# Inter-ethnic friendship and hostility between Roma and non-Roma students in Hungary: The role of exposure and academic achievement

(Appendix A-C)

# Appendix A: Data documentation

The data for our analysis comes from the “Interetnikus kapcsolatok” (Inter-ethnic relations) survey. The survey was designed by the authors of this paper and it was financed by the Educatio Kht, Hungary. The data was collected by the Adatgyujto Intezet, Hungary, in the spring of 2010.

The target population of the survey was the eighth grade students in the towns and cities of Hungary who studied in schools with at least 10 percent and at most 90 percent Roma students. The sampling frame was selected from the set of schools in the National Assessment of Basic Competencies, the nationwide student testing framework that includes administrative data on schools as well. Among other information, this data contains school principals’ estimates of the proportion of Roma students in their schools. We used the average of this information from 2006, 2007 and 2008 to select the schools in the 10 percent to 90 percent range. The final sampling frame consisted of 354 schools that were located in towns and cities (except Budapest) so we excluded all village schools.

The sample was stratified random sample of 88 schools in 74 towns and cities. The strata were based on the proportion of Roma students and the schools’ participation in an integrated education framework program implemented by the Hungarian government (“IPR program”); this latter information was not used in our analysis. The geographic distribution of the sample was not restricted or stratified. As there were few schools with high proportion of Roma students we used higher sampling weights for such schools to obtain more even distribution in the sample. Figure 8 shows the histogram of the proportion of Roma students; panel A shows the distribution in the sampling frame, while panel B shows the distribution in the sample.

|  |  |
| --- | --- |
|  |  |
| (A) Distribution in the sampling frame (n=354) | (B) Distribution in the sample (n=88) |

Figure 8. Distribution of the schools by the proportion of Roma students

All students in grade 8 in the 88 selected schools were part of the data collection. The data was collected in classrooms. The main instrument was a student questionnaire with the lists of friends and adversaries and some background information. The names of all students in the class were written on the blackboard, and students were asked to list the names of their five best male friends, their best five female friends (with some information that help assess the intensity of their friendship) and five classmates with whom they would not share a train cabin during a field trip. Students who were absent on the day of the data collection did not fill out this questionnaire but their names were listed on the blackboard, too. The background information included the ethnic identity of the students, asked in the form of two questions (What is your national or ethnic identity in the first place? What is your national or ethnic identity in the second place?) Schoolteachers were asked to provide grades and some additional information on a separate questionnaire. The school administration was then asked to assign the student identifiers to each name, and the names were removed from the questionnaires before they were collected by the data collection agency. Our data collection took place a few weeks before the testing day. We used these identifiers to merge administrative data on test scores once those scores became available.

This data collection and the appropriateness of the measures taken to ensure privacy were reviewed and approved by the Hungarian Education Authority (HEA). The Hungarian Education Authority is a key actor of public education and administration. Among others, the HEA carries out legal and professional control, educational evaluation, measurement, and audits stipulated by the Act on National Public Education. In addition, the parents of the students were informed about the goal of the research, and their consent was obtained for the participation of their children. The data were anonymized (no identifiable information was in the records).

# Appendix B: Documenting the simulation exercise

The simulation exercise consists of three steps: (1) creating a simulated population of 8th grade students of different ethnicity (Roma or non-Roma) and achievement category (high-achiever or low-achiever) estimated from a representative survey; (2) creating classes and peer groups within classes in this simulated population and simulating the ethnic composition of the peer group for each student, using administrative data on the ethnic composition of schools and representative survey data on the ethnic composition of classes within schools; (3) simulating the number of friends, by ethnicity, using estimates from our main analysis. The benchmark results of this exercise are our estimates of the friendship and hostility relations in the entire population. The purpose of this exercise is to compare its estimates to estimates under three alternative scenarios: (i) equal ethnic distribution of classes; (ii) closing the achievement gap between Roma and non-Roma students; (iii) the two together: equal ethnic distribution and no gap. These alternative estimates are based on the same simulation exercises with appropriate changes in the composition of peer groups and students’ achievements.

## *Step 1.* The population of 8th grade students

Source: Hungarian Life Course Survey (HLCS; the “Eletpalya” survey of TARKI). First survey wave, 10,022 adolescents interviewed in the fall after they finished 8th grade.

### Ethnicity

Individuals are considered Roma if

* they identified as Roma in any of the survey waves (asked in 4 out of 6 survey waves),
* any of their parents identified themselves as Roma in any of the survey waves (asked in 2 out of 6 survey waves), or
* any of their parents identified their parents or other ancestors as Roma in any of the survey waves (asked in 2 out of 6 survey waves).

There are 1320 Roma individuals defined this way is in the sample; their fraction, using the appropriate sampling weights is 11% (using weight is necessary as low-achieving students were oversampled in the survey, resulting in an oversampling Roma students).

### Achievement

Information on the grade point average (GPA) at the end of the 1st semester of 8th grade (the same point in time it is measured in the IEFH survey) is available in the administrative National Assessment of Basic Competences (NABC) dataset. We linked this information to each student in the HLCS sample (the sampling frame of the HLCS sample was the NABC administrative data).

This measure of GPA was missing for 1373 observations. We filled the missing values by predictions from a regression of GPA on Roma and piecewise linear splines of the reading and mathematics test scores (test scores were available for all students in the sample as the administrative test score data formed the frame of the sample).

High-achieving students were defined as having a GPA of 3.5 or higher.

### Expanding the sample to the simulated population

The HLCS represents the student population using its sampling weights (see earlier about the weights). These weights vary from 0.2 to 42.5 (mean is 10.9). We used the rounded integer values of the sampling weights of the HLCS survey (replaced it to 1 for the 124 observations for which the sampling weights were below 0.5). This resulted in a dataset of the simulated population of 8th grade students, n=109,119. This number is approximately the number of 8th grade students in the administrative data on test scores; the small difference is due to rounding errors.

## *Step 2.* The ethnic composition of the peer group

### Ethnic composition of the class

Two sources of information are used to estimate the estimate the ethnic composition of the 8th grade class of the individuals in the HLCS sample.

* The first wave of the HLCS as a categorical variable on students’ assessment of the composition of their class in 8th grade. We transformed the categories to estimated fractions (0.05 if “no or very few Roma”, 0.2 if “some Roma but less than half”, 0.5 if “half Roma”, 0.7 if “majority but not all Roma” and 1 if “all or almost all Roma”).
* The school-level file of the NABC contains the school principals’ estimates of the fraction or Roma students in the entire school.
* The first measure was missing for 138 of the 10,022 observations; the second measure was missing for 1,174 of the 10,022 observations; the two were jointly missing for 23 observations; those were dropped from the analysis.

We combined the two sources of information in the following way. We first took the average of the two measures (only one measure when the other one was missing). We then replaced the estimated fraction Roma to zero if the school-level estimate was less than 2 percent, and we replaced it to one if the school-level estimated was greater than 90 percent.

