Mighty oaks from little acorns? The role of self-assessment in educational transitions: mediation and moderation effects*

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Abstract

This paper investigates the transitions to secondary and to tertiary education. As a new contribution to prior scholarship, it focuses on the role of self-perceived ability (self-assessment), which might impel pupils to make costly efforts in education now, in order to have an uncertain payoff later on. The paper builds on the assumption that while making educational decisions, especially low-educated families overemphasise ability relative to effort Therefore, there is a need to identify the factors that contribute investing effort in education. It will be revealed that self-assessment might be such a factor in educational transitions. It especially helps the offspring of low-educated parents to reach their potential and to opt for college-bound secondary tracks. The paper concludes that it would be useful to concentrate more on how *effort* is influenced by parental background, since our knowledge is still limited about this kind of influence.

Key words

self-assessment; self-confidence; transition to secondary and tertiary education; school tracks; inequality in educational opportunities; track choices in education; educational panel data; effort and ability; Hungarian Life Course Survey (HLCS)

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1. Introduction

This paper argues that self-assessment might help pupils to put more effort in education and therefore could influence educational transitions. It is found that self-assessment positively influences the choice of college-bound secondary tracks especially among pupils with less advantageous parental background. Depending on self-assessment, the gap declines in secondary school track choice between the children of low- and high-educated parents. These are important findings, since if pupils remain in education until they reach the educational level of their parents, then the offspring of low-educated couples would prefer to choose vocational tracks, from where there is no direct access to tertiary education. Hence, self-assessment might help pupils with disadvantageous parental backgrounds to reach their potentials and also might block the reproduction of educational inequalities.

The trade-off between the perception of ability and actual ability (Sjögren and Sällström, 2004) and the role of self-perceived ability in educational decisions (Guo et al., 2015; Musu-Gillette et al., 2015) have been widely researched themes. They are also embedded theoretically in sociology (Breen, 1999) and social psychology (Eccles, 1983; Wigfield et al., 2006). Much less attention has been devoted to how self-perceived ability mediates and/or moderates (Baron and Kenny, 1986; Brambor et al., 2005) existing parental background differences in educational track choices. In this regard there is a need to fill this gap and investigate how educational decisions are modified depending on pupils' perceptions about their own abilities. This paper aims to build on previous research about educational decisions and inequality in educational opportunities (Breen and Goldthorpe, 1997) on the one hand, and on research about academic self-concept (Wigfield and Eccles, 2000; Wigfield et al., 2006) as the major concept of expectancy-value theory in education (Eccles, 1983) on the other hand.

The research claims that perception of own ability (self-assessment) might precede pupils' interpretations of success. If pupils self-perceive their abilities to be high, they might make more of an effort in education, since pupils who believe this are more likely to be assured of the future success of their costly investment in the present than if they believe that their abilities are insufficient (Azmat and Iriberri 2010). Based on Breen (1999) it will also be argued that social classes are different in their interpretation of the role of effort in education. Children in lower-order classes are much more likely to believe that effort is not important, and therefore these pupils will also invest less effort at school than their peers with a more advantageous parental background. Throughout the paper, I will argue therefore that (1) self-assessment regulates the amount of effort somebody invests in education. Since more effort might translate into higher transition probability, self-assessment ultimately contributes to transitions to more competitive and knowledge intensive tracks. Furthermore I claim that (2) self-assessment differs according to parental background since the low-educated families tend to overemphasise the impact of ability relative to effort in education.

The paper finds significant parental background differences in pupils' self-perceived abilities. It will also be revealed that self-assessment has an independent role to play in educational track choices, but does not mediate parental background differences in the choice of educational track. Nonetheless, the paper demonstrates that self-assessment might moderate the parental education gap in educational transitions. Self-assessment does have an especially significant impact in the track choice of pupils with less-educated parents in embarking on a secondary track that opens doors to tertiary education. For this reason it could be argued that from the little acorn of self-assessment, mighty oaks of rewards may grow.

1.1. Status differences in educational decisions: rational choice theory

Rational choice theory is one of several theoretical frameworks used to understand inequalities in educational opportunities (Stocké et al., 2011). Its relative importance among the other theories arose after Boudon's (1974) seminal work, in which he explained that the impact of social background also manifests itself in the form of different educational decisions made at the same level of ability. Since then, more research has examined why it is that pupils from different social classes make different educational decisions, even if their abilities are the same. Distinguishing primary factors from those that are left once ability is controlled for (secondary effects) is clearly one important vein of educational inequality research (Jackson, 2013; Karlson and Holm, 2011).

Class differences in educational decisions emerge because social classes are different in at least three characteristics: risk aversion, expectation of success and resources (Breen and Goldthorpe, 1997; Esser, 1999). Relative risk aversion means that people in every social class strive to maintain the same status at least from an intergenerational perspective. Individuals believe that by reaching a particular educational threshold, they will maintain the same social class position as their parents. Social classes also differ in terms of ability and interpretation of success. Higher social classes have higher-level ability. Furthermore differences in ability are believed to capture differences in the subjective estimation of success, if pupils derive self-belief from previous success, and if previous failure destroys optimism for success. This also means that pupils in lower social groups should have a greater assurance of success if they choose the same educational outcomes as their peers in more advantaged social classes. Lastly, social classes have different levels of resources, in terms of direct material resources (to buy textbooks, pay tuition fees) and the tolerance of opportunity costs in the form of forgone earnings and benefits.

Empirical analysis has mainly focused on the risk-aversion component of this model (Davies et al., 2002). Need and de Jong (2000) investigated the decision of pupils to go on to tertiary education, using Dutch panel data. They found that educational choice is highly determined by the educational aspirations (the desired degree) of pupils – even after controlling for grade point average. The offspring of better-educated parents had higher aspirations, which was interpreted as a sign of striving to avoid the risk of downward mobility. Obermeier and Schneider (2015) used data from the German Socioeconomic Panel Study and distinguished between structural (a family's social status) and individual (personal willingness to avoid risk) risk aversion. Based on their findings – after controlling for grade point average and disposable family income – students in upper social classes are structurally almost compelled to choose academically oriented educational courses. Working-class children, however, have more 'freedom' in this choice, which is also influenced by individual risk aversion. Explaining schooling ambitions, van de Werfhorst and Hofstede (2007) have similar results, finding relative risk aversion to be a relevant factor in the explanation.

Status gap in educational decisions might be explained however also by status differences in ability and interpretation of success. Focusing on that topic, new questions might be raised concerning the theoretical difference between ability and its perception (Blumenfeld, et al., 1982).

1.2. From perceived probability of educational success to self-perception of abilities

Actual ability and the interpretation of own educational prospects do not necessarily correspond each other, even though the knowledge of own ability shapes the subjective probability that pupils attach to being successful at the next stage of education (Breen and Goldthorpe, 1997: 285). Prior research interestingly focused more on the subjectively

estimated part of individual success probability, while, to the best of my knowledge, the perception of own ability received little attention. There is a strand of previous analysis showing that, even after controlling for ability, educational decisions can be explained by (a) parents' estimations about their children's probability of success (Stocké, 2007), (b) adolescents' perception of the probability of success (Keller and Neidhöfer, 2014; Tolsmaet al., 2010), and (c) subjective ability measured according to the level of education that pupils think they can achieve (Need and de Jong, 2000).

However, the way in which pupils judge their own ability could be connected to the way in which they regard themselves. In social and psychological research, self-esteem – i.e. the success achieved by a person, relative to that person's expectations of himself (James, 1890: 310) – is considered to offer protection against psychological or physical stress arising from the fear of performing badly (Himmler and Koenig, 2012). Its positive impact on educational outcomes (Heckman et al., 2006) is challenged by the findings of Himmler and Koenig. Self-efficacy, on the other hand, influences learning activities via such self-regulatory processes as setting goals (Zimmerman, 2000: 87). As people engage in tasks where they think they will succeed, self-efficacy is shown to influence the choice of career or university majors (empirical evidence is summarized by Pajares, 1996).

