicity	Non-Roma	Roma		
Model 1A	Non-Roma	1,000	0,983		
	Roma	1,064	0,883		
Model 1B	Non-Roma	1,000	1,519*		
	Roma	1,092	1,438**		
		Non-Roma	"consistent" Roma (both perceived and self-declared)	Only self-declared Roma	Only perceived Roma
Model 1C	Non-Roma	1,000	1,261	0,754	1,673*
	Roma	1,080	1,312	0,864	1,641*

Conditional odds ratios are presented, reference category: non-Roma–non-Roma nominations. *p<0.05,

**p<0.01, ***p<0.001. N=347

Table 5. The effect of ethnicity on bullying based on victims' nominations.

		Receiver's ethnicity			
	Sender's ethnicity	Non-Roma	Roma		
Model 2A	Non-Roma	1,000	1,212		
	Roma	0,821	1,786		
Model 2B	Non-Roma	1,000	2,055***		
	Roma	0,908	3,631***		
		Non-Roma	"consistent" Roma (both perceived and self-declared)	Only self-declared Roma	Only perceived Roma
Model 2C	Non-Roma	1,000	1,706**	0,805	2,118**
	Roma	0,774	3,258*	1,442	1,749

Conditional odds ratios are presented, reference category: non-Roma–non-Roma nominations. *p<0.05,

**p<0.01, ***p<0.001. N=347

Supplementary Materials

Measures

Dependent variables: Bullying and victimization

In Hungarian, the term bullying does not have an unequivocal translation; therefore, we decided to measure the various aspects of bullying behaviour with different questions, and then we combined them. The combination of the different forms of bullying into one variable had both theoretical and methodological reasons. From a theoretical point of view, our purpose was to examine students' experience of bullying in general, rather than to concentrate on the specific subtypes of bullying behaviour. Moreover, we argue that bullying relations of students might be characterized by network processes, which means that the occurrence of a bullying relation between two students depends on other bullying ties in the classroom. Students, however, do not necessarily choose the same type of bullying other classmates do.

From a methodological point of view, sparse networks might encounter convergence problems during the estimation process of the exponential random graph models. Networks created solely on fighting and humiliation data proved to be too sparse to be analysed separately. For these reasons, we estimate models only for the combined networks. However, we present descriptive statistics of the single networks as well as of the combined networks separately in Tables S1 and S2.

Table S1. Descriptive statistics of the different types of bullying networks

	Bullies as nominators					Victims as nominators				
	Gossiping	**Mocking**	**Humiliating**	**Beating**	**Combined**	**Gossiping**	**Mocking**	**Humiliating**	**Beating**	**Combined**
Total number of nominations	289	271	102	77	598	195	176	110	17	374
Average density over all classrooms (SD)	2.97% (1.38%)	2.99% (1.68%)	1.09% (0.67%)	0.84% (0.96)	6.38% (2.37%)	2.09% (0.78%)	1.86% (0.98%)	1.13% (0.53%)	0.17% (0.18%)	3.98% (1.29%)
Reciprocity over all classrooms (SD)	1.97% (4.23)	3.04% (4.48%)	1.28% (3.05%)	3.82% (8.01%)	6.67% (4.85%)	6.48% (8.11%)	2.12% (4.04%)	1.67% (5.77%)	14.29% (37.80%)	6.26% (5.48%)
Average in-/outdegree	0.83	0.78	0.29	0.22	1.72	0.56	0.51	0.32	0.05	1.08
Standard deviation indegree	1.23	1.09	0.60	0.58	1.80	0.87	0.88	0.67	0.22	1.34
Standard deviation outdegree	1.73	1.75	0.76	0.91	2.63	1.47	1.36	0.94	0.32	1.97
Average indegree among Roma (SD)	0.70 (0.93)	0.93 (1.08)	0.28 (0.54)	0.29 (0.61)	1.71 (1.58)	0.49 (0.82)	0.44 (0.77)	0.26 (0.58)	0.05 (0.22)	0.98 (1.17)
Average outdegree among Roma (SD)	0.92 (1.71)	0.96 (2.25)	0.43 (0.74)	0.18 (0.50)	1.95 (2.81)	0.68 (1.66)	0.60 (1.51)	0.31 (0.86)	0.07 (0.39)	1.39 (2.16)
Average indegree among non-Roma (SD)	0.88 (1.33)	0.73 (1.09)	0.30 (0.63)	0.20 (0.57)	1.73 (1.88)	0.59 (0.89)	0.53 (0.93)	0.34 (0.70)	0.05 (0.21)	1.12 (1.39)
Average outdegree among non-Roma (SD)	0.80 (1.73)	0.71 (1.52)	0.27 (0.77)	0.24 (1.02)	1.64 (2.55)	0.52 (1.39)	0.47 (1.30)	0.32 (0.97)	0.04 (0.29)	0.96 (1.88)

