

APPENDIX

THE RELATIONSHIP BETWEEN ACADEMIC
ACHIEVEMENT AND SOCIOECONOMIC STATUS:
AN ANALYSIS OF THE FINDINGS OF THE NATIONAL
ASSESSMENT OF BASIC COMPETENCIES IN HUNGARY
ON PARENTS' EMPLOYMENT STATUS, PERCEIVED
SOCIAL STATUS, AND LIVING ENVIRONMENT

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Abstract

The achievement gap in schools can be mostly explained by socioeconomic factors, there are several studies that prove the relevance of the societal factors in explaining this phenomenon. e.g. Manstead, 2018; Carlisle and Munay, 2015; Kraus and Stephens, 2012. Parents' social status has great effect on students' academic success if you regard the environmental conditions, parenting styles, the quantity and quality of the stimuli, etc. On the other hand, schools are expected to tighten the gap; however, research data are controversial in that respect how successful the schools are in this area (von Hippel et al, 2018). In our study, we analyse the results of the National Assessment of Basic Competencies in relation of social factors: regularity of parents' work, perceived standard of living in case of families and living environment. The results reveal the effect of types of schooling, but the social factors affect the achievement moderately. The authors of the study carried out the research on the basis of the National Assessment of Basic Competencies Research Group with the topic number 20642B800, funded by the Faculty of Humanities and Social Sciences, Károli Gáspár University of the Reformed Church in Hungary.

Keywords: parental background ■ socioeconomic status ■ assessment of competencies ■ academic achievement

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INTRODUCTION

International educational and sociological research pays particular attention to differences in academic achievement across individuals and social classes, and special focus is laid on the relationship between socioeconomic status (SES) and academic achievement by both researchers and policy makers (Carlisle & Murray, 2015). Several studies have revealed a positive relationship between SES and academic achievement, that is, higher socioeconomic statuses are associated with better educational outcomes (e.g. Manstead, 2018; Carlisle & Murray, 2015; Kraus & Stephens, 2012). Several authors suggest that SES is one of the most important predictors of academic achievement (e.g. Manstead, 2018; Csapó, Molnár, & Kinyó, 2009; van Laar & Sidanius, 2001).

The American Psychological Association (APA) has published a list of the major empirical findings on the relationship between education and SES available on designated web pages.⁶ The findings show that the impact of a low SES manifests itself as early as at preschool age, in that children living in a low-SES family or environment show slower development of abilities required for efficient learning (e.g. cognitive abilities, language skills, memory functions and social-emotional functions). The data suggest that preschool children living in poverty have underdeveloped language competencies. The findings also reveal that material, cultural and social resources equally contribute to deprived children's poorer academic achievement (e.g. they are relatively deprived of the necessary conditions including information, experiences and material conditions such as age-appropriate books and toys). Early disadvantages leave their mark on subsequent educational outcomes. According to data published by the APA (2014), children from low-SES American families show a performance gap of 10% on math and reading tests, a five-year developmental gap in reading and writing skills when entering secondary education, and a higher probability of dropout (11.6%) as compared to children from high-SES families (2.8%). While 2016 US data revealed a decrease in dropout rates at a national level, an increasing tendency was found among children from the poorest families, who were five and six times less likely to complete secondary education than middle and upper-class children, respectively.

Although it is a widely-accepted fact today that SES and academic achievement are closely related, further research is needed to obtain a detailed picture of this relationship and to reliably establish its underlying causes. Some of the related studies (e.g. Chmielewski, 2019; Owens, 2018) point out methodological issues such as the diversity of the operationalized constructs and applied methods, which led to inconsistent findings on the relationship between SES and academic achievement (e.g. on whether schools moderate or aggravate the impact of differences in socioeconomic background on educational outcomes). An important methodological issue concerns the basis on which students' SES is assessed, that is, whether the reference point is the family or the living environment, and whether the measures are objective (e.g. parents'

⁶ <https://www.apa.org/pi/ses/resources/publications/education-and>
<https://www.apa.org/pi/ses/resources/publications/children-families>

level of education and income) or subjective (e.g. perceived social status). Surveys usually measure several indicators of family SES most frequently including parents' level of education, and financial status of the family, while several studies also assess parents' employment status, the amount of books in the household, and the perceived social status of the family and the living environment (e.g. PISA and TIMSS surveys, or the National Assessment of Basic Competencies in Hungary).

The present study analyzed data of the 2018 National Assessment of Basic Competencies to explore the relationships between Hungarian students' SES and their academic achievement as reflected in performance on reading and mathematics tests. The impact of SES was assessed with selected items of students' data sheets including regularity of the parents' employment (TA 031 and TA 033), perceived social status of the family (TA 40), and social status of the living environment (TA 48).

