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ADOLESCENTS**

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DIFFERENT LEVELS OF SOCIAL ORGANIZATION IN THE FORMATION OF ANTI-SCHOOL ATTITUDES AMONG ADOLESCENTS³

This article analyzes student pro-school/anti-school attitudes on different levels and explores their relation to educational outcomes. We examine the individual level, school level, and clique level predictors (clique is defined as a tight social group within a class social network). Cliques were identified using special software called Kliqefinder. We use multi-level regression approach on a sample of 7300 students from 104 public schools from St.Petersburg. Our findings show that: 1.) Socio-economic differentiation of Russian schools does not lead to a polarization of pro-school/anti-school attitudes in different types of schools; 2.) The polarization of attitudes emerges and is maintained at the clique level; and, 3.) Clique attitudes have a significant impact on educational outcomes (net of a student's socio-demographic characteristics and individual attitudes).

JEL Classification: I21, C12.

Keywords: pro-school/anti-school culture, peer effects, social network analysis, cliques.

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Introduction

Many research projects that are focused on race- or class-based differences in educational outcomes seek an explanation of these differences in the peer-pressure effect and the emergence of a specific “anti-school culture” among racial (ethnic) minorities or children from working-class families. Nearly all research in this field has been looking at the level of individuals or the level of schools. In our study, we propose a new approach to this problem. We hypothesize that pro-school/anti-school culture originates and is maintained within small groups of school friends, called cliques.

This approach has been made possible by the novel methods of social network analysis. 104 St. Petersburg schools (with 7300 enrolled students) forms the empirical basis for this study.

International research into anti-school culture

The problem of anti-school culture was first tackled in the anthropological studies of John Ogbu and Paul Willis (Ogbu, 1978, 2004; Willis, 1977). John Ogbu studied the conduct of American school students from racial and ethnic minority groups and concluded that often minorities, reluctant to associate themselves with the mainstream, formed an “oppositional culture”, i.e. they rejected the norms and values accepted in and approved by society. Ogbu argued that school students were motivated to perform well at school when they expected that a good education would secure a more prestigious and well-paid job or a higher social status for them. But when these expectations systematically failed to be realized – when minorities constantly ran into obstacles that were non-existent for the majority – they became convinced that education would not make them successful. The result of this was the development of an oppositional culture that denied the value of education.

There have been two strands in the research of anti-school culture: the quantitative strand, based on large surveys, and the qualitative one, based on interviews and observations at schools and on a detailed analysis of case studies. Americans have authored the majority of the available quantitative research, while the British have conducted the bulk of the qualitative research .

American researchers of education have been applying Ogbu’s term “oppositional culture” to education. The oppositional culture hypothesis has been used to explain the poor academic performance of non-white students in comparison with their white peers. Numerous studies carried out in the US demonstrate that the differences in academic achievement between black and white students hold true, even when controlled for socio-economic status (Farkas, 2002).

According to one of the hypotheses, black school students do not apply themselves to study out of fear that they will be accused of “white” behavior and betrayal of their race – known as “acting white”. Signithia Fordham, Ogbu’s co-researcher that mostly used ethnographic methods, coined the term “acting white”. Scholars studying the “acting white” phenomenon arrived at contradictory conclusions. While there have been many observations that seemed to confirm the existence of this phenomenon, there are just as many studies denying its wide occurrence. Opponents of the “acting white” hypothesis claim that black adolescents are by no means a monolithic group and can have a variety of identities with different attitudes toward studying. Other researchers point out that disapproval of conduct that “imitates” whites is more often aimed at dressing styles, music tastes, diction, and only very rarely to school performance (Carter, 2005; O’Connor, 1999; Tyson et al, 2005).

