



First-generation students' educational outcomes: The role of parental educational, cultural, and economic capital – A 9-years panel study

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ABSTRACT

We examined the role of parental educational, cultural, and economic capital in differences between first-generation students' (FGS) and continuous-generation students' (CGS) educational outcomes: enrollment in a selective university, university performance, the probability of dropout, and the probability of pursuing a master's or PhD program. We analyzed data from nine waves of a cohort of 5000 Russian students surveyed yearly from 2012 to 2020. We applied structural equation modeling that allowed to conduct a multiple multivariate regression analysis and to correct for measurement error. We found that FGS are 10.8 percentage points less likely to choose a selective university and are 10.7 percentage points less likely to choose to follow a graduate program. But they do not differ from CGS in university performance and the likelihood of dropout. FGS are clearly positively selected on capitals and performance, but they still have on average less parental capital and worse school performance than CGS. Parental educational and cultural capitals partly explain the differences in educational outcomes between FGS and CGS, because they improve school and university performance. Cultural capital is an especially important mediator for choosing a selective university, while educational capital is important for the other three educational outcomes. Parental economic capital plays no role in explaining educational differences between FGS and CGS. Generally, FGS and CGS benefit equally from parental capital, except FGS profiting less from parental educational capital when entering a graduate program.

1. Introduction

According to recent research and government reports, first-generation students (FGS) – whose parents do not have a university degree – are one of the most vulnerable categories of students in universities (Beattie, 2018; Cataldi, Bennett, Chen, & Simone, 2018; Engle & Tinto, 2008; Kojaku, Nunez, & Malizio, 1998; Spiegler & Bednarek, 2013). Compared to continuing-generation university students (CGS), who have at least one parent with higher education, FGS are less likely to get enrolled to a selective university (Giancola & Kahlenberg, 2018; McGann, 2017; Pretlow, Jackson, & Bryan, 2020), they are more likely to have poor educational performance (Grayson, 1997; Pascarella, Pierson, Wolniak, & Terenzini, 2004), their risk of dropout is considerably higher (Cataldi et al., 2018; Engle & Tinto, 2008; Ishitani, 2003),

and they are less likely to follow a graduate program (Carlton, 2015; Wagner, Alderson, & Spetz, 2020). The disadvantaged position of FGS is part of a wider societal problem. In 2008–2015, it concerned a sizable group, varying from 30 % in Canada and the US to more than 70 % in Italy and Portugal (Orr, Gwosć, & Netz, 2011; RTI International, 2019; Spiegler & Bednarek, 2013). FGS are a sign of upward social mobility and decreasing educational inequality (Beller, 2009; Erikson & Goldthorpe, 1992; Sorokin, 1927, 1959). But for those FGS who drop out, social mobility does not take place. As a consequence, educational inequality may not be reduced.

At first sight, an obvious explanation for FGS' poorer educational outcomes is that they come from families that lack capital that is important for education. Parental capital can enhance students' performance (primary effect), but also can affect educational choices, for

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example, by increasing the probability that students choose to continue studying at higher levels regardless their educational performance (secondary effect) (Boudon, 1974; Bukodi, Goldthorpe, & Zhao, 2021; Karlson & Holm, 2011). Parental educational capital⁴ was found to explain part of the difference between FGS and CGS students in South Africa (Brubacher & Silinda, 2021), Canada (Grayson, 2011), and in the US (Dumais & Ward, 2010; Jenkins, Belanger, Connally, Boals, & Durón, 2013; McCarron & Inkelas, 2006; Verdín & Godwin, 2015). Cultural capital obtained at home can explain differences in educational outcomes in the US (Phillips, Stephens, Townsend, & Goudeau, 2020; Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012; Tate et al., 2015). And FGS also more often come from low-income families, which partly explains their relatively poor educational performance in the US (Engle & Tinto, 2008; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996; Warburton, Bugarin, & Nuñez, 2001). However, other studies do not find that parental capital explains the difference in performance between FGS and CGS. For example, Wells (2008) shows that parental capital does not mediate the effect of being FGS compared to CGS on college persistence in US community colleges (Wells, 2008).

Although the number of studies on different educational outcomes of FGS and CGS is increasing, very few studies show to what extent parental capital explains these differences. The focus of most of these studies is either on how parental capital influences educational outcomes, or on how FGS and CGS differ with respect to parental capital. For understanding the role that parental capital plays, both parts are necessary, preferably estimated in one model (Brubacher & Silinda, 2021).

There are several possible explanations for the differential findings of previous studies with respect to the role of parental capital. First, these studies look at different outcomes, ranging from students' performance and wellbeing to their persistence in higher education and graduation. It is very likely that different types of parental capital affect these outcomes differently. For example, parental educational capital may especially foster students' performance, whereas economic capital may determine whether students who perform equally well persist in higher education or not.

Second, it is very likely that FGS students have less parental capital, but are positively selected on other characteristics (Mare, 1980a). These other characteristics helped them take the hurdles towards the entrance of higher education (selection hypothesis). These may either be individual characteristics (e.g., cognitive capacity), or family characteristics (e.g., other forms of capital). The selection hypothesis points towards a decreasing effect of parental capital with each consecutive educational transition due to selection. Previous studies vary with respect to the extent to which they take selection on individual characteristics into account. Studies that don't do this are less likely to find effects of parental capital because the presumed lack of parental capital of FGS is counteracted by their positive selection on these individual characteristics. Studies also differ in the number of different forms of capital included in the study. If relevant forms of parental capital are excluded, this may either lead to an overestimation or an underestimation of effects of forms of parental capital that are included. Overestimation occurs because forms of capital are likely positively correlated, and one form may pick up the effect of the excluded other form. Underestimation may occur if FGS students are positively selected on the excluded forms of parental capital. If instead of excluding individual characteristics or forms of parental capital, weak measures are used, over- and underestimation may also take place, but to a lesser extent.

Finally, differences in educational outcomes between FGS and CGS could also result from CGS benefiting more from parental capital compared to FGS (reinforcement hypothesis). Only few studies have

investigated these interaction effects. For example, it has been found that CGS benefit more from their parental financial support in the US (Roksa & Kinsley, 2019). However, other studies do not show evidence of such interactions. According to Terenzini et al. (1996), FGS do not gain less or more in educational performance from family income and parental support in the US. And family cultural capital does not have differential effects for FGS' and CGS' grade point averages and the likelihood of graduation in the US (Dumais & Ward, 2010).

The aim of this paper is to examine systematically the role of parental educational, cultural, and economic capital in FGS' and CGS' educational outcomes. We improve on previous research by (1) investigating multiple forms of parental capital; (2) distinguishing multiple outcomes: the probability of enrollment to a selective university, university performance, the probability of dropout, and the probability of following a graduate program; (3) estimating a structural equation model (SEM) to show the mediating role of parental capitals, (4) taking major forms of selection into account and investigating to what extent selection plays a role; (5) measuring forms of capital with many items and correcting for measurement error; (6) distinguishing between primary and secondary effects of parental capital specifically for university outcomes. Particularly, we ask the following questions: (1) to what extent do FGS, compared to CGS, have poorer educational outcomes? (2) To what extent do FGS, compared to CGS, have less parental capital (selection)? (3) To what extent does parental capital explain the difference in each of the educational outcomes between FGS and CGS (mediation)? (4) To what extent does parental capital affect educational outcomes of FGS versus CGS via primary and secondary parental effects? (5) To what extent do FGS benefit less from parental capital compared to CGS (moderation)?

We analyzed data from nine waves of a cohort of 5000 Russian students surveyed annually in 2012–2020, aged on average 14 in 2012 and 24 in 2020 (Kurakin, 2014; Malik, 2019). This study provides an excellent opportunity to follow students through the crucial period of transitioning from school to university and progressing within university. Another advantage of these data is that they contain more than 88 items related to parental educational, cultural, and economic capital. We applied structural equation modeling to conduct a mediation analysis and to correct for measurement error.