Table S2. Proportion of inter- and intra-ethnic relations in the different types of bullying networks

	Bullies as nominators					Victims as nominators				
	Gossiping	Mocking	Humiliating	Beating	Combined	Gossiping	Mocking	Humiliating	Beating	Combined
Based on receiver's self-declared ethnicity										
Non-Roma → non-Roma nominations	49.48	44.28	42.16	50.65	45.99	50.26	51.70	59.09	41.18	50.27
Roma → Roma nominations	6.23	17.34	10.78	18.18	12.88	7.18	15.34	4.55	29.41	12.03
Intra-ethnic nominations	**55.71**	**61.62**	**52.94**	**68.83**	**58.86**	**57.44**	**67.05**	**63.64**	**70.59**	**62.30**
Non-Roma → Roma nominations	23.53	11.44	15.69	6.49	18.06	27.69	27.27	24.55	11.76	25.13
Roma → non-Roma nominations	20.76	26.94	31.37	24.68	23.08	14.87	5.68	11.82	17.65	12.57
Inter-ethnic nominations	**44.29**	**38.38**	**47.06**	**31.17**	**41.14**	**42.56**	**32.95**	**36.36**	**29.41**	**37.70**
Based on peer perceptions of receivers' ethnicity										
Non-Roma → non-Roma nominations	55.71	49.45	42.16	46.75	52.34	60.51	61.36	64.55	35.29	59.63
Roma → Roma nominations	4.50	9.96	8.82	11.69	8.70	5.13	13.64	4.55	23.53	9.89
Intra-ethnic nominations	**60.21**	**59.41**	**50.98**	**58.44**	**61.04**	**65.64**	**75.00**	**69.09**	**58.82**	**69.52**
Non-Roma → Roma nominations	17.30	6.27	15.69	10.39	11.71	17.44	17.61	19.09	17.65	15.78
Roma → non-Roma nominations	22.49	34.32	33.33	31.17	27.26	16.92	7.39	11.82	23.53	14.71
Inter-ethnic nominations	**39.79**	**40.59**	**49.02**	**41.56**	**38.96**	**34.36**	**25.00**	**30.91**	**41.18**	**30.48**

Structural effects
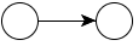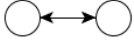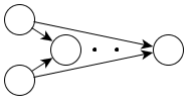
Previous studies revealed several characteristics of tie formation in bullying networks of school classes. Besides the afore-mentioned attribute effects, we aimed to control for these structural effects in our models.

Some bullies report to harass the same victims and some bullies are nominated as bullies by the same victims. Similarly, some victims report to be bullied by the same classmates and some victims are nominated to be harassed by the same bullies (Huitsing et al. 2014; Huitsing et al. 2012; Huitsing and Veenstra 2012). These tendencies are represented by the 'shared in-ties' and 'shared out-ties' parameters in the models.
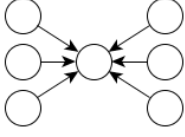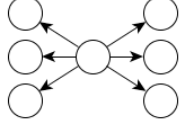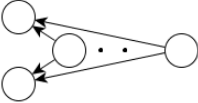
The 'out-ties spread' and 'in-ties spread' parameters model that some students report to be and are nominated more frequently as victims or bullies than others. These parameters are also included in the models to take into account the differences in the number of ties sent and received in the bullying and victimization networks. Table S3 shows the description and graphical representation of the structural parameters included in the ERG models.