Ainsworth-Darnell and Downey set out to test the oppositional culture hypothesis statistically, using large national samples (Ainsworth-Darnell and Downey, 1998, 2002). In their first study they used the NLES (National Education Longitudinal Study) as the basis for comparing African American, Asian American, and white high school students. They discovered that African American students were more inclined to value education and in general had optimistic educational expectations, which is obviously at odds with Ogbu’s hypothesis. Meanwhile, it transpired from teacher reports regarding the conduct and attitudes of their students that African American students were less disciplined, spent less time on homework, and were more inclined to violate school regulations. With control for socio-economic status, the difference in school marks between white and black students significantly decreased, and disappeared altogether when study-related variables reflecting skills and habits were added to the model. The researchers came to the conclusion that their findings did not support the “oppositional culture” hypothesis (Ainsworth-Darnell and Downey, 1998). They obtained largely similar results using a different empirical base, such as the NAEP (National Assessment of Educational Progress) (Ainsworth-Darnell and Downey, 2002).

Farkas and his co-authors, who disagreed with the conclusions of Ainsworth-Darnell and Downey, used the same national dataset, but applied different questions for measuring oppositional culture. They confirmed the existence of an oppositional culture, although not in all schools, but only in those where the student body was largely comprised of African Americans (Farkas et al., 2002).

An important contribution to the discussion was made by Roland G. Fryer, whose research demonstrated that “acting white” ought to be studied contextually. Fryer and Torelli discovered

that acting white had an effect on the academic performance of black students in schools with high levels of interracial contact, but was practically absent in racially homogenous schools (Fryer, Torelli, 2010).

Paul Willis, the pioneer of the English tradition of inquiry into the oppositional culture, wrote his famous book “Learning to Labor” on the basis of ethnographic observations and interviews with high school students conducted both during their school years and after graduation.

Willis claims that working-class adolescents (“working class lads”) consciously reject education because they do not believe in the fairness of a capitalist society and do not see any benefit in studying well; they know beforehand that, no matter how much they apply themselves, their future holds nothing in store for them but manual labor, which does not require any knowledge.

Theory of differentiation-polarization

The English tradition of qualitative theoretical research gave birth to Hargreaves’s theory of differentiation/ polarization (Hargreaves, 1967). The theory is based on a study regarding tracking in British schools – the placement of students into different education tracks with different curricula. According to this theory, tracking creates a visible educational inequality, which gives rise to two polarities – pro-school and anti-school attitudes – among school students. Students placed in lower tracks experience status deprivation and, as a result, develop an anti-school culture. The polarization of attitudes widens the gaps in the educational achievement of students from different social backgrounds.

The theory was tested several times, mostly by British scholars, who have generally concluded that the theory is true (Abraham, 1989; Ball, 1981; Boaler et al, 2000). These scholars mostly used qualitative methods based on case studies and focused on the experiences and feelings of students placed in different tracks and on how this led to the polarization of attitudes.

Recently, this theory has been addressed in studies conducted by the prominent Belgian educational researcher Mieke van Houtte and her students (van Houtte, 2006; van Houtte & Stevens, 2009; van Houtte et al, 2012). They set out to test the Hargreaves theory by quantitative methods, and their study of Belgian schools supported it. Their big research project compares attitudes among students attending schools of two different types: secondary schools preparing for institutions of higher learning (general schools) and schools offering vocational or occupational training. In the first study, which covered 34 schools (15 general schools and 19 vocational schools) and 3760 students, multi-level analysis showed that the type of school had a considerable impact on student academic culture. This effect persisted with control for individual

characteristics (gender, socio-economic status, abilities) (Houtte, 2006). Van Houtte pays particular attention to the issue of pro-school culture (referred to “study culture” in her article) and argues that this indicator, measured for a sample of students, reflects a school’s general level of academic culture because the culture of an institution – a school in this case – mostly remains constant over long periods of time and is passed on from one generation to another. When new students join the school, they adopt its dominant rules and norms.

In their second study (van Houtte et al, 2012), based on a representative national sample (85 schools with 12,000 students), the Belgian sociologists analyzed the effects of different curricula (academic and vocational) by comparing different kinds of tracking: between schools (interschool) and within a school (intra-school). The researchers found no differences between interschool and intra-school tracks for students studying under general (academic) curricula. But differences were found for students receiving a vocational education: the levels of academic culture in the intra-school tracking group were lower than in interschool tracking. Contrary to expectations, the levels of academic culture were found to be more polarized in situations of intra-school tracking than in those of interschool tracking. The researchers concluded that when different tracks co-exist within a school, students from the lower tracks become even more stigmatized than when they study at separate schools, and this negatively affects their attitudes to learning (van Houtte & Stevens, 2009; van Houtte et al, 2012).