2. Theory

2.1. The effect of parental education on parental educational, cultural, and economic capital

FGS by definition are students of whom both parents have no university degree. It is well known that families with higher educated parents are also advantaged with respect to other forms of capital. In the first place, they have more "educational capital" – all kinds of education related activities and attitudes of parents, such as educational expectations of parents towards children, parental involvement in schools, and parental involvement in all kinds of students' educational activities. A higher education is related to more educational capital in three ways. First, people with higher education are more likely to expect their children to also obtain higher education. Second, higher educated parents experienced higher levels of education themselves, and thus have more knowledge about how to assist their children in obtaining a high level as well. And third, higher educated parents are more likely to be involved in their children's school life than lower educated parents. Empirical studies have shown robust support for these expectations (Mishra, 2020).

It has also been proposed that higher educated parents have more cultural capital (Bourdieu, 1973, 1986; Bourdieu & Passeron, 1977; Jenkins, 1992; Lin, 2001). For people who already possess more cultural capital, it is not only easier to get enrolled in a university, but they also internalize cultural capital offered by school more effectively because it does not essentially differ from their home norms and values (London,

⁴ We define "educational capital" as all kinds of education related actions, beliefs, expectations, and attitudes of parents towards their children. See more elaborations in the theory section.

1992a). Thus, parents with higher education are more likely to have high cultural capital.

Finally, a high educational level of parents positively affects their economic outcomes because education is an investment leading to economic benefits including a higher occupational status, more secure job, higher income, and more wealth (Becker, 2009; Maringe, 2015; Schultz, 1961). It has been shown multiple times that high educated people are economically better off than low educated people (Benzoni & Chyruk, 2015; Mincer, 1974; Wahrenburg & Weldi, 2007). Having no university degree leads to lower incomes and wealth. Thus, we expect lower educated parents to have less capital or, in terms of FGS and CGS, we hypothesize that FGS have less parental educational, cultural, and economic capital than CGS (Hypothesis 1).

Hypothesis 1 does not take into account that there are selection processes in entering universities (Mare, 1980a). It is very likely that parents without a university degree have less educational, cultural, and economic capital than parents with a university degree, but this need not be true for those parents without a university degree of whom the children enter university. These may be parents with a lot of cultural capital who – for some reason – did not enter university themselves. Or parents who did not obtain a university degree, but who were very successful on the labor market anyhow. Alternatively, it may be that FGS are exceptionally bright and therefore were able to stay in the educational system until the highest level, although they lacked support from their parents. If selection on parental capital played a role, then we may find that FGS do not have less parental capital than CGS. But we would also expect that FGS have more parental educational, cultural, and economic capital compared to children who do not enter university and do not have parents with higher education (Hypothesis 2).

2.2. Mediation effects of parental educational, cultural, and economic capital on different educational outcomes

2.2.1. Entering a selective university

Formally, all Russian universities have the same level. However, the government granted special statuses: “national research university” (NRU) and “federal university” (FU) – to universities that are of special importance for the priority areas of research determined by the government (NRU) or are of special importance for the socio-economic development of Russian regions (FU). The NRU and FU statuses were mostly granted to universities that were already prestigious. With these statuses, the universities received additional financial resources and other privileges, such as more freedom in educational programs, courses, and curricula structure and content, which made them even more prestigious. Prestigious universities are more selective than other universities. Enrollment in universities is possible for students who passed the Unified State Exam (USE), or by taking entrance exams (for students from vocational secondary education). Selective universities impose additional requirements to the minimum USE grade for each subject. If students pass the minimum requirements, their submissions are accepted, but only those with the highest grades are enrolled according to the number of available study places for each particular program.

Selective universities not only have higher entrance requirements, but they also ask higher tuition fees, and are located farther away from the hometown of a randomly selected student. We therefore expect a lack of economic capital to be especially prohibitive for studying in a selective university. Parental economic capital including income and wealth has been theorized to have short-term and long-term effects on educational outcomes (Huang, Guo, Kim, & Sherraden, 2010), of which the short-term effects are most relevant for entering and studying at a selective university. According to the *borrowing constraints theory* parents with higher economic capital are more willing and able to borrow money to cover immediate educational costs for their children such as paying tuition fees, renting/buying an apartment close to the university, buying a car, or paying travel costs (Ellwood & Kane, 2000; Kane, 1996). These parental interventions may enable students to study at selective

universities that demand high tuition and are often far away from home (secondary effect). The long-term economic mechanism implies that parental income and wealth influence educational outcomes via, in particular, cognitive ability development through paying for additional courses, buying books and developing games, etc. (Cameron & Heckman, 1998; Carneiro & Heckman, 2002). This mechanism will be mainly indirect via performance in secondary school (primary effect).

Parental educational capital will mainly affect the likelihood to enter a selective university indirectly by raising students’ performance in secondary education and thereby their likelihood to obtain high grades in the exams. There may also be a small direct effect of parental cultural capital as families with little cultural capital might not see the additive value of studying in a selective university.

We hypothesize that especially economic capital directly mediates the effect of FGS on entering a selective university, whereas cultural capital does so to a lesser extent. We do not expect educational capital to directly mediate the effect of FGS (Hypothesis 3a). We hypothesize that especially educational capital indirectly (via performance) mediates the effect of FGS on entering a selective university, whereas economic and cultural capital do so to a lesser extent (Hypothesis 3b).

2.2.2. University performance

In order to perform successfully, students have to put effort in studying, have time and energy to do homework and for self-study; have to understand and interpret the assignments correctly; and need some discipline. It is especially parental educational capital that may help students in this respect. If parents value a good education more positively and have higher educational expectations of their children, children also become more motivated to invest effort in their studies. Parental involvement with their children’s education motivates them and may even directly help them to perform well if their parents have some knowledge on the topic of their study or know how to study in an efficient way. It has been found that parental expectations and involvement are positively associated with educational outcomes, however, these studies have been almost exclusively focused on school (not university) outcomes (Castro et al., 2015; Đurišić & Bunjevac, 2017; Gokturk & Dinckal, 2018; LeFevre & Shaw, 2012; Serna & Martínez, 2019).

Parental cultural capital can also play a positive role for performance, albeit less than parental educational capital. Teachers and administrators can recognize the status of students via specific cultural codes embedded in language, and behavioral patterns, and deliberately or unintentionally create a more beneficial environment for students with much cultural capital (London, 1992b). Students who do not receive this “benefit of the doubt” may be more easily discouraged when receiving lower grades, and subsequently loose motivation to study hard.

Higher parental economic capital may increase educational performance by allowing students to fully concentrate on studying. In contrast, students from poor families may be forced to work while also studying in a university. Research in Eastern European countries, however, has shown that students from privileged families are as likely to work as students from poorer families (Beerkens, Mägi, & Lill, 2011). Whereas students with little parental economic capital work for economic reasons, those with more parental economic capital work to signal their ambition. Besides this, the effect of working on performance was found to be small (Beerkens et al., 2011). Educational performance in university may also be positively affected by the long-term economic mechanism discussed in the previous paragraph. This effect will be largely indirect via secondary school performance, as most of these parental investments in children’s development are done when the children are small (Cameron & Heckman, 1998; Carneiro & Heckman, 2002).

We hypothesize that especially educational capital directly mediates the effect of FGS on university performance, and cultural and economic capitals to a lesser extent (Hypothesis 4a). We also expect the indirect

effect of educational capital via school performance to be the strongest among all indirect effects of capitals (Hypothesis 4b). Note that in this case both the direct and the indirect mediating effects are primary effects.

2.2.3. The probability of dropout

There are many reasons why students may drop out of university. They may do so because of low educational performance, because they do not feel at home at the university, because they cannot pay to study further, or because alternatives outside of university are more attractive to them (Mouton, Zhang, & Ertl, 2020; Spady, 1971; Tinto, 1975). Most students drop out shortly after entering university. According to Mouton et al. (2020), the main reason for such early dropouts is a lack of fit between the student and the university. We therefore expect parental cultural capital to be a main predictor of students' dropout. If the cultural differences between home and school environments are prominent, cultural adaptation requires more efforts and imposes more burden on students. This discrepancy between the university and home environment has been conceptualized under different labels as: *margins of two cultures* (London, 1992a), *cleft habitus* (Bourdieu, 2004), *culture shock* (Gofen, 2009), and *cultural schism* (FGS students should sacrifice something from their "previous" life) (Lee & Kramer, 2013). Regardless the labels, they all state that a cultural mismatch between family's norms and values and the university environment makes students feel less at home at the university. Students with less parental cultural capital may therefore be especially at risk of dropping out of university.