THE ROLE OF SCHOOLS IN REDUCING INEQUALITIES

Findings of the most recent international studies suggest that schools play a vital role in reducing social inequality, with special regard to educational outcomes (e.g. academic achievement, absence and dropout rates, further education). Public education has particular importance in this regard because most developed Western societies are oriented towards meritocracy, thus educational institutions are expected to reduce individual differences in academic achievement stemming from social inequality, to support students' progress according to individual merits, and to disregard class differences when investing efforts in working with students (Autin et al., 2019). However, certain survey findings suggest that schools do not fully meet the challenge (Autin et al., 2019). The OECD report on the PISA 2015 survey and the 2018 OECD publication entitled *Equity in Education* point out that although the number of completed grades generally shows an increasing tendency, differences in academic achievement such as those in performance on science, mathematics and reading tests may still be explained in large part by students' SES (OECD, 2015, 2018). Of the total variance in science test scores, 12.9% is explained by SES on average across countries, while there are countries such as Hungary, for example, where the explained variance reaches 20%. An increase of one unit in the PISA index of economic, social and cultural status is associated with a mean increase of 38 points in students' test performance. In Hungary, this means an increase of 45 to 50 points (OECD, 2015), and the mean difference between the highest and lowest-SES students amounts to 88 points, which roughly corresponds to about 3 grades in terms of schooling (OECD, 2018).

The impact of socioeconomic factors on academic achievement is not only manifested in differences across students but also in differences across countries. Results of the PISA surveys show that the differences between high and low-SES students in academic achievement and in the number of completed grades are smaller in developed welfare states than in lower-income countries (OECD, 2018). Cross-country differences were revealed in comparative studies as early as in the 1980s by Heyneman

and Loxley (1982, 1983; cited by Carlisle & Murray, 2015). In welfare states, academic achievement was more closely related to students' socioeconomic background than to school-related factors (e.g. characteristics of the school and teachers). In low-income countries, by contrast, the latter as opposed to the former showed closer associations with academic achievement according to the authors' findings. This peculiar phenomenon is referred to in the literature as the Heyneman-Loxley effect. Although several attempts have been made at replicating the effect, the findings are inconsistent. In any case, it is clear that both individual and school-level measures of SES are related to academic achievement, whereas their respective impacts appear different in magnitude when cross-country differences in economic and social conditions are also taken into account (Carlisle & Murray, 2015).

Cross-country differences deserve particular attention in another respect as well. The OECD uses the term academic resilience to describe disadvantaged students who perform as well as, or even better than, highest-status students. This is reflected in certain findings of the PISA 2015 survey. In Macao and Vietnam, for example, disadvantaged students performed significantly better than those with a higher social status (OECD, 2015). Disadvantaged students show high levels of academic resilience in those OECD countries that give relatively high priority to equity such as Algeria, Hong Kong, Iceland, Kosovo, or Montenegro, for example (OECD, 2018).

The impact of socioeconomic background on academic achievement also points out the importance of school-related factors (Autin et al., 2019; von Hippel et al., 2018). PISA data clearly shows that the SES of a school is closely related to its educational outcomes. More specifically, students attending higher-status schools show better average performance on PISA tests, which means that disadvantaged students attending a low-SES school are doubly disadvantaged. The educational systems of the countries participating in the PISA show differences in the level of segregation. In the OECD countries, an average of 48% of disadvantaged students attended a low-status school in 2015 according to PISA data. School SES was most closely related to academic achievement in Belgium, Bulgaria, China, Argentina, France, Hungary, Slovakia, Slovenia and the Netherlands. In 2015, the PISA science test performance of disadvantaged students attending higher-status schools exceeded that of students of lower-status schools by 130 points on average (OECD, 2018).

Any explanation for the impact of socioeconomic factors on achievement gaps is essentially a question of the primacy of the school versus the family. Some authors argue that schools in low-status living environments are less well-equipped, they employ less educated teachers, and their communities have poor motivation and morale (e.g. Owen, 2018; von Hippel et al., 2018). Status-based discrimination is not only observable across schools but also within individual schools. Stereotypes affect both teachers' and classmates' attitudes towards low-status students, and teachers set discriminatory expectations for them and feel less responsible for their academic progress (von Hippel et al., 2018; van Laar & Sidanius, 2001). Findings of a meta-analysis conducted by Autin and colleagues (2019) suggest that teachers themselves may actively contribute to socioeconomic achievement gaps. The authors analyzed research data on teachers' evaluations of students and in some cases found large differences between

these evaluations and results of independent assessments (e.g. PISA). Teachers' evaluations brought about an achievement gap when they served selection purposes (e.g. further education) rather than students' progress (Autin et al., 2019).