The Russian Context

The Russian school system is highly stratified. Social selection and differentiation in schools began in the late 1980s and early 1990s, which process is aptly described in the works of Galina Cherednichenko and David Constantinovsky. The uniform and homogenous system of Soviet schools split up, spawning a multitude of school types. Cherednichenko divides them into two major categories: “schools for the masses” with a standard curriculum, and “privileged” education establishments, including both traditional schools with enhanced coverage of foreign languages or mathematics and gymnasia and lyceums, established in the 1990s (Constantinovsky, 1998; Cherednichenko, 1999). The social composition of the student body in these two types of schools differs considerably. Parents with high cultural or economic capital are keen to send their children to gymnasia and other specialized schools. And unlike in the stratified education systems of Germany or the Netherlands, where children get streamed into different schools beginning from the age of 10 or 11 and where the streaming is based on a child’s academic performance in primary school, in Russia the stratification starts from the age

of 7, when schooling begins, and is based on the social status of the child's family, not on his or her abilities.

Social stratification at the point of entry results in differentiated outcomes at the point of exit: The comparison of standard schools with gymnasia, lyceums, and specialized schools brings out sharp differences between these two categories in terms of current grades, scores on the Uniform State Exam, and numbers of children dropping out of school after the 9th grade (Alexandrov et al, 2012).

Russia, therefore, is an interesting example of a country whose school system is obviously stratified, thus providing a satisfactory testing ground for the theory of differentiation-polarization.

The theory of differentiation-polarization focuses on the differences between tracks within schools or between types of schools, with the tacit assumption that all children placed in a certain track share certain norms and attitudes typical for a given social milieu, and that particular individuals with visibly different attitudes find themselves either in isolation or being sanctioned.

But numerous studies on the social psychology of adolescence, beginning from the classic works of Coleman and up to the present (Coleman, 1981; Fryer & Torelli, 2010), claim that an adolescent's circle of close friends has a definitive impact on his or her conduct, educational performance, and educational choices. Social milieu within a school or a track is not homogenous – it consists of numerous microgroups. We argue that it is within these microgroups that a polarization of attitudes mostly takes place. Students who have close ties with each other and spend much time together come to share attitudes and sentiments, which can differ from the attitudes and sentiments of other close-knit peer groups in the same school. A school's average attitudes (school culture), therefore, can conceal quite a substantial polarization of attitudes between groups of adolescents.

Our approach to analyzing pro-school and anti-school cultures is novel because we propose to look at yet another level between the individual and the school – the level of “cliques of friends”. We define “cliques of friends” (hereinafter referred to simply as “cliques”) as close-knit groups of students within a class. The algorithm for identifying cliques is set forth below. We argue that it is the clique level, not the school level, that has the biggest impact on the final result – a student's educational achievement.

Statement of problem and hypotheses

In this study, we pursue two objectives. First, we test the differentiation–polarization hypothesis using Russian schools as the testing ground. Second, we compare the influence of different levels of student social milieu – specifically, the level of pro-school / anti-school culture – on educational outcomes. We shall compare the influence both at the clique level and at the school level. In accordance with the objectives, we put forward the following hypotheses:

Hypothesis 1. The socio-economic differentiation of schools leads to a situation where students at schools with enhanced curricula (gymnasias, lyceums, specialized schools) have more pro-school attitudes in comparison with their peers at standard schools (the differentiation – polarization effect).

Hypothesis 1a. The effect of the type of school on pro-school / anti-school attitudes among students persists when controlling for individual attitudes and socio-demographic characteristics.

Hypothesis 2. Peer-group effects are stronger within friendship social networks than at the level of a class or a school, and students form small groups (cliques) on the basis of their educational plans and attitudes to school and learning.

Hypothesis 2a. The level of pro-school attitudes at the clique level is positively related to student's GPA when controlling for individual attitudes and aggregated school-level attitudes.

Multi-level regression analysis will be applied to tackle these objectives and to corroborate or refute these hypotheses.

