

APPENDIX

THE RELATIONSHIP BETWEEN PARENTAL INVOLVEMENT AND SCHOOL PERFORMANCE IN THE LIGHT OF THE DATA OF 2017 AND 2018 NATIONAL ASSESSMENT OF BASIC COMPETENCIES

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Abstract

The influencing effects on students' school performance are discussed in several studies from the student's, the school's and from the parents' point of view. The phenomenon of parental involvement and its effect on the students' performance is an emphasised research topic. When reading such researches however we face a number of inconsistent results. The reason for the inconsistency is due to the difference in definition for parental involvement which results in different indicators during research, indicators in school performance, the observed students' age and the persons involved in the general study. The present study wishes to introduce this variety and contradiction in the literature to a certain degree. We would also like to examine the forms of parental involvement measured in the National Assessment of Basic Competencies (NABC) and how that is connected to students' performance in competence assessments in the last two years. We aim to explore what connection is there between the activities at home such as the parents' involvement in student's homework; conversation at home about school; conversation with the family about the student's piece of reading; housework shared within the family; gardening and the performance in reading comprehension and mathematics in the course of the National Assessment of Basic Competencies in different age groups in schools.

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THE POSITIVE EFFECTS OF PARENTAL INVOLVEMENT¹

Several studies shed light on the positive effects of parental involvement^{1,3}. We can gather information from previous studies regarding increased parental involvement

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and how it positively effects students' cognitive and non-cognitive abilities, the development of motivation – students can be featured with higher level of intrinsic motivation, increased control over academic performance and the positive perception of school competencies. Correlations are sometimes displayed as causality. It is difficult to compare and generalize results. Authors of meta-analysis (Fan & Chen, 2001; Jeynes 2003, 2005, 2007) and reviews (Desforçes & Abouchaar, 2003; Bakker & Denessen, 2007; Pomerantz et al., 2007) try to raise our awareness on the challenges that they have encountered while conducting their research in the field. Parental involvement as a construct has its various coexisting definition hence clarity is required.

Definitions of parental involvement

Parental involvement can be defined as the parent's active commitment that results in the time spent on the child's cognitive and non-cognitive development (Borgonovi & Montt, 2012); or as the sum of the parent's behaviour which directly or indirectly effect the child's cognitive development and school performance (Bakker & Denessen, 2007). Parental involvement in short consists of participation at school and support at home, in a broad sense it refers to the various behaviour and practices – parental aspirations, expectations, attitudes, beliefs – that are related to the child's education (Henderson & Mapp, 2002). For the good of the development of children, parents produce several activities or forms of social behaviour (Podrąnczky, 2012).

Beyond the participation at school events parental involvement refers to an intrinsic commitment, positive attitude, motivation in relation to school activities, being involved in the education of the child away from home (F. Lassú et al., 2012).

Parental involvement is the quality and the extent to which parents assist children doing their homework, communicate with teachers, participate at school events and how well one can create an incentive cognitive environment (Yamamoto & Holloway, 2010). It covers all activities that are related to studying intentionally (Bouffard & Weiss, 2008). It means the parent's direct effort in order to enhance the child's level of education (Avvisatim, Besbas & Guyon, 2010).

In addition to the definitions above, many researchers avoid providing a concrete definition, instead they refer to different forms of parental involvement indicating their understanding of the construct.

Forms of parental involvement

Parental involvement as a construct was first defined only as parents behaviour towards the children's school life. The definition has been gradually implemented with activities which are not connected to the school directly however they do support the academic performance – such as the regulation of TV time (e.g. Georgiou, 1997; Baker & et al., 1999; Ho & Willms, 1996); the regulation of time spent with friends (e.g.

¹³ Positive parental involvement is the parent's support towards the student's independent decision, focusing on the process, believes in the student's underlying potential, nurtures the student's abilities and motivational development (Pomerantz et al., 2007).

Ho & Willms, 1996); having the child to behave according to a set of rules (e.g. Mcwayne, Hampton, Fantuzzo, Cohen & Sekino, 2004); being at home when the child arrives home (e.g. Ho & Willms, 1996); being present at sport events (e.g. Steinberg, Lamborn, Dornbusch & Darling, 1992); taking the child to cultural programs (e.g. Baker & et al., 1999). Others defined parental involvement as beliefs, attitudes and values which involve aspects such as knowing the child's whereabouts (e.g. Grolnick & Slowiaczek, 1994) to know the child's friends (e.g. Georgiou, 1997); the parent's belief that they have an active role in child's education (e.g. Grolnick, Benjet, Kurowski, 1997); to raise children a good person (see e.g. Georgiou, 1997, Bakker & Denessen, 2007). (See more at the influencing factors on parental involvement from the parent's perspective.)

Slowly but surely "models" were formed.

For our study it was instructive to decide from whose perspective we are going to take into account when discussing parental involvement. In this approach...