### Ethnic composition of the peer group

The peer group is defined as same-sex classmates. We have information on the size of the 8th-grade class for each individual (from the linked administrative NABC database) but we have no complete information on the gender composition of the classes. We assumed that exactly half of each class is female. For each student the size of the peer group is the rounded integer of the half of the class minus one. For each student the number of Roma students in her or his peer group is the size of the peer group multiplied with the fraction Roma in the class and rounded to the nearest integer. For Roma students the number of Roma in their peer group is one minus this number. When this estimate turned out to be negative we replaced it by zero. The fraction of Roma in one’s peer group is the ratio of these two numbers: the estimated number of Roma students in the peer group divided by the estimated size of the peer group.

Figure 9 shows the simulated fraction of Roma students in the peer groups or Roma students and non-Roma students. 46 percent of non-Roma students and 37 percent of Roma students have zero Roma in their peer group. The average fraction of Roma students in the peer group of non-Roma students is 9 percent, and the average fraction of Roma students in the peer group of Roma students is 21 percent.



Figure 9. Simulated distribution of students’ exposure to Roma peers (Benchmark case)

## *Step 3.* The estimated number of friends and adversaries

We estimated the number of friends and adversaries Roma students receive, also by the ethnicity of the nominating peer, and the number of Roma friends and adversaries non-Roma students nominate.

### Estimation

The estimation procedure is the same as the one outlined in Section 5 of the main text: We created categories by the fraction of Roma in the peer group using increments of 0.1 up to 0.4 and 0.2 above. We then estimated the average number of friends and adversaries Roma students receive in those categories, separately for high-GPA Roma students and low-GPA Roma students. For the number of Roma peers nominated by non-Roma we created similar categories separately of the fraction of high-GPA Roma students and low-GPA Roma students and estimated the average number of peers non-Roma students nominate in the two-dimensional distribution of these categorical variables. We replaced the number of friends to 0 when the size of the appropriate peer group was 0.

### Importing estimates to the simulated data

We used the first set of estimates to predict the number of friends and adversaries Roma students receive, by the GPA of the Roma student and fraction Roma in her or his peer group. We used the second set of estimates to predict the number of Roma friends and adversaries non-Roma students nominate by the two-dimensional distribution spanned by the categories of the fraction of high-GPA Roma students and low-GPA Roma students in the peer group.

## Benchmark

Steps 1 through 3 provide the estimated number of friends and adversaries of Roma students under the current distribution of academic achievement and the ethnic composition of classes. These estimates are the benchmark to our policy simulations.

## Policy simulation 1: Equal ethnic distribution of students

In this exercise we simulate the effect of equalizing the ethnic composition of classes across the nation. We simulate the fraction of Roma students in the peer groups of each student in the population first. We start with replacing the fraction of Roma students in each class from the benchmark estimates to 11 percent. In a typical class that would imply exactly two Roma students. Simply projecting this 11 percent fraction to each class-gender group would amount to assume that of those two Roma students one is always a girl and one is a boy. Instead, a complete random allocation would result in a same-sex Roma student in only 50 percent of the cases. We implement this second assumption in our simulation exercise by allocating zero Roma peers to a random one quarter of class-gender groups and two peers to another quarter.

Then we see the number of Roma students this fraction would imply in each group defined by class and gender by rounding the implied number to the nearest integer. Then we create the fraction of Roma students in the peer group of each student, defining the size of the peer group and the number of Roma peers the way we did in Step 2 above (making sure we don’t double count Roma students). This procedure incorporates the inherent indivisibility of peer groups that can result to zero Roma peers to many people.

Figure 10 shows the simulated fraction of Roma students in the peer groups or Roma students and non-Roma students in this scenario. Now only 27 percent of non-Roma students have zero Roma students in their peer group, and 69 percent of the Roma students have no Roma peer. The average number of Roma students in the peer group of non-Roma students is now 11 percent, while the average number of Roma students in the peer group of Roma students is 0.5 percent.



Figure 10. Simulated distribution of students’ exposure to Roma peers (Equal ethnic composition of classes)

Applying the non-parametric regression estimates of the implied number of friends and adversaries to this simulated distribution of peer group composition we receive the following results. Table 7 shows the simulated number of friends and adversaries of Roma students. Table 8 shows the simulated percent of non-Roma students with at least one Roma friend and the percent with at least one Roma adversary.

Table 7. Number of friends and adversaries of Roma students in the benchmark simulation and the simulated effect of equal ethnic distribution

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Number of | |  | Number of | |  | Number of | |
|  | Friends | Adversaries |  | Roma Friends | Roma Adversaries |  | Non-Roma Friends | Non-Roma Adversaries |
| *(A) Friends and adversaries of low-achieving Roma students* | | | | | | | | |
| Benchmark | 2.7 | 1.7 |  | 1.0 | 0.1 |  | 1.7 | 1.6 |
| Equal distribution | 2.2 | 2.1 |  | 0.2 | 0.0 |  | 2.1 | 2.1 |
| Equal - Benchmark | -0.5 | 0.4 |  | -0.8 | -0.1 |  | 0.4 | 0.5 |
| *(B) Friends and adversaries of high-achieving Roma students* | | | | | | | | |
| Benchmark | 3.8 | 0.7 |  | 1.0 | 0.1 |  | 2.8 | 0.6 |
| Equal distribution | 3.7 | 0.9 |  | 0.2 | 0.0 |  | 3.6 | 0.9 |
| Equal – Benchmark | -0.1 | 0.1 |  | -0.8 | -0.1 |  | 0.7 | 0.2 |
| *(C) Friends and adversaries of an average Roma student* | | | | | | | | |
| Benchmark | 3.1 | 1.4 |  | 1.0 | 0.1 |  | 2.1 | 1.3 |
| Equal distribution | 2.8 | 1.7 |  | 0.2 | 0.0 |  | 2.6 | 1.7 |
| Equal - Benchmark | -0.3 | 0.3 |  | -0.8 | -0.1 |  | 0.5 | 0.4 |

Table 8. The simulated percent of non-Roma students with Roma friends and adversaries

|  |  |  |
| --- | --- | --- |
|  | Percent who have at least one | |
|  | Roma friend | Roma adversary |
| Benchmark estimates | 18 | 14 |
| Equal ethnic distribution | 26 | 15 |

The benchmark results are in line with our previous results from, with slightly different levels. These differences are due to the fact that the sample used for our main analysis is not representative of the entire population of 8th grade students in Hungary by design.

## Policy simulation 2: Closing the achievement gap

In the benchmark simulated dataset 69 percent of the non-Roma students and only 34 percent of the Roma students have high GPA (a GPA of 3.5 or more; maximum is 5.0). In this simulation exercise we increased the GPA of Roma students between 3.0 and 3.5 to above 3.5. The fraction of high-GPA students in this exercise increased from 34 percent to 67 percent.

Table 9 shows the estimated number of friends and adversaries of Roma students in this case with the simulated ethnic distribution of peers and under the scenario of closing the achievement gap. Table 10 shows the simulated percent of non-Roma students with at least one Roma friend and the percent with at least one Roma adversary.