Leaving aside social status differences, expectancy-value theory also focuses on how individuals' beliefs predict academic outcomes (Wigfield and Eccles, 2000). It is argued that academic outcomes and choices are mainly determined by skill-related and goal-related expectations or perceptions (Eccles, 2009). More importantly for this argumentation, this theory claims that the way in which pupils think about their abilities (academic self-concept) influences their educational decisions. Applying this theory to empirical research, several analyses have revealed the role of self-concept in educational decisions (Musu-Gillette et al., 2015; Guo et al., 2015; Jackson, 2003) or intention (Nagy et al., 2006).

Prior research, however, is more reluctant to specify the causal mechanisms for why perception of ability might be important in educational decisions. According to my reading of prior literature, two causal mechanisms seem paramount. First, underestimated ability could act as a self-fulfilling prophecy and get in the way of pupils opting for knowledge-intensive education (Sjögren and Sällström, 2004), simply because they do not dare to strive for better school qualifications, which they could easily attain if they only tried. Overestimated ability, on the other hand might increase the probability of failure. Despite this risk, however, as Filippin and Paccagnella (2011) showed in their model, those who initially overestimate their abilities will follow more ambitious educational roads if they have access to a greater volume of knowledge. The increase in knowledge accumulated will be translated into a widening of the gap in human capital between those with and without self-confidence.

Secondly, a higher perception of own ability might contribute to the choice of the optimal level of effort. Since school performance is a combination of ability and effort, and since effort is costly and has only an uncertain future payoff, if pupils perceive themselves to be ahead of others, this self-perception might lead them to put in more effort, because they are assured that it will be worthwhile (Azmat and Iriberri, 2010). In other words, those with higher self-assessment might invest more current effort (preparing for the lessons, doing homework) than those who think that these efforts are meaningless, since the costly investments are anyway inadequate because of their lack of ability.

Even though there is ample research to demonstrate that self-perception – and more particularly academic self-concept – does contribute to educational outcomes, much less evidence has been gathered about its status profile. In particular, more information is needed about why parental background differences might prevail in self-assessment.

1.3. Why status differences in perceived ability might exist

Breen (1999) argues that social differences in subjective probability might exist because various status groups have different information about the educational system; moreover, in determining success at school, they estimate the role of effort and ability differently. Working-class pupils ascribe lower belief to the role of effort than do their peers in the middle class, and therefore they are more pessimistic about the prospects of success (Breen, 1999: 471). Lucas (2009) also claims that 'myopia' – the mismatch between subjective estimations and actual chances of success – has more unpleasant consequences for pupils of low status than for their high-status peers, since the parents of high-status pupils strive to afford any kind of help required to maintain the positions of advantage, and this could compensate for pupils not having appropriate information about their own abilities and possibilities.

On the other hand, empirical research reinforces the idea that families in different social strata employ different parenting styles, which could influence the transmission of personality traits and, through personality, educational outcomes (Kaiser and Diewald, 2014). Parenting style is also known to have a direct effect on adolescents' school achievement (Carolan and Wasserman, 2015; Spera, 2005) and is demonstrated to be different according to social status (Hoff et al., 2002). Baker and Stevenson (1986) found that mothers with higher socioeconomic status were more likely to have accurate knowledge of their child's schooling, to have had contact with the school, and to have employed different strategies to help their children in their school-related duties. Poorly educated mothers, on the other hand, have less interest in the schooling progress of their children. Other research reinforces the notion that, unlike children in working-class and poor families, middle-class children are deliberately stimulated by their parents in order to foster their cognitive and social skills (Lareau, 2003). Dufur, Parcel and Troutman (2013) showed that 'home capital' – assessed as the frequency of parent–child discussion of school activities and the frequency with which parents check homework – significantly increases academic achievement (measured by test scores in maths, reading literacy and science).

If parents of different social status employ different parenting styles and have different information about the role of ability and effort in education, it could be assumed that these differences modify the way in which pupils in different families interpret their own abilities. Since low-status pupils and their parents overstate the importance of ability and downgrade the role of effort in education (Breen, 1999), lower self-assessment is hypothesized among pupils in lower strata. This argumentation seems to be supported by Sullivan (2006), who reports a survey in which pupils in England were asked to predict the outcome of their GCSE exam a couple of months before they actually sat it. A comparison of the estimates with the actual results showed that pupils from lower classes systematically underestimated their ability, compared to their more advantaged peers. Since only a month or so elapsed between the measurement of self-assessed and real performance, reverse causation (working-class pupils making more rapid progress) could be excluded.

Summing up the scholarship of prior research, self-assessment is likely to be influenced by parental background (Breen, 1999; Sullivan, 2006) and it might have a role in educational decisions (Guo et al., 2015; Musu-Gillette et al., 2015). Still more research is needed to understand how self-assessed abilities mediate and/or moderate existing status-related differences in educational track choice.

1.4. The purpose of the analysis

This paper broadens understanding of educational transitions by distinguishing actual ability (school grade or test points) from perceived ability. Even though these two concepts are naturally correlated, they could both contribute individually to future school track choice. While the consequences of status-related differences in ability are well known in educational decision-making, much less attention has been devoted to the same differences in perceived ability, especially in connection with later educational outcomes. The analysis therefore will delve more deeply into this.

Our knowledge in terms of status-related educational transitions will be expanded by providing empirical evidence on the following three questions:

1. What kinds of factors mediate parental background differences in perceived ability (self-assessment)?
2. How does self-assessment mediate parental background differences in educational transitions?
3. How does self-assessment moderate the parental education gap in educational transitions?

2. Material and methods

2.1. Data

The data are derived from the Hungarian Life Course Survey (HLCS) – an individual panel survey conducted by TÁRKI Social Research Institute on a yearly basis – from the academic year 2006/07, with an initial sample of 10,022 largely 14–15-year-old individuals at the beginning of year 9 (the 1st wave was organized in autumn 2006). Currently the survey has six completed waves with fairly large response rates (2nd wave in 2007: N=9,000; 3rd wave in 2008: N=8,648; 4th wave in 2009: N=8,110; 5th wave in 2011: N=8,825; 6th wave in 2012: N=7,092).

The HLCS practically follows one single school cohort – those who begun year 9 in the academic year of 2006/07 – throughout their secondary education (which usually lasts for four years in Hungary). The last two waves also have information about tertiary education or labour market entry. The questionnaire contains detailed questions on family background, ethnicity and school achievement, as well as many other dimensions, including the attitudes and values of the respondents. The survey is, however, individual based, which means that the HLCS does not provide information on all the classmates of the respondents.

The HLCS can be merged with the National Assessment of Basic Competencies (NABC), which provides information about the year 8 (from academic year 2005/06) reading and maths competency of the same pupils, assessed using a PISA-like test. The NABC contains administrative data about the entire school cohort, and therefore the researcher is able to glean information about competence test scores, school grades and family background for all the year 8 classmates of those who are sampled in the HLCS. The competence test itself is centralized: it is developed and run by the Hungarian Educational Authority and assesses Hungarian pupils using the same instrument across the country.

The sample in the analysis contains data on those who began secondary school in 2006/07. This means that those pupils are analysed from HLCS who did not drop out at the end of year 8 and did not choose the early secondary track (discussed in section 2.2 below) after year 4 or year 6. Pupils with special educational needs are also excluded, because they are oversampled in HLCS and have only reading test scores available.