Regarding parental involvement, the "parents' perspective" in the literature has two forms: home involvement and school involvement (e.g. Ho & Willms, 1996; Desforges & Abouchaar, 2003; Pomerantz et al., 2007; Green et al., 2007; Borgovit & Montt, 2012). The interpretation of these slightly differs. Ho and Willms (1996) categorized 12 specific forms of behaviour. In the category of 'home involvement', they defined two forms "conversation at home" (discussing what activities, happenings occurred in school) and "supervision at home" (the supervision of the student's activities outside school such as doing their homework, regulating time spent with watching TV, making sure the student arrives home in time, providing the necessary environment for the student to study). Forms of school involvement mean "communication with the school" (relationship between the parents and the teachers) and "school participation" (voluntary participation of the parents in school activities).

In their study, Pomerantz et al. (2007) defined school involvement as behaviour such as participation at school events, conversation with the teachers, and voluntary work in the school. Home involvement refers to activities that are connected to the school but are outside the institution itself or sometimes are away from home. Some of those activities are connected directly to the school – e.g. assisting in doing homework (making room for the task, assistance) helping in choosing classes; being responsible for encouraging the student (choosing suitable project for an exam); discussing the value of school (what happened there, the value of good achievement). Involving the student in intellectual activities (visiting museums, reading together) are also parts of this category.

The above-mentioned home involvement can be explained in the literature as a construct having three elements. Borgonovi and Montt (2012) defines three forms of home-based involvement: involvement in the student's academic performance, involvement in the general development of the student and the parents' attitudes towards reading. The involvement in the student's academic performance refers to an activity assisting in doing the homework, searching for a topic in a project assignment, talking with the student about everything that is related to school. The not home-based, non-academic involvement includes conversation in regards to the child's life and the world

surrounding him/her (political and social matters, dining together); intellectual activities that are not related to school (going to a concert, library, museum, playing together). The parents' attitude toward reading can be explained from a role model point of view. The parent creates positive attitude towards school and studying by being present at the child's life in the school and also by embodying values such as reading for the pleasure of reading, being fond of going to the library and bookstores.

With regards to home-based parental involvement, the role model of parents have been emphasized by others as well (social values, the value of studying) (e.g. Desforges & Abouchaar, 2003). (Several other lists have been created throughout previous research in connection with parental involvement however selecting which aspect to consider from home-based parental involvement is left for us to decide).

In the literature, different categorisations exist to address the "school perspective". From the school's perspective having the parents involved can happen on formal, consultative, active and on a board level (Daniels et al., 1995). Epstein's model is also frequently applied (2001, 2010) that differentiate six forms: parental participation; communication; voluntary support of the school; supporting studying at home; involving parents in decision making emphasizing the importance of active involvement; collaboration with communities formed around the institution. In terms of our study, parental participation and involvement are the main interest. The school supports families in how parents can sufficiently manage their tasks and how they can provide suitable environment at home that supports their children to study. Through several programs (courses for parents, family visits, support programs) the school assists parents to understand the development of their children; they provide an opportunity for parents to share information about their children (family background, values, personal needs) with the school. It also promotes studying at home. It informs the families about the curriculum of each year and how parents can join in and work together on assignments.

Children can be also interviewed in the subject explaining how they see parental involvement. Several researchers have done this (Ho & Willms, 1996; Edwards & Alldred, 2000; Deslandes & Cloutier, 2002; Alldred et al., 2005).

Once the dust has settled around our topic of interest, along with the difficulty we faced due to the complexity of definitions we have to take into account the various factors, that effects parental involvement itself.

Factors that influence the degree of parental involvement

The factors that influence the degree of parental involvement from the parent perspective include the subjective intention of the parents concerning how much they want to take part in the child's education and school life (e.g. Williams et al., 2002); the parent's perception on how much the child and the school requires his or her participation (Hoover-Dempsey & Sandler, 1997, 1997); the belief/experience of the parent in being able to teach their own child; how comfortable the parent is in the communication towards teachers (Hoover-Dempsey & Sandler, Kohl et al., 2000); the parent's understanding of how the education of the child is a part of the parental role (Hoover-

Dempsey & Sandler, 1995,1997); the parent's relation towards performance, studying and the parent's beliefs regarding the child's abilities and expectations towards the child's academic performance (Yamamoto & Holloway, 2010); the parent's level of education (Kohl et al., 2000; Lee & Bowen, 2006; Baeck, 2010); the economic status of the parents/family (Ho & Willms, 1996; Desforges & Abouchaar, 2003; Hoover-Dempsey et al., 2005; Lee & Bowen, 2006; Ho, 2006; Avvisati, Besbas, & Guyon, 2010, Podráczky, 2012; Koltói et al., 2019), how the school interprets different levels of involvement (e.g. Desforges & Abouchaar, 2003)...

Last but not least the parent's preceptor role (autonomy/support vs. control; process vs. person focus; positive vs. negative affection; beliefs concerning the child's positive vs. negative potentials) (Pomerantz et al., 2005) (for further aspect see Hill & Taylor, 2004; Hoover-Dempsey & Sandler, 1997, Jafarov, 2015).

The factors that influence parental involvement from the students perspective are the students' age, needs that change accordingly (Bouffard & Weiss, 2008; Hornby & Lafaele, 2011), sex (Desforges & Abouchaar, 2003), abilities (Avvisati et al., 2010), the kind of previous experiences they possess when they succeeded or failed to perform (Pomerantz et al., 2007)... It is important to highlight the intention a student has to involve the parents in his or her school related tasks or wants to see them in school (Edward & Alldred, 2000; Hoover-Dempsey et al., 2001).