A lack of economic capital may also be prohibitive for continuing education. However, because most dropouts occur early in the study, we assume that most of them are not driven by economic reasons. It is more likely that people with few economic resources would not apply for a university at all. Thus, the main selection on economic capital has already occurred before applying to a university. Parental educational capital may affect dropout as well, but mainly indirectly through students' performance in university.

We hypothesize that especially cultural capital directly mediates the effect of FGS on the probability of dropout, whereas educational and economic capitals do so to a lesser extent (Hypothesis 5a). We hypothesize that especially educational capital indirectly (via school and university performance) mediates the effect of FGS on the probability of dropout, whereas economic and cultural capital do so to a lesser extent. (Hypothesis 5b).

2.2.4. Following a graduation program

After successfully obtaining an undergraduate diploma, students can choose to follow a graduate program. This decision occurs very late in the educational career. It is only relevant for students who took all previous hurdles and because entrance to graduate training is selective, it will strongly depend on university performance and performance during the entrance exams. We expect that the parental capitals will affect this educational outcome only indirectly via performance. Students are now at least 21 years old. With increasing age, people become more independent of their parents, making direct effects of parental capital less likely (Rijken, 1999). This is also true because of the strong selection that has already taken place (Mare, 1980b). Any remaining parental influence will probably be invisible because it is counteracted by selection on unmeasured student characteristics, such as intelligence and motivation. But we do expect primary effects of parental capital – and especially educational capital. Throughout their life students of parents with much educational capital have profited from this with better performance. Good performance at an early age also tends to make good later performance more likely (DiPrete & Eirich, 2006). It increases self-confidence but also affects the expectations of parents and teachers.

We do not formulate a hypothesis on direct mediation effects of parental capitals. We hypothesize, however, that especially educational capital indirectly mediates the effect of FGS on entering a graduate

program via school and university performance, whereas cultural and economic capitals do so to a lesser extent (Hypothesis 6a) Fig. 1.

2.3. Reinforcement mechanism

It can be expected that CGS benefit more from parental capital compared to FGS. According to the relative risk aversion model, an important reason for all parents to intervene in educational choices of their children and strive for higher levels of education for them is to avoid downward mobility for their children (Breen & Goldthorpe, 1997). FGS have already reached a higher educational level than their parents. But for CGS not successfully completing university, would mean that they are downwardly mobile compared to their parents. With a lower educational level, they would also be unlikely to reach the same standard of living and status as their parents. Even if CGS and FGS have equal amounts of parental capital, the parents of CGS would be more likely to actively use their capital to improve their children's university career.

Therefore, we hypothesize that the positive effect of parental educational, cultural and economic capital on the likelihood of enrollment to a selective university, university performance, and the likelihood of following a graduate program is weaker for FGS compared to CGS (H7a); and that the negative effect of parental educational, cultural and economic capital on the likelihood of dropout of students is weaker for FGS compared to CGS (H7b).

3. Data

We analyzed data from the "Trajectories in Education and Careers" (TrEC) – an ongoing cohort panel study of about 5000 young people nested within 196 schools in 43 Russian regions, and 3264 of their parents⁵ (Kurakin, 2014; Malik, 2019). The sample for the first wave was constructed by the "Trends in Mathematics and Science Study" (TIMSS) project's team. In the first stage, sixteen large Russian regions were distinguished; within each large region, nine strata with different levels of urbanization were formed; within each stratum, a random sample of schools was selected, then a random eighth-grade class (if there was more than one) within each school was picked and all students from the selected class were surveyed (Joncas & Foy, 2012). In 2012, one year after the TIMSS sample was constructed, the TrEC's research team collected data for the first wave. The now ninth-grade pupils (age 15–16) and their parents were surveyed. In the first wave, students filled out the questionnaires mostly in their classroom, and a minority by telephone interview. The pupils were surveyed each consecutive year, the parents only once at the first wave (2012). Parental characteristics were measured by asking parents directly via the parental questionnaire. In the consecutive waves, Computer Assisted Web Interview (CAWI) became the most used data collection method: from 76 % in 2015 to 94 % in 2017 (Malik, 2019).

Compared to the initial TIMSS sample, the response rate was: 69 % – for wave I, 86 % – for waves II–III, and on average 78 % – for waves IV–IX. Thus, there were more people surveyed in Wave II compared to Wave I, for example. Potential factors of non-response, such as individual or school refusal, weather, or individual mobility, are discussed in Malik et al. (2019, pp. 131–132). We additionally conducted a Poisson regression analysis of the number of waves a person participated in the study on a set of independent variables (Table A.1, Appendix A). Table A.1 shows that the following variables have a significant effect: educational capital, school performance, female, age in 2012, minority status, and level of urbanization. We controlled for these variables in all

⁵ This work includes data from the Russian panel study "Trajectories in Education and Careers" (TrEC – <http://TrEC.hse.ru/>). Support from the Basic Research Program of the National Research University Higher School of Economics is gratefully acknowledged.

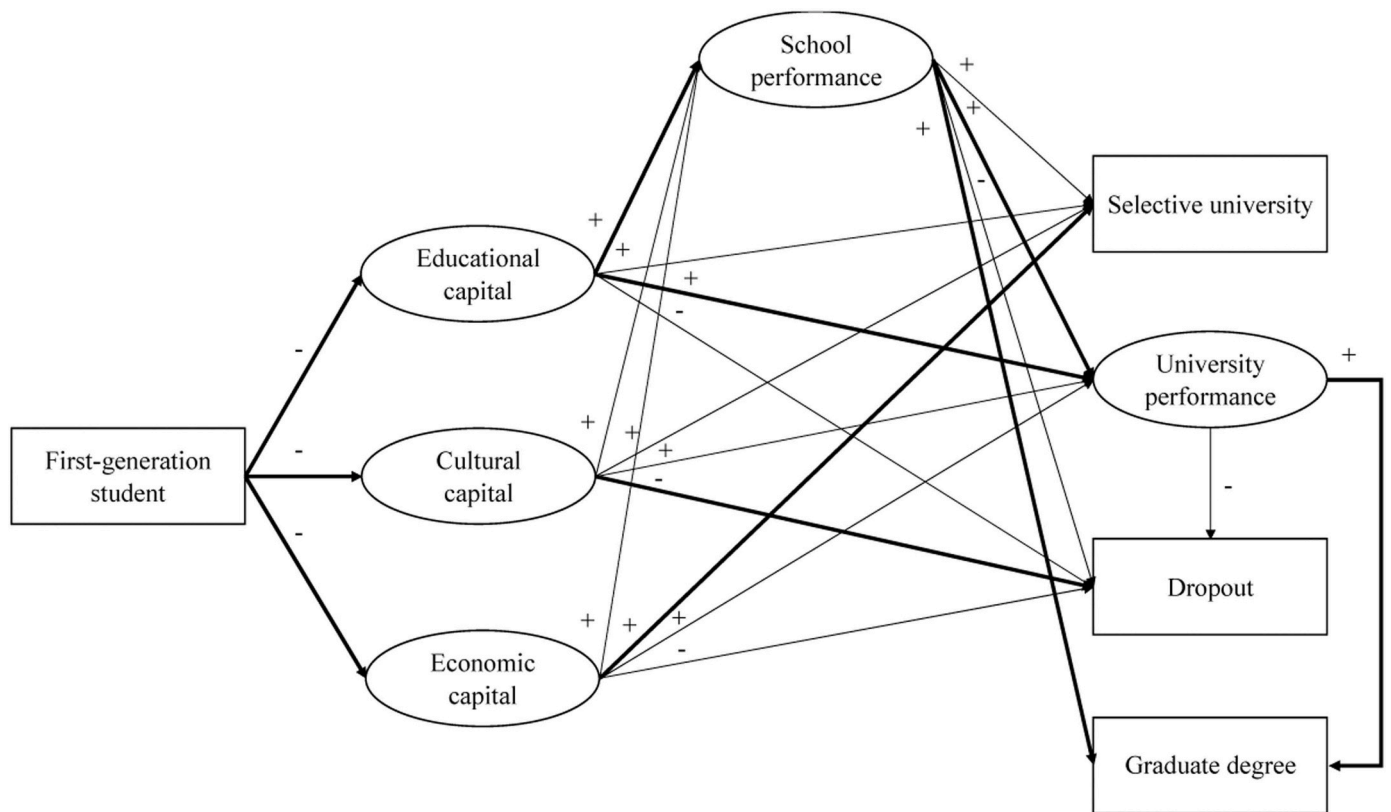


Fig. 1. The theoretical SEM-model of the study. Note: The solid arrows indicate which of the direct and indirect effects we expect to be strongest per educational outcome. As will be described in the measurement section, variables in ovals are latent variables, variables in squares are measured variables.

our models.