By contrast, other studies suggest that schools do not essentially contribute to inequalities and thus to socioeconomic achievement gaps, but the causes lie in family-related factors (family income, parents' education and occupation, ethnicity, number of siblings etc.). Proponents of this position argue that resources are distributed much more unevenly across families than across schools; there are much larger variations in family income than in school funds (e.g. the difference between a graduate mother in her thirties and a teenager mother is larger than that between teachers with and without professional experience; von Hippel et al., 2018).

CHANGES IN THE RELATIONSHIP BETWEEN DIFFERENCES IN ACADEMIC ACHIEVEMENT AND SES

The term socioeconomic achievement gap used in the international literature refers to the differences observed between low and high-SES students' educational outcomes. The phenomenon has for long been studied and empirically demonstrated by sociologists and educational researchers (see above), while the purposes of prevention and intervention also require researchers to analyze the changing trends of the relationship between differences in academic achievement and SES.

Findings of international surveys (e.g. PISA) reveal that achievement gaps are observable in most countries (OECD, 2018). These findings cast doubt on the above mentioned meritocratic position widely popular in the USA that education is the Great Equalizer. The importance of SES raises the question whether the related differences in academic achievement change over time. Identifying trends is difficult due to the diversity of the applied methods and operationalized constructs, which has resulted in mixed empirical findings.

The OECD (2018) tested the explanatory power of SES for performance in science, reading and mathematics. The analysis revealed an improving tendency overall, that is, the explanatory power of SES was found to decrease in all three competence areas. The mean variance in science performance explained by SES decreased from 14.4% to 12.9% between 2006 and 2015 (decreasing in 11 of the participating countries), while the explained variance in reading performance decreased from 14.3% to 11.9% between 2000 and 2015 (decreasing in 11 out of 35 countries), and that in mathematics performance decreased from 16.9% to 13.1% between 2003 and 2015 (decreasing in 15 out of 38 countries; OECD, 2018).

Chmielewski (2019) analyzed the trends of the association between SES and academic achievement within a period of 50 years (1964–2015). The analysis included the results of 30 large-sample international assessments (e.g. PISA, PIRLS, TIMSS, FIMS, SIMS) on scientific, reading and mathematical literacy of about 5.8 million students in 100 countries. The impact of SES on academic achievement was assessed by compar-

ing the 10th and 90th percentiles of three measures including parents' level of education, their occupation and the number of books in the household. The findings on all three SES measures consistently showed that the achievement gap between students with the lowest and highest SES status steadily increased over time in most involved countries: the mean increase in achievement differences associated with parents' level of education was 50%, while an increase of 55% was found for parents' occupation and 40% for the number of books in the household. However, increase in the achievement gap showed considerable cross-country variations, and even a moderate decrease or stagnation was found in some countries over the assessed period (e.g. the USA, Finland, Japan, Mexico and Brazil). The largest differences were found in countries where enrolment rates grew at the fastest pace, since increased student diversity entailed by educational expansion revealed the inequalities already existing outside education. In addition, an increase in the achievement gap was also found in several countries that have for long provided widespread access to education, which points out the importance of other factors such as the development of cognitive abilities, for example. The consistency between the associations of the three SES measures with academic achievement suggests that the single underlying factor explaining achievement differences found in various cohorts is family SES. The largest achievement gaps were shown by diverse countries such as Belgium, Luxembourg, Ireland, Norway, Poland, Hungary, Iran and Thailand. Chmielewski also points out that the largest achievement gaps were found between middle and low-class students (i.e. between the 50th and 10th percentiles), which suggests that increasing access to education does not directly contribute to increasing achievement differences but only reflects pre-existing social inequalities. Interestingly, diverse trends were found among countries where achievement differences are decreasing or stagnating. In lower-income countries (Brazil, Mexico, and Trinidad and Tobago), the closing achievement gap appears to be related to decreasing differences in family income, while some higher-income countries show the opposite trend: decreasing achievement differences are associated with increasing differences in income. In these latter countries (e.g. the USA, Israel, Japan), increasing differences in income are accompanied by wide access to education and high employment rates, that is, inequalities are not manifested in education or employment. However, there are countries where decreasing achievement differences are due to decreasing inequalities in education. In England and Finland, for example, the age when curricular tracking begins have been delayed, but this in itself does not sufficiently explain decreasing achievement differences, since there are other countries where track selection has also been moved to a later age, and achievement gaps are still increasing. These findings point to the importance of other, possibly family-related factors underlying socioeconomic achievement gaps.

