Vera Titkova, Valeria Ivaniushina, Daniel Alexandrov

SOCIOMETRIC POPULARITY IN A SCHOOL CONTEXT

Vera Titkova[1], Valeria Ivaniushina[2], Daniel Alexandrov[3]

SOCIOMETRIC POPULARITY IN A SCHOOL CONTEXT[4]

This study investigates how the sociometric popularity of schoolchildren is related to individual academic achievements in a context of different levels of academic culture and educational aspirations in the classroom. The sample includes 5058 students in 270 classes from 98 schools in St. Petersburg. To examine class-level effects, we employ multi-level hierarchical models using HLM 7 software. Different effects for boys and girls were found, indicating that the relationship between academic performance and popularity is gender-specific. The results demonstrate that in classes with a low learning motivation individual academic achievements of boys are negatively related to their popularity, while in classes with a high academic culture the relationship is positive.

JEL Classification: I21, C12.
Keywords: popularity, sociometry, academic culture, motivation.

[1] Sociology of Education and Science Lab, National Research University Higher School of Economics, St. Petersburg, Researcher. E-mail: tvera.v@gmail.com

[2] Sociology of Education and Science Lab, National Research University Higher School of Economics, St. Petersburg, Senior Researcher. E-mail: ivaniushina@hse.spb.ru

[3] Sociology of Education and Science Lab, National Research University Higher School of Economics, St. Petersburg, Professor. E-mail: d_alexandrov@hse.spb.ru.

Introduction

Each day students spend many hours on building relationships with their classmates. A student's popularity among peers is considered to be one of the indicators of their successful integration into school life. As a rule, unpopular students, who are not connected with the peer network, often demonstrate anti-social behavior, poor mental well-being, and have higher risk of school drop-out (*Ostberg 2003, Rubin 2007, Cillessen, Borch 2008, Motti-Stefanidi 2012).*

A student's level of involvement in a peer network can be assessed by two methods designed to evaluate two different popularity types: perceived and sociometric. The perceived popularity index is derived from peer surveys directly asking about the popularity of their peers (for example, "Who in your grade are most popular?"). A student's sociometric status is estimated from the names of their peer friends or students they like. It has been shown that these two popularity indices do not necessarily correlate with each other: Students with high levels of perceived popularity do not always have high levels of involvement in a peer network, and vice versa (*Cillessen and Mayeux 2004; Parkhurst and Hopmeyer, 1998*).

The first approach – evaluating perceived popularity – is mainly used in social psychology studies dealing with the psychological profiles and behavior patterns of popular and unpopular teenagers. The second approach evaluates popularity levels via a student's involvement in a peer network, and has been widely used lately due to the development of social network analysis (*Lubbers 2003; Baerveldt etal. 2004; Lubbers, Snijders 2007*). This approach emphasizes the structures of ties between persons, rather than characteristics of the persons themselves.

In this paper, we examine the connection between the sociometric popularity and academic achievements of students in schools and classrooms with different academic cultures. In order to place our study in the context of earlier studies in this area, we shall briefly review the parameters affecting a student's popularity among peers.

Factors and conditions affecting popularity: previous research

The perceived level of popularity is based on the student notion of "cool": teenagers with a high level of perceived popularity are socially highly visible and are often perceived by their peers as a model for imitation (*Rodkin et al., 2000; Lease et al. 2002*). At the same time, students perceived as popular sometimes demonstrate traits of dominance and aggression and may experience problems with learning (*Salmivalli et al 2000; LaFontana, Cillessen, 2002; Moody J., 2011*).

Sociometric popularity indicates a student's place in the structure of a friendship network and reflects the likes and dislikes of their classmates. Children with a high level of sociometric

popularity (in other words, those who are highly connected in peer networks) demonstrate a good command of social skills: sociability and desire to help, a low level of aggression, and fewer problems with behavior and social withdrawal. Many of them demonstrate leadership skills, although they do not impose their objectives on others, are open to compromise, and their actions are aimed at maintaining group activity (*Wentzel 2004; Lease & Kennedy, 2002; Rubin 1998, Farmer 2000*).

Regardless of the method used for evaluating the level of popularity, researchers have identified two sets of parameters connected with a student's popularity: ascribed characteristics (gender, race and ethnicity, looks, sports, and physical abilities), and social behaviors (varying manifestations of aggression, the ability to interact in a group, sociability, friendliness, etc.) (*Parkhurst & Hopmeyer, 1998; Lease et al., 2002; Rodkin et al, 2006*). We summarize main findings below, always indicating the type of popularity (perceived or sociometric), since the effects of each of these are often different.

Gender differences

Many researchers have noted that popularity factors are gender-specific. Boys and girls construct different perfect models for their behavior. The popular boys should demonstrate athletic abilities, coolness, success with the opposite sex, and social skills; while the popular girls may demonstrate the financial status of their parents, personal attractiveness, social skills, and academic success (*Adler et al 1992; Lease et al 2002*). Prosocial behavior is more important for girls than for boys, and, in the process of choosing a friend, girls significantly more often take this into account than do boys (*LaFontana & Cillessen, 2002*).

Aggressive boys with marked violent behavior towards the group are recognized as antisocial by their peers and teachers, but still get nominated as popular. Their peers describe their behavior as disruptive and as causing trouble, yet at the same time they perceive them as cool, and athletically talented (*Rodkin et al.,* 2000, 2006). Simultaneously, these boys are highly connected to similar aggressive teenagers, which connection also increases their degree of aggression. Barbara Read also lists additional factors affecting the popularity of boys: interpersonal skills, wit, a sense of humour, smart and getting good grades without much effort, and excessive studying (Read et al, 2011). A popular girl should have good social skills, good academic grades without visible efforts, and she should be physically attractive and fashionable (*Skelton et al 2010*).

An overwhelming majority of studies on the effect of gender on popularity has used an ethnographic or qualitative approach. We claim that quantitative studies should not overlook

gender differences in popularity in order to not undervalue important differences between groups.

Race and Ethnicity

Factors affecting popularity may differ for various race and ethnic groups. For example, Rodkin et al have described a difference in the behavior of popular boys of different races in elementary school. Among black popular boys, the share of boys popular due to their toughness was higher than among white boys (*Rodkin et al, 2000*). Same-race popularity in school is higher for Blacks and Hispanics as compared to Whites, which can be explained by a high degree of ethnicity-based gang solidarity, especially for boys *(Cillessen & Borch, 2006).*

A study by Dutch researchers on inter-ethnic relationships in multi-ethnic schools has shown that, during the process of forming emotional support for ethnic minorities, same-ethnic relationships play a more important role than majority support (*Baerveldt et al 2004*). Researchers connect the discovered differences between various ethnic statuses with cultural differences, specifically with the fact that children from different ethnic groups have a different notion of correct behavior, which, in turn, causes them to evaluate the behavior of other people in a different way (*LaFontana et al, 2002; Rodkin et al, 2000*).