Table S4 presents the parameters measuring the effects of receiver's self-declared and perceived ethnicity in the ERG models

Table S3. Description and graphical representation of the structural parameters included in the ERG models

Parameter	MPNet name	Description	Graphical representation
Arc	*arc*	Occurrence of nominations	
Reciprocity	*reciprocity*	Occurrence of reciprocated ties	
In-ties spread	*A-in-S*	Dispersion of in-ties distribution	
Out-ties spread	*A-out-S*	Dispersion of out-ties distribution	
Shared in-ties	*A2P-D*	Structural equivalence based on in-ties (being nominated by the same students)	
Shared out-ties	*A2P-U*	Structural equivalence based on out-ties (nominating the same students)	

Table S4. Parameters measuring the effects of receiver's self-declared and perceived ethnicity in the ERG models

	Self-declared ethnicity of receiver			Perceived ethnicity of receiver		
Reference category	0 Non-Roma → 0 Non-Roma			0 Non-Roma → 0 Non-Roma		
Roma Sender	1 Roma → 0 Non-Roma			1 Roma → 0 Non-Roma		
Roma Receiver	0 Non-Roma → 1 Roma			0 Non-Roma → 1 Roma		
Roma Interaction	1 Roma → 1 Roma			1 Roma → 1 Roma		

Treatment of missing data

Bullying and victimization. As incoming nominations (in-ties) of students who were missing in the second wave (13.0%) are known from their classmates' nominations, outgoing nominations (out-ties) of these students were imputed, using data from the first and third waves. If there were valid answers in both waves, we calculated the mean of the two values. Means higher than 0.5 were recoded into 1, means less than or equal to 0.5 were recoded into 0. If any of the first or third wave data were missing, outgoing nomination data were imputed using that wave in which we had valid answers (Boda and Néray 2015).

Self-declared ethnicity. Missing second-wave data on students' self-declared ethnicity (14.7%) were imputed using data from the other waves. As some students tended to change their self-declared ethnicity between the Roma and non-Roma categories from one wave to the next (2.88%, 2.31% and 0.29% between the consecutive waves, respectively), missing cases were imputed according to the following procedure. First, data from the other waves were imputed for those students who identified themselves as Roma or non-Roma in any other wave, and did not report belonging to the other ethnicity in another wave. For one student, who indicated to be Roma in the first wave and Hungarian in the third, we imputed the data from the first wave because it was much closer in time to the second wave. Second, if data on students' self-declared ethnicity were not available in other waves (2.9%), we calculated the ratio of classmates who classified these students as Roma in the second wave, as this proved to be a good predictor of self-declared ethnicity. If the ratio was greater than 50% (one student belonged to this category with 56%), students were recoded as Roma; if the ratio was less than 50% (actual values ranging from 0% to 9%), students were recoded as non-Roma.

Perceived ethnicity. As incoming nominations (in-ties) of students who were missing in the second wave (13.0%) are known from their classmates' nominations, outgoing nominations (out-ties) of these students were imputed in the same way as the data on bullying described above.

Control variables. Missing second-wave data on mother's education (12.1%) and number of books (12.4%) were imputed, using data from the other waves. For those cases where imputation could not be implemented and CATPCA scores could not be calculated (4.9%), we imputed the missing SES scores using regression imputation method. We estimated SES scores using the mean of SES in the classroom and students' self-declared ethnicity as explanatory variables.

Analytical Strategy

We analysed our data using exponential random graph models (Lusher, Koskinen, and Robbins 2013; Robins et al. 2007), which provide statistical models for social networks. Standard statistical methods (e.g., logistic regression) assume independence among actors and ties; therefore, they cannot model network dependencies. ERGMs explicitly model the dependence among ties by conditioning the likelihood of the presence of a tie on the presence or absence of other ties in the network (Lusher, Koskinen, and Robbins 2013).

Several underlying social mechanisms (e.g., reciprocity, transitivity, homophily) structure the formation of ties between actors in social networks. These processes create local patterns of ties. Such local structures include dyad-based, triad-based, and higher-order level network configurations, which are represented by the parameters of the model. An ERGM allows us to make inferences about whether the analysed network comprises significantly more or less of the configurations of interest than we would expect by chance. During a simulation process, the model estimates the effects of included parameters on the probability that a tie exists (Lusher, Koskinen, and Robbins 2013).