2.2. The Hungarian educational system

Hungary has basically an 8+4 year compulsory education,[1] where eight years of primary education (ISCED 1 and 2) are followed by four (sometimes five, with a special language year at the beginning) years of secondary education. There are three different educational tracks at the secondary level: (a) vocational track – ISCED 3C, (b) secondary general track also called as grammar schools, and (c) a mixed version called 'secondary vocational track'. The general secondary and secondary vocational tracks are equivalent, with an ISCED 3A level. In the case of these two types of secondary tracks, the curriculum ends with a school-leaving certificate also called as A-level (*érettségi*), which is a necessary requirement to enter tertiary education (university or college). Henceforth, the term 'college-bound secondary tracks' (*középiskola*) will be used as a generic term for secondary general and secondary vocational tracks. More detailed information is available in Bukodi et al. (2008) and also in Figure A1 of the Appendix, which provides a schematic overview of the Hungarian school system.

The empirical analysis focuses on two educational transitions: the transition to secondary education, and the transition to tertiary education. These are not the first educational choices that a pupil makes in his or her life; thus educational decisions analysed in this paper are already consequences of previous decisions. The reason for focusing even on these choices is that supposedly the transition to secondary education is the first educational decision where pupils themselves have a say (rather than just their parents). The vast majority of adolescents in the sample (nearly 75 per cent) reported that they made the decision about secondary school (at age 14) alone.

The educational transition analysed first in this paper occurs when pupils are 14–15 years old and are in the last year of primary education (which usually lasts eight years). At the beginning of the second semester, they draw up an order of preference for the secondary school they would like to attend (Figure A2 in Appendix shows how these events are connected to the timing of HLCS). With the choice of a particular secondary school pupils also opted for a particular track. Pupils are admitted to secondary school on the basis of their preference ordering and their results in the admission test and/or school marks. As mentioned above, there are three tracks available at the secondary level: secondary general (*gimnázium*) and secondary vocational (*szakközépiskola*) tracks and a vocational track (*szakiskola*).

The second educational transition analysed here occurs after the completion of compulsory education: whether or not pupils go on to tertiary education (college or university). In Hungary, there are no general tuition fees for tertiary education: there is a dual system in operation, under which some students pay tuition fees, while others do not. But the vast majority of students study free of charge. The first degree is financed by the state (according to a quota determined annually by the government) in the case of those who achieve an adequate standard in the entrance examination. This regulation basically means that approximately every second applicant can study free of charge at university level.[2]

2.3. Definitions

[1] Pupils also have the opportunity to enter secondary general school after year 4 or year 6. This means that besides the 8+4 template, 4+8 and 6+6 systems are also in operation. The majority of pupils, however, go on to secondary school after year 8. Usually talented high-status pupils choose the early track. This selection could therefore bias the estimations.

[2] http://www.felvi.hu/felveteli/ponthatarok_rangsorok/elmult_evek/!ElmultEvek/elmult_evek.php?stat=4

2.3.1. Educational tracks at secondary level

The secondary track was defined on the basis of the path that pupils are following at the beginning of year 9 (three possible categories), using HLCS data and as reported by parents. In the empirical analysis, two dummy variables will be employed. The first is coded 1 if someone has been admitted to a college-bound secondary track (secondary general or secondary vocational tracks – the schools from which there is potential access to tertiary education) and 0 if someone is at the vocational track. The second dependent variable deals with the difference between secondary general track (coded 1) and secondary vocational track (coded 0). The reason for using binary categories rather than multinomial is that the choice between general and vocational secondary track is a horizontal decision, while the choice between the vocational track and the college-bound secondary tracks is vertical.[3]

2.3.2. Educational tracks at tertiary level

Tertiary education is defined on the basis of pupils' answers in HLCS about the type of tertiary education (college or university) they are enrolled in. Those who have actually been admitted to state-financed tertiary education (coded 1) are compared to those who had the opportunity to go on to such education – i.e. sat the school-leaving certificate – or who entered fee-paying tertiary education (coded 0). Fee-paying university places usually have lower requirements: pupils are admitted with worse admission tests or school marks; moreover, applications to such places are strongly related to social status.

Note that the population in the case of tertiary education is restricted to those who passed their school-leaving certificate (*érettségi*) and completed their secondary education within five years of commencing it (there are no data about respondents later; HLCS has six completed waves). Pupils could be enrolled in tertiary education in the year of their school-leaving certificate, or one year after. This shortcoming of the HLCS could result in right-censored data.

Please also note, that the tracks both at secondary and tertiary level are those where pupils had been admitted, and not those which had been applied. It could be that pupils applied schools within a given track but they had been not admitted to (see section 2.2). The impact of self-assessment on application is analysed in a different paper (Keller 2016).

2.3.3. Parent's highest school qualification

Inspired by Breen and Goldthorpe (1997) prior analyses measured social status by parental occupation. Occupational status, however, was neither available in HLCS nor in NABC. Therefore the focus is limited here to parental education, which is also a frequently used indicator of social origin. However, in recognition of the fact that parental education is not equivalent to social-class position, the differences to be found according to parental background will be referred to as status-*related* (not simply status) differences, indicating that the variation is not necessarily attributable to social status.

Parental background is defined by the parents' (biological or step) highest level of education. Two categories are distinguished. Those parents who completed only primary education or finished vocational track will be referred to as *low-educated* parents. Those parents who graduated from college-bound secondary tracks (see Figure A1) and have a school-leaving certificate or also have a tertiary degree are called *high-educated* parents. As

[3] Results are consistent using multinomial logit; results are available from the author on request.

Holm and Jæger (2008) showed, in many cases pupils are only encouraged to study until they reach the educational level of their parent(s). The school-leaving certificate seems to be a dividing line. The offspring of parents without a school-leaving certificate might be more likely to choose the vocational school track, from which there is no direct entry to tertiary education.

If both the mother's and the father's educational levels were available, and if they were not the same, the higher of the educational levels was used.[4] Educational level was reported by the parents themselves in HLCS. This reveals larger parental background differences in achievement than if children report their parents' educational level (Jerrim and Micklewright, 2014)

Table 1 contains the mean, standard deviation and the number of observations (N) for the three dependent variables in the analysis. For example, on average almost 74% of pupils follow the college-bound secondary track (Panel C). Some 58% of those whose parents are low-educated (Panel A) but 88% of those with high-educated parents (Panel B). Similar differences are established on the other two dependent variables (21% versus 46% in the case of secondary general school, and 17% and 40% in the case of tertiary education. Explaining these gaps more carefully is the aim of the empirical analysis below.

[Table 1 around here]

2.3.4. Self-assessment

Self-assessment is measured using the following question: 'What do you think your score would be in a test in your year 8 class where the total available score is 100 and the average in your class is 70?' Note that the wording of the question indicates the hypothetical class average (70 points). Contrary to prior research (Alicke and Govorun 2005; Williams and Gilovich 2008), the above described question gives pupils information about the class average performance. This has at least three important consequences. It makes (1) the answers comparable between schools since the average class performance (70 points) is the same in classrooms with good and bad achievement. Furthermore (2) the clear reference points help pupils to grasp the meaning of 'average' performance, which would be hard to figure out otherwise (Dunning, Meyerowitz, and Holzberg 1989). Lastly (3) self-assessment depends only on the interpretation of own ability and it is not connected to the perception of class-mates' performance.

Answering the self-assessment question pupils had to indicate a number ranging from 0 to 100. The average score in the sample is nearly 60 points. This means that pupils interpreted their own performance on average below the stated class average (70 points). This is somewhat surprising, because prior studies (Alicke and Govorun 2005) claim that people tend to believe that they are above average. It is likely, however, that giving pupils clear reference about the average performance explains this underestimation, since in prior studies (Dunning et al. 1989) the average performance was not given. The standard deviation in the answers is about 20 points. In the analysis, however, the self-assessment measure is standardized with a 0 mean and one unit standard deviation.

Note, that this question refers to performance in year 8, and so is a kind of retrospective question (it was asked in the first wave of HLCS, when students had already begun year 9). Moreover, it is worth mentioning that the wording of the question does not suggest the type of test. One can only guess that the test mentioned in the question probably measures some cognitive ability (rather than talent in sport, art, etc.), since pupils usually do not have test in

[4] Results are robust to use of other kinds of definition, such as only mother's or only father's educational level.

these subjects. A more detailed and domain-specific self-concept measure (used, for example, by Musu-Gillette et al., 2015) was not available in the survey. Obviously the question measures self-assessment with noise, but this is the only available proxy for that in the dataset.