The number of friends and adversaries of low-achieving Roma students and high-achieving Roma students is the same in this exercise as in the benchmark case. The difference is in the number of friends and adversaries of the *average* Roma student: these are a lot closer to the high-achieving numbers because this average student is now more likely to have high achievement. The percent of non-Roma students with Roma friends in this experiment is very similar to the previous experiment (25 percent versus 26 percent), but the percent with Roma adversaries is reduced substantially, to 5 percent.

Table 9. The number of friends and adversaries of Roma students in the benchmark scenario and the simulated scenario of closing the achievement gap

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Number of | |  | Number of | |  | Number of | |
|  | Friends | Adversaries |  | Roma Friends | Roma Adversaries |  | Non-Roma Friends | Non-Roma Adversaries |
| *(A) Friends and adversaries of low-achieving Roma students* | | | | | | | | |
| Benchmark | 2.7 | 1.7 |  | 1.0 | 0.1 |  | 1.7 | 1.6 |
| Closed gap | 2.8 | 1.7 |  | 1.1 | 0.2 |  | 1.6 | 1.5 |
| Closed gap - Benchmark | 0.0 | 0.0 |  | 0.1 | 0.0 |  | 0.0 | -0.1 |
| *(B) Friends and adversaries of high-achieving Roma students* | | | | | | | | |
| Benchmark | 3.8 | 0.7 |  | 1.0 | 0.1 |  | 2.8 | 0.6 |
| Closed gap | 3.8 | 0.8 |  | 0.9 | 0.1 |  | 2.9 | 0.6 |
| Closed gap - Benchmark | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |
| *(C) Friends and adversaries of an average Roma student* | | | | | | | | |
| Benchmark | 3.1 | 1.4 |  | 1.0 | 0.1 |  | 2.1 | 1.3 |
| Closed gap | 3.5 | 1.1 |  | 1.0 | 0.1 |  | 2.5 | 0.9 |
| Closed gap - Benchmark | 0.4 | -0.3 |  | 0.0 | 0.0 |  | 0.4 | -0.3 |

Table 10. The simulated percent of non-Roma students with Roma friends and adversaries

|  |  |  |
| --- | --- | --- |
|  | Percent who have at least one | |
|  | Roma friend | Roma adversary |
| Benchmark estimates | 18 | 14 |
| Closing the achievement gap | 25 | 5 |

## Policy simulation 3: Equal ethnic distribution of students and closing the achievement gap

Our third simulation exercise combines the previous two. Table 11 shows the simulated number of friends and adversaries of Roma students, and Table 12 shows the simulated percent of non-Roma students with at least one Roma friend and the percent with at least one Roma adversary.

Table 11. The number of friends and adversaries of Roma students in the benchmark simulation and the simulated effect of equal ethnic distribution and closing the achievement gap at the same time

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Number of | |  | Number of | |  | Number of | |
|  | Friends | Adversaries |  | Roma Friends | Roma Adversaries |  | Non-Roma Friends | Non-Roma Adversaries |
| *(A) Friends and adversaries of low-achieving Roma students* | | | | | | | | |
| Benchmark | 2.7 | 1.7 |  | 1.0 | 0.1 |  | 1.7 | 1.6 |
| Equal distribution + closed gap | 2.3 | 2.1 |  | 0.2 | 0.0 |  | 2.0 | 2.1 |
| Equal + closed gap - Benchmark | -0.5 | 0.4 |  | -0.8 | -0.1 |  | 0.4 | 0.5 |
| *(B) Friends and adversaries of high-achieving Roma students* | | | | | | | | |
| Benchmark | 3.8 | 0.7 |  | 1.0 | 0.1 |  | 2.8 | 0.6 |
| Equal distribution + closed gap | 3.7 | 0.9 |  | 0.2 | 0.0 |  | 3.6 | 0.9 |
| Equal + closed gap - Benchmark | -0.1 | 0.1 |  | -0.8 | -0.1 |  | 0.7 | 0.2 |
| *(C) Friends and adversaries of an average Roma student* | | | | | | | | |
| Benchmark | 3.1 | 1.4 |  | 1.0 | 0.1 |  | 2.1 | 1.3 |
| Equal distribution + closed gap | 3.2 | 1.3 |  | 0.2 | 0.0 |  | 3.1 | 1.3 |
| Equal + closed gap - Benchmark | 0.2 | -0.1 |  | -0.8 | -0.1 |  | 1.0 | 0.0 |

Table 12. The simulated percent of non-Roma students with Roma friends and adversaries

|  |  |  |
| --- | --- | --- |
|  | Percent who have at least one | |
|  | Roma friend | Roma adversary |
| Benchmark estimates | 18 | 14 |
| Equal distribution + closing the achievement gap | 32 | 10 |

# Appendix C: Additional Tables and Figures

## Tables

Table 13. Ethnic identification in the sample. (All respondents who indicated a primary or a secondary identification)

|  |  |  |
| --- | --- | --- |
|  | Primary identification (%) | Secondary identification (%) |
| Hungarian | 81.5 | 6.9 |
| German | 0.3 | 2.3 |
| Serbian | 0.2 | 0.5 |
| Croat | 0.1 | 0.4 |
| Romanian | 0.8 | 1.2 |
| Slovak | 0.0 | 0.5 |
| Roma | 16.2 | 4.5 |
| Other | 0.8 | 1.8 |
| No identification | 0.2 | 82.0 |
| Sum | 100.0 | 100.0 |
| Observations | 3,430 | 3,430 |

Table 14. The distribution of friendship and adversary nominations in the sample (percent)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | # same-sex friends  nominated by | | |  | # opposite-sex friends  nominated by | | |  | # adversaries  nominated by | | |
|  | Roma | Non-Roma | All |  | Roma | Non-Roma | All |  | Roma | Non-Roma | All |
| 0 | 3 | 2 | 2 |  | 21 | 17 | 18 |  | 30 | 16 | 19 |
| 1 | 6 | 4 | 4 |  | 11 | 12 | 12 |  | 15 | 13 | 13 |
| 2 | 10 | 9 | 9 |  | 11 | 15 | 14 |  | 15 | 17 | 16 |
| 3 | 14 | 13 | 14 |  | 14 | 17 | 16 |  | 12 | 19 | 18 |
| 4 | 17 | 16 | 16 |  | 13 | 11 | 11 |  | 8 | 11 | 10 |
| 5 | 50 | 56 | 55 |  | 30 | 28 | 29 |  | 20 | 24 | 24 |
| Sum | 100 | 100 | 100 |  | 100 | 100 | 100 |  | 100 | 100 | 100 |

Table 15. Friends and adversaries as function of GPA. *OLS results without fixed-effects.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.50\*\* (0.05) | -0.36\*\* (0.05) | -0.16\*\* (0.03) | -0.03\* (0.01) | 0.66\*\* (0.05) | -0.33\*\* (0.04) |
| Roma × GPA | 0.19 (0.11) | -0.25\* (0.11) | 0.23\*\* (0.08) | -0.01 (0.03) | -0.04 (0.11) | -0.24\* (0.11) |
| Roma | -0.12 (0.11) | -0.13 (0.09) | 1.19\*\* (0.11) | 0.05 (0.04) | -1.30\*\* (0.12) | -0.17\* (0.08) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.36 | 0.27 | 0.00 | 0.00 |
| Class FE | NO | NO | NO | NO | NO | NO |
| N | 3430 | 3430 | 3430 | 3430 | 3430 | 3430 |