We found ERGMs suitable to examine bullying among students of different ethnic background, because previous studies indicated that bullying nominations among a set of actors constitute social networks characterized by certain typical mechanisms of tie formation (Huitsing and Veenstra 2012; Huitsing et al. 2012; Huitsing et al. 2014). The effect of ethnicity might be overestimated if we used other type of models which do not control for endogenous structural network processes.

Model specification

To estimate our ERG models, we used the MPNet program (Wang et al. 2014), available at www.sna.unimelb.edu.au/PNet. MPNet estimates the parameters via Monte Carlo maximum likelihood methods (Snijders 2002). The estimation procedure converges if the simulated networks are similar enough to the observed graph, which is expressed by a t-ratio. The model converges if the absolute value of the t-ratio is less than 0.1 for all parameters included in the model. The sample autocorrelation factor (SACF) of the statistics can be tolerated if its absolute value does not exceed 0.4 (Lusher, Koskinen, and Robbins 2013).

After convergence is reached, the Goodness of Fit (GOF) measures of the models are assessed. Through a simulation process, the GOF procedure shows how the estimated model describes characteristics of the networks that were not explicitly modelled with the included configurations. GOF of a configuration can be regarded as acceptable if the difference between the observed value and the mean over the simulated sample of graphs, divided by the standard

deviation (the GOF t-ratio), is not higher than 2 in absolute value (Lusher, Koskinen, and Robbins 2013).

The estimation procedure was similar as described by Huitsing et al. (2012). We aimed to find a relatively low number of configurations that represent the structure of bullying networks in all of our classes. We estimated ERG models with the configurations described before for each class separately. After convergence was reached for all classes, we checked whether the sample autocorrelation factors were less than 0.4 and assessed the GOF statistics of the models. If SACF exceeded 0.4, we increased the multiplication factor (Lusher, Koskinen, and Robbins 2013). If GOF procedure yielded t-ratios higher than 2, we included other parameters to reach a better fit of the model. Those parameters that proved to be nonsignificant in the majority of the classes were removed from the analysis if the models converged and GOF statistics were satisfactory without them as well. Finally, our models consisted of almost the same parameters for all classes. We meta-analysed the parameters and the standard errors of the separate models based on the procedure described by Snijders and Baerveldt (2003). We tested whether the values of the parameters significantly differed from 0, indicating general tendencies in the networks.

For each class, all of our models converged for every parameters based on the convergence criterion (t-ratio $< |0.1|$). For each parameter, moreover, the value of the sample auto-correlation factor was lower than 0.4. For almost all included parameters, the value of the GOF t-ratio was below 0.1, and it was below 0.12 for all of them. For almost all non-included parameters, the value of the GOF t-ratio was below 2, and it was below 2.8 for all of them. Occasionally, however, higher values than 2 are tolerable (Lusher, Koskinen, and Robbins 2013).

In MPNet, those parameters that are not present in our observed networks cannot be included and estimated in the ERG models. In some networks, therefore, some attribute-based parameters have been removed from the models. In those classes, where there were no nominations between boys, for instance, the boy interaction parameter could not be estimated. In 2 and 4 classes (in Model 1 and 2, respectively), the 'reciprocity' parameter had to be included to achieve acceptable Goodness of Fit statistics. In the victimization models, the shared in-ties and shared out-ties parameters were left out from the model in one class, because including them caused convergence problems.

Results

Structural parameters and control variables in the exponential random graph models

The negative arc parameter reflects the low density of the bullying networks. All other structural parameters included in the models are consistently significantly positive in the different types of models. The positive in-ties spread and out-ties spread parameters indicate that some students are more frequently bullied than their peers, and some students bully more peers than other classmates. The positive shared in-ties and shared out-ties parameters represent that some victims are harassed by the same bullies. The reciprocity parameter had to be included in some classes to obtain a better fit of the model, and in these classes, students tend to reciprocate bullying nominations. In other classes, however, the percentage of mutual nominations was low, in some classes even zero.

Examining the control variables, socio-economic status does not have a significant effect on bullying in our models. This is probably because the sample is quite homogeneous in terms of SES; mostly students from relatively low social backgrounds go to these school classes. Gender, however, plays a significant role in bullying nominations. From the perspective of both the bullies and the victims, the odds of a tie from a boy towards a girl is significantly lower, than that of between two girls. It is also less likely that girls report to bully boys than they report to bully other girls. In Model A based on bullies nominations, ties between boys occur significantly more likely than ties between girls (see Table S8 for details).