We selected waves I–IX (2012 – 2020). Because waves 2013 (autumn) and 2014 (spring) cover the same academic year, we recovered missing data on education in 2014 by replacing them from wave 2013 ($N_{recovered} = 193$). At wave nine, the participants were either university or vocational college students, or finished their education (age 23–24). The final sample consisted of three groups of respondents: university students with parents with higher education – continuous generation students (CGS, $N = 1139$); university students without parents with higher education – first generation students (FGS, $N = 955$); and people who have never been enrolled to a university and do not have parents with higher education ($N = 900$). In most of our analyses we compare FGS with CGS, but for the selection hypothesis, we compare FGS with the third group.

4. Measurements

4.1. Dependent variables

Selective university enrolled. Students were asked in which university they were enrolled in 2015 – 2018. We measure whether the first university they were enrolled in was selective. For a more elaborate description of the Russian educational system, see Appendix B. We assign a university to be selective if it had a status either “federal university”, or “national research university”, or it belonged to the top-25 best Russian universities in 2015, according to the Rating Agency RAEX (Appendix C). In our sample, 25.35 % of students studied in a selective university which is very close to the national proportion of students that were enrolled in selective universities in 2015 – 26.02 %.⁶

⁶ The report for 2015 is published here: <https://ege.hse.ru/rating/2015/65122482/gos/>

Appendix D presents the methodology that we used to calculate the national proportion of students. Descriptive statistics for all variables can be found in Table 1, and Table 2 present the correlation matrix for all variables.

University performance. We created this variable as a latent variable based on 18 items measured in 2015–2017 containing (1) self-evaluation of grades, ranging from “only excellent”, to “mostly satisfactory”; and (2) self-extracted grades from the record book for the most recent five courses. Grades range from 1 to 5. The reliability coefficient of this variable is 0.925. We ran a confirmatory factor analysis (CFA) on the items and saved factor scores and standard errors for each student. We used the full information maximum likelihood (FIML) estimator to impute missing values. The full list of the items for all latent variables, their descriptive statistics including correlation tables are presented in Appendix E. Fit indices for all CFA-models, reliability coefficients, and factor loadings are presented in Appendix F.

Dropout – a binary variable showing whether a student dropped out from the university. Because the question was explicitly asked only in waves 2015–2017, we constructed another variable based on the students’ level of education and diploma obtained in 2014–2020. We considered students as dropped out as of year t (value label – “1”) if they were studying in a higher education program (bachelor, specialist, master) in $t-1$ year, but did not study in year t anymore and did not possess a diploma from the higher education program where students were studying in year $t-1$. We also assigned students as dropouts if they were studying in a lower level of education program in year t compared to year $t-1$ and did not possess a diploma from $t-1$ year of education program in year t . We assigned students as “not drop out” (value label – “0”) if persons were studying in a higher education program in year $t-1$ and they continued studying in that program in year t or they obtained a diploma from that program (or higher level) in year t . According to our measure, of all people ever enrolled to universities, about 26.50 % dropped out at least once. Our statistic is very close to a statistic reported

Table 1
Univariate statistics for FGS, CGS, and people who did not study at a university and did not have parents with higher education.

Variables	FGS (N = 955)					CGS (N = 1139)					No university & No higher educated parents (N = 900)				
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Selective university	889	0.143		0	1	1101	0.247		0	1					
University performance, latent	931	0.062	0.948	-3.922	1.801	1108	0.077	0.934	-2.709	1.801					
Ever dropped out	840	0.269		0	1	1048	0.253		0	1					
Graduate program	955	0.185		0	1	1139	0.294		0	1					
Educational capital, latent	952	0.129	0.750	-3.495	1.553	1138	0.470	0.542	-3.813	1.633	897	-0.725	1.026	-3.538	1.446
Cultural capital, latent	954	-0.095	0.806	-2.262	1.948	1138	0.401	0.760	-1.908	1.948	898	-0.47	0.828	-2.262	1.948
Economic capital, latent	954	-0.002	0.741	-2.515	2.607	1139	0.347	0.842	-3.058	3.377	898	-0.407	0.786	-2.440	2.703
School performance, latent	944	0.153	0.920	-2.866	2.181	1130	0.471	0.914	-1.538	2.181	864	-0.677	0.728	-2.628	2.175
Female	955	0.594		0	1	1139	0.525		0	1	900	0.426		0	1
Age in 2012	955	15.894	0.476	14	17	1139	15.839	0.468	14	17	900	16	0.560	14	18
Minority	946	0.222		0	1	1118	0.191		0	1	892	0.212		0	1
Urban	955	0.559		0	1	1139	0.658		0	1	900	0.474		0	1

Note: continuous variables except age are standardized based on the pooled sample of all respondents. For the analysis, all continuous variables except age were standardized within the final analytic samples: a pooled sample of FGS and CGS together and a pooled sample of FGS and respondents with no university & no higher educated parents together.

by Kolotova (2011) – 26.7 % and by Shmeleva and Froumin (2020) – 25 %. Online Appendix G presents more elaborations on the validity of our measure.

Graduate degree measures whether the student has ever been enrolled to a master’s or PhD program in 2012–2020. According to our calculations, 24.77 % of bachelor or specialist students have ever been enrolled to a master’s or PhD program.

4.2. Independent variables

First-generation student – a binary variable that takes the value “1” for students who do not have parents with a higher education diploma (FGS) and “0” – for CGS. Parental education was measured in wave I (2012). According to our data of all persons from this cohort, 61.93 % have ever been enrolled in a higher education institution; and among those who have ever been enrolled in higher education institutions, 45.6 % of students are FGS. We have also created another binary FGS2 variable that has the value “1” when a person is FGS, and “0” when a person did not enroll to a university and does not have a parent with a higher education.

Educational capital. We estimated this latent variable based on 19 items measured mostly by the parental questionnaire when children were still studying in grade 9 in secondary school (2012), thus, before students were enrolled to universities. Measuring parental capitals before university enrollment prevents the problem of reverse causality when parents react to low university performance of their children. The items originate from four subscales: (1) *Parental school involvement*, (2) *Parental support with education*, (3) *Parental expectation*, and (4) *Parental orientation towards education versus money*. The reliability coefficient is 0.853. We assume that these measurements are good approximations of parental educational capital also in later life, when respondents were following university education.

Cultural capital. We estimated this latent variable based on 9 items that can be grouped into: (1) *Number of books* at home measured in 2012 (parental questionnaire) and in 2013 (student questionnaire), and (2) Whether the family possesses *cultural assets* such as classical literature books of Tolstoy or Pushkin, or art works measured in 2012 (parental questionnaire) and in 2013 (student questionnaire). The reliability coefficient is 0.767.