Notes. The number of friendship and adversary nominations from all peers as well as from Roma and non-Roma peers separately, as functions of GPA and ethnicity of the student. Peers are same-sex classmates. GPA is publicly observable grade point-average ranging from 1 to 5, normalized to be zero at its mean value 3.5.  
Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 16. Friends and adversaries as function of GPA. *Results with class-gender fixed-effects.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.67\*\* (0.06) | -0.49\*\* (0.06) | -0.11\*\* (0.03) | -0.02 (0.02) | 0.78\*\* (0.06) | -0.47\*\* (0.05) |
| Roma × GPA | 0.22 (0.12) | -0.19 (0.11) | 0.11 (0.07) | -0.03 (0.04) | 0.11 (0.11) | -0.16 (0.10) |
| Roma | -0.02 (0.13) | 0.11 (0.10) | 0.28\*\* (0.10) | -0.19\*\* (0.05) | -0.30\* (0.11) | 0.31\*\* (0.08) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.97 | 0.16 | 0.00 | 0.00 |
| Class-gender FE | YES | YES | YES | YES | YES | YES |
| N | 3430 | 3430 | 3430 | 3430 | 3430 | 3430 |

Notes: see Table C15. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 17. Friends and adversaries as function of GPA. Sample restricted to students who did not repeat grades and are not older than grade level age 15

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.51\*\* (0.06) | -0.37\*\* (0.05) | -0.11\*\* (0.03) | -0.01 (0.02) | 0.61\*\* (0.06) | -0.36\*\* (0.05) |
| Roma × GPA | 0.22 (0.13) | -0.32\* (0.12) | 0.08 (0.08) | -0.07 (0.05) | 0.14 (0.13) | -0.25\* (0.12) |
| Roma | -0.13 (0.13) | 0.13 (0.11) | 0.48\*\* (0.10) | -0.14\*\* (0.05) | -0.61\*\* (0.13) | 0.28\*\* (0.10) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.75 | 0.14 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 2935 | 2935 | 2935 | 2935 | 2935 | 2935 |

Notes: see Table C15. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 18. Friends and adversaries as function of GPA. *Sample restricted to common support* (peer group has at least two Roma and two non-Roma members).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.48\*\* (0.09) | -0.41\*\* (0.09) | -0.21\*\* (0.06) | -0.04 (0.04) | 0.69\*\* (0.07) | -0.37\*\* (0.07) |
| Roma × GPA | 0.42\*\* (0.14) | -0.40\*\* (0.14) | 0.26\* (0.11) | -0.01 (0.05) | 0.16 (0.12) | -0.39\*\* (0.12) |
| Roma | 0.08 (0.15) | -0.02 (0.12) | 0.54\*\* (0.12) | -0.20\*\* (0.06) | -0.47\*\* (0.14) | 0.19\* (0.09) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.63 | 0.31 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 1571 | 1571 | 1571 | 1571 | 1571 | 1571 |

Notes: see Table C15. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 19. Friends and adversaries as function of GPA. *Results with control variables*.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.57\*\* (0.06) | -0.41\*\* (0.06) | -0.10\*\* (0.03) | -0.02 (0.02) | 0.67\*\* (0.06) | -0.39\*\* (0.05) |
| Roma × GPA | 0.15 (0.12) | -0.23\* (0.11) | 0.14 (0.08) | -0.04 (0.04) | 0.01 (0.11) | -0.19 (0.10) |
| Roma | 0.05 (0.13) | 0.01 (0.11) | 0.46\*\* (0.10) | -0.15\*\* (0.05) | -0.41\*\* (0.12) | 0.16 (0.09) |
| Repeated grade | -0.04 (0.17) | 0.17 (0.15) | 0.12 (0.08) | -0.02 (0.05) | -0.16 (0.15) | 0.20 (0.14) |
| Female | -0.33\*\* (0.08) | 0.15\* (0.08) | 0.05 (0.05) | 0.03 (0.03) | -0.38\*\* (0.08) | 0.13 (0.07) |
| Age 14 | 0.07 (0.09) | -0.07 (0.08) | 0.01 (0.04) | -0.04 (0.02) | 0.06 (0.08) | -0.04 (0.08) |
| Age 16 | -0.24 (0.16) | 0.12 (0.17) | -0.05 (0.07) | 0.10 (0.05) | -0.19 (0.14) | 0.02 (0.14) |
| Age 17 or more | -0.72\*\* (0.24) | 0.19 (0.28) | -0.28\* (0.13) | 0.03 (0.08) | -0.45\* (0.20) | 0.17 (0.24) |
| Years in preschool | 0.06 (0.05) | -0.05 (0.04) | -0.01 (0.02) | -0.00 (0.01) | 0.07 (0.05) | -0.05 (0.04) |
| Mother’s educ.  8 grades | 0.29 (0.21) | -0.23 (0.21) | 0.12 (0.14) | -0.07 (0.08) | 0.17 (0.15) | -0.16 (0.17) |
| Mother’s educ.  vocational | 0.51\* (0.22) | -0.32 (0.21) | 0.08 (0.15) | -0.07 (0.08) | 0.42\* (0.16) | -0.25 (0.17) |
| Mother’s educ.  high school | 0.48\* (0.23) | -0.35 (0.22) | 0.02 (0.15) | -0.05 (0.08) | 0.46\* (0.18) | -0.30 (0.18) |
| Mother’s educ.  college | 0.29 (0.24) | -0.22 (0.23) | -0.02 (0.15) | 0.03 (0.09) | 0.30 (0.20) | -0.24 (0.19) |
| Mother’s educ.  missing | -0.09 (0.65) | 0.21 (0.93) | 0.31 (0.23) | -0.09 (0.09) | -0.39 (0.51) | 0.30 (0.92) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.55 | 0.11 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 3426 | 3426 | 3426 | 3426 | 3426 | 3426 |

Notes: see Table C15. Standard errors, clustered at the class level, in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 20. Friends and adversaries as function of GPA. Results with class-gender fixed-effects, control variables and sample restricted to common support.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.45\*\* (0.10) | -0.42\*\* (0.09) | -0.20\*\* (0.06) | -0.05 (0.04) | 0.65\*\* (0.08) | -0.36\*\* (0.07) |
| Roma × GPA | 0.36\* (0.15) | -0.28\* (0.14) | 0.20 (0.11) | 0.03 (0.05) | 0.16 (0.13) | -0.32\* (0.13) |
| Roma | 0.17 (0.16) | -0.04 (0.13) | 0.39\*\* (0.13) | -0.20\*\* (0.07) | -0.22 (0.15) | 0.17 (0.10) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.98 | 0.61 | 0.00 | 0.00 |
| Class-gender FE | YES | YES | YES | YES | YES | YES |
| Control variables | YES | YES | YES | YES | YES | YES |
| N | 1567 | 1567 | 1567 | 1567 | 1567 | 1567 |