Data and methods

Sampling

The data about social ties inside classes were gathered via a questionnaire survey of school students. The survey was conducted in the spring of 2010 in St. Petersburg schools. Respondents included 9th and 10th grade students (ages 15-16). The population in our study consists specifically of general state-run schools of St.Petersburg (598 schools); private schools, corrective schools, primary schools, and boarding schools were not included into the sample. The schools were selected using two-stage stratified sampling. The strata were identified with reliance on data provided by the St.Petersburg Committee for Education. The schools were divided into two strata: schools with a standard curriculum, and enhanced schools (gymnasias, lyceums, and schools with an enhanced coverage of certain subjects). At the first stage, 30

schools were randomly selected from the first stratum and 10 from the second stratum. At the second stage, 60 small schools were added to the sampling because our preliminary research showed that these schools had the highest concentration of children from minority migrant families. To this end, all schools in the sampling were divided into two strata depending on the number of students: more than 450, or less. Small schools were randomly selected from the general listing of schools with a head count below the specified amount. Because the stratification was based on externalities and each stratum comprised of a known number of schools, one can calculate the weighed coefficients for extrapolating the results to the general population. The survey covered 7063 respondents from 104 schools, including the 9th and 10th grades of each school. The project was supported by the St.Petersburg Committee for Education, and because of this the school participation level was very high: Only one school out of 104 declined to participate and was replaced with a school from the backup list.

The questionnaires were self-administered. The surveys in schools were all-encompassing, meaning that the sheets were distributed to each student irrespective of his or her migration history and native language.

The questionnaire included questions for eliciting information on socio-demographic characteristics, grades, educational plans, and socio-psychological attitudes. The network part of the questionnaire included questions about a student's social ties. A student could name up to 10 other students from his or her class with whom he or she had social ties. Because all students present at the school on the day of the survey participated, we have full information about each. The questionnaires were not anonymous, which was necessary for producing a complete picture of networks within the classes. All names were removed when the dataset was processed; making the final dataset used in the analysis fully anonymous.

Description of the variables

Pro-school attitudes. The levels of pro-school attitudes were measured with an adapted version of the study engagement scale (Van Houtte, 2006; Van Houtte, Stevens, 2009) consisting of eight items: "School is a waste of time", "Studying at school is interesting for me", "My grades are more important for my parents and teachers than for me", "Some disciplines interest me so much that I devote extra time to them", "Even people who study poorly can succeed in life", "I'm willing to commute to a remote school if it is a good one", "Only a good education can secure a good job for you", "There are subjects that I and my classmates discuss after the

lessons”. Students were asked to indicate their degree of agreement with these statements on a scale from 1 (totally disagree) to 4 (completely agree). While calculating the index, all replies were re-coded unidirectionally, such that a higher place on the scale meant a higher degree of pro-school attitudes. Reliability of this scale (Cronbach alpha) equals 0.65. The index of individual attitudes of students was calculated as simple average of all items.

GPA (grade point average) is the average grade from the preceding academic term for five disciplines (Russian language, mathematics, a foreign language, physics, and biology).

Socio-economic status of student’s families was coded from open-ended questions about the parent occupations. We used questions from the questionnaire of the Programme for International Student Assessment (PISA): “What is your mother’s professional occupation?” and “What does she do at work?” These questions were asked about both parents. Then a specially trained coder mapped data from the replies according to ISCO-88 standards (International Standard Classification of Occupations). When possible, the data were coded into 4-digit codes; when impossible, data were coded into at least 2-digit codes. Then, using a tool developed by Harry Ganzeboom and available on his site⁴, the ISCO codes were converted to ISEI (International Socio-Economic Index of Occupational Status) scores (Ganzeboom, Treiman D, 1996).

Parent’s education. This is a binary variable, with 0 meaning that neither parent has a higher education and 1 meaning that at least one of the parents has a higher education.

The migrant minority status (hereinafter simply “migrant status”) was assigned to children whose families came to Russia from the countries of Central Asia or the Southern Caucasus, or from the republics of the Northern Caucasus, *and* whose parents’ native language is not Russian. Thus, Russian families who came from the Commonwealth of Independent States (CIS) were not included into this category. Nor were Ukrainians and Belarusians classified as migrant minorities, because their languages, religions, and cultures are very close to that of the Russian majority.