Another important line of trend analysis focuses on seasonal variations in academic achievement, that is, on changes in achievement inequalities between students with different social backgrounds over the school year and the summer holiday. Quinn and colleagues (2016) conducted a large-sample longitudinal study replicating a 2004 US study published under the title "Are Schools the Great Equalizer?" (Downey, von Hippel, & Broh, 2004), whose findings demonstrated that schools moderated while

families aggravated achievement differences stemming from social inequality, since the achievement gap between students with different social backgrounds was found to increase over summer holidays. In addition to students' SES, their mathematics and reading test scores were measured in three rounds (over the first three years of schooling) comprising six waves (each including fall and spring assessments). The results were only partly consistent with previous findings. The equalizing role of schools was clearly confirmed by data on the first year when low-SES students showed larger improvement than their high-SES counterparts, whereas this pattern was not consistently maintained in subsequent years, and the reverse pattern was also observed in some cases. Authors note, however, that the observed dynamics of inequality partly depends on how the achievement gap is operationalized, since the equalizing effect of schools is more obvious when measuring changes in absolute terms than when using a relative measure (Quinn et al., 2016).

Von Hippel and colleagues (2018) also replicated the original study (Downey, von Hippel, & Broh, 2004) to test the equalizing effect of schools using a methodology similar to that employed by Quinn and colleagues (2016). The replication study deviated from the original one in the operationalization of inequality and in certain statistical procedures. The associations of mathematics and reading performance with SES were assessed in two cohorts during the fall and spring of the first two or three school years. The clearest pattern revealed a socioeconomic achievement gap as early as in kindergarten fall, while this gap decreased rather than increased in subsequent years. The achievement gap between students in the lowest and highest SES brackets decreased by about 17% in mathematics and by 25% in reading overall; a decrease was found between kindergarten fall and first year spring in the older cohort and between kindergarten fall and second year spring in the younger cohort. However, differences only decreased during school years, while they stagnated or increased during summer holidays. A particularly large increase was found in the summer after kindergarten when highest-SES students continued to progress at a pace almost as fast as that shown over the preceding school year, while lowest-SES students' progress dropped. In sum, the socioeconomic achievement gap was observable as early as in a preschool year, while it decreased over school years. The deviation in students' achievement increased during summers as reflected in the increased total variance of test scores, while it decreased during school years, that is, schools moderated social inequalities. Although both the original study (Downey, von Hippel, & Broh, 2004) and the replication study conducted by von Hippel and colleagues (2018) demonstrated that schools had a relative equalizing effect on achievement as reflected in their moderating the inequalities that increased during summers, only the latter study revealed an absolute decrease over school years as reflected in a decrease in the total variance.

AZ ISKOLAI TELJESÍTMÉNY ÉS A SZOCIOÖKONÓMIAI STÁTUSZ ÖSSZEFÜGGÉSEI
INCREASING SOCIOECONOMIC ACHIEVEMENT GAP AND LIVING
ENVIRONMENT

Owens (2018) examined the causes of the increasing socioeconomic achievement gap. The author suggests that the increasing inequalities between students with different socioeconomic backgrounds are primarily related to contextual factors. The most important underlying factor seems to be parents' income-based segregation observed in cities. Between 1990 and 2010, both the income gap and the segregation of public schools increased by 15% in the USA. In segregated living environments, the resources required for educational progress is distributed unevenly (e.g., school funding, quality of teachers' competencies, parents' social capital). For this reason, students living in higher-SES neighbourhoods have access to more and better resources. Several studies have demonstrated that there is a relationship between students' living environment and school achievement: a disadvantageous living environment impairs cognitive performance or educational outcomes (e.g., Burdick-Will, 2017; Hegedűs, 2016; Ainsworth, 2002). Owens attributes this relationship to income-based segregation. Income-based segregation results in a high concentration of disadvantaged students in cities, which increases the costs of ensuring a safe and healthy living environment and those of maintaining quality education, while the amount of funds invested in education is related to students' educational outcomes. Furthermore, the living environment determines the composition of the student body, which also influences individual students' progress (e.g., van Laar & Sidanius, 2001). Disadvantaged schools are in most cases attended by a homogeneous student body, since the living environment is homogeneous due to income-based segregation. The most important finding of Owens' study is the demonstration of the impact of income-based segregation in American cities on the increasing socioeconomic achievement gap, that is, the association between the income gap and the socioeconomic achievement gap is moderated by income-based segregation (Owens, 2018). In segregated environments, students with different socioeconomic backgrounds show significant differences in mathematics and reading performance; the strength of the association between family income and school achievement increases with increasing segregation in cities, which is due to increasing achievements of children from high-income families as opposed to decreasing achievements of those from low-income families. The more pronounced segregation is, the more advantageous conditions for academic achievement are enjoyed by students from high-income families. Among students in the highest income bracket, those living in the most segregated neighbourhoods achieve the highest test scores. By contrast, educational outcomes of children from low-income families are less closely related to the level of segregation.