In an ideal situation, self-assessment should be measured before pupils transitioned from primary to secondary education. Since the wording of the self-assessment refers to year 8 performance, if the question were not asked retrospectively, the causality assumption would hold – simply because of the temporal ordering between cause and effect. As things stand, however, reverse causality might be a factor: something could have altered pupils' perceptions, and under this influence their estimated abilities might be biased. The bias could be connected to the way in which pupils were allocated to different secondary schools.

Note that pupils enter secondary education on the basis of the order of preference they indicate on their application form, and on the basis of their results in the admission test. Usually pupils rank better schools higher on their order of preference. It should also be noted that usually more competitive schools prescribe an ability test, and schools without a good reputation cannot select pupils.

It is quite reasonable to assume that those who did not get into their first-preference school downgraded their year 8 performance retrospectively. Moreover, those who were admitted to a competitive secondary school could have upgraded their self-assessment retrospectively. The same is true in the opposite direction for those who were admitted to a weak secondary school.

It is not easy to deal with reverse causality in the case of track choices at the secondary level, since the bias in self-assessment is likely to be connected to the secondary school somebody has entered. Even introducing secondary-school fixed effects (as is done) would be a classification based on the dependent variable and therefore would not capture the substantive choice process. Nonetheless, it is hard to find an instrumental variable which influences only self-assessment and not track choice. Therefore the impact of self-assessment in models fitted to secondary track choice is likely to be overestimated and not causal. However, in the case of the choice to go on to tertiary education, the retrospective nature of self-assessment probably will not bias the estimations.

2.3.5. Ability

Ability or academic/school performance is measured by school marks and by standardized test scores in mathematics and reading literacy. Test scores might be a more objective measure of ability, since it is assessed by means of a centralized test which is corrected by external examiners who do not know the pupils personally. At the same time school marks might be more sensitive to teachers' evaluation. Note that even test points can be regarded as an outcome of the school system, and therefore they are not necessarily a perfect measure of ability.

School marks are the grade point average (GPA) based on the mid-term report card in year 8, taking all school subjects into account. These marks are acknowledged at the time of admission to secondary school and remain unaffected by the competence score, since pupils receive a mid-term report card usually in January, while competence scores are measured in May. Missing GPA (12 per cent) was replaced either with the available grade in maths or Hungarian, or the GPA measured at the end of year 7, or the class average. GPA is reported by the school, and is available in NABC as additional information. It is assumed that GPA is the major information source for pupils about their school achievement. School marks are readily available. Pupils know what grade they have, and moreover pupils (and sometimes

also teachers) discuss grades in their classrooms. Therefore pupils might also know the grades of their classmates (and therefore their own grade relative to those classmates).

GPA is derived from NABC (which unlike HLCS asked everybody from the school cohort). Therefore the classroom average (in year 8) could also be computed. In order to have similar (relative to classmates) measures of self-assessment, the GPA measure appears as a classroom average and the individual deviation from that. Therefore, for every individual one can calculate the average GPA in the former year 8 classroom, and – by subtracting this average from the actual score – individual deviation from that class average. Both variables (individual and classroom-average GPA) are standardized with 0 mean and one unit standard deviation.

Competence scores, on the other hand, are used in the analysis to control for unobserved ability (which teachers cannot observe, but pupils might have – see Keller, 2015; Terrier, 2014). This is important, since pupils' self-estimations might be driven by ability, which is not necessarily captured by grades. Test scores in NABC are measured at the end of year 8, usually in May. The test itself measures mathematical and reading literacy. This is a written test requiring four sessions of 45 minutes. It is completed by pupils in their usual classroom environment. In maths, pupils have to think about everyday life problems, to which they are required to apply their maths knowledge. In reading, they have to read between six and eight 1–2 page long texts, after which they are asked questions on what they have read. Since the aim of including competence measures (alongside school grades) in the analysis is to control for unobserved ability as well as possible, in order not to lose variance, both maths and reading comprehension test scores are introduced into the analysis (rather than some form of composite measure). Both maths and reading comprehension test scores are standardized to 0 mean and one unit standard deviation.

Descriptive statistics about self-assessment, competence scores and school marks (the major intendant variables) are summarized in Table 2. Since every measure is standardised and have 0 mean and 1 standard deviation (Panel C), one unit corresponds to one standard deviation. It means for example that the difference in self-assessment between the offspring of low- and high-educated parents is 0.6 unit of standard deviation (Panel D): it is below the average (-0.31) among children with low-educated parents (Panel A) and above average (0.29) among those with high-educated parents (Panel B). Similar differences can be found in school marks and competence test scores.

[Table 2 around here]

2.3.6. Psychological variables

The way in which pupils rate their own ability could be influenced by some psychological traits. In a limited scope, pupils' personality traits are investigated by HLCS. Rotter's (1966) locus of control scale measures the degree of control that individuals have over their lives. While internal control means that a person believes he or she has some control over life, external control is defined as when someone considers that environmental factors (or fate) influence life outcomes. Rosenberg's (1965) self-esteem estimates the overall evaluation of one's worth or value. Harter's (1982) social competence scores provide information on whether a pupil feels an important member of his/her school class. Moreover, a depression scale was constructed from questions about anxiety and suicidal thoughts.

2.3.7. Control variables

The following control variables were used, though the estimated effects of the variables do not appear in the tables: *gender* (dummy variable, 53 per cent of respondents were male); *year of birth* (introduced as a continuous variable which ranged from 1987 to 1993; the mean value was 1991); *number of siblings* (introduced as a continuous variable, ranging from 0 to 9, with 1.3 average); *birth order* (dummy variable indicating who is the first born among siblings); respondent is *Roma* (measuring ethnic minority with a dummy variable, 9.7 per cent of pupils in the sample were Roma); *type of settlement of residence* (four categorical variables: rural, town, county seat and capital, introduced in three dummy variables; omitted category is the capital); and *county of residence* (19 dummies). Because the focus of the analysis is not on the impact of these variables, tables containing the results do not summarise the estimated parameters for these variables.

2.3.8. School fixed effects

If there is a sorting of students across schools, endogeneity might occur, especially since the heterogeneity of schools is considered quite remarkable in Hungary (Horn, 2013). Following the logic of Falch and Strom (2011), it is easy to assume that pupils/parents select schools in order to maximize the peer effect, or that motivated parents send their offspring to schools with high teacher quality. The same issue emerges if teachers select a school to work at on the basis of its pedagogical programme; thus it is not just pupils, but also teachers that are not randomly distributed among schools.

Even though HLCS is not a school-based survey, school-level information for year 8 can be merged with it from NABC, and year 9 school IDs are available in HLCS. Throughout the main analysis, year 9 fixed effects will be used, since it is assumed that the unobserved heterogeneity at that school level might bias the results – especially how pupils estimated their self-assessment – since this question was asked in year 9. Compared to hierarchical models, fixed-effects models are known to be more effective if variance at the higher ordered level influences variance at the individual level (Hox, 2010; Snijders and Bosker, 1999), as might be the case with school-level unobserved heterogeneity and school achievement or self-assessment, as discussed above. However, employing school fixed effects also means that only within-school variance is used, and the estimated parameters should be interpreted relative to the school average in year 9.

2.4. Descriptive

The empirical analysis to be done later is driven by the assumption that, at the same level of GPA, those who perceive their abilities to be higher will be more successful in their educational transitions than their peers with the same grades but a lower level of self-assessment. This assumption could be easily validated with some descriptive evidence. Since NABC has full information about the classroom attended in year 8 (grades and competence scores are recorded for each class member), and since the wording of the self-assessment question indicates the hypothetical classroom average, it is possible to anchor self-assessment to relative school achievement.