In studies on peer status in multi-ethnic settings, the race/ethnic composition of a school plays a very important role, since the school creates the pre-conditions for interactions and offers an opportunity for structure. Hence, ethnic composition has to be controlled properly in order to correctly interpret the findings *(Bellmore et al, 2011).*

Athletic abilities, physical attractiveness and social skills

Athletic abilities are more closely connected to perceived popularity rather than to sociometric popularity. This factor is very important for boys, but makes almost no difference for girls. In addition, boys tend to discriminate each other on their athletic abilities to a much larger extent than girls do – athletic abilities tend to increase same-gender popularity in a more noticeable way (*LaFontana, Cillessen 2002*). Athletic popularity quite often comes along with leadership skills (*Parkhurst, Hopmeyer, 1998; Meisinger et al., 2007*). Physical attractiveness tends to increase both sociometric and perceived popularity. With other things being equal, attractive girls have a greater perceived popularity than attractive boys (*Borch et al 2011*). Since such parameters as athletic skills and physical attractiveness are difficult to quantify, they cannot be used as variables in quantitative studies.

Social skills (the ability to understand the goals, needs, and intentions of other people) have been found to be important for maintaining both perceived and sociometric popularity

(*LaFontana, Cillessen 2002; Meijs, 2008*). Students with a high level of sociometric popularity demonstrate prosocial behavior and are aware of ways to remain friendly with their peers. On the other hand, those who have a high perceived-popularity may not necessarily adhere to prosocial behavior and can display aggressive behavior, but at the same time they know how to interact with people in order to achieve their goals.

Academic performance

Some researchers have noted that good academic performance has a negative correlation with perceived popularity, but that it significantly increases sociometric popularity (*LaFontana, Cillessen 2002*; *Gorman et al 2002*; *Schwartz 2006).*

Academic performance is more important for the perceived popularity of girls than it is for boys (*Adler 1992).* For boys, good academic performance may negatively affect their perceived popularity: In his study of children in their early teens, Adler noted that boys often have to hide their interest in good grades (*Adler 1998).* In a study based on live observations in classrooms and in interviews, it was shown that a high-achieving student has to employ special tactics to balance their popularity and achievement (*Becky et al 2010).*

While studying the phenomenon of "acting White", Fryer and Torelli demonstrate that higher academic achievements of Black and Hispanic students in urban American schools lead to diminished popularity among co-ethnic peers (*Fryer & Torelli 2010).* In continuation of this study, Flashman examined the observable phenomenon of choosing low achieving same-race friends by Black and Latino students and demonstrated that this is partly explained by opportunity structure (*Flashman, 2012).*

Therefore, the data on connection between academic performance and popularity are ambiguous. However, there are still very few studies on the connection between popularity and academic performance in schools, in contrast to the amount of studies that connect popularity to various aspects of behavior.

Role of context

In popularity studies, context is mainly regarded as the gender or race/ethnic composition of a school or a classroom. The main effect of gender composition on sociometric popularity is the fact that boys usually get fewer nominations in classes mainly composed of girls than in classes with a more balanced gender composition; the reason is significant gender homophily (*Lubbers 2003; Lubbers & Snijders 2007*). Race/ethnic homophily has similar effects.

The effect of unbalanced gender or race/ethnic composition on perceived popularity is strongly noticeable in an environment with different norms of behavior for different groups of

teenagers; under such conditions, the minority group has to either adopt the norms of the majority, or create its own, relatively isolated "sub-culture" (*Meisinger et al 2007).*

We are aware of just one study of popularity in different educational contexts, in which the authors were comparing college preparatory classrooms and vocational track classrooms. It has been shown that the relationship of academic achievement (measured by GPA) to sociometric popularity is different in contrasting educational contexts (*Meijs et al, 2010*).

Research Goal and Hypotheses

The goal of this study is to investigate the relationship between student academic achievement and sociometric popularity among peers in different contexts. Based on theoretical assumptions, we formulate the following hypotheses.

Hypothesis 1a. In groups with a high academic motivation, individual academic success is positively related to popularity among peers.

Hypothesis 1b. In groups with a low academic motivation, academic success is negatively related to popularity among peers.

Hypothesis 2. The relationship between individual academic achievement and popularity is gender-specific, being stronger for girls and weaker for boys.

Analytical approach

In order to investigate the relationship between popularity and academic achievement in different academic contexts, we need to define what a different context is. We define context as class-level or school-level characteristics of academic culture.

We use two approaches to measure the level of academic culture, both of which are frequently used in educational research. The first approach uses such characteristics of school/class as the percentage of students planning to get a higher education (*Meijs et al, 2010*). The second approach employs special pschychometric scales for evaluating the "study culture" on an individual level and then aggregates student characteristics on a group level (*Van Houtte, 2006*).

For data analysis, we used multilevel regression because our data have a hierarchical (nested) structure: Students are nested in classes, and classes are nested in schools. Multilevel modeling not only adjusts standard errors for clustered units; it also allows us to analyze the effects of variables measured on different levels and investigate cross-level interactions. Because of this, it is the method of choice for our analysis (Hox, 2010; Woltman, Feldstain, 2012). The models were calculated using HLM7 software.

Data and Methods

This study is based on empirical data of a survey that was conducted in St. Petersburg schools in 2010. The general population was composed of state high schools, which numbered 598 at the time of the survey. This population does not include other types of schools, such as private, correctional, primary, or boarding schools. Based on information of the Committee of Public Education of St. Petersburg, schools were divided into two categories. The first category is ordinary high schools with a standard curriculum. The second category is schools with an enhanced curriculum, such as gymnasiums, lyceums, and specialized schools with an in-depth study of specific subjects. Schools were selected randomly as a stratified sample from the general sample.

The survey sample consisted of 104 schools (419 classes) with 7300 interviewed students from the 8th, 9th, and 10th grades; the age of students ranged from 14 to 16 years. For the purpose of our study, we selected only the classes with no fewer than 75% students present at the time of the survey. Therefore, the total data included 5058 students from 99 schools, 270 classes.

Questionnaire & Variables

Each student present in the class at the time of survey had to fill in a questionnaire. The questionnaire consisted of several question blocks aimed at the socio-demographic characteristics of students, the socio-economic status of their families, their migration background, academic performance, education plans, and expected future occupation. The questionnaire also included blocks of questions for evaluating socio-psychological characteristics of students: their attitude towards their school, motivation to study, and involvement in school life.

For the collection of network data, the students were asked to nominate their friends in the classroom; they could name up to 10 friends. The classroom was chosen as the network boundary, because in the Russian school system students from different classrooms do not mix for lessons, and a great majority of students remain in the same class with the same classmates all the way from 1st grade until graduation. This makes the class a "natural" network boundary.