Notes: see Table C15. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 21. Friends and adversaries as function of GPA. *Nominations capped at 4.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.49\*\* (0.05) | -0.42\*\* (0.05) | -0.10\*\* (0.02) | -0.02 (0.01) | 0.60\*\* (0.05) | -0.40\*\* (0.04) |
| Roma × GPA | 0.10 (0.12) | -0.25\* (0.11) | 0.08 (0.08) | -0.05 (0.04) | 0.02 (0.10) | -0.21\* (0.10) |
| Roma | -0.06 (0.11) | 0.10 (0.10) | 0.47\*\* (0.09) | -0.12\*\* (0.04) | -0.53\*\* (0.10) | 0.23\*\* (0.08) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.75 | 0.10 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 3430 | 3430 | 3430 | 3430 | 3430 | 3430 |

Notes: see Table C15. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 22. Friends and adversaries of Roma students as function of GPA.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.72\*\* (0.13) | -0.75\*\* (0.13) | 0.14 (0.08) | -0.15\*\* (0.05) | 0.58\*\* (0.11) | -0.60\*\* (0.11) |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 711 | 711 | 711 | 711 | 711 | 711 |

Notes: see Table C15. Roma students. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 23. Friends and adversaries of non-Roma students as function of GPA.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.56\*\* (0.06) | -0.42\*\* (0.05) | -0.09\*\* (0.02) | -0.02 (0.01) | 0.66\*\* (0.06) | -0.40\*\* (0.05) |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 2719 | 2719 | 2719 | 2719 | 2719 | 2719 |

Notes: see Table C15. non-Roma students. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 24. Friends and adversaries as function of GPA (6th grade).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA (grade 6) | 0.45\*\* (0.08) | -0.39\*\* (0.06) | -0.06\* (0.03) | -0.02 (0.02) | 0.50\*\* (0.08) | -0.36\*\* (0.05) |
| Roma × GPA (grade 6) | 0.00 (0.16) | 0.06 (0.13) | 0.10 (0.09) | -0.07 (0.05) | -0.09 (0.15) | 0.12 (0.12) |
| Roma | -0.12 (0.15) | 0.15 (0.14) | 0.62\*\* (0.11) | -0.15\*\* (0.06) | -0.73\*\* (0.15) | 0.30\* (0.12) |
| p value on GPA(g6)+ Roma × GPA(g6) | 0.00 | 0.01 | 0.63 | 0.07 | 0.00 | 0.02 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 2477 | 2477 | 2477 | 2477 | 2477 | 2477 |

Notes: see Table C15. The source of the 6th grade GPA is the family background questionnaire of the National Assessment of Basic Competencies (NABC). Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 25. Friends and adversaries as function of GPA (change between the 6th and 8th grade; 6th grade).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| ∆GPA (grade 8 – grade 6) | 0.53\*\* (0.11) | -0.31\*\* (0.08) | -0.13\*\* (0.04) | -0.01 (0.02) | 0.67\*\* (0.10) | -0.30\*\* (0.07) |
| Roma × ∆GPA | 0.10 (0.18) | -0.30 (0.19) | -0.09 (0.13) | 0.05 (0.07) | 0.18 (0.18) | -0.35\* (0.16) |
| GPA (grade 6) | 0.52\*\* (0.08) | -0.43\*\* (0.06) | -0.08\* (0.03) | -0.02 (0.02) | 0.59\*\* (0.08) | -0.40\*\* (0.06) |
| Roma × GPA (grade 6) | 0.21 (0.17) | -0.17 (0.13) | 0.02 (0.10) | -0.05 (0.05) | 0.19 (0.16) | -0.12 (0.12) |
| Roma | 0.03 (0.16) | -0.00 (0.13) | 0.57\*\* (0.11) | -0.13\* (0.06) | -0.53\*\* (0.14) | 0.13 (0.10) |
| p value on ∆GPA + Roma × ∆GPA | 0.00 | 0.00 | 0.09 | 0.58 | 0.00 | 0.00 |
| p value on GPA(g6)+ Roma × GPA(g6) | 0.00 | 0.00 | 0.60 | 0.16 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 2477 | 2477 | 2477 | 2477 | 2477 | 2477 |

Notes: see Table C15. The source of the 6th grade GPA is the family background questionnaire of the National Assessment of Basic Competencies (NABC). Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 26. Friends and adversaries as function of GPA (from the 6th and 8th grade).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA (grade 8) | 0.53\*\* (0.11) | -0.31\*\* (0.08) | -0.13\*\* (0.04) | -0.01 (0.02) | 0.67\*\* (0.10) | -0.30\*\* (0.07) |
| Roma × GPA (grade 8) | 0.10 (0.18) | -0.30 (0.19) | -0.09 (0.13) | 0.05 (0.07) | 0.18 (0.18) | -0.35\* (0.16) |
| GPA (grade 6) | -0.01 (0.12) | -0.12 (0.08) | 0.05 (0.04) | -0.01 (0.02) | -0.07 (0.11) | -0.11 (0.07) |
| Roma × GPA (grade 6) | 0.11 (0.20) | 0.13 (0.19) | 0.11 (0.11) | -0.10 (0.07) | 0.01 (0.17) | 0.23 (0.16) |
| Roma | 0.03 (0.16) | -0.00 (0.13) | 0.57\*\* (0.11) | -0.13\* (0.06) | -0.53\*\* (0.14) | 0.13 (0.10) |
| p value on GPA(g8) + Roma × GPA(g8) | 0.00 | 0.00 | 0.09 | 0.58 | 0.00 | 0.00 |
| p value on GPA(g6)+ Roma × GPA(g6) | 0.57 | 0.94 | 0.13 | 0.11 | 0.65 | 0.38 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 2477 | 2477 | 2477 | 2477 | 2477 | 2477 |

Notes: see Table C15. The source of the 6th grade GPA is the family background questionnaire of the National Assessment of Basic Competencies (NABC). Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 27. Friends and adversaries as function of GPA (students without grade 6 GPA are excluded).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA (grade 8) | 0.52\*\* (0.08) | -0.40\*\* (0.06) | -0.09\*\* (0.03) | -0.02 (0.02) | 0.61\*\* (0.07) | -0.37\*\* (0.05) |
| Roma × GPA (grade 8) | 0.18 (0.15) | -0.20 (0.12) | -0.01 (0.10) | -0.02 (0.05) | 0.19 (0.14) | -0.19 (0.12) |
| Roma | 0.05 (0.15) | 0.02 (0.13) | 0.58\*\* (0.11) | -0.15\* (0.06) | -0.53\*\* (0.14) | 0.17 (0.10) |
| p value on GPA(g8)+ Roma × GPA(g8) | 0.00 | 0.00 | 0.31 | 0.42 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 2477 | 2477 | 2477 | 2477 | 2477 | 2477 |