One possible way of doing this is to check whether grades in year 8 fall below or above the classroom average (two categories) and compare whether the corresponding self-assessment is lower or higher than the average indicated in the question (i.e. 70 points – two categories again). Combining these two sets of two categories, a four-category classification is produced, showing the match and mismatch between school grade and self-assessment. The

same could also be done in the case of competence scores; but, since grades are more obvious in the classroom (and might often be discussed by peers), the classification is based on school grades. However, a corresponding classification based on competence scores is also made, and shows the same results.

Based on this four-category variable called *anchored self-assessment*, approximately 70 per cent of pupils estimate their abilities to correspond to their test scores, at least relative to the distribution of both variables. For the remaining 30 per cent – where there is some kind of mismatch – the combination of above-average grades and below-average self-assessment (when pupils underestimate themselves) is more likely than vice versa, when a below-average grade goes together with above-average self-perception. In general, for every outcome variable analysed in this paper, a higher mean is found among those who have below-average school achievement and above-average self-assessment than among those with below-average grades and below-average self-assessment. Hence, self-assessment may well increase the probability of transition. But the reverse argument holds, too: when above-average school achievement is combined with below-average self-assessment, the probability that those pupils will choose more knowledge-intensive education is lower than among their peers who are above average in terms of both grades and self-assessment.

[Figure 1 about here]

2.5. Models

2.5.1. Parental background differences in self-assessment

When calculating the differences in self-assessment according to parental background, raw differences are shown first. These are refined using multivariate fixed-effect ordinary least squares (OLS) models, where, in addition to parental background, self-assessment is explained by ability, psychological variables, school fixed effects and control variables.

Eq.1 shows the estimated model, where *SA* stands for self-assessment, *PB* for parental background, and *A* is a vector for ability containing school marks and competence scores. *P* is the vector of psychological variables, containing psychological traits like internal control, social competence, self-esteem and inclination to depression. *C* is a vector representing individual controls like gender, year of birth, number of siblings, birth order, whether the respondent is Roma, plus type of settlement and county of residence. *S* stands for school fixed effects; separate models are fitted using primary and secondary school unobserved school-level heterogeneity. In the equation ε stands for individual error term. The β-s are the vectors of OLS coefficients; and α is the constant in the equation.

The results appear in Table 3. Throughout this exercise, the focus is on the impact of parental background (β_1) and how its effect is mediated by additional control variables.

$$SA = \alpha + \beta_1 \times PB + \beta_2 \times A + \beta_3 \times P + \beta_4 \times C + \beta_6 \times S + \varepsilon \qquad \text{(Eq.1)}$$

2.5.2. Self-assessment and educational choices, and how self-assessment mediates parental education gap in track choices

Mediational analyses try to identify the process whereby a particular independent variable leads to a specific outcome for a dependent variable, decomposing the total effect between the independent and the dependent variable into direct and indirect effect, which is transmitted

through a third independent variable (Alwin and Hauser, 1975; Hou, 2014). Therefore the second research question concerns the differences in educational transitions according to parental educational level, and the question to be analysed involves the extent to which self-assessment mediates these differences.

Three different dependent variables are employed (descriptive statistics are available in Table 1). In the case of transition from primary to secondary education, the dependent variable consists of those who were admitted to college-bound secondary tracks (secondary general and secondary vocational track) versus those at vocational track. In a second set of models, the difference between secondary general and secondary vocational track is analysed. In the last set of models, the transition to state-financed tertiary education provides the focus of attention. Here, the population contains those who completed secondary education (secondary general or secondary vocational track) within five years of commencing it.

Among the right-hand variables appear self-assessment (*SA*), parental background (*PB*), ability (*A*), psychological controls (*P*), school fixed effects (*S*) and other individual-level control variables (*C*). Unobserved school heterogeneity deals with the unknown selection of pupils into schools, which could also influence self-reported ability (self-assessment). Only secondary-school unobserved school heterogeneity is controlled for, since unobserved school heterogeneity might influence the way in which pupils answered the self-assessment question. In the case of entry to tertiary education, an additional variable appears in the regression, indicating the year in which pupils graduated from secondary school (*U*).

Testing whether self-assessment mediates the parental education gap in educational transitions, the difference in the estimated coefficient of parental background (β_2) will be tested in models with (Eq.2) and without (Eq.3) self-assessment.

$$Y = \alpha + \beta_1 \times SA + \beta_2 \times PB + \beta_3 \times A + \beta_4 \times P + \beta_5 \times S + \beta_6 \times C\ [+ \beta_7 \times U] + \varepsilon \quad \text{(Eq.2)}$$

$$Y = \alpha + \beta_2 \times PB + \beta_3 \times A + \beta_4 \times P + \beta_5 \times S + \beta_6 \times C\ [+ \beta_7 \times U] + \varepsilon \quad \text{(Eq.3)}$$

2.5.3. The moderation effect of self-assessment in the parental education gap of educational transitions

Moderator variables are understood as variables that affect the direction and/or strength of the relationship between the independent and the dependent variable (Baron and Kenny, 1986; Muller et al., 2005). In that sense, self-assessment moderates the parental educational gap if the impact of self-assessment on the track choice differs among the offspring of differently educated parents. Statistically, the moderation effect is assessed by the interaction between parental educational level and self-assessment. Eq.4 therefore differs from Eq.2 in that it contains the interaction term as well.

$$Y = \alpha + \beta_1 \times SA + \beta_2 \times PB + \beta_3 \times (PB \times SA) + \beta_4 \times A + \beta_5 \times P + \beta_6 \times S + \beta_7 \times C\ [+ \beta_8 \times U] + \varepsilon \quad \text{(Eq.4)}$$

Throughout the analysis, linear probability models are preferred to logit or probit models. This is partly because the calculation of marginal effects using conditional non-linear models could be biased (Fernández-Val, 2009), and the same problem could arise when calculating the interaction effect (Buis, 2010; Norton et al., 2004).

3. Results

3.1. What kind of factors mediate parental education differences in self-assessment

Table 3 shows the results of estimations explaining self-assessment. Column 1 reports the raw gap according to parental education between pupils who have parents with and without the school-leaving certificate ($b = 0.599$, $p < 0.01$). Note, that the numbers in the table are expressed relative to the standard deviation of self-assessment which is fixed in one unit. It could be established (Column 2) that approximately 40 per cent (1-0.381/0.599) of the differences in self-assessment according to parental education are mediated through ability differences, which means that pupils with low-educated parents estimate their abilities to be lower (since their individual academic achievement is also lower) than do their peers with high-educated parents (the difference between the two parameters is significant: $F = 117.40$, $p < 0.001$).

Another explanation for this status-related gap in self-assessment is that pupils with various parental backgrounds probably attend quite different classrooms. Including classroom-level characteristics (like average school marks) (see Column 3), the parental education difference in self-assessment decreases further (the difference in the effect of parental education between the two parameters in Columns 2 and 3 is significant: $F = 170.50$, $p < 0.001$). Parental background differences in self-assessment might also be connected to unobserved school-level heterogeneity: controlling for year 8 school characteristics (fixed effect regression), the gap in self-assessment according to parental education shows a further decrease (Column 4). (However, the drop in the effect of parental education between the two parameters in Columns 3 and 4 is not significant: $F = 0.03$, $p = 0.86$). Furthermore, school differences in year 9 have a somewhat higher impact on self-assessment than in year 8 (the coefficient in the first row of the table decreases further in Column 5), which means that pupils' reports of self-assessment are more a function of year 9 school characteristics than year 8. This serves to underline the reasoning that, depending on the quality of the secondary school, pupils might revise their year 8 achievement retrospectively (the drop in the parameter of parental education is not significant either between Column 3 and Column 5: $F = 0.73$, $p = 0.39$).