First-level variables

Sociometric popularity (the dependent variable) was calculated for each student as a normalized indegree. That is, the number of nominations of a given student by his or her classmates has been normalized according to the number of all possible nominations (N_{class} - 1). Normalization is necessary for comparison between classes because class size varies considerably among different classes.

School performance has been measured as GPA, which is the mean of term grades for five subjects: Russian language, algebra, a foreign language, biology, and physics). For the purposes of our analysis, this variable was class-centered.

Academic attitudes. For evaluating learning motivation at an individual level, we used the study involvement scale, which consists of 9 items (from van Houtte, 2006, translated into Russian and adapted by SESL HSE-SPb). Agreement to each item has been measured on a 4-point Likert scale. In the questionnaire, items were formulated in both directions (for example, "School is just a waste of time" and "Only with a good education can one get a good job"). In the database all items were recoded such that a higher score reflects a more positive attitude towards school and learning.

Factor analysis reveals that the learning motivation scale consists of three separate subscales: learning engagement (items 3, 5, 6), pro-school/anti-school attitudes (items 1, 4, 7, 8), and normative beliefs (items 2, 9) (see Appendix). It shows that there are separate dimensions of motivation that are only partly correlated (Alexandrov et al., 2012).

Several indices have been constructed from this scale and its subscales: *motivation* (complete scale of 9 items, Cronbach's Alpha = 0,65); *engagement* (3 items, Cronbach's Alpha = 0,5); *pro-school/anti-school* (4 items, Cronbach's Alpha = 0,55); *normative* (2 items, Cronbach's Alpha = 0,45). These indices were constructed by averaging of corresponding items.

We also constructed an *Academic attitudes index* using a principal component analysis (PCA) procedure. The index is first-factor loading of PCA of motivation scale (eigenvalue = 2,2)

The *socio-professional status* of the student's family was estimated using the ISEI scale developed by *Ganzeboom and Treiman (1996)*. The ISEI index represents a combination of professional income and education. The data were collected using a series of open-ended questions. Students were asked to give the professions of both parents ("What is their occupation?") and describe their professional activity ("What do they do at work?") After that, the answers were coded manually in accordance with ISCO-08. In most cases the information on parent's profession was sufficient for coding, but in some cases it was necessary to turn to more detailed descriptions of a parent's activity at their work place. Four-digit codes were assigned when possible, but in some cases where information was insufficient we used two- or three-digit codes. At the next stage we converted the ISCO-08 codes to ISEI-08 scale using special scripts developed by Ganzeboom.

Second-level variables

We used two different approaches to compare classes according to level of academic motivation.

First, indices for measuring academic attitudes, constructed from the study-involvement scale, were aggregated at the class level. We obtained several aggregated indices characterizing different dimensions of learning motivation (engagement, normativity, pro-school/anti-school attitudes), or characterizing all three dimensions altogether (*Motivation index* and *Academic attitudes index*). All of these indices were tested separately in multi-level models.

Second approach was calculating Educational aspirations index, construed as a percentage of students aspiring to receive a higher education. This parameter also shows the level of academical culture in the class, although estimation is achieved not through the attitude questions, but through the behavioral paramteres (in this case, future plans regarding higher education).

RESULTS

Descriptive analysis

First-level variables

Table 1 shows popularity indices for boys and girls. Boys generally have a higher level of popularity, and this difference is statistically significant.

Comparing the values of same-sex and cross-sex popularity, meaning the nominations received from one's own or from the opposite gender, one can see that same-sex popularity is slightly higher for girls, but cross-sex popularity for girls is considerably lower (t = 7,38). In other words, girls tend to nominate boys as their friends more often than vice versa. As a result, the popularity of boys is generally higher.

Another difference we can see is in the number of reciprocated nominations. For girls, about 70% of nominations are mutual, while for the boys only 60% are such.

Table 1 Descriptive statistics for sociometric popularity for girls and boys

	Girls Mean (SD)	Boys Mean (SD)	t-value (Sig.)
Popularity (total)	0.23 (0.14)	0.25 (0.15)	3.25 (0.001)
Same-sex popularity	0.38 (0.23)	0.37 (0.23)	3.25 (0.001)
Cross sex popularity	0.09 (0.15)	0.13 (0.18)	7.38 (0.000)
Reciprocated nominations	0.16 (0.10)	0.15 (0.11)	2.72 (0.006)

Table 2 shows the mean values and standard deviations for the GPA and academic attitudes indices. Not surprisingly, girls have better grades and more positive attitudes towards school and education. A t-test confirms that all gender differences are highly significant.

Table 2 Descriptive statistics of GPA and academic attitudes indices for girls and boys

	Girls Mean (SD)	Boys Mean (SD)	t-value (Sig.)
GPA	3.77 (0.57)	3.49 (0.51)	19.7 (0.000)
Motivation	2.93 (0.43)	2.80 (0.48)	10.5 (0.000)
Normativity	2.68 (0.68)	2.60 (0.74)	4.4 (0.000)
Engagement	2.83 (0.64)	2.67 (0.70)	9.1 (0.000)
Pro-/Anti-School	2.20 (0.55)	2.08 (0.60)	7.8 (0.000)
Academic Attitudes Index	0.10 (0.95)	-0.08 (1.03)	7.01 (0.000)

Figures 1 & 2 show the distribution of GPA and motivation for boys and girls (both variables are class-centered). We can see that the GPAs for girls are distributed almost symmetrically, while for the boys they are negatively skewed. This shows that boys, on average, have lower grades than the class average.
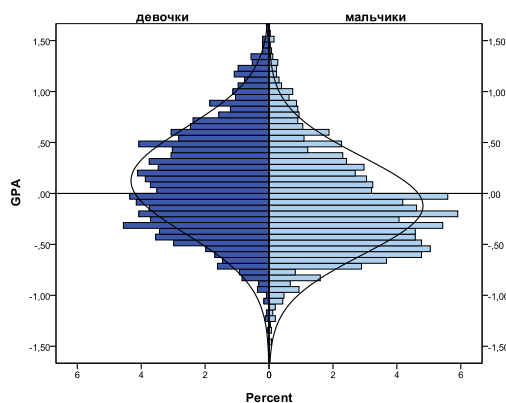

Figure 1 GPA distribution for girls and boys (GPA is class-centered)

The distribution of the motivation index is symmetric for the boys, while for the girls it is positively skewed (Fig.2). This means that girls have a slightly higher motivation than the class average.
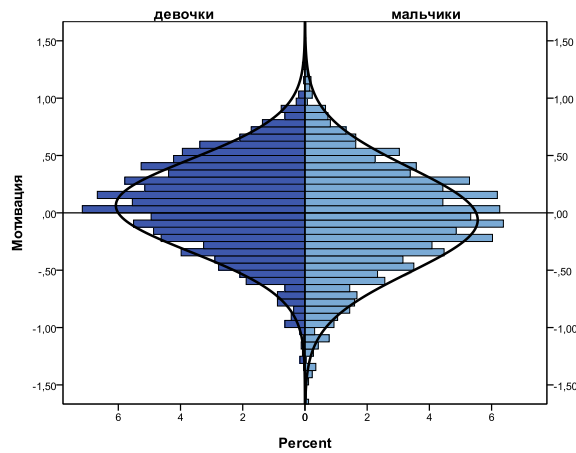
Figure 2 Distribution of Motivation index for girls and boys (index is class-centered)

Second-level variables

Table 3 shows the means, standard deviations, minimum, and maximum values for variables characterizing classes. It should be noted that the difference between classes with the minimum and maximum GPAs (4.15 and 3.03, respectively) is over 1. In some classes, 100% of students made a choice in favour of receiving a higher education, while in other classes only 33% students had such intentions. The family ISEI index varies from 35 to 61, with a mean of 45.