Edward and Alldred (2000) conducted interviews with 70 students aged 10-14 and identified 4 categories: actively involves parents, passively involves parents, actively rejects parental involvement, and passively rejects parental involvement. Students in the first category feel good about the parent-school relationship and cooperate with the parent – mostly with their mother. They ask their parents for help in doing homework or extra tasks, they discuss the importance of studying, look for opportunities actively and talk about their day at school spontaneously. Not necessarily because they require assistance but because this activity is part of family life. Students in this category are happy to see their parents at school. Students passively involving their parents agree with the extrinsic incentive which they sometimes may be accompanied by the fact that they are aware that this step was initiated by the school.

They support the idea of involving the parents and they make it possible through their action even though they haven't promoted the idea. In this second category the student does not mind if the parent (mostly the mother) gets involved in the school's life e.g. takes the student to school, helps doing the homework and buy school equipment together (books, toys). Students in this category talk about what happened in school and let the parents to check their bags. The authors state the students can be as equally active opposing and avoiding their parents' involvement as they are supportive of it. In the third category students make an effort to reject each and every attempt from both the school or the parents that try to promote parental involvement. In the interviews they explained they separate their school life from their life at home with their parents and they possess boundaries surrounding their personal life. They achieve this in two ways. For one they consider themselves as autonomous people who can make their own decisions, are responsible for their own homework, in general they can cope with the happenings at school hence they do not require the involvement of

their parents. They resist to each initiative that aims to incorporate their family and school life and they actively hinder their parents to get involved in their education. Second, they can avoid involving their parents for they do not want to stress them. Students restrict the information they share with their parents by “forgetting” information or by simply not mentioning the daily happenings. If the parents attend school events or consulting hours it results in acute perplexity and resistance. The “absent parent” is the characteristic of the fourth category. Not a single student believes that their parent is not willing to get involved in their life at school. They simply think their parents “are not like that”, “do not like these sorts of activities”. Or they believe that the parents do not understand how the school functions or the homework itself hence they do not get involved. Perhaps students presume their parents have so much work to do, they simply lack the time. Students rarely articulate their desire for their parents to get involved in their education. Sometimes they accept the situation without a question.

The factors influencing parental involvement from the school’s perspective are not discussed in this study.

Researches confirmed that students, parents and teachers have a different understanding of what parental involvement is (Grolnick & Slowiaczek, 1994). If we have them evaluate parental involvement based on the same respect, e.g. its frequency, there is low correlation between the answers (e.g. Barge & Loges, 2003; Bakker et al., 2007).

According to researches parental involvement clearly depends on culture (e.g. Mau, 1997; Caro, 2012). Mau (1997) observed a counter effect (decrease in students’ performance) with regards to Asian students when parental support increased. He found an underlying cultural effect: success comes from individual performance, so parental support would decrease the value of performance. (See also PISA studies).

Parental involvement (its forms at home) and the performance of children at school

The varied details in definitions presented above, the characteristics of the people examined do not contribute to a simple summarization of the results in connection with the studies. The outcomes are inconsistent, because of the different definitions of the examined phenomenon. In this section, we aim to generate further discussion of these phenomena by presenting conclusions of research, meta-analyses, and overviews. We cite mainly those researches that - corresponding to ours - were made on large-scale data. (Regarding Hungarian researches we mentioned those in our previous paper (Nyitrai et al., 2019a, b).)

■ *Results of meta-analyses*

Fan & Chen (2001) reviewed 25 studies. They recoded the different means of parental involvement forms into a structure they used for meta-analysis: "pupil-parent discussion"; "supervision at home"; "aspiration of the parent regarding further education of the pupil"; "school meetings and involvement in school activity"; and "other" variables. Similarly, variables measuring school performance were recoded into "grade point averages"; "test results"; and "other" categories. Besides that, they formed groups in

school performance: "mathematics", "reading", "sciences", "social studies", "others" and "general". (The studies they reviewed can be found in their article.) As a result of the meta-analysis, they found that the connection between parental involvement and school performance cannot be generalized onto the different definitions of parental involvement or the distinct areas of school performance. However, it can be generalized between the different means of measurement regarding school performance. In further research, they found a strong connection between parental involvement and school performance in case the measurement of the latter was more generic (e.g. grade point averages of several scholastic areas or overall points of grades). The average correlation coefficients were significantly lower when they measured distinct areas such as mathematics or reading performance. According to their results, among the forms of parental involvement, "aspiration of the parent regarding further education of the pupil" displayed a significantly stronger relationship with school performance, than the "supervision at home" form.

Jeynes (2003) made a meta-analysis consisting of 20 studies (approx. 12.000 pupils). According to its results, "home involvement" (merged indicator) was in a significant positive relationship with school performance (merged indicator), independent of gender, but the strength of the relationship was excursive at different minority groups. The relationship between parental involvement and school performance was similar when the indicators used to measure school performance (grade point average, standardized tests, an evaluation made by teachers regarding the pupil's school behavior and performance) were used to examine the correlation. Parental involvement was in a stronger relationship with the performance on standardized tests than it was with grade point averages.