Psychological traits (as well as other control variables) also mediate the initial parental education gap in self-assessment. The correlation between self-assessment and psychological variables works in the assumed direction: internal control, self-esteem and social competences maintain a positive relationship with self-assessment, while the relationship is negative in the case of the depression scale.

Even after controlling for an extended set of individual, classroom and school-level explanatory mechanisms, a remarkably large part of parental background differences ($b = 0.076$, $p < 0.001$) remains unexplained. Throughout the analysis, what follows this residual parental education gap in self-assessment is interpreted as the imprint of status-related differences in parenting styles (Kaiser and Diewald, 2014; Lareau, 2003) and a consequence of different interpretations of ability and effort (Breen, 1999).

[Table 3 about here]

3.2. How track choices are influenced by self-assessment, and how self-assessment mediates parental education differences

Table 4 summarizes the results for the role of self-assessment in educational transitions. In the three panels of the table, three different dependent variables appear: the choice (1) between college-bound secondary tracks and the vocational track (Panel A), (2) the choice between secondary general and secondary vocational track (Panel B) and (3) admission to state-financed tertiary education versus no tertiary education or no state-financed tertiary education (Panel C).

Self-assessment has a significant positive effect in every model presented. Its impact ranges from 0.037 to 0.02 across the models, which means that one standard deviation change in self-assessment increases the probability of a pupil choosing a more knowledge-intensive educational track by approximately 2–4 percentage points. Even though there are differences in the size of the estimated parameter for self-assessment across models in the three different panels, these differences are not significant at the 5 per cent level.

Making predictions from the first model (column 1) in Panel A this means that if we have two pupils with low-educated parents the one with average self-assessment has 70.3% chance to apply to a college-bound secondary tracks. The same probability calculated for the other pupil with one standard deviation higher self-assessment is 73% (the difference between the two figures is 0.027). At the same time, if we have two pupils with average self-assessment the one who is the offspring of high-educated parents have 77.2% chance to apply to college bound secondary tracks (the same probability for his peer with low-educated parents is 70.2%, and the difference is 0.07). Altogether the impact of self-assessment on educational track-choices is small. In the given example, it is approximately one third of the effect of parental background. One should, however, also be aware that the meaning of one standard deviation increase is 20 points difference on the original 0 to 100 scale (the not standardised self-assessment variable). It equals with the change if somebody believes that his performance is above (80 points) and not bellow (60 points) the classroom average.

If we compare the estimated parameters for parental schooling across the two models within each panel, it is possible to gain some clue about the importance of self-assessment in mediating this gap. The difference in parameters across the two models is only because of the inclusion of self-assessment. The gap in track choices according to parental educational attainment is always larger in the second model than in the first, and the difference between the two models is the mediation effect of self-assessment.

If pupils with low- and well-qualified parents assessed themselves as equally performing, the gap in their educational transitions would decrease by an additional 2.7 per cent [(0.072-0.070)/0.072], 3.1 per cent [(0.032-0.031)/0.032] or 2.5 per cent [(0.078-0.076)/0.078]. However, none of the three figures turn out to be significant at the 5% level. This means that, even though self-assessment has an effect in educational transitions, it *does not mediate* parental background differences in educational track choices. So the offspring of parents with a different educational level do not follow different school tracks because of their self-assessment.

It should be highlighted that individual-level school marks have a higher impact on the choice of whether to embark on further education than does the probably more objective ability measure – the competence scores. However, one could also argue that school marks are more accurate measures, since they reflect pupils' performance over a longer time period, rather than at one point in time. All in all, both maths and reading comprehension test scores play an independent role in the explanations of the outcome variables.

[Table 4 about here]

3.3. How self-assessment moderates the parental education gap in educational transitions

Table 5 contains the estimations for the interaction between parental background and self-assessment. Column 1 shows the choice between college-bound secondary tracks and the vocational track. The interaction term is negative ($b = -0.051$, $p<0.01$), showing that self-assessment might moderate the parental education gap in educational transitions. The same could be established in the case of the choice between secondary general and secondary vocational track; here, however, the interaction term is only partially significant ($b = -0.015$, $p<0.1$).

Since it is often difficult to imagine the interaction effect solely on the basis of estimated coefficients (Brambor et al., 2005), Figure 2 helps to visualize the predicted probabilities of being admitted to a college-bound secondary rather than to the vocational track. The gap between pupils with well versus poorly educated parents (in predicted probability) shows a decreasing pattern if self-assessment increases and all other variables in the models are held at the mean value. In the case of offspring of low-educated parents, the 25 percentage point difference between having very low and very high self-assessment is statistically significant ($chi2 = 52.62$; $p < 0.001$). The higher the self-assessment estimated by the children of low-educated parents, the higher their probability of entering college-bound secondary tracks. In the case of the offspring of those with high-educated parents, self-assessment seems to make no difference. In other words the results indicate that the gap in the transition-probability between pupils with low- and high educated parents decreases if pupils' self-assessment increases. This could mean that, while offspring of high-educated parents are almost compelled to go to college-bound secondary tracks, self-assessment might increase the transition-probability of pupils who have less advantageous parental backgrounds.

[Figure 2 about here]

The results could be also interpreted as a sign that self-assessment helps pupils with relatively uneducated parents to take the first step in educational mobility and to choose a college-bound secondary tracks instead of a vocational one. Note that these tracks (instead of the vocational track) offer the school-leaving certificate that serves as an admission ticket to tertiary education. Self-assessment has less of a role to play in moderating the parental education gap in more qualitative educational choices at the secondary level (choosing a secondary general instead of a secondary vocational track). At the tertiary level (as Column 3 of Table 5 indicates), however, self-assessment does not have a significant moderating effect on the parental education gap, most likely since this stage of transition is a consequence of prior educational transitions.

[Table 5 about here]

4. Summary and discussion

Throughout the research it was assumed self-assessment might reinforce the investment in effort. If pupils are more confident of their abilities they will probably invest more effort in education (Azmat and Iriberri, 2010). At the same time, even small investments (little acorns)

could make a significant change (mighty oaks) among pupils with low-educated parents. Note that if pupils aim to reach the educational level of their parents, this means the offspring of low-educated couples tend to choose secondary tracks that do not lead directly to tertiary education. This is, however, a direct way to reproduce social inequality. The results presented here indicate that estimating own performance higher might help pupils with less advantageous parental background to reach their potential and encourage them to choose college-bound secondary school tracks. Consequently, depending on self-assessment, the gap decreases in college-bound secondary track choice between the offspring of low-and high-educated parents.

4.1. Limitations

There are some limitations to the results, which should invite careful reading, above all because of the retrospective character of self-assessment. The relationship between self-assessment and educational track choices at the secondary level is likely to be overestimated and is not causal in nature. However, a promising feature of the results is that self-assessment influences the choice of tertiary education, which is clearly unaffected by the retrospective nature of self-assessment.

It should also be mentioned that ability and school achievement could both be products of self-assessment; therefore an early-childhood measure of self-assessment would be more appropriate. The finding that the impact of self-assessment was estimated to be higher in the transition to tertiary education also shows that self-assessment could induce later academic achievement. The ceiling effect could, however, result in lower estimations. Since self-assessment is measured on a scale of 0–100, and the hypothetical class average is fixed (70). Therefore there may be limited scope for expressing outstanding performance relative to classmates.

4.2. Conclusion

The choice of secondary education (at age 14) is probably the first educational decision where pupils have a say. Self-assessment could therefore be important for pupils if it helps them to decide to break away from parental models, follow their own inclinations and opt for more demanding education. As has been shown elsewhere, inducing pupils to think that they are highly able is more of an ego-centred than a task-centred exercise, and is therefore perceived to be a less effective way of developing ability (Nicholls, 1990: 39).