Similarly to Owens (2018), Pearman II (2018) also examined the relationship between segregation in cities and students' achievement differences, but his meta-analysis focused on a different phenomenon. Namely, he studied gentrification, which refers to the tendency of higher-status families to move to low-SES neighbourhoods. In such cases, disadvantaged students are expected to benefit from the changes in their living environment due to collective socialization processes. However, the available

empirical findings do not support this expectation. In fact, findings show that gentrified families tend to undergo segregation (e.g., Bolt & van Kempen, 2013; Lelevrier, 2013; cited by Pearman II, 2018). Increased competition in gentrified neighbourhoods entails increased dropout rates among low-SES students, that is, socioecological improvement in such areas impairs disadvantaged students' educational outcomes (Kearney & Levine, 2014; cited by Pearman II, 2018). The impact of students' living environment on their achievement may also be mediated by institutional structure and functioning, which suggests that gentrification contributes to disadvantaged students' progress through its positive effect on the quality of education, which is due to schools' striving to meet higher-SES families' demands. Although the related empirical findings are inconsistent, several of the above mentioned studies have demonstrated that students attending higher-SES schools show better achievements. Furthermore, the impact of school SES is not only manifested in differences across schools but also in differences across disadvantaged students: those attending higher-SES schools perform better than other disadvantaged students (e.g., Milner, 2015; Palardy, 2013; Sirin, 2005; cited by Pearman II, 2018). However, institutional restructuring may aggravate the marginalization of autochthonous low-SES families, whose extent depends on the proportions of enrolment of students from gentrified families. In any case, gentrification clearly has a favourable effect on low-SES students' educational outcomes by contributing to reduced delinquency and healthier living environments (Pearman II, 2018).

STUDY

A secondary analysis of data obtained in the 2018 National Assessment of Basic Competencies was conducted to examine the relationship of students' mathematical and reading literacy with three socioeconomic factors including the regularity of parents' employment (TA 031 and TA 033), parents' perceived social status (TA 40), and the social status of the living environment (TA 48). The analysis was aimed at gaining a better understanding of the importance of socioeconomic background in academic achievement. The analysis included data obtained from eighth and tenth-grade students. The data obtained in 2018 were compared to the data obtained in 2017 to observe the possible changes.

The samples of 2017 and 2018 assessment do not differ in relation with demographic features (Appendix, table 33). The subsample of eighth-graders mainly consists of students going to primary school, and girls outnumber the boys a little. In the population of tenth-graders high school and vocational high school students form the biggest part of the sample, and in case of four-, six- and eight grade high schools, the girls outnumber the boys, while in case of vocational high school and technical college the boys outnumber the girls.

Due to the limited scope of the present paper, the detailed results of the analysis are available at the home page of the journal: PSYC_HU⁷

REGULARITY OF EMPLOYMENT

Two items of the questionnaire administered to students assessed the regularity of the mother's and the father's employment. Besides regular employment, the following response alternatives were available: employed on a casual basis, on parental leave, pensioned, unemployed, and permanently disabled.

Eighth-grade students

The results generally showed that regularly employed and self-employed mothers' children performed well in mathematics as reflected in their competence levels falling within the range of 1600 to 1800 points for both high school students and primary students. Cross-school differences in mathematical literacy were primarily found among students whose mothers were pensioned, unemployed or permanently disabled. Interestingly, the poorest mean performance in mathematics among girls attending six grade high schools was shown by those whose mothers were unemployed or employed on a casual basis. Similar results were obtained for boys enrolled in six grade secondary education, among which those with a permanently disabled mother showed the poorest performance in mathematics. It has to be noted, however, that the estimated competence levels of six and eight-grade high school students whose mothers had no regular employment involved relatively large error margins as reflected in standard errors and confidence intervals. This is essentially due to the relatively small sample sizes rather than to large performance differences compared to other samples. Nevertheless, the obtained large error margins have to be taken into account when drawing conclusions.

Eighth-grade students reading performance partly reflected a similar trend. The competence levels of those whose mothers had a permanent job fell within the range of 1600 to 1800 points, which reflects good performance. The only exception was the sample of primary students; whose performance fell slightly short of the 1600-point lower limit. However, the same pattern of differences across school types was shown by this sample as that found in other samples. That is, performance differences were related to school type among those whose parents were regularly employed. Both six and eight grade high school students performed better than primary students, with mean differences reaching or exceeding half a standard deviation.