In another study, Jeynes (2005) examined the connection between parental involvement and school performance in primary schools in cities. The definition of parental involvement was the parent's involvement in the child's studying processes and experiences. A general parental involvement indicator, and also a specific parental indicator were used. The latest consisted: "communication" (discussion of school-related events); "homework" (inspecting); "parental expectations" (aspiration of the parent regarding the further education of pupil); "reading" (continuously practicing with them); "taking part in school activities"; and "supportive parental attitude". The school performance categories used by Jeynes (2005) were: "grade points"; "standardized tests"; "teacher's evaluation" and an "overall variable". According to the findings, parental involvement (summarized) was in a significant positive correlation with school performance (summarized indicator). It is not equally strong with different forms of parental involvement. The strongest relationship was found between parental expectations and school performance, and between the parenting style and school performance. There was no significant connection found with inspecting homework and school performance. Further result of the research is that parental involvement (summarized indicator) is in a stronger relationship than the parental involvement and school performance's other indicators (such as standardized tests or evaluation of teachers).

Jeynes (2007) rerun his research with high school pupils in cities. The indicators were the same, except that the forms of parental involvement did not consist of the category of reading. 52 studies were involved in the meta-analysis. The results were overall similar. The "parental expectation" form of parental involvement had the strongest positive relationship with school performance. The strenght of the other forms of parental involvement depended on the performance indicator. For example, between the parent's involvement in school activities and grade point averages was no connection, but was significantly connected to the teacher's evaluation and performance measured with grades. The discussion of school-related events form was positively connected to school performance, but the relationship was not significant. Overall, his conclusion was that parental involvement is a better / stronger predictor of school performance in the group of primary school pupils than in the group of high school students.

Castro et al (2015) conducted a meta-analysis of 37 studies published between 2000 and 2013. Their means of parental involvement in codes were: "general parental involvement"; "discussion of school values with pupil"; "homework (supervision)"; "parental expectations"; "reading with the child"; "parental involvement in school activities"; "parenting style". The categories regarding the performance of pupil were as follows: "general performance"; "mathematics"; "reading"; "science"; "social studies"; "foreign language"; "other". The relationship between parental involvement and school performance was the strongest when parents had high expectations towards their child, formed and maintained discussions regarding school and work and when they supported the improvement of reading and forming reading habits. Other forms of parental involvement, such as supervising or inspecting homework, or taking part in school activities were in a weaker relationship with school performance. Both are more needed when the child is having difficulties with school tasks and the situation would have a negative impact on performance, despite the cooperation of parents. They also found that the most positive relationship between school performance and parental involvement occurs when they used global school performance or standardized tests. There was only one special exemption: the area of arts or music.

▪ *Results of reviews*

Desforges and Abouchaar (2003) reviewing a couple of hundred research found that what is more important than parents taking part in school activities is the involvement at home and supporting the child's study at home. Parental school involvement is less important regarding school performance if the economical variable was controlled, in this case, that has more effect on children's behaviour and integration at school. Indirectly through the change of the family's attitude, this could also influence school performance. Moreover, they found that from among other home-forms of parental involvement, "home discussions" have the most powerful positive influence. Regardless of the social or economic status of families, this is the most important factor that has an impact on school performance. The more discussion the parents and children have at home, the more they talk to each other, the better school performance the children have. Furthermore, those children had better performance at school whose

parents raised them from an early age in an atmosphere stimulating studies and then supported studying at home at school age.

▪ *Important results from research made on small sample*

In light of these studies, the extent of parental involvement does not have the same influence on performing in different subjects in school. In case of white, middle-class children with two parents, the extent of parental involvement had an influence only on science subjects, not generally on performance (McNeal, 2001). Sanders-Epstein (2000) found subject-related or skill-related improvement in case of those children whose parents were involved in activities related to those subjects.

Results of research made on national or international databases

Results from NELS¹⁴ database

Ho and Willms (1996) used Epstein's model of parental involvement in their research. The six forms of parental involvement (as discussed above) coded into specific activities/statements, and asked children and parents about the frequency of those in their life. They used a database of 24.200 8-grade students (NELS 1998, 1500 schools). The performance was measured with standardized tests of mathematics and reading. Items regarding parental involvements formed four factors: "home conversations" (with mom; with dad); "home supervision" (limiting TV time, limiting time spent with friends, checking homework, whether parents are at home when their child arrives from school, overseeing activities away from school) - both are forms of home involvement. "School communication" (relationships between parents and school staff) and "taking part in school activities" (taking part in activities voluntarily, parental activities) - are two components of school involvement.

Regarding their findings, frequencies of these forms of involvement are more varied within one school, than between schools. There are no differences in distribution between different schools. Further findings were that the family's economic status has an influence on the extent of parental involvement. The extent of parental involvement has a slight influence on the school performance. Regardless of the social status of the family, the more conversations parents had with their children at home, the better performance the children had on mathematics and reading tasks.

In the same sample with a different definition of parental involvement, Singh et al. (1995) found excursive results.

Singh et al. (1995) isolated four forms of parental involvement as well: "aspirations of parents regarding the schooling of children" (the wish and expectation of parent that their children will have further education); "parent-child conversation about school"; "the structure of home" (the extent to which children are getting involved in home-activities and the degree of other activities that are extracting the children from them (for example watching TV)); and "parents taking part in school-related activities".