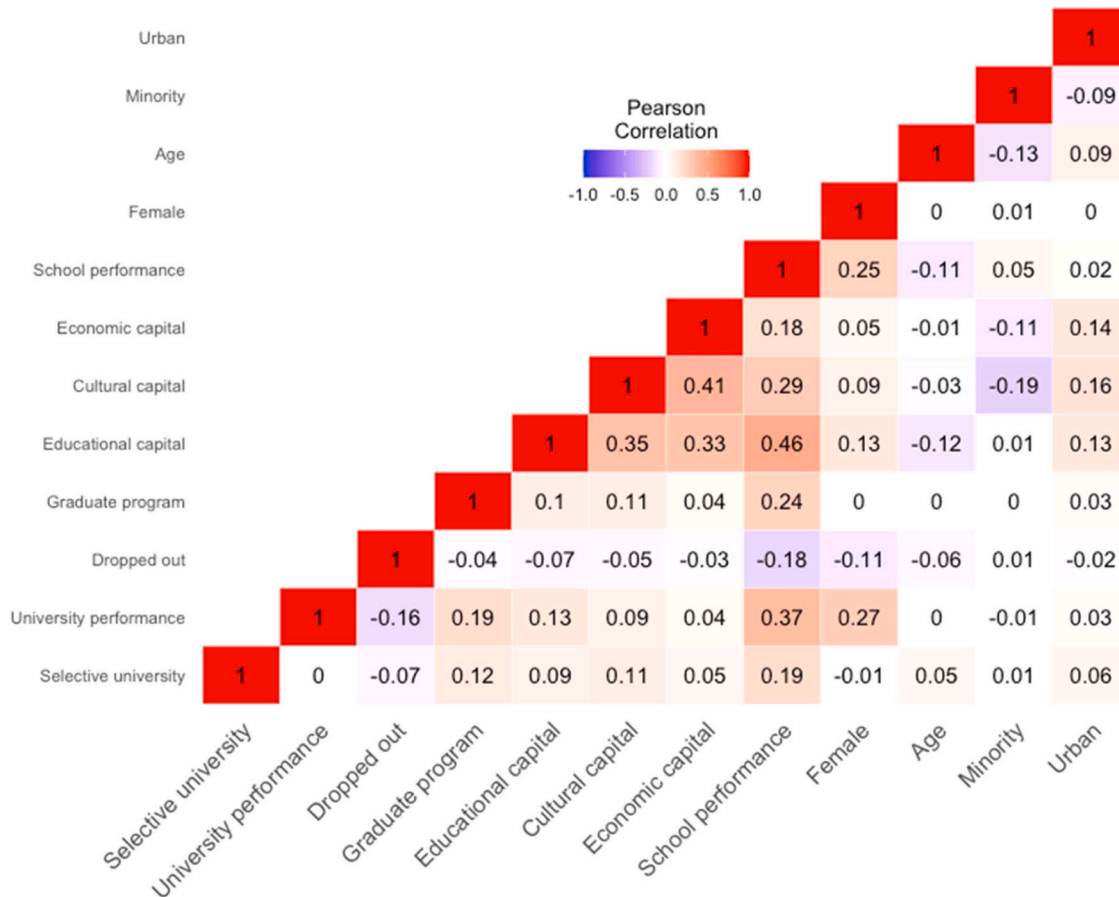
Parental economic capital. We estimated this variable based on 23 items that can be grouped into: (1) *Parental income* measured by the parental questionnaire in wave I (2012) as an approximate monthly family income in five categories. (2) *Economic conditions and property* measured in 2012 and 2013 by the question whether or not parents have and can provide eleven types of goods such as a separate room for studying, internet access, and a laptop. (3) *Number of assets* measured in 2012 by the question of how many of each of five following items the family has: cell phone, TV, computer, car, and bathroom on the scale from 0 to 3 and more. (4) *Self-evaluation* by the students of their *family financial situation* in 2013. The reliability coefficient is 0.811.

4.3. Control variables

School performance. We controlled for this variable to take into account primary parental effects that take place before university entrance (Boudon, 1974). We calculated a latent variable based on 19 items – school grades provided by the students for the main secondary school subjects measured in 2012, 2013, and 2014. Although schools are free to choose their own grade system, a grade system from 1 (bad performance) to 5 (excellent performance) has become the standard. The reliability coefficient is 0.965.

Female. Gender was measured in 2012, 2013, 2019, and 2020. There were some changes in gender (N = 23). In case gender changed two or more times, we assumed gender change was a measurement error and considered the most frequently reported gender as the correct one (N = 9). However, if gender changed only once, we assigned the last

Table 2
Pairwise correlation heatmap of the main variables.



reported gender as the final gender ($N = 14$). It is difficult, but legally allowed to change gender in Russian passports.

Age in years was measured in 2012. We took the age at the first wave.

Minority was measured in 2012 by a question about students' ethnic self-identification. We assigned "0" to Russians and "1" to those who identified with other groups.

Urban residence. We calculated this binary variable based on a question about place of residence asked to students in TIMMS questionnaire in 2011. The original measure contains 3 categories: small towns (< 50,000), towns (100–680,000), cities (>680,000). We recorded towns and cities as urban ("1") and small towns as non-urban ("0").

5. Methods

We applied structural equation modeling (SEM) to test our hypotheses. SEM allows to estimate latent variables, to adjust for measurement errors, and to conduct mediation analysis with multiple dependent and independent variables (Kaplan, 2009; Kline, 2010; Raykov & Marcoulides, 2006). However, if there are multiple latent variables with many items, models not always converge. Our main SEM model contains 5 latent variables with 88 items. In order to overcome the problem of model non-convergence, we conducted our analysis in two steps: first, we estimated measurement models for each latent variable separately by running series of CFA-models, saved factor scores and their standard errors; and then we included the factor scores in the structural model in the second step as a single indicator (latent) variable. In order to correct for the measurement error, we specified the error variance for all single indicator (latent) variables in the structural model. The error variance can be calculated as (Brown, 2015, p. 122; Wang & Wang, 2012, p. 131):

$$Var(error) = Var(X) * (1 - \rho_x) \tag{2}$$

Where, $Var(error)$ is error variance of a single indicator variable X , $Var(X)$ is the observed variance of the single indicator variable, which in our case is the variance of the factor scores, ρ_x is the reliability of the single indicator variable. We calculated the reliability for each latent variable from the results of a confirmatory factor analysis (Raykov, 2004), treating all binary and ordinal items as continuous. We used the following formula:

$$\rho_x = \frac{(\sum_{j=1}^k \lambda_j)^2 * \Phi}{(\sum_{j=1}^k \lambda_j)^2 * \Phi + \sum_{j=1}^k \Psi_{jj} + 2 * \sum_{j<h} \Psi_{jh}} \tag{3}$$

Where, λ_j is the unstandardized loading of item j ; Φ variance of latent variable; Ψ_{jj} residual variance of item j ; Ψ_{jh} residual covariance of items j and h .

Our analyses follow the order of the hypotheses. We controlled for gender, age in 2012, minority status, and level of urbanization. We intentionally did not control for the graduation exams (SFE and USE), because they are heavily affected by parental economic capital and are less related to children's school performance. We ran SEM models with the FIML estimator to impute missing data and with corrected measurement error for latent variables. Because in our sample students are nested within classes, we used clustered standard errors. We did not use weights. We applied linear probability models for binary variables.

We conducted data manipulation and estimated CFA-models in

STATA version 15.1 (Stata Statistical Software v.15.1, 2017), we fitted SEM-models with a package “lavaan” in R version 4.3.0 (R Core Team, 2023; Rosseel, 2012).

6. Results

6.1. Inequality in parental capital and selection

We expected FGS to have less parental educational, cultural, and economic capital compared to CGS. Panel A in Table 3 shows that FGS have less educational capital ($b = -0.499, p < 0.001$), less cultural capital ($b = -0.558, p < 0.001$), and less economic capital ($b = -0.404, p < 0.001$). We reject the null hypotheses for all three types of capital in favor of Hypothesis 1.

At the same time, we expected FGS to have more parental educational, cultural, and economic capital compared to children who also do not have parents with higher education, just like FGS, but who, unlike FGS, do not enter university. Panel B in Table 3 shows that compared to this group, FGS have more parental educational capital ($b = 0.788, p < 0.001$), more cultural capital ($b = 0.406, p < 0.001$), and more economic capital ($b = 0.494, p < 0.001$). Therefore, we reject the null hypotheses for all types of capitals in favor of Hypothesis 2. FGS are positively selected with respect to parental capital, but they still have less parental capital compared to CGS.