Table 3 Descriptive statistics for classes

	Min	Mean (SD)	Max
Class GPA	3.03	3.6 (0.2)	4.15
Class ISEI	34.6	45.4 (4.7)	60.8
% students choosing higher education	33.3	76.6 (15.4)	100
Class Academic culture	-0.85	0.00 (0.35)	0.91
Class Motivation	2.32	2.87 (0.16)	3.26
Class Normativity	2.11	2.63 (0.18)	3.25
Class Engagement	2.10	2.74 (0.21)	3.27
Class Pro-/Anti-School	1.39	2.14 (0.18)	2.70

Since we surveyed students from the 8th, 9th, and 10th grades, we have in our database information for several classes per school. Thus, we could compare classes from one school on their level of academic attitudes. Figure 3 illustrates the result of such a comparison. The classes are markedly different on their level of academic culture, and this difference is statistically significant.
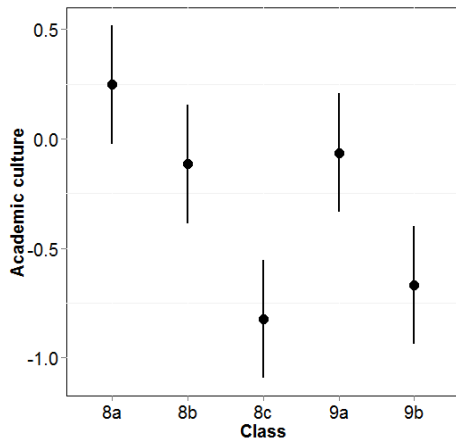

Figure 3 Differences in Academic attitudes between five classes from one school

Preliminary analysis

In order to evaluate the explanatory power of each variable, we constructed several simple models before constructing the final multi-level model.

We have analyzed the relationship between individual grades and class academic motivation for boys and girls separately. This relationship is linear and positive for girls. For boys, the relationship is not linear and can most closely be approximated using a polynomial function.
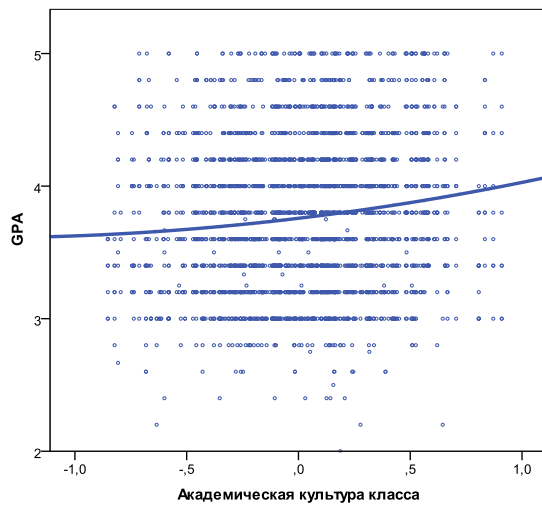
Figure 4 Relation between individual GPA and class Academic attitudes index (girls)
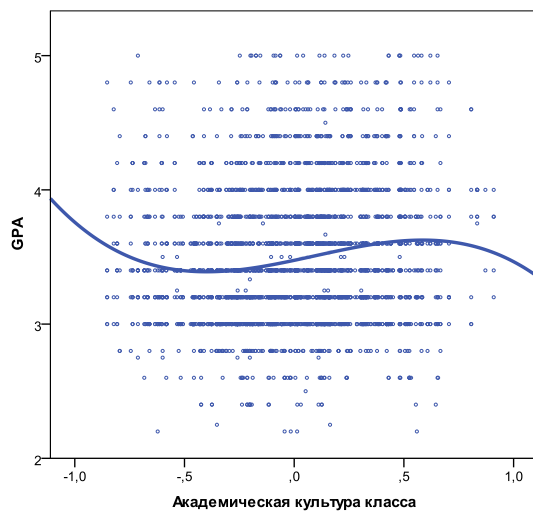

Figure 5 Relation between individual GPA and class Academic attitudes index (boys)

We then built several ordinary least square (OLS) models in order to test the relationship between the dependent variable (popularity) and potentially important independent variables. The results are presented in Table 4. Both GPA and aspirations towards higher education are positively related to popularity; the effect of GPA is stronger (for GPA, t = 10.6; for higher-education aspirations, t = 4.3). The socio-economic status of a student's family does not have effect on popularity, according to our data.

Table 4 OLS models for Popularity (for the whole sample)

	Model 1	Model 2	Model 3
GPA	0.137 (10.63) ***		
Plans higher education		0.06 (4.32) ***	
ISEI family			0.008 (0.545)
R²	0.018	0.004	0
*p < .05; *p < .01; ** p <0.001 ***			

At the next stage we investigated bivariate relations on class level.

The relationship between class GPA and class motivation is non-linear: there is almost no relationship up to a certain point, and then it becomes positive. The line of best fit is a quadratic function (R^2=0.143).
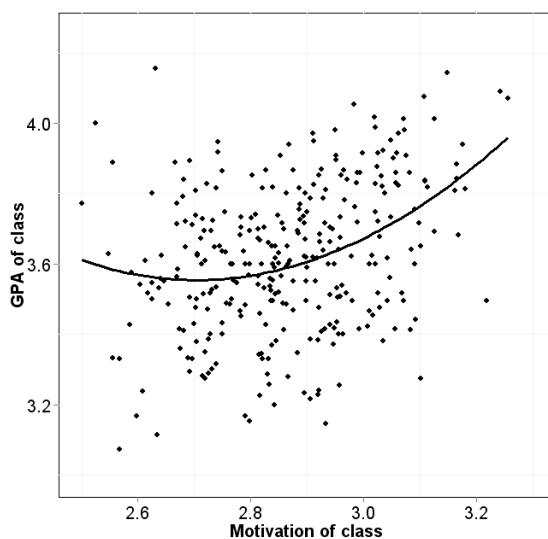

Figure 6 Relation between class motivation and class GPA

In order to identify classes with contrasting values of academic motivation, we divided classes by deciles based on this parameter. At the lowest decile, the academic attitudes index was equal to -0.75 on average, while at the highest decile it was equal to 0.81. For each of these three groups of classes, we constructed the same model.