According to their findings, taking part in school activities has no influence (this is similar to Ho and Willm's results) and home-structure has a slight influence on school

¹⁴ US National Educational Longitudinal Study (NELS)

performance. Discussions at home had a moderate effect, the strongest influencing form was the parent's aspiration of schooling.

Catsambis (2001) had the opposite results using the NELS database, although she used the data from '88 and '92, and analysed information on elderly students, aged between 14 and 18. As reported by her findings, in that age group none of these forms of parental involvement had any connection with school performance (background variables such as socioeconomic status and previous performance were controlled). According to her, the self-regulated study takes over parental involvement (specifically in terms of the aspirations of further education).

PISA – Hungarian aspects

Vári et al. (2002, 2003) analysed the PISA 2000¹⁵ results. Their results showed that in Hungary the favourable family background – such as family structure, the occupation of parents and their level of education, the cultural goods at home – as an indicator of it – meant a substantial advantage to performance than in the other countries. The performance of students was not influenced on Hungarian sample by the cohabitation or occupation of parents, in contrast the parent's level of education and the access to home cultural goods had an above-average influence.

Róbert (2004, 2006) analysed the relationship between school performance – reading-comprehension scores – and parental – domestic cultural climate – relationship at the PISA 2000 data in an international comparison in the age group of 15. Data was analysed regarding questions that focused on the quality and the quantity of time parents spent with their children; the frequency and the topic of their discussion; whether they converse about politics, society, culture, happenings at school; shared activities; the level of attention parents and other family members pay to the child, how they help and supervise the child's studies at home. He created three merged variables for the analysis: the indicators of "cultural communication"; "social communication" and "parental support in studying". For the measurement of family background, he used the indicators of ISEI score (occupation of parent), the number of siblings, the fact if it is a single-parent family, and if the mother was in a part-time or full-time job.

The study revealed that the occupation of parent and the reading-comprehension performance had not resulted the same relationship in different countries, in Hungary - it was strongly related. Besides that, in Hungary, the strongest relationship was found in connection with the level of education regarding the mother and the father. The parent's assistance in studying had a negative correlation with the reading-comprehension performance. Further, he formed a regression model where he found that in Hungary family background defined performance the most. The family's cultural climate contributed to performance with a smaller influence than the other measured indicators of family background.

¹⁵ The PISA 2000 is a study for measuring the skills of 265,000 15-year-old student regarding reading comprehension, mathematics and science. The areas of reading comprehension: in what extent can the student recall the read information; interpret or reflect to the given text – these areas were evaluated separately, and then a total score was calculated. The aim of the study was to reveal differences between countries, and the underlying reason causing them. The aim of the OECD was to esteem the extent to which students are able to utilize their studies in their future in different countries.

Borgonovi and Montt (2012) analysed data from the parent's questionnaire from PISA 2009 and examined the nature of parental involvement (see above), and the influence it had on school performance - in this case, the reading scores -, enjoyment of reading and, the consciousness of students regarding the success of studying strategies for summarizing long and complex texts. According to their findings¹⁶, those students whose parents had discussions with them about complex social values, and read books together, ate together with them (home based parental involvement - not related to school) not only enjoyed reading more but had a better performance in reading and were more conscious about the efficiency of studying strategies, while school-related parental involvement had a negative relationship with these indicators. Those students whose parents regularly helped with homework (home based parental involvement - related to school) had lower scores regarding reading and reading-comprehension tasks (excluding Korea and Italy - with the economic variables taken into consideration). In their understanding it is not because the parents are not efficient supporters, but because those parents whose children have a poorer performance at school are more willing to spend time studying with their children so that they could have a better performance. Students having a better performance at school do not ask for help with completing homework, thus their parents are less involved. Those students who have discussions about school-related issues, more frequently have a better performance in reading (in the case of six countries - parents who are in a better economic status). The more frequent it is in the case of home involvement not related to school, the better the reading performance is. Frequency of discussions about political and social topics showed a stronger positive relation than going to the library or communal meals. In Hungary, the discussion about books and movies shows the strongest - stronger than other countries' - positive relation with reading performance. After controlling socioeconomic variables, those students in all countries achieve higher reading points whose parents have more frequent discussions about social and political topics, except Hungarian students. That is an interesting result in itself as 85% of parents (more than 95% of the Hungarians) stated that they have conversations about school-related issues, and 40% help their children with homework.

Authors also reviewed if there was any difference between gender. They found that in Hungary, Germany, Portugal and Croatia parents tend to discuss political-social topics with their sons, but found no differences in other forms of home-based parental involvement.

Regarding mathematical performance, Park (2008) conducted this analysis, but we could not access his study.

(Further PISA related Hungarian references: Balázs and Ostorics (2010, 2013), Fehérvári (2017)).