Notes: see Table C15. Baseline regressions excluding students without grade 6 GPA. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 28. Friends and adversaries as function of GPA. *Nominations weighted by the friends of the nominating students.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers weighted by their friends | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.84\*\* (0.13) | -0.45\*\* (0.10) | -0.09\*\* (0.02) | 0.00 (0.02) | 0.97\*\* (0.12) | -0.43\*\* (0.08) |
| Roma × GPA | 0.34 (0.26) | -0.52\*\* (0.18) | 0.18 (0.11) | -0.04 (0.05) | -0.17 (0.19) | -0.39\* (0.16) |
| Roma | -0.39 (0.28) | 0.11 (0.19) | 0.65\*\* (0.16) | -0.15\* (0.06) | -1.24\*\* (0.24) | 0.34\* (0.14) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.43 | 0.49 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 3430 | 3430 | 3430 | 3430 | 3430 | 3430 |

Notes. Dependent variable: The number of friendship and adversary nominations from all peers as well as from Roma and non-Roma peers separately, weighted by the friendship nominations they receive; the number of same-sex friends of each nominating friend or adversary is added and the result is divided by two (when Roma or non-Roma nominations are considered only same ethnicity friends are added). Peers are same-sex classmates. Right hand side variable: GPA is publicly observable grade point-average ranging from 1 to 5, normalized to be zero at its mean value 3.5.  
Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 29. Friends and adversaries as function of GPA. *Relations defined as the union of nominations given and received.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: measure of popularity | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.31\*\* (0.05) | -0.36\*\* (0.06) | -0.13\*\* (0.02) | 0.02 (0.02) | 0.47\*\* (0.05) | -0.35\*\* (0.05) |
| Roma × GPA | 0.25\* (0.11) | -0.19 (0.12) | 0.08 (0.08) | 0.01 (0.06) | 0.15 (0.11) | -0.25\* (0.12) |
| Roma | -0.03 (0.10) | -0.03 (0.11) | 0.43\*\* (0.10) | -0.31\*\* (0.06) | -0.56\*\* (0.12) | 0.47\*\* (0.12) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.51 | 0.60 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 3430 | 3430 | 3430 | 3430 | 3430 | 3430 |

Notes. Dependent variable: The number of friends and adversaries defined as the union of nominations given and received (number of peers who were nominated by the student or who nominated the student). All peers as well as from Roma and non-Roma peers separately. Peers are same-sex classmates. Right hand side variable: GPA is publicly observable grade point-average ranging from 1 to 5, normalized to be zero at its mean value 3.5.  
Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 30. Friends and adversaries as function of GPA. *Reciprocal relations.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: measure of popularity | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.39\*\* (0.04) | -0.03\* (0.02) | -0.10\*\* (0.02) | 0.01 (0.01) | 0.48\*\* (0.04) | -0.04\*\* (0.01) |
| Roma × GPA | -0.01 (0.08) | -0.02 (0.04) | 0.04 (0.07) | 0.01 (0.02) | -0.05 (0.08) | -0.03 (0.03) |
| Roma | -0.06 (0.08) | 0.06 (0.03) | 0.49\*\* (0.08) | -0.01 (0.02) | -0.55\*\* (0.09) | 0.07\* (0.03) |
| p value on GPA + Roma × GPA | 0.00 | 0.13 | 0.38 | 0.18 | 0.00 | 0.02 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 3430 | 3430 | 3430 | 3430 | 3430 | 3430 |

Notes. Dependent variable: The number of reciprocal friends and reciprocal adversaries (number of peers who were nominated by the student and who nominated the student at the same time). All peers as well as from Roma and non-Roma peers separately. Peers are same-sex classmates. Right hand side variable: GPA is publicly observable grade point-average ranging from 1 to 5, normalized to be zero at its mean value 3.5.  
Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 31. Friends and adversaries as function of GPA. *The Echenique-Fryer measure of popularity on the LHS.*

|  |  |  |  |
| --- | --- | --- | --- |
| Dep. var.: measure of popularity | Friends | Roma friends of Roma students | Non-Roma friends of non-Roma students |
| GPA | 0.14\*\* (0.02) | -0.09 (0.05) | 0.19\*\* (0.02) |
| Roma × GPA | 0.12\* (0.05) |  |  |
| Roma | -0.09 (0.05) |  |  |
| p value on GPA + Roma × GPA | 0.00 |  |  |
| Class FE | YES | YES | YES |
| N | 3429 | 774 | 2853 |

Notes. Dependent variable: The Echenique-Fryer (2007) measure of popularity, as used by Fryer and Torelli (2010). Intuitively, it measures the number of friends weighted by the number of their friends, iterated. Technically, it uses the symmetric matrix of connections (using the union of nominations given and received.), and takes the largest eigenvalue and the corresponding eigenvector of the matrix, multiplies the two, and multiplies it with the determinant of the matrix. The individual measure of is the value of this vector that corresponds to the individual. The measure can be computed for friendship among all students as well as friendship within ethnic groups (it is defined for symmetric and transitive relations, so it is not defined for adversary relationships or relationships across ethnic groups).

Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 32. Friends and adversaries *of opposite sex (nominations received)* and GPA

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations from opposite-sex peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.65\*\* (0.08) | -0.75\*\* (0.06) | -0.02 (0.02) | -0.08\*\* (0.02) | 0.66\*\* (0.07) | -0.67\*\* (0.06) |
| Roma × GPA | 0.02 (0.16) | -0.06 (0.13) | 0.00 (0.07) | -0.01 (0.04) | 0.02 (0.13) | -0.05 (0.12) |
| Roma | 0.06 (0.15) | 0.10 (0.10) | 0.21\*\* (0.08) | -0.11\*\* (0.03) | -0.15 (0.12) | 0.21\* (0.09) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.81 | 0.01 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 3430 | 3430 | 3430 | 3430 | 3430 | 3430 |

Notes: see Table C15. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 33. Friends and adversaries and GPA, for students who identified as Roma in the 1st place, in the 2nd place (reference group: non-Roma)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.58\*\* (0.06) | -0.44\*\* (0.05) | -0.11\*\* (0.02) | -0.02 (0.01) | 0.69\*\* (0.05) | -0.42\*\* (0.05) |
| Roma 1st × GPA | 0.20 (0.14) | -0.25\* (0.12) | 0.19 (0.10) | -0.04 (0.04) | 0.02 (0.13) | -0.21 (0.12) |
| Roma 2nd × GPA | 0.15 (0.21) | -0.33 (0.19) | 0.17 (0.11) | -0.10 (0.08) | -0.02 (0.20) | -0.23 (0.17) |
| Roma in 1st place | -0.15 (0.14) | 0.12 (0.10) | 0.58\*\* (0.11) | -0.13\*\* (0.05) | -0.72\*\* (0.14) | 0.25\*\* (0.09) |
| Roma in 2ndplace | 0.06 (0.19) | 0.08 (0.18) | 0.26\* (0.13) | -0.17\* (0.08) | -0.20 (0.18) | 0.26 (0.14) |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 3430 | 3430 | 3430 | 3430 | 3430 | 3430 |