Table S5. Descriptive statistics of the sample

	Non-Roma	Roma	Total
N	239	108	347
boy	43.1%	30.6%	39.2%
Roma peer perception (standardized indegree)			
mean	0.02	0.43	0.15
SD	0.05	0.29	0.25
minimum	0.00	0.00	0.00
maximum	0.50	0.92	0.92
mother's highest education			
fewer than 8 years of primary school	0.9%	10.8%	3.9%
primary school	16.6%	53.9%	28.1%
vocational school	41.5%	23.5%	36.0%
secondary technical school	17.5%	4.9%	13.6%
secondary grammar school	10.0%	5.9%	8.8%
college (BA)	12.2%	1.0%	8.8%
university (MA)	1.3%	0.0%	0.9%
number of books at home			
0-10 books	12.0%	34.3%	18.9%
11-25 books	10.7%	29.5%	16.5%
26-100 books	32.5%	21.9%	29.2%
101-200 books	24.8%	9.5%	20.1%
201-500 books	11.5%	1.9%	8.6%
more than 500 books	8.5%	2.9%	6.8%

Chi-squared tests showed statistically significant differences between the two ethnic groups for all nominal variables ($p < 0.001$ for mother's highest education and number of books at home, $p < 0.05$ for gender). Mann-Whitney test showed statistically significant differences between the two ethnic groups for the variable measuring Roma peer perceptions ($p < 0.001$).

Table S6. Meta analysis of the exponential random graph models based on bullies' nominations

Self-Reported Bullying Networks	Model 1A						Model 1B						Model 1C						N
	Est,	SE		σ	Q		Est,	SE		σ	Q		Est,	SE		σ	Q		N
Structural parameters																			
Arc	-4.749	0.221	***	0.490	13.617		-4.815	0.196	***	0.397	12.257		-4.782	0.203	***	0.382	11.198		12
Reciprocity	1.213	0.342	***	0.087	1.033		1.204	0.339	***	0.028	1.004		1.208	0.334	***	0.080	1.029		2
In-ties spread (AinS)	0.462	0.123	***	0.000	11.238		0.463	0.120	***	0.000	11.297		0.453	0.126	***	0.000	11.163		12
Out-ties spread (AoutS)	1.040	0.130	***	0.203	14.134		1.014	0.136	***	0.244	15.380		1.015	0.138	***	0.245	15.066		12
Shared in-ties (A2P-D)	0.173	0.017	***	0.000	12.543		0.169	0.016	***	0.000	13.607		0.172	0.017	***	0.000	12.718		12
Shared out-ties (A2P-U)	0.148	0.047	**	0.090	23.701	*	0.173	0.045	***	0.086	25.039 **		0.143	0.052	**	0.110	23.119	*	12
Roma ethnicity																			
Roma Sender	0.062	0.136		0.291	12.872		0.088	0.122		0.285	12.290		0.077	0.126		0.238	12.906		12
Roma Receiver (self-declared)	-0.017	0.202		0.479	16.807								-0.283	0.222		0.480	17.351		12
Roma Sender*Receiver (self-declared)	-0.170	0.366		0.708	12.167								0.059	0.368		0.423	14.021		9
Roma Receiver (peer perceived)							0.418	0.169	*	0.000	11.955		0.514	0.244	*	0.415	13.613		12
Roma Sender*Receiver (peer perceived)							-0.142	0.329		0.000	9.206		-0.096	0.577		0.782	10.858		7
Control variables																			
Boy Sender	-0.828	0.157	***	0.155	10.259		-0.803	0.151	***	0.121	10.417		-0.809	0.162	***	0.175	10.613		10
Boy Receiver	-0.440	0.128	***	0.000	8.107		-0.412	0.126	**	0.000	7.314		-0.419	0.128	***	0.000	9.213		11
Boy Sender*Receiver	1.645	0.397	***	0.833	12.256		1.637	0.417	***	0.912	12.973		1.616	0.431	***	0.947	13.965		8
SES Sender	0.072	0.039		0.000	7.444		0.068	0.040		0.000	7.461		0.074	0.041		0.000	7.212		12
SES Receiver	0.082	0.139		0.416	29.858	**	0.101	0.099		0.268	19.294		0.086	0.138		0.407	27.895 **		12
SES Difference	0.065	0.064		0.035	12.607		0.049	0.063		0.000	10.328		0.070	0.066		0.027	11.342		12