Type of school. This is a binary variable, with 0 for schools with a standard curriculum, and 1 for specialized schools, i.e. gymnasias, lyceums, and schools with enhanced coverage of certain subjects.

⁴ <http://home.fsw.vu.nl/~ganzeboom/pisa/>

The method

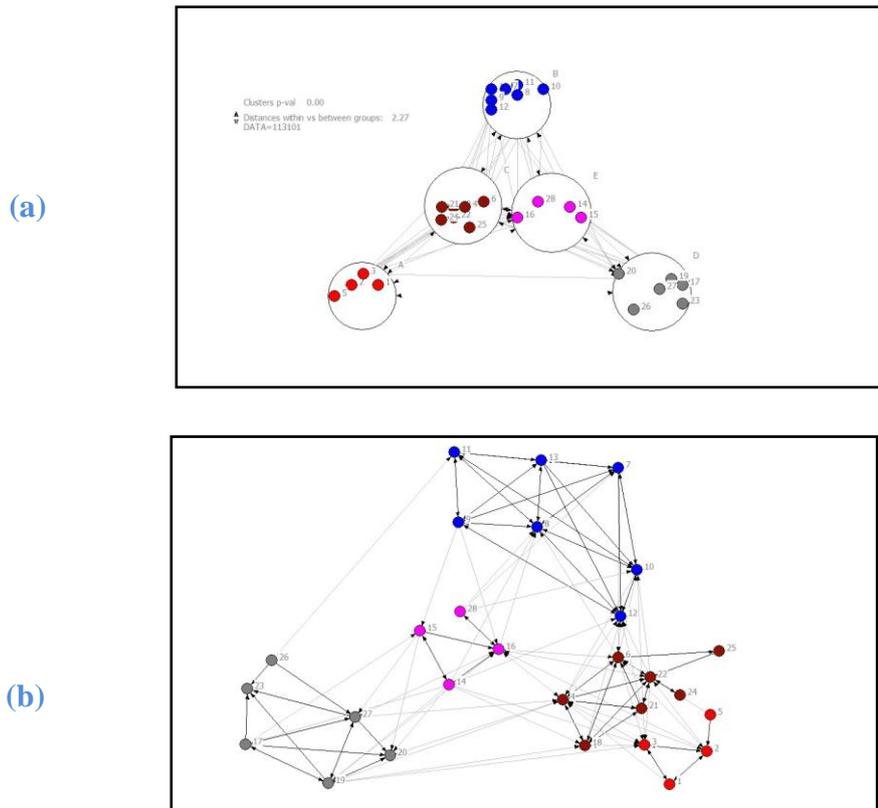
Multi-level hierarchical regression was used for the data analysis. This is a traditional tool for an analysis of hierarchically arranged samplings, such as when students are grouped in schools. In addition to the individual and school levels, we introduced the clique level – level of tightly-knit peer groups.

Identification of cliques within classes

We identified cliques relying on the complete data about networks within classes that we had at our disposal. In real life, networks are never uniformly dense and always include groups of nodes more closely connected to each other than to other nodes within the network. The mathematical theory of networks identifies several types of such groups, depending on different characteristics: k-cliques, k-cores, and k-plexes. Presently, there is an immense amount of algorithms (community detection, modularity detection) for identifying denser sections within a network. For all the differences between these algorithms, their function is to locate structures whose internal ties are denser than their external ties.

We used the Kliquefinder tool, which was developed by Kenneth Frank (Frank, 1995) specially for the purpose of identifying cliques in small collectives. For many years, Frank, a sociologist of education, and his colleagues have been successfully applying this tool for identifying cliques of students and teachers. It should be noted that a clique identified with Kliquefinder is not a clique in the mathematical sense, i.e. it is not an element of a network where every node is connected to every other node. Frank employs a less rigid concept of clique that reflects a non-academic meaning: a close-knit group of people who socialize with peers from their group more than with peers from outside the group. Cliques identified by this tool do not overlap with each other. The drawing below illustrates the result of Kliquefinder's application to a class network comprised of five identifiable social cliques.