6.2. Mediation effects of parental educational, cultural, and economic capital on different educational outcomes

6.2.1. Entering a selective university

Table 4 shows that FGS compared to CGS are 10.8 percentage points less likely to be enrolled in a selective university ($b = -0.108, p < 0.001$). We expected that especially economic capital directly mediates the effect of FGS on entering a selective university, whereas cultural capital does so to a lesser extent. We did not expect educational capital to directly mediate the effect of FGS (Hypothesis 3a). Panel B in Table 5 shows that FGS are 1.7 percentage points less likely to be enrolled in a selective university because of lower cultural capital ($b = -0.017, p < 0.01$), and this is the strongest direct mediation effect. The direct mediation effect of educational capital is statistically non-significant, as expected. However, contrary to our expectations, the effect of economic capital is statistically non-significant as well. Therefore, we found only little support for Hypothesis 3a, only for the direct

Table 3

A SEM-model of the effect on parental capitals of FGS versus CGS (Panel A) and FGS versus People who do not have parents with higher education & did not enroll in a university (Panel B).

Independent variables	Dependent variables		
	Educational capital	Cultural capital	Economic capital
Panel A FGS vs CGS, N = 2063			
FGS	-0.499 (0.046)***	-0.558 (0.048)***	-0.404 (0.046)***
Female	0.176 (0.041)***	0.131 (0.047)**	0.038 (0.041)
Age in 2012	-0.021 (0.050)	0.028 (0.054)	0.078 (0.059)
Minority	0.006 (0.062)	-0.419 (0.075)***	-0.256 (0.076)**
Urban	0.143 (0.059)*	0.187 (0.057)**	0.250 (0.060)***
Panel B FGS vs Children with no parents with higher education & no university, N = 1838			
FGS	0.788 (0.043)***	0.406 (0.046)***	0.494 (0.050)***
Female	0.248 (0.045)***	0.144 (0.048)**	0.004 (0.049)
Age in 2012	-0.173 (0.038)***	-0.003 (0.044)	0.039 (0.062)
Minority	0.091 (0.054)	-0.500 (0.072)***	-0.239 (0.089)***
Urban	0.177 (0.053)**	0.256 (0.059)***	0.294 (0.059)***

Note: Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The dependent variables are standardized. This is a saturated model; therefore, no fit indices are calculated. The independent variables are set free to correlate. In both models, parental capitals are allowed to correlate with each other.

mediation effect of cultural capital, but not for the relative strength of the mediating effects of the capitals.

We expected that especially educational capital indirectly (via performance) mediates the effect of FGS on entering a selective university, whereas economic and cultural capital do so to a lesser extent (Hypothesis 3b). It seems the results are mostly in line with our expectations. Among the indirect effects of interest, the indirect mediation effect of educational capital is the strongest. FGS are 1.4 percentage points less likely to be enrolled in a selective university because of low educational capital and consequently lower school performance. Cultural capital also indirectly mediates the effect of FGS, but less so than educational capital. At the same time, the mediation effect of economic capital is statistically non-significant Tables 5 and 6.

All in all, it seems that cultural capital is the strongest mediator of the effect of FGS on the probability of being enrolled in a selective university. If we compare the direct and indirect effects within each type of capital, we see that the mediation effect of educational capital is mostly indirect via performance. The mediation effect of cultural capital is mostly direct, increasing the likelihood of CGS to enroll in a selective university irrespective of their performance.

6.2.2. University performance

FGS and CGS do not significantly differ with respect to performance in university (Table 4). We nevertheless investigate the role of parental capital, because as discussed before stronger selection of FGS may suppress effects of parental capital. We expected that especially educational capital directly mediates the effect of FGS on university performance, and cultural and economic capitals to a lesser extent (Hypothesis 4a). We also expected the indirect effect of educational capital via school grades to be the strongest among all indirect effects (Hypothesis 4b).

Panel B in Table 5 shows that educational capital is indeed the strongest mediator directly as well as indirectly via school performance. However, the direct mediation effect is unexpectedly positive ($b = 0.056, p < 0.01$). FGS parents have less educational capital, but students with much educational capital perform worse at the university ($b = -0.111, p < 0.01$). This is, however, after taking school performance into account. The indirect mediation effect via school performance is negative as expected ($b = -0.087, p < 0.001$). Students with much parental educational capital – mostly CGS – did better at school, which also positively affects their performance at the university. The indirect effect of cultural capital is negative and statistically significant: FGS have 0.027 standard deviations lower university performance compared to CGS because of lower cultural capital and consequently lower school grades. The effects of economic capital are statistically non-significant. Our findings are not in line with Hypothesis 4a, but support Hypothesis 4b for educational and cultural capital.

When we consider direct and indirect effects together, we better understand why we do not find that FGS perform worse in university than CGS. Positive effects of parental educational and cultural capital on performance that occurred when students were still in secondary school are partially cancelled out by a negative effect of parental educational capital on students’ performance at the university. We will come back to this in the conclusion.

6.2.3. The probability of dropout

We do not find a significant difference between FGS and CGS with respect to their likelihood to drop out of university (Table 4). We expected that especially cultural capital directly mediates the effect of FGS on the probability of dropout, whereas educational and economic capitals do so to a lesser extent (Hypothesis 5a). We also expected that especially educational capital indirectly via school and university performance mediates the effect of FGS on the probability of dropout, whereas economic and cultural capital do so to a lesser extent. (Hypothesis 5b).

Panel B in Table 5 shows that none of the parental capitals directly mediates between FGS and dropout. We thus don’t find support for

Table 4
A SEM-model of the total effect of being FGS on educational outcomes ($N = 2064$).

Independent variables	Dependent variables				
	School performance	Selective university	University performance	The probability of dropout	The probability of choosing a graduate program
FGS	-0.387 (0.047)***	-0.108 (0.021)***	-0.041 (0.045)	0.027 (0.021)	-0.107 (0.019)***
Female	0.497 (0.047)***	0.013 (0.019)	0.558 (0.046)***	-0.122 (0.022)***	0.018 (0.020)
Age	-0.033 (0.055)	0.047 (0.023)*	0.032 (0.046)	-0.064 (0.023)**	-0.005 (0.020)
Minority	0.048 (0.084)	0.030 (0.040)	-0.032 (0.064)	0.003 (0.027)	0.002 (0.028)
Urban	-0.181 (0.071)*	0.028 (0.033)	0.095 (0.053)	0.000 (0.022)	0.015 (0.022)

Note: Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. This is a saturated model; therefore, no fit indices are calculated. The independent variables are set free to correlate.

Table 5
A structural equation model of the direct and indirect effects of FGS on educational outcomes ($N = 2064$).

Predictors	School performance	Selective university	University performance	Dropout	Graduate program
Panel A: Direct effects					
FGS	-0.102 (0.047)*	-0.055 (0.022)*	0.055 (0.046)	-0.008 (0.022)	-0.056 (0.019)**
Educational capital	0.469 (0.043)***	0.012 (0.017)	-0.111 (0.034)**	-0.019 (0.017)	0.014 (0.014)
Cultural capital	0.123 (0.030)***	0.028 (0.013)*	0.008 (0.031)	-0.001 (0.015)	0.025 (0.014)
Economic capital	-0.051 (0.027)	0.019 (0.012)	0.006 (0.025)	-0.005 (0.013)	-0.006 (0.011)
School performance		0.061 (0.014)***	0.371 (0.024)***	-0.056 (0.014)***	0.075 (0.013)***
University performance				-0.049 (0.013)***	0.066 (0.010)***
Female	0.402 (0.044)***	-0.023 (0.019)	0.391 (0.045)***	-0.064 (0.024)**	-0.062 (0.021)**
Age	-0.023 (0.045)	0.046 (0.023)*	0.042 (0.043)	-0.064 (0.023)**	-0.005 (0.019)
Minority	0.084 (0.074)	0.042 (0.037)	-0.046 (0.061)	0.002 (0.025)	0.010 (0.027)
Urban	-0.257 (0.060)***	0.028 (0.031)	0.175 (0.051)**	-0.001 (0.023)	0.017 (0.021)
Panel B: Indirect effects of FGS on educational outcomes, via:					
Educational capital:					
Direct		-0.006 (0.008)	0.056 (0.018)**	0.009 (0.009)	-0.007 (0.007)
Indirect (via performance)		-0.014 (0.004)***	-0.087 (0.010)***	0.011 (0.004)**	-0.020 (0.004)***
Cultural capital:					
Direct		-0.017 (0.007)*	-0.005 (0.018)	0.001 (0.009)	-0.014 (0.008)
Indirect (via performance)		-0.004 (0.001)**	-0.027 (0.007)***	0.006 (0.002)**	-0.007 (0.002)**
Economic capital:					
Direct		-0.007 (0.005)	-0.003 (0.010)	0.002 (0.005)	0.002 (0.005)
Indirect (via performance)		0.001 (0.001)	0.008 (0.004)	-0.001 (0.001)	0.002 (0.001)