NABC results

Regarding the results of the National Assessment of Basic Competencies (NABC) in 2014, children with better family background performed better both in mathematics and reading in all groups (6th, 8th and 10th grade). Family background was also measured

¹⁶ We only cite the references regarding home involvement and reading performance.

with both a family background index-indicator (FB-index) (similar to the international standards) and with the variables too, separately. The family background index contains the educational level of both parents, the number of books at home, the child's number of books at home, the presence of a computer at home, and after 2013 the children's multiple disadvantage status (MD status). According to the report of 2017, with the increase of the FB-index increased the performance of the students as well regardless of which grade the student attended. This connection was already present in the 6th grade, and it had not changed in case of older students. It had not had any connection with the place of living. On the other hand, excursive performance was found between the different forms of education - thus this is not the classification of the place of education, but can be interpreted as the result of the differences between the economic-social situations. Furthermore, they analysed the connection between the desired level of education and performance. A great amount of the students (79-81%) aimed to have higher level of education than matriculation. That group of students who aimed higher had better performance than the group of having lower aims regarding the level of education. Higher performance than the national average was seen in the group that aimed for higher educational (college or university).

Hegedűs (2016) analysed the FB-index, mathematics- and reading comprehension performance and the place of living of students from the NABC database from 2012. He aimed for examining the performance of the students, what performance can be expected from them based on the family background, and the discrepancy of the two aspects compared to each other. Based on the family background index, he calculated the desirable points of mathematical performance and then subtracted this value from the actual score achieved. This way he could measure if the students performed according to-, worse- or better than the expected performance. He also performed his calculations with reading comprehension performance. He then conducted an analysis in the country's subregions.

The research group formed its examinations from the data of 2017's NABC: Nyitrai et al 2019a, b; Koltói et al, 2019a, b. The results of the former examination is presented jointly with the analysis of the data from 2018.

OUR RESEARCH

We examined the connection between students' performance – reading comprehension skills and mathematical literacy - and the characteristics of the family with the questions below:

How frequent are the following activities in your family?

- a) your parents (or grandparents, siblings) help you with studying, completing homework;
- b) your family discusses what happened in school;
- c) you have conversations with your family about what you are currently reading;
- d) you do housework together with your family;

e) you work together with your family in the garden, in the plough-land or in the workroom.

Students had to choose between four possibilities: never; almost never; once or twice a month; once or twice a week and every day or almost every day.

Our hypotheses and assumptions

In our previous work, we examined the association of home forms of parental involvement with mathematical and reading performance (Nyitrai, 2018a, b). In our present analysis, we hypothesized that we find varying degrees of correlation between forms of parental involvement and the two performance areas, between different regions, different school types, different grades, and the two sexes.

Methods

In the present analysis, we grouped five different forms of parental involvement into two groups: one group included spending time together on school events (helping with homework, discussing what happened at school, and the family talking about what the student is reading) (hereafter school aspect), while another group consisted of working together (either housework or working together in the fields / workrooms) (hereafter work aspect). For each variable, Dummy variables were created. We considered involvement when the activity was 2-3 times a week or more - the rarer cases were considered more negative.

With the binary variables thus formed, we first performed an exploratory factor analysis (5 variables, principal component analysis, with VARIMAX rotation). Since we then wanted to combine the variables into two components (learning aspect / work aspect), it did not make sense to use either maximum likelihood or other methods - just as it was not appropriate to use a multi-player repository of rotation options. Namely, the exploratory nature has really played a role here now, whether the applied 5 questions involved really show a grouping in the direction of these two components?

The KMO value of the principal component analysis was 0.629, and the Bartlett test was significant ($\chi^2(10) = 140027,145, p < 0.001$), the communality of all 5 variables far exceeded the minimum expected value of 0.25, respectively. The explained variance of the arrangement of the variable into two factors was 55.861% (see Table 1).

	school aspect	work aspect
They help in learning ...	,720	,039
They discuss what happened at school	,662	,051
They talk about reading	,687	,159
They do housework	,151	,788
They work together	,037	,831

Table 1: Arrangement of items after factor analysis, factor weights

The above 2-factor model was also verified by a confirmatory factor analysis: its RMSEA value was 0.021, its SRMR value was 0.017 - the fit indices were: CFI = 0.997, TLI = 0.992. Thus, it seems acceptable to consider parental collaboration in learning, school events, and reading experiences as one component, while teamwork and housework are the other components when placing home scenes of parental involvement at the center of our study. This can also be interpreted as, on the one hand, co-operation related to school workload on the part of the family and, on the other hand, involvement of the student in joint activities beyond home schooling. After this, we formed the index of school events (0-3 possible scale values) and the index of work performance (0-2 possible scale values) as a measure of involvement.

Results

We examined whether there were differences in math and comprehension performance for 2017 or 2018 data, regionally, by school type, grade, or gender. It is important to note that the sample of data for 2017 and 2018 treated together is significant in size, so even in such cases, even the smallest discrepancies can easily become significant discrepancies. Thus, it was not primarily the p-value that played a major role in decision-making, but the partial eta-square as an explained proportion of variance or as a tangible indicator of the effect measure.

The grouping variables involved were therefore the year of the study (2017 or 2018), the region of the student's place of learning, the type of school, the student's grade (6, 8, or 10), and the student's gender — and the two variables we developed for parental involvement. We examined how differences appear in either mathematical or comprehension performance (treated as cohesive variables), so we used mixed, multi-variate analysis of variance.