Figure 1. Graphic representation of social cliques in a school class. (a) Output from Kluefinder (b) NetDraw layout



Cliques within a class' social networks were identified only in those classes where at least 75% of students answered network-related questions. Classes with a high percentage of absent students or students who did not answer the network-related questions were excluded from the analysis. After the exclusion of such classes, we were left with 309 classes (5905 children).

Results

Table 1 presents the descriptive statistics (mean and standard deviations) for all variables used in the models for the two types of schools: schools with a standard curriculum (ordinary schools) and specialized schools (gymnasias, lyceums, and schools with enhanced coverage of certain subjects). These schools are markedly different with respect to all characteristics (except

proportions of gender representation). Ordinary schools have a lower share of parents with a higher education, family socio-economic status is lower, the proportion of minority migrant children is higher, grades are lower, and the level of pro-school attitude is lower.

Table 1. Descriptive statistics of dependent and independent variables used in the statistical models: comparison of the student characteristics in two types of schools.

	Ordinary schools	Gymnasia, lyceums, enhanced schools	t-test (signif.)
	Mean (SD)	Mean (SD)	
% of parents with higher education	53.2 (0.49)	72.9 (0.44)	t=17.8 (p<0.001)
Socio-economic status (ISEI family) <i>(number of missing values)</i>	44.83 (12.66) (394)	49.84 (13.47) (326)	t=15.3 (p<0.001)
GPA <i>(number of missing values)</i>	3.61 (0.55) (13)	3.74 (0.57) (14)	t=9.6 (p<0.001)
Pro-school attitudes	2.86 (0.46)	2.94 (0.43)	t=8.5 (p<0.001)
% of migrants	10.0 (0.29)	5.4 (0.24)	t=5.7 (p<0.001)
% of girls	49.6 (0.50)	51.1 (0.50)	
N students	3221	3842	

Tables 2 and 3 contain the descriptive statistics of cliques identified with the use of Kliquefinder. Each class has between 2 and 7 identifiable cliques; each clique includes from 1 to 16 individuals. The average size of clique is 5.3 persons. There were 31 one-person cliques – in other words, only about 0.5% of students were not affiliated with one or another peer group in their classes.

Table 2. The number and size of cliques in classes

	Minimum	Maximum	Average	Standard deviation
Number of cliques in a class	2	7	3.86	1.09
Number of children in a clique	1	16	5.31	2.19

The cliques have the following gender composition: About one third of the cliques were boys only, a little less than one third were girls only, and 36% were mixed-gender cliques. As for migrant status, only 0.5% of cliques consisted of migrant minority students only. One third of the cliques were mixed, and 65% of the cliques did not have any migrant minority students.

Table 3. Gender and ethnic composition of the cliques (only for cliques consisting of more than one person)

Composition of the cliques	All-boys cliques	All-girls cliques	Mixed-gender cliques	All-migrants cliques	All-non-migrants cliques	Migrant & non-migrants cliques
N cliques	344	332	385	5	690	366
% cliques	32.4	31.3	36.3	0.5	65	34.5

In order to test the first hypothesis about the differentiation-polarization effect in a Russian context, we build a series of models in which student pro-school attitudes serve as a dependent variable and school type is the main independent variable. Because the social composition of students in the two types of schools differs considerably, these parameters should be controlled for. We build a two-level hierarchical model with the characteristics of schools on level 2, and the characteristics of students on level 1. The results of this series of models are presented in Table 4.

Table 4. Relation between school type and levels of pro-school attitudes

Fixed Effect	Model 0	Model 1	Model 2
Level 2			
Intercept	2.895 (0.019) ***	2.861 (0.011) ***	2.785 (0.016) ***
<i>Type of school</i>		0.075 (0.038) **	0.053 (0.037)
Level 1			
Gender (reference category - boy)			0.109 (0.015) ***
Migrant			0.089 (0.023) ***
ISEI family			0.001 (0.0006) **
Parents education (reference category – no higher education)			0.057 (0.018) ***
Random Effect			
r^2_0 (var (u_0))	0.098 (0.009) ***	0.089 (0.008) ***	0.088 (0.008) ***
*p < 0.05; p < 0.01; ** p < 0.001 ***			

Model 0, which has no explanatory variables, shows that the school level accounts for 5% of the dependent variable's variation, and variation at the school level is statistically significant.