In all three groups of classes, we observed a positive relation between popularity and academic performance. The effect was stronger for classes with a high motivation (B=0.21***),

somewhat weaker for classes with average motivation (B=0.16***), and the weakest for classes with a low motivation (B=0.11*).

Boys are more popular than girls in all three groups of classes, as shows positive sign of gender coefficient. However, the gender effect is stronger in classes with low academic motivation.

Table 5 OLS models for Popularity (for three groups of classes)

	Standardized coeffs.	**t**	**Sig.**	**R^2**
Classes with low academic attitudes index				
Gender (ref. category – girls)	0.141	2.49	0.013	
GPA	0.109	1.92	0.055	0.03
ISEI family	-0.032	-0.58	0.57	
Classes with average academic attitudes index				
Gender (ref. category – girls)	0.086	5.64	0.000	
GPA	0.163	10.62	0.000	0.03
ISEI family	-0.021	-1.43	0.152	
Classes with high academic attitudes index				
Gender (ref. category – girls)	0.106	2.04	0.042	
GPA	0.208	3.98	0.000	0.04
ISEI family	0.009	0.18	0.86	

In all groups, boys were more popular than girls, and GPA was positively correlated with popularity. At the same time, the regression coefficient GPA was increasing from classes with low motivation to classes with high motivation. None of the groups showed any correlation between ISEI and popularity.

Multi-level analysis

At the next level, we constructed an empty 3-tier model (not shown). This was done in order to calculate the intra-class correlation coefficient (ICC), and to evaluate the necessity of taking into account variations of this variable at all three levels: individual, class, and school characteristics.

The empty model has shown that 76% of a student's popularity can be attributed to the first level (individual), 22% can be attributed to the second level (class, *p*-value<0.001), and only 2% of the dispersion can be attributed to the third level (school, *p*-value=0.02).

Taking into account both this fact and the high degree of collinearity between the index of academic motivation at the class and school levels, we concluded that a three-tier analysis is not practical. Therefore, we chose to examine two-tier models: individual vs. class, and individual vs. school.

The main purpose of our study was to identify the context effect. Therefore in multi-level model we are interested in finding cross-level interaction effects, since the existence of such effects proves the influence of the context. The context effect can be verified when controlled by individual characteristics .

In order to identify classes and schools with contrasting contexts, we used the aggregated index of *academic attitudes*[5]. We assumed that the class (or school) had a low degree of academic attitudes if the index value was 1.5 standard deviations below the mean. If the index value was 1.5 standard deviations above the mean, then we assumed that the class (or school) had a high degree of academic motivation.

Popularity and Class Context

The effects of a class' academic motivation on popularity are shown in Figure 7 and Table 6. Interpretation of the coefficients in Model 1 shows that boys were more popular than girls, and GPA was positively correlated with popularity. However, there is a significant interaction effect between gender and GPA. The negative value of the first-level interation effect shows that the relation between popularity and GPA is weaker for boys than for girls. In other words, good marks are more likely to increase the popularity of a girl rather than that of a boy.

---

[5] We also examined a number of other indices in our preliminary models: *motivation* index based on the complete scale of study involvement, and indices of *engagement* and *pro-school/anti-school* based on sub-scales. However, these preliminary models did not provide a satisfactory fit, and there for the final model we selected the index of *academic attitudes* obtained by means of PCA.

Table 6. Multilevel popularity models (class context)

Fixed Effect	Model 0	Model 1	Model 2
Intercept	0.248 (0.004) ***	0.233 (0.005) ***	0.232 (0.005)***
high academic motiv. classes		0.002 (0.015)	0.004 (0.015)
low academic motiv. classes		-0.001 (0.017)	0.000 (0.019)
Boy		0.0242 (0.005) ***	0.0273 (0.005)***
GPA		0.055 (0.005) ***	0.0568 (0.005)***
Boys*GPA		-0.021 (0.008)	-0.018 (0.008)**
Boys*GPA *high academic motiv. classes		0.029 (0.015) *	0.021 (0.014)
Boys*GPA low academic motiv. classes		-0.042 (0.024) *	-0.043 (0.023)*
ISEI family			-0.000 (0.000)
r^2_0 (var (u_0))	0.072 (0.005) ***	0.068(0.005) ***	0.0679 (0.005)***
r^2_1 (var (Sex, u_1)		0.051 (0.003) ***	0.047 (0.002) ***
r^2_2 (var (u_2))		0.033 (0.001) ***	0.041 (0.002)**
r^2_3 (var (GPA*Sex, u_3)		0.046 (0.002) ***	0.056 (0.003) ***
r^2_4 (var (ISEI, u_4)			0.001 (<0.001) **
Level 1 (var, r)	0.130 (0.016)	0.124 (0.015)	0.123 (0.01518)

The academic context of a class also has an effect. Even though the main effects (intercept) are not statistically significant, cross-level interaction effects are highly significant. For easier interpretation, the relationship between the variables of the first and second levels is presented on a graph (Fig.7).

For girls, the correlation between popularity and GPA is positive, and it does not depend on the context, i.e. it shows the same pattern both in low-motivation classes and in high-motivation classes.

For boys from highly motivated classes, the relation between popularity and GPA is very close to that for girls. However, in the classes with a low academic culture, we find the opposite picture: the correlation of a boy's popularity with his academic performance is negative.
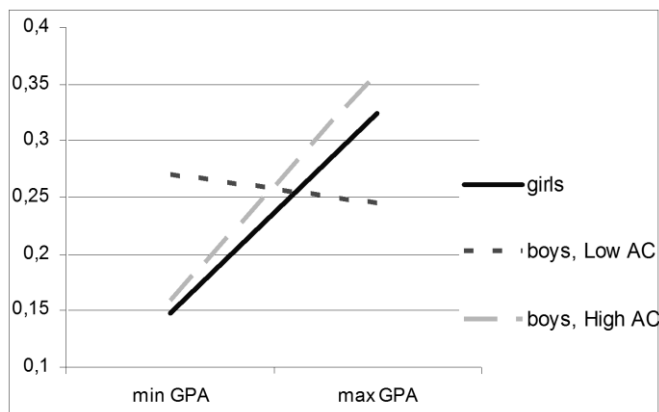

Figure 7 Boys and girls popularity in classes with high and low academic motivation

In Model 3 variable for socio-economic status is added (ISEI family). It decreases the significance of the cross-level interaction effect for highly motivated, but for low motivated classes the effect remains the same.