The results demonstrated in this paper therefore illustrate that in terms of educational outcomes and decision-making it might be important to focus more on the rather overlooked *effort* component, than concentrating exclusively on the well-researched *ability* component.. Our knowledge of how effort is influenced by parental background remains very limited. Even though there is a growing body of literature pointing out the importance of personality traits (though personality traits are not necessarily equivalent to effort) in educational outcomes (Borghans et al. 2008), often this does not focus on the connection to family background (but see, for example, Heckman 2008 on this issue).

Making an investment in education is costly, since investment *now* is only rewarded in the uncertain future. As with any investment, there is always the possibility of failure. Hence, having something which modifies the willingness of pupils to make the effort is of significant importance. Self-assessment – the perceived knowledge about own ability – was found to be

the kind of factor which might help to understand who makes the investment in education. If somebody believes that he is able (or more able than his peers), that belief might help him to consider the effort to be worthwhile. Because of the confidence in own ability, people with high self-assessment might worry less about fruitless investment and might endure current efforts in order to earn later rewards. Therefore from the little acorn of self-assessment, the mighty oaks of reward may grow.

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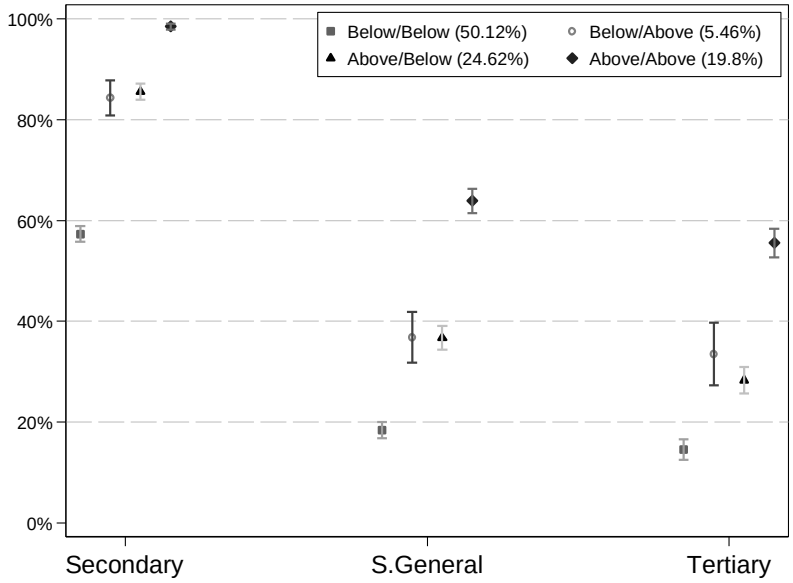
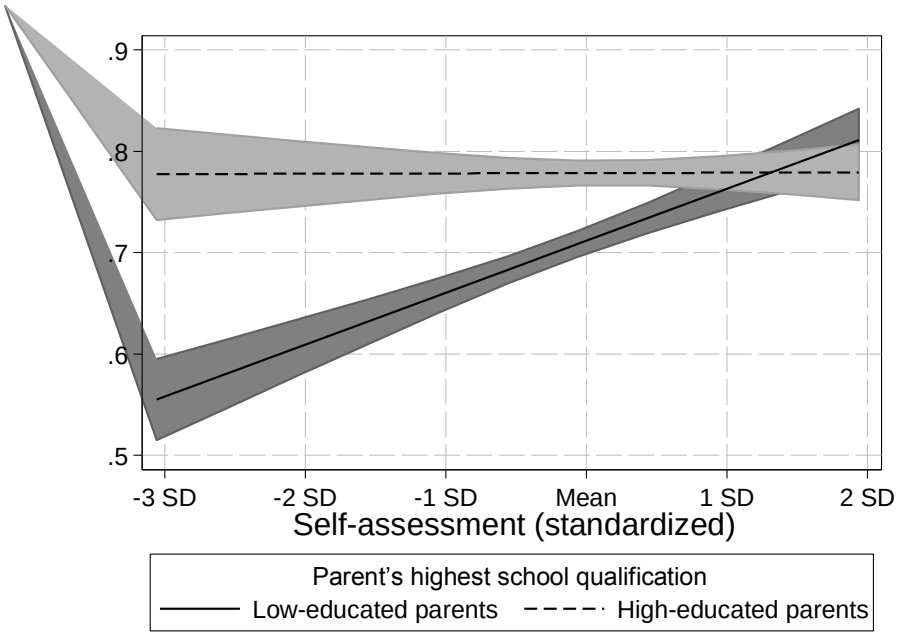
Figures

Figure 1: The mean value of the dependent variables to be used in the analysis by anchored self-assessment (mean values with 95 per cent confidence intervals)



N=7722.
Secondary refers to the dependent variable 'college-bound secondary tracks versus vocational track'; *S.General* refers to the dependent variable 'secondary general track versus secondary vocational track'; *Tertiary* refers to the dependent variable 'state-financed tertiary versus no tertiary education'.

Figure 2: Different predictions of the choice of college-bound secondary tracks rather than the vocational track, according to parental background (based on Model 1 in Table 5)



Tables

Table 1: Mean, standard deviation and number of cases of the three dependent variables in analysis, by parental background

			Dependent variables used in the analysis		
	Parent's highest school qualification		College-bound secondary tracks *versus* Vocational track	Sec. general track *versus* Sec. vocational track	State-financed tertiary *versus* No tertiary/not state-fin.
Panel A	*Low-educated parents*	mean	57.93%	21.36%	17.23%
		sd	49.37%	41.00%	37.78%
		N	3,677	2,130	1,126
Panel B	*High-educated parents*	mean	88.45%	45.89%	40.11%
		sd	31.96%	49.84%	49.02%
		N	4,045	3,578	2,533
Panel C	Total	mean	73.92%	36.74%	33.07%
		sd	43.91%	48.21%	47.05%
		N	7,722	5,708	3,659

Table 2: Mean, standard deviation and number of cases of self-assessment and ability measures in year 8, by parental background

	Parent's highest school qualification		Self-assessment	School marks (year 8)		Competence test scores (year 8)	
				Individual	Class average	Maths	Reading
Panel A	*Low-educated*	mean	-0.31	-0.26	-0.34	-0.40	-0.38
		sd	0.95	0.99	0.94	0.85	0.86
		N	3,677	3,677	3,677	3,677	3,677
Panel B	*High-educated*	mean	0.29	0.24	0.31	0.37	0.35
		sd	0.96	0.95	0.96	0.99	1.00
		N	4,045	4,045	4,045	4,045	4,045
Panel C	Total	mean	0.00	0.00	0.00	0.00	0.00
		sd	1.00	1.00	1.00	1.00	1.00
		N	7,722	7,722	7,722	7,722	7,722
Panel D	*Gap (above-below)*	*mean*	0.60	0.50	0.64	0.77	0.73

Table 3: Explaining self-assessment, school fixed effect OLS coefficients with standard errors in parentheses

Number of model	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Self-assessment	Self-assessment	Self-assessment	Self-assessment	Self-assessment	Self-assessment
Parents' highest school qualification						
Low-educated	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
High-educated	0.599***	0.381***	0.116***	0.112***	0.097***	0.076***
	(0.022)	(0.020)	(0.020)	(0.022)	(0.022)	(0.022)
School marks (GPA)						
Individual		0.436***	0.328***	0.313***	0.278***	0.268***
		(0.010)	(0.011)	(0.012)	(0.013)	(0.013)
Class average			0.128***	0.122***	0.094***	0.085***
			(0.011)	(0.016)	(0.012)	(0.012)
Competence test scores						
Maths		0.267***	0.292***	0.242***	0.204***	0.267***
		(0.014)	(0.016)	(0.015)	(0.016)	(0.014)
Reading		0.044***	0.042***	0.024	0.040***	0.044***
		(0.014)	(0.016)	(0.015)	(0.015)	(0.014)
Rotter's internal control						0.049***
						(0.010)
Harter's social competence scores						0.073***
						(0.021)
Rosenberg's self-esteem scale						0.226***
						(0.025)
Depression scale						-0.104**
						(0.045)
Other controls	No	No	No	No	No	Yes
School fixed effects	No	No	No	Year 8	Year 9	Year 9
Constant	-0.314***	-0.199***	-0.061***	-0.059***	-0.051***	-27.642
	(0.016)	(0.014)	(0.014)	(0.014)	(0.015)	(31.877)
Observations	7,722	7,722	7,722	7,722	7,722	7,722
Adjusted R-squared	0.089	0.267	0.368	0.444	0.387	0.416
F-stat	759.3***	1409***	900.5***	684.8***	255.3***	48.63***

*** p<0.01, ** p<0.05, * p<0.1

Other controls (in vector C) discussed in 2.3.7: male; year of birth; number of siblings; birth order; respondent is Roma; type of settlement; county.