An explanatory variable – school type – is introduced in Model 1. This variable is significant at the 5% level, and the model shows that students from enhanced schools have a higher level of pro-school attitudes in comparison with students from ordinary schools.

At the next stage – Model 2 – we introduce control variables for the first level: gender, migration status, the family's socio-professional status, and the parent's education. As anticipated, pro-school attitudes are positively related to a higher socio-professional status and parents with higher education. Besides this, girls and minority migrant children have higher pro-school attitudes.

The most important finding of Model 2 is that, after introducing control variables for the first (individual) level, the school level-effect disappears altogether. In other words, the level of pro-school attitudes is completely determined by students individual characteristics, as well as the characteristics of their families. Apparently, differences in the level of pro-school culture between different school types that are identifiable in the descriptive statistics and in Model 1 are due to the differences in the composition of the student body in these two types of schools. The findings of the statistical models disprove hypothesis 1 because the school type itself does not have an effect on the level of a student's individual pro-school / anti-school attitudes. Therefore, the differentiation-polarization hypothesis does not bear out in the Russian context.

We then proceed to build a second series of models in order to find out what level of student milieu produces the strongest impact on their educational outcomes. To compare the influence of the school level and the level of a student's circle of friends, we build a 3-level model: the individual, his or her clique, and his or her school. The results are presented in Table 5.

Model 0 shows the distribution of variations between the three levels of analysis. The school level accounts for 7% of the dependent variable's variation, while the level of cliques accounts for 18%.

Variables at the individual level are introduced in Model 1. It is clear that nearly all of them (except migration status) are meaningfully related to a student's grades. Female gender, a parent with higher education, and a family's higher socio-professional status are positively related to grades. When all these parameters are controlled for, high levels of pro-school attitudes at the individual level, too, are positively related to grades.

The variable of academic culture is introduced in Model 2 at the school level. This parameter, in this model, is significant. Yet, after the introduction of a new variable, pro-school attitudes at the clique level, the school level is reduced to insignificance while the clique level becomes very important statistically. The following conclusion suggests itself from the model's results: For students with largely similar socio-demographic characteristics and motivation levels who study at schools of the same type, levels of their friends' pro-school / anti-school attitudes significantly affect their educational outcomes. Hypotheses 2 and 2a, therefore, bear out.

Table 5. Relation between pro-school attitudes and educational outcomes (GPA)

Fixed Effect	Model 0	Model 1	Model 2	Model 3
Level 3				
Intercept	3.66 (0.032)***	3.466 (0.019)***	3.459 (0.019) ***	3.465 (0.019) ***
<i>Pro-school (school level)</i>			0.349 (0.155) **	0.222 (0.189)
Level 2				
<i>Pro-school (clique level)</i>				0.265 (0.076) ***
Level 1				
Gender (reference category - boy)		0.243 (0.021) ***	0.243 (0.021) ***	0.232 (0.021) ***
Migrant (ref. category – non-migrant)		-0.029 (0.048)	-0.027 (0.046)	-0.041 (0.047)
ISEI family		0.004 (0.001) ***	0.004 (0.001) ***	0.004 (0.001) ***
Parents education (ref. category – no higher education)		0.109 (0.023) ***	0.107 (0.023) ***	0.106 (0.023) ***
Pro-school (individual level)		0.233 (0.028) ***	0.228 (0.028) ***	0.189 (0.033) ***
Random Effect level 1-2 var. components				
R ₀ (var)	0.241 (0.058) ***	0.152 (0.023) ***	0.153 (0.023) ***	0.151 (0.023) ***
GenderGirl slope, r3		0.246 (0.06) ***	0.249 (0.062) ***	0.253 (0.064) ***
Random Effect level 3 var. components				
u ₀₀ (var)	0.152 (0,023) ***	0.118 (0.014) ***	0.105 (0.011)***	0.100 (0.01) ***

Discussion

Research into pro-school and anti-school attitudes and their influence on educational outcomes has a rich history. Depending on a particular researcher's objectives, the focus was either on the individual attitudes of students (Ainsworth-Darnell & Downey, 1998; Farkas et al., 2002) or on general characteristics of an education institution, defined as "school climate", "school culture", or the "academic culture of a school" (Hoy & Hannum, 1997; Esposito, 1999; Van Houtte, 2006).