It is important to point out that due to the sample size, 100-200 people were incised 1-1 at different interaction points of the variables involved in the study, i.e. the size of the cells had a sufficient number of cases to be able to perform studies at the average performance level. The standard deviation of variance was checked by Levene's test; however, robust choices (Welch's test and Johnson's or Gayen's tests for the difference variable) were not justified due to a decision with a partial eta-square based on the effect size. In other words, in addition to the significances present due to the larger sample size, the consideration of the effect size was the more important, relevant factor. However, both Geisser-Greenhouse and Huynh-Feldt correction indicators were taken into account in each case.

In 2017, we processed data from 204,605 students, while in 2018, we processed a total of 203,143 students. Additional demographic data for the full sample can be read from the national reports of the National Assessment of Basic Competencies (the National Report is available on the website of the Educational Authority¹⁷).

¹⁷ <https://www.oktatas.hu/koznevels/meresek/kompetenciameres/eredmenyek>

Involvement - school aspect and work aspect

In two cases, the school level of involvement and some of the other variables involved had a significant effect, and the partial eta-square shifted from the level marked 0 (there was an interaction effect with an explained variance ratio of 0.001 and 0.002, respectively). It is important to mention that in the case of the work aspect we did not find any significant interaction effects, or any significant differences or differences - so we will examine the school aspect of involvement in more depth.

In both cases (mathematics and comprehension), only the school level of involvement (i.e. presence in learning, reading experiences, conversations about school history) was included in each interaction effect. Gender on the one hand and region on the other were the determining factors in this (Tables 2 and 3)

Thus, in relation to regions and gender, the main effects indicated a significant difference in both cases ($F(21, 407634) = 29.866, p < 0.001$ for region and $F(3.407634) = 176.301, p < 0.002$ for gender). We highlight that the aggregate, non-central linear model parameter of these areas was 627 power points for the region and 528 points for the gender as a whole, which can be said to be significantly fluctuating with a standard deviation of 100 (total difference between the different differences between groups).

In comparison, the same rate between the two years was 4.6 points in total, so it is clear that at the level of performance, taking into account school involvement regionally, very significant performance interaction effects can be expected to be achieved.

		School aspect			
		No	One	Two	All area
Budapest	Mathematics	1656,30	1691,31	1654,16	1604,42
	Reading	1615,39	1665,33	1641,17	1603,09
Central Hungary	Mathematics	1581,63	1623,60	1576,34	1534,76
	Reading	1550,72	1606,36	1567,02	1530,32
Central Transdanubia	Mathematics	1586,85	1629,36	1581,85	1528,96
	Reading	1554,65	1610,63	1571,56	1527,80
Western Transdanubia	Mathematics	1623,68	1660,20	1615,97	1561,98
	Reading	1591,02	1640,63	1605,05	1557,73
Southern Transdanubia	Mathematics	1563,36	1611,64	1564,84	1520,62
	Reading	1533,92	1594,81	1556,71	1515,24
Northern Hungary	Mathematics	1476,15	1562,38	1534,46	1496,02
	Reading	1438,78	1542,60	1522,95	1486,39
Northern Great Plains	Mathematics	1488,89	1570,50	1538,56	1496,40
	Reading	1455,19	1553,91	1530,24	1488,81
South Plains	Mathematics	1587,49	1623,29	1578,05	1529,14
	Reading	1552,44	1604,11	1572,27	1526,43

Table 2: Scores of regions from mathematics and reading

Notice two characteristics in our table. On the one hand - and this is visible in all regions, at all levels of involvement: the greater differences and differences in the mathematical field are accompanied by different degrees of involvement - and not in the comprehension of the text there are more serious differences. This means that math deficiencies, worse math performance, bring about parental activation sooner than differences in reading comprehension. By this we mean that parental involvement appears in the case of mathematics even at a difference of 40-50 points, even in a single field - while in the case of comprehension it appears at almost 60-70 points, so at a higher rate of difference. We emphasize that due to the lack of interaction, this appears to be essentially a phenomenon across school types and other areas (since there was only regionally detectable interaction, for example, not by school type). Thus, in some regional areas (e.g. Budapest) the difference between the mean means in school involvement is 62 points, so there are quasi-half standard deviations of differences along the levels of parental involvement - while in mathematics the difference between the two extreme means is 87 points (ie almost one full standard deviation). That is, larger differences between the two objects essentially mean a quarter standard deviation difference as well.

Another important difference is worth highlighting in two regions: in the case of Northern Hungary and the Northern Great Plain, a very significant difference can be observed compared to the other regions. In all other regions, it is true that parental involvement in 1-2 school areas is usually associated with the highest school performance, while it is also generally observed that stronger (i.e. covering all three school areas) parental involvement / control is available for the worst performing students. With the exception of these two regions - here it can be seen that in the case of the worst performing students, the parents do not show any control or involvement in school tasks - in fact! Here we can see a really indicative feature that can also be called an indicator: these students generally have half a standard deviation (1439 and 1455 points) level of comprehension, on average they start with significantly worse independent learning skills (since the interpretation of the read text is weaker), and parents do not receive any involvement or cooperation in school studies either.

Since there was an interaction effect, we also present the results at the level of a summary table for gender. In the case of gender, the interaction effect is more pronounced in the differences in performance (Table 3).