Note: Estimated parameters, estimated standard errors, estimated between-classroom standard deviations, test statistics of between-classroom difference, number of classrooms. *p<0.05, **p<0.01, ***p<0.001

Table S7. Meta analysis of the exponential random graph models based on victims' nominations

Self-Reported Victimization Networks	Model 2A					Model 2B					Model 2C					N
	Est,	SE		σ	Q	Est,	SE		σ	Q	Est,	SE		σ	Q	
Structural parameters																
Arc	-4.621	0.179	***	0.093	11.621	-4.701	0.199	***	0.299	11.623	-4.699	0.223	***	0.410	12.653	12
Reciprocity	1.239	0.451	**	0.359	3.468	1.279	0.464	**	0.471	3.499	1.309	0.464	**	0.445	3.701	4
In-ties spread (AinS)	0.402	0.168	*	0.000	4.229	0.519	0.163	**	0.000	7.820	0.447	0.166	**	0.000	5.050	12
Out-ties spread (AoutS)	1.079	0.140	***	0.077	11.108	1.086	0.139	***	0.000	9.876	1.098	0.142	***	0.000	9.463	12
Shared in-ties (A2P-D)	0.174	0.024	***	0.000	6.737	0.171	0.025	***	0.000	7.203	0.161	0.028	***	0.000	6.541	11
Shared out-ties (A2P-U)	0.201	0.050	***	0.000	9.966	0.177	0.057	**	0.000	11.064	0.181	0.057	**	0.000	10.623	11
Roma ethnicity																
Roma Sender	-0.198	0.150		0.000	7.002	-0.097	0.129		0.090	9.711	-0.256	0.163		0.000	8.971	12
Roma Receiver (self-declared)	0.192	0.311		0.820	16.904						-0.216	0.303		0.673	15.190	12
Roma Sender*Receiver (self-declared)	0.586	0.360		0.000	7.472						0.838	0.436		0.000	4.107	9
Roma Receiver (peer perceived)						0.720	0.203	***	0.000	12.935	0.751	0.237	**	0.000	10.601	12
Roma Sender*Receiver (peer perceived)						0.666	0.626		1.331	14.836	0.065	0.821		1.666	12.448	10
Control variables																
Boy Sender	-0.569	0.158	***	0.000	12.192	-0.585	0.164	***	0.000	9.999	-0.564	0.161	***	0.000	11.445	11
Boy Receiver	-0.539	0.287		0.635	11.690	-0.560	0.283		0.618	10.404	-0.507	0.281		0.596	11.128	10
Boy Sender*Receiver	1.781	0.412	***	0.474	6.422	1.761	0.380	***	0.278	4.876	1.761	0.376	***	0.000	5.784	8
SES Sender	0.142	0.102		0.267	16.096	0.183	0.113		0.307	18.284	0.169	0.115		0.310	17.458	12
SES Receiver	0.184	0.099		0.140	9.980	0.184	0.095		0.159	10.743	0.200	0.108		0.189	10.753	12
SES Difference	-0.083	0.097		0.125	8.288	-0.084	0.090		0.065	8.000	-0.069	0.097		0.105	8.218	12

Note: Estimated parameters, estimated standard errors, estimated between-classroom standard deviations, test statistics of between-classroom difference, number of classrooms.

*p<0.05, **p<0.01, ***p<0.001

Table S8. The effect of gender on bullying

		Receiver's gender			
		Based on bullies' nomination		Based on victims' nominations	
	Sender's gender	girl	boy	girl	boy
Model A	girl	1.000	0.644***	1.000	0.583
	boy	0.437***	1.458*	0.566***	1.960
Model B	girl	1.000	0.662**	1.000	0.571
	boy	0.448***	1.525	0.557***	1.852
Model C	girl	1.000	0.658***	1.000	0.602
	boy	0.445***	1.474	0.569***	1.994

Conditional odds ratios are presented, reference category: girl-girl nominations. *p<0.05, **p<0.01, ***p<0.001