The novelty of our approach to this problem consists in including into the analysis a student's circle of close friends – his or her social networks within his or her class. Everyone acknowledges that peer influence is an important factor that has an enormous impact on different aspects of the development of children and adolescents. We use methods of network analysis for identifying dense peer groups (cliques) inside schools and classes and analyze their influence on student educational outcomes in comparison with the influence of a school's general climate.

The Russian system of secondary school education during the last 20 years has experienced a deep differentiation (Cherednichenko, 1999). Thus, 43% of state-run schools in St. Petersburg are gymnasia, lyceums, and schools with an enhanced coverage of certain subjects. About 50% of students attend such schools, according to information provided by the St. Petersburg Committee for Education (2010). These two types of schools have a markedly different student body composition : parents of students at gymnasia and other enhanced schools have a higher education and socio-professional status and there are fewer minority migrant students at such schools. As a result of differentiation "at the point of entry", there are significant differences in educational outcomes: at standard schools, on average, current grades are lower, proportions of children leaving school after the 9th grade in order to continue education in colleges and vocational lyceums are higher, and scores at the Uniform State Examination are considerably lower (Alexandrov et al., 2012). Considering all this, one could expect these two types of schools to have different levels of academic culture. This so-called differentiation-polarization effect has been observed in many European countries practicing intraschool or interschool tracking (Abraham,1989; van Houtte et al., 2012).

However, despite the large differentiation among schools, we failed to detect a polarization of attitudes at the school level. Indeed, the level of pro-school attitudes on average is higher at gymnasia, lyceums, and specialized schools, but these differences are fully accounted for by the composition of students. Children of educated parents generally have more positive attitudes

towards schooling, and the type of school does not produce an additional effect on their educational attitudes.

One of the first studies to prove the significance of peers for race-based differences in education achievement and ambitions was the famous Coleman study (Coleman, 1966). After Coleman, numerous researchers of school education used the concepts of “peer effect” and “peer pressure”. However, it should be pointed out that there is no generally accepted definition for “peers”. Usually this word applies to an adolescent’s reference group, against whose judgment he or she evaluates him or herself. Often, because of a lack of detailed data about a respondent’s social circle, their classmates, or fellow school students were considered as the peer group (Coleman, 1966; Sacerdote, 2001; Angrist, Lang, 2004). There is no doubt that a class or a school as a whole can serve as an influential environment. However, with such a standardized approach, the important information about interactions between small groups within a class or a school seems to become lost, and this information is especially valuable when the opinions and attitudes of groups are polarized. We believe that it is important to separate the effect of school climate from the direct influence of a student’s social circle.

A detailed study on the influence of a student’s close friends requires the use of specially collected data about student social networks and special methods for processing this data. As modern methods of social network analysis have been developing as of late, researchers in ever increasing numbers have been using them. For example, we can refer to Add Health, a national longitudinal study of American school children, and the Children of Immigrants Longitudinal Survey in Four European Countries, a cross-country longitudinal study based on data from Germany, Netherlands, Sweden, and the UK.

We used our own network data about the social ties of students within their classes in order to study the effect produced by a student’s close circle of friends and to compare it with the school’s effect. We produced a complete picture of social networks within classes and identified tightly knit social groups, known as “cliques”. We analyzed the influence of pro-school and anti-school attitudes within cliques on education outcomes of students, while controlling for individual characteristics.

Many variations in grades are accounted for by motivations (pro-school attitudes) at the clique level, in addition to individual pro-school attitudes. We thus show that a polarization of attitudes takes place at the level of close-knit peer groups.

In our previous work, we analyzed how school students choose friends among their classmates. With control for gender, socio-economic status, and migration status, we found homogeneity in education plans and pro-school/anti-school attitudes (Ivanyushina, Alexandrov, currently in print). It can be argued that certain educational attitudes are shared within small companies of friends, or cliques. The results of the hierarchical regression analysis show that it is these “group attitudes”, net of individual characteristics, that produce a major impact on educational outcomes.

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