Table 4: The explanation of track choices, school fixed effect OLS coefficients with standard errors in parentheses

	Panel A		Panel B		Panel C	
Number of model	(1)	(2)	(3)	(4)	(5)	(6)
Population	Year 8 pupil in 2005/06		Year 8 pupil in 2005/06		Finished secondary school within 5 years	
Dependent variable	College-bound secondary tracks (1) *versus* vocational track (0)		Sec. general track (1) *versus* sec. vocational track (0)		State-financed tertiary (1) *versus* no/not state-f. (0)	
Self-assessment	0.027***		0.020***		0.037***	
	(0.005)		(0.005)		(0.011)	
Parental schooling						
Low-educated	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
High-educated	0.070***	0.072***	0.031***	0.032***	0.076***	0.078***
	(0.010)	(0.010)	(0.009)	(0.009)	(0.018)	(0.018)
School marks						
Individual	0.085***	0.093***	0.029***	0.036***	0.069***	0.082***
	(0.006)	(0.006)	(0.006)	(0.005)	(0.013)	(0.013)
Class average	0.054***	0.057***	0.016***	0.019***	0.037***	0.042***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.011)	(0.011)
Competence score						
Maths	0.023***	0.029***	0.013**	0.018***	0.053***	0.060***
	(0.007)	(0.007)	(0.006)	(0.006)	(0.013)	(0.012)
Reading	0.019***	0.021***	0.011*	0.012**	0.042***	0.044***
	(0.007)	(0.007)	(0.006)	(0.006)	(0.012)	(0.012)
Graduated in 2010					Ref.	Ref.
Graduated in 2011					-0.043**	-0.040**
					(0.018)	(0.018)
Graduated in 2012					-0.144**	-0.142**
					(0.069)	(0.069)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
School fixed effects	Year 9	Year 9	Year 9	Year 9	Year 9	Year 9
Constant	-42.683***	-43.514***	0.701	1.197	-16.584	-16.118
	(13.914)	(13.939)	(13.784)	(13.807)	(30.493)	(30.557)
Observations	7,722	7,722	5,708	5,708	3,570	3,570
Adjusted R-squared	0.422	0.419	0.733	0.732	0.265	0.262
F-stat	26.67***	26.57***	6.678***	6.315***	8.123***	7.961***

*** p<0.01, ** p<0.05, * p<0.1; Other controls (in vector C) discussed in 2.3.7: male; year of birth; number of siblings; birth order; respondent is Roma; type of settlement; county.

Table 5: Interactional effects, fixed effect OLS coefficients with standard errors in parentheses

Dependent variable	(1) College-bound secondary tracks (1) *versus* vocational track (0)	(2) Sec. general track (1) *versus* sec. vocational track (0)	(3) State-financed tertiary (1) *versus* no/not state-f. (0)
Self-assessment	0.051***	0.028***	0.019
	(0.007)	(0.007)	(0.016)
Parental schooling			
Low-educated	Ref.	Ref.	Ref.
High-educated	0.067***	0.032***	0.069***
	(0.010)	(0.009)	(0.019)
Self-assessment×Parental schooling			
Low-educated	Ref.	Ref.	Ref.
High-educated	-0.051***	-0.015*	0.028
	(0.009)	(0.008)	(0.019)
School marks			
Individual	0.085***	0.029***	0.069***
	(0.006)	(0.006)	(0.013)
Class average	0.055***	0.017***	0.037***
	(0.005)	(0.005)	(0.011)
Competence score			
Maths	0.025***	0.014**	0.052***
	(0.007)	(0.006)	(0.013)
Reading	0.020***	0.011*	0.042***
	(0.007)	(0.006)	(0.012)
Graduated in 2010			
Graduated in 2011			-0.042**
			(0.018)
Graduated in 2012			-0.141**
			(0.069)
Constant	-39.439***	1.516	-17.273
	(13.892)	(13.789)	(30.490)
Other controls	Yes	Yes	Yes
School fixed effects	Year 9	Year 9	Year 9
Observations	7,722	5,708	3,570
Adjusted R-squared	0.424	0.733	0.266
F-stat	26.99***	6.575***	7.958***

*** p<0.01, ** p<0.05, * p<0.1

Other controls (in vector C) discussed in 2.3.7: male; year of birth; number of siblings; birth order; respondent is Roma; type of settlement; county.

Appendix

Figure A1: Schematic overview of Hungarian educational system

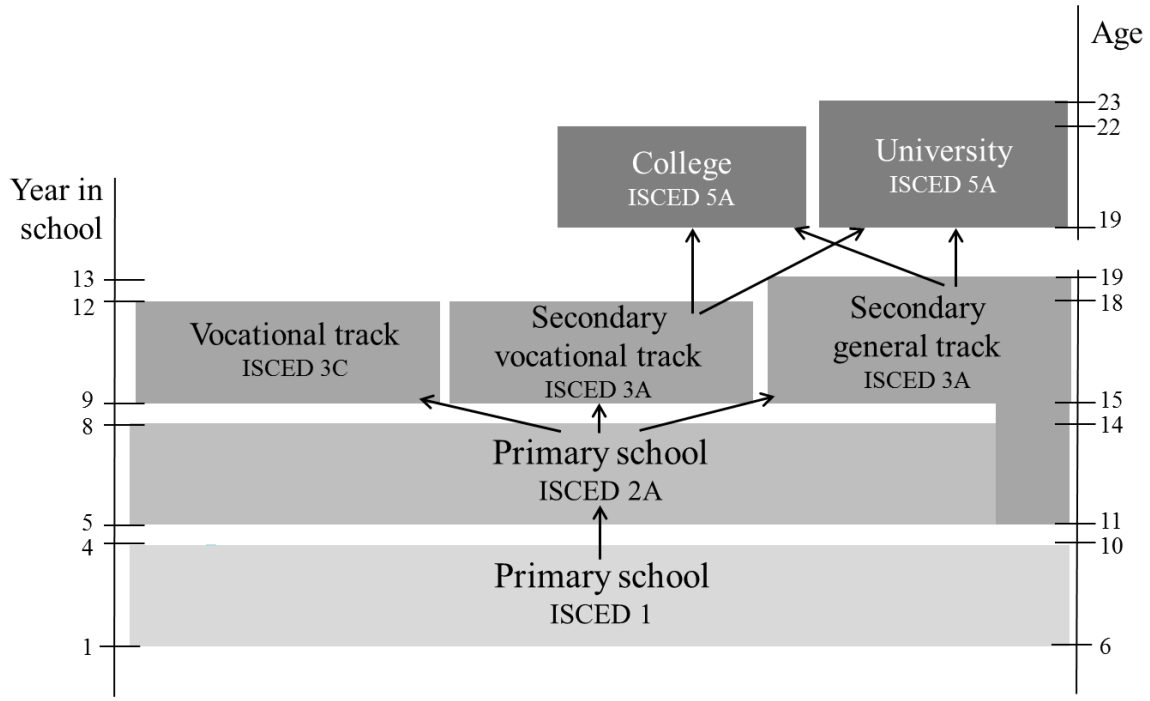


Figure A2: Schematic overview of Hungarian Life Course Survey