Notes: see Table C15. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 34. High-achiever and low-achiever Roma friends and adversaries as function of GPA.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dep. var.: nominations received from Roma peers | (1) | (2) | (3) | (4) |
| Friends | Adversaries | Friends | Adversaries |
| From high-achiever Roma classmates | | From low-achiever Roma classmates | |
| GPA | 0.02 (0.01) | -0.01 (0.01) | -0.12\*\* (0.02) | -0.00 (0.01) |
| Roma × GPA | 0.03 (0.04) | -0.02 (0.02) | 0.13 (0.07) | -0.04 (0.03) |
| Roma | 0.07 (0.04) | -0.01 (0.02) | 0.42\*\* (0.08) | -0.14\*\* (0.04) |
| p value on GPA + Roma × GPA | 0.17 | 0.12 | 0.95 | 0.22 |
| Class FE | YES | YES | YES | YES |
| N | 3430 | 3430 | 3430 | 3430 |

Notes: see Table C15. High-achiever=GPA>=3.5. Standard errors, clustered at the class level, are in parentheses. \* p<0.05; \*\* p<0.01

Table 35. High-achiever and low-achiever non-Roma friends and adversaries as function of GPA.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dep. var.: nominations received from non-Roma peers | (1) | (2) | (3) | (4) |
| Friends | Adversaries | Friends | Adversaries |
| From high-achiever non- Roma classmates | | From low-achiever non- Roma classmates | |
| GPA | 0.75\*\* (0.05) | -0.33\*\* (0.04) | -0.05 (0.04) | -0.09\*\* (0.02) |
| Roma × GPA | -0.16 (0.08) | -0.10 (0.07) | 0.20\*\* (0.07) | -0.11\* (0.05) |
| Roma | -0.54\*\* (0.09) | 0.21\*\* (0.06) | -0.05 (0.07) | 0.04 (0.05) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.02 | 0.00 |
| Class FE | YES | YES | YES | YES |
| N | 3430 | 3430 | 3430 | 3430 |

Notes: see Table C15. High-achiever=GPA>=3.5. Standard errors, clustered at the class level, are in parentheses. \* p<0.05; \*\* p<0.01

Table 36. Friends and adversaries of female students as function of GPA.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.74\*\* (0.09) | -0.53\*\* (0.09) | -0.12\*\* (0.04) | -0.04 (0.02) | 0.86\*\* (0.08) | -0.50\*\* (0.08) |
| Roma × GPA | 0.10 (0.16) | -0.13 (0.16) | 0.08 (0.11) | 0.02 (0.05) | 0.03 (0.15) | -0.15 (0.15) |
| Roma | -0.16 (0.14) | 0.16 (0.14) | 0.19 (0.12) | -0.15\* (0.06) | -0.35\* (0.14) | 0.30\* (0.12) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.69 | 0.83 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 1666 | 1666 | 1666 | 1666 | 1666 | 1666 |

Notes: see Table C15. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 37. Friends and adversaries of male students as function of GPA.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.59\*\* (0.09) | -0.45\*\* (0.07) | -0.11\*\* (0.03) | -0.00 (0.02) | 0.71\*\* (0.08) | -0.44\*\* (0.06) |
| Roma × GPA | 0.40\* (0.19) | -0.28\* (0.14) | 0.18 (0.11) | -0.11\* (0.05) | 0.22 (0.17) | -0.18 (0.14) |
| Roma | 0.22 (0.23) | 0.02 (0.13) | 0.40\*\* (0.15) | -0.27\*\* (0.07) | -0.18 (0.21) | 0.30\*\* (0.11) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.52 | 0.02 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 1764 | 1764 | 1764 | 1764 | 1764 | 1764 |

Notes: see Table C15. Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 38. Friends and adversaries of students as function of GPA. Peer groups with high average GPA

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.73\*\* (0.08) | -0.53\*\* (0.08) | -0.07\* (0.03) | -0.01 (0.02) | 0.80\*\* (0.08) | -0.52\*\* (0.07) |
| Roma × GPA | 0.25 (0.20) | -0.19 (0.21) | -0.00 (0.12) | 0.06 (0.05) | 0.25 (0.18) | -0.25 (0.19) |
| Roma | -0.23 (0.17) | 0.24 (0.16) | 0.36\* (0.15) | -0.05 (0.05) | -0.59\*\* (0.15) | 0.30\* (0.14) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.55 | 0.35 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 1716 | 1716 | 1716 | 1716 | 1716 | 1716 |

Notes: see Table C15. Higher than average GPA: Average GPA in same-sex peer group is in the top half or the average GPA distribution (above 3.6). Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 39. Friends and adversaries of students as function of GPA. Peer groups with low average GPA

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.50\*\* (0.09) | -0.41\*\* (0.07) | -0.15\*\* (0.04) | -0.01 (0.02) | 0.65\*\* (0.07) | -0.39\*\* (0.06) |
| Roma × GPA | 0.41\*\* (0.15) | -0.33\* (0.13) | 0.26\* (0.10) | -0.13\*\* (0.04) | 0.15 (0.15) | -0.19 (0.12) |
| Roma | 0.19 (0.17) | -0.04 (0.13) | 0.48\*\* (0.13) | -0.28\*\* (0.05) | -0.29 (0.16) | 0.24\* (0.11) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.26 | 0.00 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 1714 | 1714 | 1714 | 1714 | 1714 | 1714 |

Notes: see Table C15. Lower than average GPA: Average GPA in same-sex peer group is in the bottom half or the average GPA distribution (less than or equal to 3.6). Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 40. Friends and adversaries of students as function of GPA. Towns with lower than median prejudice

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.55\*\* (0.09) | -0.41\*\* (0.08) | -0.13\*\* (0.03) | 0.00 (0.02) | 0.68\*\* (0.08) | -0.40\*\* (0.07) |
| Roma × GPA | 0.15 (0.17) | -0.34\* (0.15) | 0.26\* (0.11) | -0.11 (0.06) | -0.11 (0.16) | -0.23 (0.14) |
| Roma | -0.13 (0.18) | 0.02 (0.14) | 0.55\*\* (0.13) | -0.21\*\* (0.06) | -0.68\*\* (0.17) | 0.23 (0.12) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.24 | 0.11 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 1659 | 1659 | 1659 | 1659 | 1659 | 1659 |

Notes: see Table C15. Lower than average prejudice: Fraction of votes on Jobbik (far-right party) in town in the general election of 2010 is less than 22% (median in the sample). Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 41. Friends and adversaries of students as function of GPA. Towns with higher than median prejudice

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) | (5) | (6) |
| Friends | Adversaries | Friends | Adversaries | Friends | Adversaries |
|  |  | From Roma classmates | | From non-Roma classmates | |
| GPA | 0.62\*\* (0.08) | -0.47\*\* (0.06) | -0.08\* (0.03) | -0.03 (0.02) | 0.70\*\* (0.08) | -0.43\*\* (0.06) |
| Roma × GPA | 0.27 (0.16) | -0.21 (0.15) | 0.07 (0.11) | -0.01 (0.05) | 0.19 (0.14) | -0.20 (0.14) |
| Roma | -0.06 (0.16) | 0.18 (0.14) | 0.45\*\* (0.14) | -0.09 (0.07) | -0.51\*\* (0.15) | 0.27\* (0.12) |
| p value on GPA + Roma × GPA | 0.00 | 0.00 | 0.91 | 0.42 | 0.00 | 0.00 |
| Class FE | YES | YES | YES | YES | YES | YES |
| N | 1771 | 1771 | 1771 | 1771 | 1771 | 1771 |