Popularity and School Context

At the next step, we model popularity by taking into account a school's type and its academic culture. The main effect of a school's type is negative, meaning that in gymnasiums and lyceums sociometric popularity is lower (net of individual characteristics). In ordinary schools children tend to nominate more peers as their friends.

Basically, the coefficients are the same as for class models, except that there is no cross-level interaction effect. A graphic representation of first-level interaction is presented on Fig. 9. One can see that the slope for the girls is steeper. In other words, a gain in GPA adds more to a girl's popularity that to a boy's popularity.
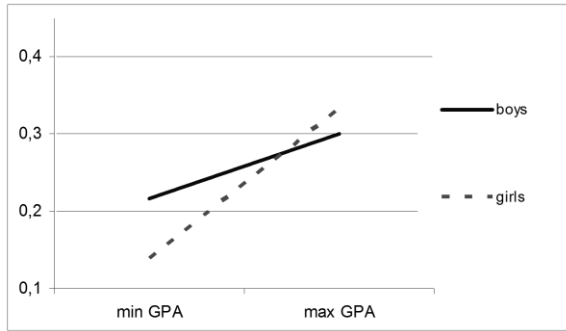
Figure 8. Boy and girl popularity (school model)

Table 7. **Multilevel popularity models (school context)**

Fixed Effect	Model 3	Model 4
Intercept	0.238237 (0.005) ***	0.214 (0.008)***
School type (ref.: ordinary schools)		-0.019 (0.009) ***
high acad. motiv. schools		0.001 (0.013)
low acad. motiv. schools		-0.017 (0.043)
Boys		0.025 (0.006) ***
GPA		0.057 (0.007) ***
Boys*GPA		-0.031 (0.013) **
Boys*GPA *high academic culture schools		0.024 (0.015)
Boys*GPA *low academic culture schools		0.072 (0.043)
r^2_0 (var (u_0))	0.03836 (0.002) ***	0.037 (0.001) ***
r^2_1 (var (Sex, u_1))		0.022 (0.001) **
Level 1 (var, r)	0.13606 (0.019)	0.133 (0.018)

Our results show that sociometric popularity among peers is related to school performance and to the gender of the student, and is mediated by the academic context. We have found that academic performance has a different effect on the popularity of boys and girls. We have also found a statistically significant difference in the effect of academic performance in different academic contexts. The context of the class has a greater effect that the context of the school, and

this affects boys and girls in a different way. Our research hypotheses were confirmed, but not completely: we found effect of context only for boys but not for girls.

DISCUSSION

This study contributes to the literature on popularity of schoolchildren via a systematic analysis on the influence of the context characteristics in question. We demonstrate the role of contextual factors − especially academic culture − on relations between individual academic achievement and popularity. Unlike previous research in this field, where academic culture was not measured, but rather was assumed based on school type (*Meijs et al, 2010)*, in our study academic culture had been measured via a battery of items.

The methodological approach employed in this study − multi-level analysis − allows for the investigation of contextual effects of higher-level characteristics on individual variables. Though widely used in educational research, this method has not been intensively employed in popularity studies. Part of the reason can be that not so many studies in this area have been done on large multi-level samples. Our empirical data, consisting of 5058 students from 270 classes of 97 schools, is a unique dataset perfectly suited for such type of analysis.

Our goal was to evaluate how the educational context, namely the academic culture of a school and class, is relevant to the popularity of students with different academic standings. It was hypothesized that a student's academic success will contribute to her or his popularity in highly academic classes, where most students share positive attitudes to learning, while in low-academic classes there will be no positive association between good grades and popularity.

Educational context can be understood on different levels. Most broad is the country or society level, on which norms towards education are set. Presumably all students in one country share these norms to a certain extent. Local context is more important, since schools − and classes inside schools − differ considerably on their level of academic culture. In Russian schools students attend the same class of 20-25 pupils, with the same classmates, for many years in a row, often from 1st to 11th grade. This is markedly different from the American system, where classes are based on subjects, so students are constantly mixing with different peers. The stability of Russian school classes contributes to the emergence of local academic culture on the class level.

We assumed that school characteristics, such as the school type, academic culture, and the percentage of students who plan to continue their education, are less influential than class characteristics of academic culture, because even within one school, regardless of its curriculum, one can find classes with contrasting levels of academic culture. As a result, indices aggregated

on the basis of the academic culture of the school will not reflect the actual situation in an adequate way.

In order to test this hypothesis, we have built linear hierarchical two-level models: student vs school. The school type taken as a main factor plays an important role in a student's popularity: in standard schools, students tend to nominate more schoolmates, which increases the popularity level of each of them. On the other hand, the school type and the academic profile of the school do not affect the connection between the personal academic achievements of a student and that student's popularity. Therefore, this confirms our hypothesis that the class context has a greater effect than does the school context.

Analyzing the effects of educational context at school and class levels, we have demonstrated that: 1.) The variation of academic culture at the class level is bigger than at the school level; 2.) Schools with an enhanced curriculum do not necessary have a higher level of academic motivation than schools with a standard curriculum; and, 3.) The relationship between academic achievement and popularity are affected by the level of academic motivation at the class level, but not on the school level.

Along the lines with previous research on popularity, we have found several gender-specific effects. We anticipated that gender would have an effect on the relationship between popularity and academic achievement. Indeed, we have demonstrated that good grades are important for a girl's popularity. As for the boys, the link between grades and popularity has been observed in only a specific context: In low-academic classes, good grades actually decreased a student's popularity. Moreover, in highly academic classes, popularity and academic achievement were positively related. Boys with higher-than-average levels of academic performance are more popular among their classmates.

From our analysis of context at the level of class characteristics, we have found that the association between sociometric popularity and academic achievement is not linear, but instead has a complex nature, depending on educational context. From our data, we have found the following: 1.) Academic performance is connected to popularity; 2.) The class context is formed by the academic motivation and education intentions of the students; and, 3.) The relationship between class context and academic performance depends on the gender of the student.

For girls, academic performance has a positive effect, regardless of the class context: for a girl, even in a class with low academic culture, a high level of academic performance will increase her popularity.

The effect of academic performance on a boy's popularity depends on the context. In classes with a high academic motivation, boys become more popular with an increased level of academic performance: Their academic achievements are approved by their classmates, as

indicated by an increase in their being liked by peers. On the contrary, in the classes with a low academic motivation, boys with high grades do not receive peer approval: In such classes, a boy's popularity does not increase with better academic performance.

Our results confirm, to some extent, the conclusions of other studies on anti-school culture. Thus, a number of researchers have shown that, in some situations, students that demonstrate an interest for learning and for getting good marks face the disapproval of their peers because, in the eyes of these peers, they do not support common values (Fryer & Torelli, 2010; Ogbu, 2004). Our research contribution helped to identify and describe the conditions for the observed effects.