The interesting relationship between mathematical literacy and parents' employment status (i.e., pensioned, unemployed, and permanently disabled mothers' children showed poorer performance) was also obtained for reading literacy, although the

⁷ <http://www.kre.hu/portal/index.php/kiadvanyok/folyoiratok/psychologia-hungarica-caroliensis.html>

estimates for small samples had much wider confidence intervals than larger samples in this case as well.

The obtained pattern revealed that primary students whose mothers had no regular employment showed poorer performance. This trend was not clearly observable in the sample of eighth-graders attending a six or eight-grade high school. Moreover, those female eight-grade school students whose mother was pensioned, unemployed or permanently disabled performed as well as, or even slightly better than, comparable students with a regularly employed mother (the above mentioned limitations for small samples also apply in this case as a matter of course). Among male six grade high school students, the performance of those with a permanently disabled mother was close to primary students' performance. The poorest performance and the least reliable estimates were obtained in this sample. (Estimates with low reliability were obtained because the overall samples of six and eight grade high school students were relatively small and sample sizes were further reduced by selecting those having permanently disabled parents.)

Eighth-grade students mathematics performance showed larger differences across school types (up to 200 points) irrespective of their fathers' employment status; high school students performed better than primary students. Large differences were found among those high school students whose fathers were employed on a casual basis, unemployed or permanently disabled. Particularly marked differences were revealed among female eight grade high school students with a father employed on a casual basis, while the poorest performance among male six grade high school students was shown by those with an unemployed father. However, it has to be noted again (as it was pointed out in relation to mothers' impact) that the performance estimates for high school students whose parents were not regularly employed had a wide confidence interval.

The results on eighth-graders' reading literacy were similar to those on mathematics performance. Primary students with a father not regularly employed showed poorer performance than comparable students, while the estimates for high school eighth-graders and particularly for those with an unemployed or permanently disabled father involved large standard errors.

No significant difference was found between the results of the 2017 and 2018 assessments with respect to the associations between academic achievement and parents' employment status. However, changes were revealed within smaller samples, each of which comprised students whose mother or father had a specific employment status. Male eight grade high school students with a pensioned mother performed better in 2018 in both competence areas, while their female counterparts whose mothers were unemployed showed better reading performance in 2018. No considerable performance difference was found between the two assessments except for male six grade high school students with a permanently disabled father, whose reading performance was better in 2018. However, the relatively large standard errors due to small sample sizes have to be taken into account when drawing conclusions.

Tenth-grade students

Parents' employment status showed similar associations with performance levels in both competence areas within both gender groups of tenth-graders. The largest differences in mathematical and reading literacy were found across school types in both gender groups: the poorest performance was shown by vocational high school students, while eight and six grade high school students reached the highest performance levels. Within these two groups, no performance difference was associated with parents' employment status. Among boys and girls attending four grade high schools, a slight difference was found in both competence areas between students with regularly employed versus not employed parents. The mathematics and reading performance estimates for those six and eight grade high school students whose mother or father was not regularly employed had wider confidence intervals. More specifically, less reliable estimates were obtained for male students with a pensioned, unemployed or permanently disabled mother, and for female students with an unemployed or permanently disabled father.

In these cases, the wider confidence intervals along with the large standard errors were due to the small sample sizes of those with parents having different specific employment statuses outside regular employment. These statistical properties of the performance measures practically excluded the possibility of meaningful comparisons. In sum, performance differences among secondary students were essentially related to school types including vocational high school and technical college, six or eight grade high schools, and four grade high schools (these differences occasionally amounting to one standard deviation) rather than to parents' employment status. Of course, the present analysis does not enable us to establish causal relationships, and it is beyond the scope of the paper. Furthermore, it has to be noted that any conclusion on the general performance differences between students with different parental employment statuses should be treated with caution, considering the large error margins of the performance measures due to small sample sizes.

Comparisons between the results of the two annual assessments did not reveal any considerable changes in performance in samples of students with different parental employment statuses. Smaller male samples showed slight differences. Six grade high school students with a pensioned mother performed better in mathematics in 2018 than in 2017. Four grade high school students with an unemployed mother showed higher competence levels both in reading and, to a lesser extent, in mathematics in 2018 than those assessed in 2017.

PERCEIVED SOCIAL STATUS

The analysis of students' perceived social status was based on responses to the relevant question (IA40). Students reported their perceptions of their families' financial situation as compared to other families.

Eighth-grade students

Results on mathematical and reading literacy were similar to those discussed previously: students attending a standard eight grade primary school showed somewhat poorer performance than those attending a six- or eight grade high school, that is, the largest differences were found across school types. It has to be noted that estimates for those six- and eight grade high school students whose families had serious or moderate financial difficulties had wide confidence intervals indicating small sample sizes, which suggest that a lower proportion of high school students had a difficult financial background as compared to all other school types.