Note: Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Fit indices: $\chi^2(1) = 1.354$ ($p = 0.245$), robust CFI = 1, robust TLI = 1, RMSEA = 0.013 (CI [0.000, 0.062]), SRMR = 0.002. The model has a good fit. Parental capitals are allowed to correlate with each other as well as educational outcomes that are not connected with causal links are allowed to correlate with each other.

Table 6
A structural equation multiple group comparison model for educational outcomes for FGS and CGS ($N = 2064$).

Variables	FGS	CGS	Difference
Selective university on:			
Educational capital	0.023 (0.014)	0.069 (0.041)	-0.046 (0.043)
Cultural capital	0.024 (0.017)	0.045 (0.018)*	-0.021 (0.025)
Economic capital	0.027 (0.015)	0.005 (0.017)	0.022 (0.023)
University performance on:			
Educational capital	0.015 (0.038)	0.156 (0.065)*	-0.141 (0.075)
Cultural capital	0.084 (0.044)	0.025 (0.038)	0.059 (0.058)
Economic capital	0.027 (0.045)	-0.045 (0.034)	0.072 (0.056)
The probability of dropout on:			
Educational capital	-0.038 (0.018)*	-0.068 (0.033)*	0.030 (0.037)
Cultural capital	-0.018 (0.023)	-0.004 (0.018)	-0.014 (0.029)
Economic capital	-0.006 (0.025)	0.004 (0.017)	-0.010 (0.030)
The probability of entering a graduate program on:			
Educational capital	0.034 (0.014)*	0.095 (0.026)***	-0.061 (0.030)*
Cultural capital	0.025 (0.019)	0.046 (0.021)*	-0.021 (0.028)
Economic capital	-0.002 (0.019)	-0.021 (0.017)	0.019 (0.025)

Note: standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; the full model is presented in Appendix H. We did not control for school and university performance to capture the difference in the total mediation effects of parental capitals.

Hypothesis 5a.

The table also shows that educational capital is the strongest indirect mediator for the probability of dropout, followed by cultural capital, with the effect of economic capital being statistically non-significant.

FGS are 1.1 percentage points more likely to drop out than CGS because their parents possess less educational capital, and they are less than 1 percentage points more likely to drop out because of less parental cultural capital. The mediating effect of parental educational and cultural capital work through school performance which in turn positively affects university performance. These effects are somewhat counteracted by the negative effect of parental educational capital on university performance that we described in the previous section. Taken together, we found support for Hypothesis 5b for educational and cultural capital.

Overall, parental educational capital is the strongest mediator between FGS and dropout. All mediation effects exclusively operate indirectly via performance.

6.2.4. Following a graduate program

FGS are 10.7 percentage points less likely than CGS to follow a graduate program ($b = -0.107$, $p < 0.001$) (Table 4). We did not expect that parental capitals directly affect this educational outcome because it is so late in the students' educational career. However, we expected indirect effects, and especially that educational capital indirectly mediates the effect of FGS on entering a graduate program via school and university performance, whereas cultural and economic capitals do so to a lesser extent (Hypothesis 6a).

Panel B in Table 5 shows that, as was anticipated, the parental capitals do not directly mediate the negative effect of FGS on following a graduate program. There are, however, two indirect effects via performance of which the indirect mediation via educational capital is the strongest. FGS are 2 percentage points less likely to attend a graduate

program because their parents have less educational capital and this harmed their school performance (but note that this was not the case for university performance) ($b = -0.020$, $p < 0.001$). A lack of cultural capital decreased the likelihood of FGS to attend a graduate program by almost 1 percentage point ($b = -0.007$, $p < 0.01$). The mediation effect of economic capital is statistically non-significant. Thus, we found support for Hypothesis 6a for educational and cultural capital.

For this outcome, we can conclude that overall educational capital is the strongest mediator. The parental capitals operate exclusively indirectly via students' performance.

6.3. Reinforcement effect

We expected the positive effect of parental educational, cultural, and economic capitals on the probability of enrollment to a selective university, university performance, and the probability of following a graduate program to be weaker for FGS compared to CGS (Hypothesis 7a); and the negative effect of parental educational, cultural, and economic capitals on the probability of dropout of students to be weaker for FGS compared to CGS (Hypothesis 7b).

Table 6 shows that the effect of parental educational capital on the probability of entering a graduate program is weaker for FGS ($b = 0.034$, $p < 0.05$) compared to CGS ($b = 0.095$, $p < 0.001$), and this difference is statistically significant ($b = -0.061$, $p < 0.05$). The results also suggest that the unexpected negative effect of parental educational capital on students' performance at the university, after taking school performance into account only exists for FGS. For them the total effect of parental educational capital on university performance is almost zero ($b = 0.015$), indicating that the positive affect via school performance is cancelled out by the negative direct effect on university performance. For CGS the total effect of parental educational capital on university performance is significantly positive. These results are somewhat inconclusive because the difference between the effects for FGS and CGS is not statistically significant. All other differences in the effects of parental capitals are statistically non-significant as well. Therefore, we found minimal support for Hypothesis 7a: only for the effect of parental educational capital on the probability of entering a graduate program.

7. Conclusions and discussion

First-generation students are a big part of the student population in many countries. Previous research showed that they have poorer educational outcomes than continuous generation students: they choose less selective universities, have poorer performance, are more likely to dropout, and are less likely to follow a graduate program. In this study, we asked to what extent the poor educational outcomes of FGS can be explained by parental educational, cultural, and economic capital, and whether FGS benefit less from their parental capital compared to CGS. We tested our expectations on panel data of 5000 Russian students and their parents tracked for 9 years from 2012 to 2020. We applied structural equation modeling to conduct mediation analysis and to correct for measurement error.

We observed that FGS are less likely to obtain some – but not all – educational outcomes compared to CGS in Russia: they are 10.8 percentage points less likely to choose a selective university and are 10.7 percentage points less likely to choose to follow a graduate program. These results are in line with studies in other countries (Carlton, 2015; Giancola & Kahlenberg, 2018; McGann, 2017; Pretlow et al., 2020; Wagner et al., 2020). However, FGS and CGS do not differ in university performance and the probability of dropout, which contradicts some of the previous studies (Cataldi et al., 2018; Engle & Tinto, 2008; Grayson, 1997; Ishitani, 2003; Pascarella et al., 2004). This suggests that FGS strive for successfully finishing university, while CGS try to distinguish themselves by entering high prestige universities and graduate education. It has been argued that with educational expansion – and thus the increase of the share of FGS at universities – such horizontal educational

distinctions have become more important (Lucas, 2001). Also in Russia, families with a longer tradition of attending higher education seem to use this strategy to stay ahead of newcomers.

An obvious explanation for CGS' better educational outcomes is that they – through their parents – have access to more resources than FGS. However, this late in the educational career FGS may be so strongly selected that they no longer differ in this respect from CGS students. We showed that selection indeed occurred: FGS have more educational, cultural, and economic capital than children without higher-educated parents who did not enroll in a university. And, as could be expected, there is also strong performance-based selection: FGS performed much better in secondary school than youngsters with equally educated parents who never enrolled in a university. However, these selection processes were not that strong that they wiped out differences in parental capital or in school performance between FGS and CGS. Parental capitals can therefore potentially explain differences in educational outcomes between FGS and CGS, but it is important to take differences in school performance into account.