In contrast to some other researchers (*Lease et al 2002; Michell 1997),* in our study we have not found a connection between socio-economic status of a student's family and her/his student's popularity. This may partly be explained by a low range of variation for this parameter within classes in our sample. Another explanation is that SES is more important for perceived popularity and has less effect on sociometric popularity. These assumptions should be tested in further studies on classes composed by students from families with marked differences in their socio-economical status. Studies in such classes may provide a number of interesting observations, while testing the influence of academic achievements on a student's popularity.

LITERATURE

1. Adler, Patricia A., Steven J. Kless, and Peter Adler. 1992. "Socialization to Gender Roles: Popularity Among Elementary School Boys and Girls." Sociology of Education 65 (3) (July 1): 169–187. doi:10.2307/2112807.

2. Alexandrov. D., Baranova V., and V. Ivaniushina. 2012(a). "Migrant children and their parents: cooperation with the Russian school system." Journal of Educational Studies, #1: 176-199. [in Russian].

3. Alexandrov. D., Baranova V., and V. Ivaniushina. 2012(b). "Migrant Children in Russia. I. Migration, Ethnicity and Segregation in St. Petersburg - Working Papers." ISBN: 978-5-7422-3359-6.

4. Baerveldt, Chris, Marijtje A.J Van Duijn, Lotte Vermeij, and Dianne A Van Hemert. 2004. "Ethnic Boundaries and Personal Choice. Assessing the Influence of Individual Inclinations to Choose Intra-ethnic Relationships on Pupils' Networks." Social Networks 26 (1) (January): 55–74. doi:10.1016/j.socnet.2004.01.003.

5. Bellmore A., A.Nishina, S.Graham. 2011. Peer Popularity in the Context of Ethnicity. In: Popularity in the Peer System, Eds. Antonius H.N.Cillessen, David Schwartz, Lara Mayeux. The Giulford Press.New York - London. Pp. 193 – 219.

6. Borch, C., A. Hyde, A. H. Cillessen, and N. 2011. "The role of attractiveness and aggression in high school popularity." Social Psychology of Education: An International Journal 14 (1) (March): 23–39. doi:http://dx.doi.org/10.1007/s11218-010-9131-1.

7. Cherednichenko G. 2000. School Reform in the 1990s: Innovations and Social Selection // Russian Education & Society, Volume 42, Number 11, P.6-32.

8. Cillessen, Antonius H. N., and Lara Mayeux. 2004. "From Censure to Reinforcement: Developmental Changes in the Association Between Aggression and Social Status." Child Development 75 (1): 147–163. doi:10.1111/j.1467-8624.2004.00660.x.

9. Cillessen, Antonius H.N., and Casey Borch. 2006. "Developmental Trajectories of Adolescent Popularity: A Growth Curve Modelling Analysis." Journal of Adolescence 29 (6) (December): 935–959. doi:10.1016/j.adolescence.2006.05.005.

10. Farmer, Thomas W. 2000. "The Social Dynamics of Aggressive and Disruptive Behavior in School: Implications for Behavior Consultation." Journal of Educational and Psychological Consultation 11 (3-4): 299–321. doi:10.1080/10474412.2000.9669417.

11. Flashman, Jennifer. 2012. "Different Preferences or Different Opportunities? Explaining Race Differentials in the Academic Achievement of Friends." Social Science Research 41 (4) (July): 888–903. doi:10.1016/j.ssresearch.2012.03.001.

12. Francis, Becky, Christine Skelton, and Barbara Read. 2010. "The Simultaneous Production of Educational Achievement and Popularity: How Do Some Pupils Accomplish It?" British Educational Research Journal 36 (2): 317–340. doi:10.1080/01411920902919265.

13. Fryer Jr., Roland G., and Paul Torelli. 2010. "An Empirical Analysis of 'acting White'." Journal of Public Economics 94 (5–6) (June): 380–396. doi:10.1016/j.jpubeco.2009.10.011.

14. Ganzeboom H., Treiman D. Internationally Comparable Measures of Occupational Status for the 1988 International Standard Classification of Occupations // Social Science Research. 1996. V.25. P.201–239.

15. Gorman, Andrea Hopmeyer, Janna Kim, and Anne Schimmelbusch. 2002. "The Attributes Adolescents Associate with Peer Popularity and Teacher Preference." Journal of School Psychology 40 (2) (March): 143–165. doi:10.1016/S0022-4405(02)00092-4.

16. Hox J.J. 2010. Multilevel Analysis: Techniques and Applications (2nd edition). Routledge. New York & Hove.

17. Ivaniushina V., Alexandrov. D. 2012. "Inter-ethnic relations in Russian schools: p2 model analysis" Sociology 4M, in press. [in Russian].

18. LaFontana, Kathryn M., and Antonius H. N. Cillessen. 2002. "Children's Perceptions of Popular and Unpopular Peers: A Multimethod Assessment." Developmental Psychology 38 (5): 635–647. doi:10.1037//0012-1649.38.5.635.

19. LaFontana, Kathryn M., and Antonius H.N. Cillessen. 1998. "The Nature of Children's Stereotypes of Popularity." Social Development 7 (3): 301–320. doi:10.1111/1467-9507.00069.

20. Lease, A. Michele, Karen T. Musgrove, and Jennifer L. Axelrod. 2002. "Dimensions of Social Status in Preadolescent Peer Groups: Likability, Perceived Popularity, and Social Dominance." Social Development 11 (4): 508–533. doi:10.1111/1467-9507.00213.

21. Liem, Gregory Arief D., and Andrew J. Martin. 2011. "Peer Relationships and Adolescents' Academic and Non-academic Outcomes: Same-sex and Opposite-sex Peer Effects and the Mediating Role of School Engagement." British Journal of Educational Psychology 81 (2): 183–206. doi:10.1111/j.2044-8279.2010.02013.x.

22. Lubbers, Miranda J. 2003. "Group Composition and Network Structure in School Classes: a Multilevel Application of the P∗ Model." Social Networks 25 (4) (October): 309–332. doi:10.1016/S0378-8733(03)00013-3.

23. Lubbers, Miranda J., and Tom A.B. Snijders. 2007. "A Comparison of Various Approaches to the Exponential Random Graph Model: A Reanalysis of 102 Student Networks in School Classes." Social Networks 29 (4) (October): 489–507. doi:10.1016/j.socnet.2007.03.002.

24. Meijs, Noortje, Antonius H. N. Cillessen, Ron H. J. Scholte, Eliane Segers, and Renske Spijkerman. 2008. "Social Intelligence and Academic Achievement as Predictors of Adolescent Popularity." Journal of Youth and Adolescence 39 (1) (December 9): 62–72. doi:10.1007/s10964-008-9373-9.