Another pattern is also visible in the related figures: students' perceived financial situation was found to be associated with the results of the competence assessment. The poorest performance was shown by students whose families had serious financial difficulties, while the best performance was reached by those living under average or better circumstances. It should be noted that very small differences were found between students living in average versus well-off families: the latter showed marginally better performance among primary students, while no difference was found among high school students. Larger differences were found between those with an average versus difficult financial background, the latter showing somewhat poorer performance primarily among primary students. However, these findings should also be treated with caution because of the relatively large standard errors.

The figures also reveal gender differences. In mathematics, boys consistently performed better than girls irrespective of students' financial background. The best performance was shown by male eight grade high school students with a very high living standard, while the poorest performance by female primary students living under particularly difficult financial circumstances. The reverse is true for gender differences in reading literacy. Girls' overall performance was better than that of boys, while no considerable gender difference was found among students whose families had serious financial difficulties; these students showed the lowest levels of reading literacy in both gender groups.

Comparisons between 2017 and 2018 data only revealed a few marginal changes in the performance of students with different financial backgrounds. Male eight grade high school students performed better in both mathematics and reading in 2018, and six and eight grade high school students showed slightly better reading performance in 2018 except for those living under particularly difficult circumstances.

Tenth-grade students

Tenth-graders showed even more pronounced performance differences across school types as compared to eighth-graders. The lowest and highest competence levels were reached by technical college students and high school students, respectively. Students' perceptions of their families' financial situation were associated with academic achievement in this case as well, albeit to a lesser extent. This relationship was primarily reflected in the larger standard errors of performance estimates for six and eight

grade high school students whose families had serious or moderate financial difficulties. The larger error margins indicate that the high school sample included a lower proportion of students with a difficult financial background. Likewise, estimates for students with a very high living standard involved slightly larger errors, and thus indicated a lower proportion, than those for students with an average or better-than-average financial background. Interestingly, the overall performance of secondary students attending vocational schools and six or eight grade high schools showed that students with a very high living standard performed worse than those with a difficult or average financial background.

No difference was found between comparable results of the 2017 and 2018 assessments within samples of students with different financial backgrounds. Only girls' mathematics performance showed marginal differences. Among female students attending six grade high schools, the 2018 mathematics performance of those with serious financial difficulties was poorer, while that of students with moderate difficulties was better. Furthermore, female eight grade high school students with a very high living standard scored slightly lower in 2018. However, estimates for these samples involved larger error margins; therefore caution is needed when drawing conclusions.

PERCEIVED LIVING ENVIRONMENT

Similarly to students' perceptions of their families' financial situation, the measure of the perceived socioeconomic status of the living environment was also used to assess students' perceived social status.

Eighth-grade students

Data on this measure showed a picture similar to that based on the family's perceived financial situation. The largest differences were found across school types. Six and eight grade high school students performed better both in mathematics and in reading than primary students in either gender group. Performance estimates involved large standard errors in this case as well, due to small sample sizes. Specifically, small samples represented high school students living in an extremely or moderately poor environment, and the number of eight-grade high school students within these samples was so small that no performance estimate could be calculated for them. Particularly large standard errors were associated with the estimated reading performance of eight-grade high school students living in an extremely poor environment. Similarly large error margins were obtained for mathematics performance and for female and male six grade high school students' performance. Nevertheless, the data clearly shows that a relatively low proportion of six and eight-grade high school students lived in a low-SES environment.

Performance estimates for students living in an environment with an average or better-than-average SES involved small standard errors, while slightly larger errors

were obtained for those reporting a high-SES environment due to the smaller sample size as compared to the former samples. However, differences between the mean performance levels suggest that a better-than-average financial situation does not entail substantially better performance within any of the assessed school types.

Students and especially primary students living in an extremely or moderately poor environment showed somewhat lower competence levels than comparable students living in an environment with an average or better-than-average SES. The analysis focusing on students' perceived living environment also revealed the previously discussed gender differences in competencies: boys performed slightly better in mathematics, while girls showed higher performance in reading. Another interesting finding is that the highest mean level of mathematical competence was shown by male six grade high school students living in a high-SES environment.

In the present analysis, comparisons between the two annual assessments revealed changes in reading literacy. High school students living in low, average and higher-SES environments reached marginally higher performance in 2018 as compared to the previous year. A particularly large increase was obtained for female eight grade high school students living in a low-SES environment. It is worth noting that the 2018 performance estimates for those living in an extremely poor environment were associated with relatively large standard errors, which indicates a small sample size.