Notes: see Table C15. Fraction of votes on Jobbik (far-right party) in town in the general election of 2010 is more than or equal to 22% (median in the sample). Standard errors, clustered at the class level, are in parentheses. \* p<0.05; \*\* p<0.01

Table 42. Friends and adversaries of Roma students and the ethnic composition of their peer group, interacted with whether they have high GPA.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) |
| Number of friends | Number of Adversaries | Number of friends | Number of Adversaries |
| High-GPA student | 1.24\*\* (0.23) | -1.01\*\* (0.19) | 1.25\*\* (0.32) | -1.16\*\* (0.28) |
| Fraction Roma among peers | 4.27\*\* (0.96) | -2.08\* (0.97) | 4.66\*\* (1.59) | -0.95 (2.43) |
| Fraction Roma squared | -3.59\*\* (0.93) | 0.25 (1.09) | -4.21\*\* (1.34) | 0.45 (1.91) |
| High-GPA student interacted with fraction Roma squared | -1.44\*\* (0.43) | 1.25\*\* (0.34) | -1.18\* (0.51) | 1.05\* (0.45) |
| Class FE | NO | NO | YES | YES |
| Control variables | NO | NO | NO | NO |
| N | 710 | 710 | 710 | 710 |

Notes. Peers refer to same-sex classmates (not including the student). High-GPA refers to grade point average higher than 3.5 (the overall average and median; the 80th percentile among Roma students and the 40th percentile among non-Roma students). The interaction of high-GPA and the linear term of fraction Roma is dropped from the specification as it is never statistically significant. The predicted left hand side variables have the same shape from the OLS and the FE regressions; they overlap completely for the number of friends and the discrepancy is small for the number of adversaries.

Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 43. Friends and adversaries of Roma students and the ethnic composition of their peer group, interacted with whether they have high GPA.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dep. var.: nominations received from peers | (1) | (2) | (3) | (4) |
| Number of friends | Number of Adversaries | Number of friends | Number of Adversaries |
| High-GPA student | 1.10\*\* (0.24) | -0.96\*\* (0.19) | 1.13\*\* (0.34) | -1.03\*\* (0.32) |
| Fraction Roma among peers | 4.52\*\* (0.95) | -2.14\* (0.93) | 4.83\*\* (1.62) | -1.14 (2.49) |
| Fraction Roma squared | -3.83\*\* (0.92) | 0.36 (1.05) | -4.54\*\* (1.34) | 0.68 (1.96) |
| High-GPA student interacted with fraction Roma squared | -1.34\*\* (0.44) | 1.19\*\* (0.36) | -1.03\* (0.51) | 0.92 (0.51) |
| Class FE | NO | NO | YES | YES |
| Control variables | YES | YES | YES | YES |
| N | 707 | 707 | 707 | 707 |

Notes. See Table C15. Control variables are gender, year of age dummies, whether repeated grade, years in preschool, mother’s education.

Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

Table 44. The probability that non-Roma students nominate Roma students as friends and adversaries.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dep. var.: nominations given | (1) | (2) | (3) | (4) |
| Nominated any Roma friend | Nominated any Roma adversary | Nominated any Roma friend | Nominated any Roma adversary |
| Fraction low-GPA Roma | 1.22\*\* (0.17) | 1.81\*\* (0.16) | 1.41\*\* (0.34) | 1.64\*\* (0.31) |
| Fraction low-GPA Roma, squared | -0.44 (0.24) | -2.01\*\* (0.28) | -0.92 (0.63) | -1.80\*\* (0.63) |
| Fraction high-GPA Roma | 2.79\*\* (0.26) | 0.18 (0.24) | 2.74\*\* (0.38) | 0.07 (0.39) |
| Fraction high-GPA Roma, squared | -2.26\*\* (0.54) | -0.27 (0.54) | -1.88\*\* (0.70) | -0.60 (0.64) |
| Constant | 0.05\*\* (0.01) | 0.04\*\* (0.01) | 0.04 (0.03) | 0.06\* (0.03) |
| Class FE | NO | NO | YES | YES |
| N | 2719 | 2719 | 2719 | 2719 |

Notes. Peers refer to same-sex classmates. High-achieving refers to grade point average higher than 3.5 (the overall average and median; the 80th percentile among Roma students and the 40th percentile among non-Roma students). The constant is the average of the class fixed-effects.  
Standard errors, clustered at the class level, are in parentheses. \* *p*<0.05; \*\* *p*<0.01

## Figures

|  |  |
| --- | --- |
|  |  |
| (A) Fraction Roma by self-identification | (B) Fraction Roma estimated by teacher |

Figure 11. The distribution of classes in the sample by the fraction of Roma students



Figure 12. The distribution of students in the sample by their grade point average (GPA)

|  |  |
| --- | --- |
|  |  |
| (A) Standardized reading test score | (B) Standardized mathematics test score |

Figure 13. The distribution of students in the sample by their standardized test scores (reading and mathematics)

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | |  |
|  | (A) All students | |  |
|  | |  | |
| (B) Received by Roma students | | (C) Received by non-Roma students | |

Figure 14. The distribution of students in the number of friendship nominations they receive

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | | |  | |
|  | (A) All students | | | |  | |
|  | | |  | | | | |
| (B) Received by Roma students | | (C) Received by non-Roma students | | | | |

Figure 15. The distribution of students in the number of adversary nominations they receive

|  |  |
| --- | --- |
|  | |
| (A) Friends of Roma students | (B) Adversaries of Roma students |

Figure 16. Number of friends and adversaries of Roma students by the fraction of Roma students in the group (Same-sex nominations; number of nominations capped at 4)

|  |  |
| --- | --- |
|  | |
| (A) Friends of Roma students | (B) Adversaries of Roma students |

Figure 17. Number of friends and adversaries of Roma students by the fraction of Roma students in the group (Opposite-sex nominations)

|  |  |
| --- | --- |
|  | |
| (A) Has a Roma friend | (B) Has a Roma adversary |

Figure 18. The percentage of non-Roma students nominating Roma students as a friend and as an adversary. (Same-sex nominations; number of nominations capped at 4)

Notes: As a function of the fraction of low-achieving Roma students and the fraction of high-GPA Roma students in the peer group. Both of these fractions are aggregated to categories. Variance of the estimates computed as p(1-p)/#schools). Peer group is defined as same-sex classmates.

|  |  |
| --- | --- |
|  | |
| (A) Has a Roma friend | (B) Has a Roma adversary |

Figure 19. The percentage of non-Roma students nominating Roma students as a friend and as an adversary (Opposite-sex nominations)

Notes: As a function of the fraction of low-achieving Roma students and the fraction of high-GPA Roma students in the peer group. Both of these fractions are aggregated to categories. Variance of the estimates computed as p(1-p)/#schools). Peer group is defined as opposite-sex classmates.