25. Meisinger, E.B., J.J. Blake, A.M. Lease, G.J. Palardy, and S.F. Olejnik. 2007. "Variant and Invariant Predictors of Perceived Popularity Across majority-Black and majority-White Classrooms." Journal of School Psychology 45 (1) (February): 21–44. doi:10.1016/j.jsp.2006.09.005.

26. Michell, Lynn. 1997. "Loud, Sad or Bad: Young People's Perceptions of Peer Groups and Smoking." Health Education Research 12 (1) (March 1): 1–14.

27. Moody, James, Wendy D. Brynildsen, D. Wayne Osgood, Mark E. Feinberg, and Scott Gest. 2011. "Popularity Trajectories and Substance Use in Early Adolescence." Social Networks 33 (2) (May): 101–112. doi:10.1016/j.socnet.2010.10.001.

28. Ogbu, J. (2004) Collective Identity and the Burden of ''Acting White'' in Black History, Community, and Education // The Urban Review. Vol. 36. P. 1-35.

29. Östberg, Viveca. 2003. "Children in Classrooms: Peer Status, Status Distribution and Mental Well-being." Social Science & Medicine 56 (1) (January): 17–29. doi:10.1016/S0277-9536(02)00006-0.

30. Parkhurst, J. T., and A. Hopmeyer. 1998. "Sociometric Popularity and Peer-Perceived Popularity: Two Distinct Dimensions of Peer Status." The Journal of Early Adolescence 18 (2) (May 1): 125–144. doi:10.1177/0272431698018002001.

31. Puckett, Marissa B., Julie Wargo Aikins, and Antonius H.N. Cillessen. 2008. "Moderators of the Association Between Relational Aggression and Perceived Popularity." Aggressive Behavior 34 (6): 563–576. doi:10.1002/ab.20280.

32. Read, Barbara, Becky Francis, and Christine Skelton. 2011. "Gender, Popularity and Notions of In/authenticity Amongst 12-year-old to 13-year-old School Girls." British Journal of Sociology of Education 32 (2): 169–183. doi:10.1080/01425692.2011.547304.

33. Rodkin, Philip C., Thomas W. Farmer, Ruth Pearl, and Richard Van Acker. 2000. "Heterogeneity of Popular Boys: Antisocial and Prosocial Configurations." Developmental Psychology 36 (1): 14–24. doi:10.1037/0012-1649.36.1.14.

34. Rodkin, Philip C., Thomas W. Farmer, Ruth Pearl, and Richard Van Acker. 2006. "They're Cool: Social Status and Peer Group Supports for Aggressive Boys and Girls." Social Development 15 (2) (May): 175–204. aph. doi:10.1111/j.1467-9507.2006.00336.x.

35. Rubin, Kenneth H., William M. Bukowski, and Jeffrey G. Parker. 2007. "Peer Interactions, Relationships, and Groups." In Handbook of Child Psychology. John Wiley & Sons, Inc. http://onlinelibrary.wiley.com/doi/10.1002/9780470147658.chpsy0310/abstract.

36. Ryan, Allison M. 2000. "Peer Groups as a Context for the Socialization of Adolescents' Motivation, Engagement, and Achievement in School." Educational Psychologist 35 (2) (June): 101–111. doi:10.1207/S15326985EP3502_4.

37. Salmivalli, Christina, Ari Kaukiainen, and Kirsti Lagerspetz. 2000. "Aggression and Sociometric Status Among Peers: Do Gender and Type of Aggression Matter?" Scandinavian Journal of Psychology 41 (1): 17–24. doi:10.1111/1467-9450.00166.

38. Schwartz, David, Andrea Hopmeyer Gorman, Jonathan Nakamoto, and Tara McKay. 2006. "Popularity, Social Acceptance, and Aggression in Adolescent Peer Groups: Links with Academic Performance and School Attendance." Developmental Psychology 42 (6): 1116–1127. doi:10.1037/0012-1649.42.6.1116.

39. Skelton, Christine, Becky Francis, and Barbara Read. 2010. "'Brains Before "beauty"?' High Achieving Girls, School and Gender Identities." Educational Studies 36 (2): 185–194. doi:10.1080/03055690903162366.

40. Van Houtte M. 2006. School type and academic culture: evidence for the differentiation–polarization theory // Journal of Curriculum Studies. V. 38. P. 273-292.

41. Vermeij L., van Duijn M., Baerveldt C. 2009. Ethnic segregation in context: Social discrimination among native Dutch pupils and their ethnic minority classmates. Social Networks. V.31. P. 230-239.

42. Wentzel, Kathryn R., Carolyn McNamara Barry, and Kathryn A. Caldwell. 2004. "Friendships in Middle School: Influences on Motivation and School Adjustment." Journal of Educational Psychology 96 (2): 195–203. doi:10.1037/0022-0663.96.2.195.

43. Wigfield, A., J. S. Eccles, and D. Rodriguez. 1998. "Chapter 3: The Development of Children's Motivation in School Contexts." Review of Research in Education 23 (1) (January 1): 73–118. doi:10.3102/0091732X023001073.

44. Woltman, Heather, Andrea Feldstain, J. Christine MacKay, Meredith Rocchi. 2012. "An introduction to hierarchical linear modeling." Tutorials in Quantitative Methods for Psychology 8(1): 52-69.

Appendix.

1. "Study-Involvement" scale (from Van Houtte, 2006; translated into Russian and adapted by SESL HSE – St.Petersburg [Alexandrov et al., 2012])

   1.School is just a waste of time

   2.Only with a good education can one get a good job

   3.There are some school subjects that we discuss with my classmates after lessons

   4.My grades are more important for my parents and teachers than for myself

   5.I am so interested in some school subjects that I do extra work (read additional literature, go to science club, etc.)

   6.I am willing to commute to school if the school is good

   7.My friends make fun of people who work hard at school

   8.It is interesting for me to study in school

   9.Even those who do not do well in school can achieve success in life

2. Factor analysis results of Study-Involvement Scale. For factor analysis, all the items were recoded such that a higher score reflected a more positive attitude towards school and learning.

Rotated-Component Matrix[a]

	Component		
	1	2	3
3. There are some school subjects that we discuss with my classmates after lessons	0,689		
5. I am so interested in some school subjects that I do extra work (read additional literature, go to science club, etc.)	0,649		
6. I am willing to commute to school if the school is good	0,617		
4.My grades are more important for my parents and teachers than for myself (REVERSED)		0,690	

7.My friends make fun of people who work hard at school (REVERSED)		0,636	
1.School is just a waste of time (REVERSED)		0,595	
8.It is interesting for me to study in school		0,431	
2.Even those who do not do well in school can achieve success in life (REVERSED)			0,738
9.Only with a good education can one get a good job			0,707

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Vera Titkova, National Research University Higher School of Economics, Sociology of Education and Science Laboratory, researcher.

E-mail*: tvera.v@gmail.com*

Tel.: +7 812 400 13 47