Tenth-grade students

The results on tenth-graders' academic achievement show a picture fully consistent with the previously discussed trends. In this case, the most pronounced performance differences were found across school types. The perceived SES of the living environment was only marginally related to the performance measures: the lowest and highest competence levels were associated with an extremely poor environment and with an average or better-than-average environment, respectively. This difference is more pronounced in reading performance. Larger standard errors were obtained for high school students, which is primarily due to smaller sample sizes. More specifically, large errors were associated with the estimates for those living in an extremely poor environment and especially six and eight grade high school students among them. This indicates that much lower proportions of children living in lower-SES environments are enrolled at six and eight grade high schools. This is well reflected in the figures, which show no data for female eight grade high school students. The estimates for students living in a high-SES environment also involved larger standard errors as compared to those associated with an average environment, which indicates a smaller sample size in the former case.

Comparisons between the two annual assessments only revealed a marginal difference in one case. Male eight grade high school students performed better in reading in 2018 than comparable students did in the previous year.

SUMMARY

The present study was based on a secondary analysis of data obtained in the 2018 National Assessment of Basic Competencies in Hungary, which was aimed at exploring the relationship between students' competencies and socioeconomic background. This latter was assessed with three commonly used SES measures including parents' employment status and financial status, and the SES of the living environment. The latter two measures assessed students' perceptions, whose validity has been confirmed in several studies (e.g., Kraus & Stephens, 2012).

The present study provided some important findings. First, a general tendency was that the largest differences in mathematics and reading performance were found across school types, irrespective of the assessed students' current school year (eighth or tenth) and gender. Nor did the employed SES measure (either parents' employment status or the two measures of students' perceived social status) influence the consistent associations between school types and performance: six and eight grade high school students reached the highest competence levels, while those attending standard eight grade primary schools and technical college showed the poorest performance. In short, school types played a decisive role in both mathematics and reading performance. This finding points to the selectivity of the Hungarian educational system: the impact of socioeconomic factors is manifested in differences at an early phase of school tracking (e.g., Csapó, 2015; Csapó, Molnár & Kinyó, 2009). The regularity of the parents' employment and the perceived SES of the family and the living environment accounted for smaller performance differences among eighth-graders than among tenth-graders in each school type sample.

The impact of the SES measures in focus was primarily manifested in the width of the confidence intervals and in the magnitude of the standard errors of the competence measures rather than in the medians of the performance measures, especially in the samples of six and eight grade high school students. Second, it has to be noted that this latter finding is due to the small sample sizes; therefore findings on the impact of SES should be treated with caution in order not to draw erroneous general conclusions. Thus, for example, it may not be established in general that those male eight grade high school students show the best performance in mathematics in the eighth grade whose fathers are employed on a casual basis.

Taking account of this limitation, the above discussed results show that parents' regular employment was positively associated with eighth-graders' performance and with that of high school students in the tenth grade. By contrast, parents' employment status was unrelated to the performance of secondary students attending vocational schools and six or eight grade high schools. Parents' lack of regular employment was primarily associated with primary students' lower performance, while large standard errors were obtained for six and eight grade high school students, which indicates that this type of school was attended by only few of those whose parents were not regularly employed.

Students' perceived social status was assessed with two measures concerning the family's financial situation and the SES of the living environment. The positive rela-

tionship between students' SES and academic achievement was more pronounced in the eighth-grader sample, while the impact of SES was primarily reflected in the relatively large standard errors associated with the performance estimates for tenth-graders. Summarizing the findings on students' perceived social status, higher levels of SES are generally associated with marginally higher levels of academic achievement, while this positive association in itself does not by any means indicate a causal relationship. Performance differences between students whose families had serious or moderate financial difficulties versus those with an average or better family SES were more pronounced in the eighth-grader sample as opposed to tenth-graders, whose performance was also closely related to school types. However, the association between family SES and academic achievement was also observed in the high school sample, but it was primarily reflected in the large standard errors. In sum, the direct impact of students' social background appears to decrease with their age, and it seems to be primarily manifested indirectly by the tenth grade, through the effects of sociocultural factors associated with school tracking. Since the analyzed data do not reveal any causal relationships between the factors in focus, it may only be established that while those sixth and eighth-graders enrolled in longer secondary school programmes including lower general secondary education were primarily higher-SES students, the same trend in the tenth grade was primarily observed in high school education.

In conclusion, the most pronounced performance differences were associated with school types, which were also reflected in the results of comparisons between the 2017 and 2018 data. By contrast, no change in performance was revealed by the comparisons taking account of students' socioeconomic background. However, parents' regular employment and the family's average or better financial situation may be protective factors. Relatively small proportions of students attending high schools and especially of those enrolled in six and eight grade programmes came from a low-SES family or environment, which points to the early selectivity of the Hungarian education system.

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