In line with Boudon (1974), we distinguish between primary and secondary effects of parental capital. Primary (or indirect) effects are in place when students with more parental capital perform better already in secondary school or at the university and therefore obtain better educational outcomes. We expected that parental educational capital would be most important for students' performance and that primary effects for all educational outcomes would be explained foremost by differences in parental educational capital between FGS and CGS. This is also what we found. The parents of CGS are more involved with their children's education, find education more important, support their children more, and have higher expectations. This results in better performance of their children already in secondary school. The knowledge and abilities obtained in secondary school, in turn make that they also perform better at the university, enter more selective universities, dropout less often and are more likely to enter a graduate program.

However, if we take school performance into account, students with much parental educational capital perform less well at the university than students with less of this capital. This seems especially the case for FGS. We did not expect such a reversed capital effect, but we can imagine two explanations. First, this may be an example of very strong selection of FGS on observed characteristics. Those FGS who made it into university although their parents could not help them and did not have high expectations, must be especially bright. This would result in a negative association between parental educational capital and FGS performance, that would not be causal, but the result of selection. Alternatively, it is likely that FGS parents with relatively much educational capital could still help their children while in secondary school, but no longer after they entered university. If high ambitions and support of these parents made that these FGS entered university with relatively low skills and knowledge, this would also lead to the observed negative association between parental capital and students' performance at university. Again, this would not be a causal effect, but driven by selection processes.

With respect to secondary effects of parental capital – increasing educational outcomes of students with equal performance – we expected differences between the educational outcomes. Selective universities have high tuition fees and because there are relatively few, are often far away from students' parental homes. We therefore expected the parental economic capital would be especially important in explaining why FGS would enter these universities less often. However, the access to economic capital via their parents does not increase students' likelihood to enter a selective instead of a regular university and therefore also does not explain differences between FGS and CGS. Selective universities do provide economic support for their students, including reduction or sometimes even cancellation of tuition fees, and offering affordable accommodation and travel arrangements. They also give (higher) scholarships to the most motivated and bright students. Although this economic support does not completely compensate for higher costs, it

seems enough to give FGS and CGS equal opportunities to enter these universities. We find that entering a selective university is mostly a meritocratic process, with high performance in secondary school as the main predictor. The fact that all Russian universities use the standardized State Final Examination as the main entrance exam may contribute to this.

Some deviation from meritocratic selections is, however, observed as well. Students with more parental cultural capital are more likely to enter selective universities, irrespective of their performance, and this explains part of the difference between FGS and CGS students. This again confirms that obtaining a diploma of a selective university is a form of horizontal educational distinction that is used by families with high status to give their children a lead in society.

We argued that FGS would be more likely to drop out of university because they would feel less at home because of a lack of cultural capital. But we do not observe any secondary effects on university dropout. Dropout seems only driven by student's performance. Maybe the share of FGS in Russia has grown so much in the meantime – approaching 50 % – that they can easily socialize with students with a similar social background.

With respect to the last step in the educational career – entering a graduate program – we expected that secondary effects would no longer play a role and this expectation was supported. Students making this transition are adults and less likely to be influenced by their parents. Compared to younger students they are also more able to obtain financial resources themselves through work. And, after taking many hurdles, especially FGS with little parental capital should be very strongly positively selected. To determine to what extent selection or age is the driving factor requires further investigation. Whereas we expected that CGS would generally profit more from parental resources, we only find this for this specific educational outcome. CGS parents seem to use their educational capital more than FGS parents to improve their children's performance and in the end their likelihood to reach the highest possible level of education. This again indicates that graduate education may be a new form of distinction, used by CGS now that FGS are populating universities in large numbers.

All in all, we conclude that Russian FGS are somewhat less likely to obtain high prestige educational outcomes. This seems partly driven by family strategies towards horizontal educational distinction. But better educational outcomes of CGS are mostly the result of these students performing better than FGS. This makes this form of educational inequality less visible and better defensible. It seems fair that better students obtain better outcomes. But CGS better performance are not entirely the result of innate abilities. Their parents use their educational resources to make them outperform other students.

Our results to some extent differ from those of other studies. For example, parental economic capital plays no role in explaining differential educational outcomes between FGS and CGS in our study. Economic inequality in Russia is high (Russell, 2018), but parents do not seem to use economic resources extensively to help their children through university. This contradicts findings in the US (Engle & Tinto, 2008; Terenzini et al., 1996; Warburton et al., 2001). This may be a real country difference and for example be the result of better support of relatively poor students in Russia or of higher standardization of entrance exams that give students from different backgrounds more equal chances. But it can also be a methodological artifact because the studies on the US did not control for selection and other types of parental capital to the same extent as we did in our study. Only with a truly comparative study can we decide on this.

There remains a difference between FGS and CGS in the probability of choosing a selective university and the probability of choosing a graduate program that cannot be explained by parental capitals or performance. Explanations beyond parental capitals and performance may include personal or family ambitions, students' motivation, the effects of peers or the wider network that are not captured by our measures. Future research could investigate to what extent these factors

play a role. Since they are very likely related to parental capital and students' school performance, it is advisable to study them alongside these variables.

Our study has some limitations. We used the strictest definition of FGS in which both parents did not finish any higher education program regardless of whether they have ever been enrolled in a university. In this respect, our estimates of the differences between FGS and CGS are rather conservative because the CGS partly consist of "half-FGS". Another limitation is that we measured parental capital only before entering universities. This is not a problem for choosing a selective university and probably for university performance, however, it can affect the results for the probability of dropout and the probability of choosing a graduate program. Parental capital may change over time, but we could not take that into consideration.

But our study also has some exceptional strengths. The most obvious one is the extensive measurement with many items of three types of capital, and school and university performance. Using SEM, these measures are corrected for measurement error. This allows more reliable conclusions on mediating effects of parental capital as primary effects (via and to performance) and as secondary effects compared to studies with less extensive and uncorrected measures. Furthermore, we tested hypotheses on FGS students in a new context.

In conclusion, we have shown that parental educational and cultural capital play a role in the disadvantaged position of first-generation students in Russia. Even when they have the same cognitive potential, children from less advantaged families are struggling in making their way to a higher socioeconomic position via prestigious educational institutions or by obtaining higher educational credentials such as a master's degree or PhD.

Ethical approval

Study: There is safety in numbers? First-generation students' university enrollment, educational achievements, and dropouts: the role of family social and cultural capital – a study on 9-years panel data.

Principal investigator: V.M. Barsegyan.

This research project does not belong to the regimen of the Dutch Act on Medical Research Involving Human Subjects, and therefore there is no need for approval of a Medical Ethics Committee.

The study is approved by the Ethics Committee of the Faculty of Social and Behavioural Sciences of Utrecht University. The approval is based on the documents sent by the researchers as requested in the form of the Ethics committee and filed under number 21–0308. The approval is valid through 01 March 2023. Given the review reference of the Ethics Committee, there are no objections to execution of the proposed research project, as described in the protocol. It should be noticed that any changes in the research design oblige a renewed review by the Ethics Committee.

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CRediT authorship contribution statement

Ineke Maas: Writing – review & editing, Supervision, Methodology, Conceptualization. **Vardan Barsegyan:** Writing – review & editing, Writing – original draft, Visualization, Software, Project administration, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of Competing Interest

We have no known conflict of interest to disclose. This study was not preregistered. Preprints of previous versions of this article are published at the project's web-page at the Open Science Framework web-portal:

<https://osf.io/wnsf8/>.

Data availability

This work includes data from the Russian panel study “Trajectories in Education and Careers” (TrEC – <http://TrEC.hse.ru/>). Support from the Basic Research Program of the National Research University Higher School of Economics is gratefully acknowledged. Data can be requested from the research team that collected the data: <https://trec.hse.ru/en/>. The code to replicate the results is freely available at the project’s page at the Open Science Framework web-portal: <https://osf.io/wnsf8/>.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.rssm.2024.100939](https://doi.org/10.1016/j.rssm.2024.100939).

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