		School aspect			
		No	One	Two	All area
Girls	mathematics	1548,56	1603,72	1572,19	1527,39
	reading	1557,67	1622,27	1598,07	1559,28
Boys	mathematics	1579,73	1640,02	1592,11	1540,67
	reading	1508,25	1578,33	1543,40	1501,45

Table 43 Gender differences by engagement

We can observe that the running dynamics are different for the two sexes. For boys (along with the fact that they usually deal most with both genders who perform poorly), the difference in reading comprehension and mathematical performance is essentially at least 40 points (nearly half the standard deviation) between the two areas, i.e. mathematics moves at a higher level throughout as comprehension. In contrast, in case of girls, it can be seen that the difference between the two areas is essentially achieved at a higher level of reading comprehension throughout, but as long as this difference decreases more for boys (from 70 points to 40 for all involved), for girls, the difference is essentially growing steadily (from 9 points to 32 points). That is, it seems that for boys, more “hectic,” different performance is associated with parents being less involved in school tasks, while for girls, more involvement is achieved when the child’s performance is more hectic, showing greater differences.

SUMMARY, DISCUSSION

From the questions taken from the OKM student questionnaire, we created the indicators of parental involvement for our own study. The five questions we selected and examined mostly cover the phenomenon discussed as the so-called home form of parental involvement in the literature (Ho & Willms, 1996; Pomerantz et al., 2007; Borgonovi & Montt, 2012). Ho and Willms (1996) defined “home conversations” (discussing school events, activities, tasks) as a form of home involvement, in which our family discusses what happened at school, rhymes with the question. In the definition of Pomerantz et al. (2007), parental involvement at home includes school-related but out-of-school, often out-of-home, activities. Some of them are directly connected to the school - e.g. help with homework, which also shows up with us; and to talk to the student about school values that are also present in us. And for them, this includes involving the learner in intellectual activities (e.g., visiting a museum, reading together) that are not necessarily related to school. The latter is not with us. In the approach of Borgonovi and Montt (2012), there are three forms of home involvement: home involvement related to student school performance; home involvement in the overall development of the learner and parents’ attitudes toward reading. One and a half of this appeared in our country.

In our study, we divided the five questions about parental involvement at home into two aspects. An attempt to group different forms of parental involvement also appears in previous literature (see above).

We found a relationship between parental involvement and school performance, similar to previous research (Singh et al., 1995; Ho & Willms, 1996; Fan & Chen, 2001; Catsambis, 2001; Abouchaar, 2003; Jeynes, 2003, 2005, 2007; Castro et al., 2015; Desforges &)

We found that of the home forms of parental involvement, the area we call the work aspect has no meaningful interaction effects, while the area we call the school aspect has. Previous research has also shown that the strength of the relationship be-

tween different forms of parental involvement and school performance is different for different forms of parental involvement. Fan and Chen (2001) found that among parental engagements, a parent's aspiration for further learning is significantly more strongly related to a student's school performance than a parent's home supervision. Jeynes (2005) indicators of parental involvement - "communication" (talking to the child about school-related events); "Homework" (review it); "Parental expectation" (the parent's aspirations for the child's further learning); "Reading" (reading regularly with the learner); "Participation in school activities"; and "supportive parenting style" - and examining the relationship between school performance and found that there was no significant relationship between students' homework control and school performance. The strength of the other forms of parental involvement depended on the performance indicator. In another work by Jeynes (2007), the discussion of what happened in school was positively related to the student's school performance, but here the relationship was not significant. Castro et al (2015) found that the relationship between parental involvement and school performance was the strongest when parents had high school expectations of the student, formed and maintained conversations about school and school work, and when they supported reading and learning, the development of reading habits. Other forms of parental involvement, such as supervision of supervisor and homework, or parental participation in school events, were less strongly associated with school performance. Both are more necessary when the student has difficulty with school responsibilities and the situation would / has a negative impact on performance despite the cooperation of the parents. It was also found that the relationship between parental involvement and school performance is most positive when looking at global school performance or standardized tests. One very special exception was found: the field of art, or music, where this was not true.

We found that the greater differences and differences in the field of mathematics are accompanied by different degrees of involvement - and there are no more serious differences in comprehension. This means that mathematical deficiencies, worse mathematical performances bring about parental activation sooner than differences in reading comprehension. In previous researches, the authors have pointed out that the relationship between parental involvement and school performance is not equally strong for different subjects, the degree of parental involvement does not equally affect school performance in different subjects (Castro et al, 2015). In the group of white, middle-class, two-parent children, the degree of parental involvement only affected performance in science subjects, not performance in general (McNeal, 2001). Sanders-Epstein (2000) found that subject- or skill-specific performance improvement was observed in the learner where parents were involved in subject-related activities.

Our further result is that among the home forms of parental involvement, the school aspect showed a correlation in two areas – gender and region. For boys (along with the fact that they usually deal most with both genders who perform poorly), the difference in reading comprehension and mathematical performance is essentially at least 40 points (nearly half the standard deviation) between the two areas, i.e. mathematics moves at a higher level throughout as comprehension. In contrast, in case of girls, it can be seen that the difference between the two areas is essentially achieved at a

higher level of comprehension throughout, but as long as this difference tends to decrease for boys, the difference for girls is essentially increasing. With two exceptions, it is true in all regions that parental involvement in 1-2 school areas is usually associated with the highest school performance, while it is also generally observed that stronger (i.e., all three school areas) parental involvement / control is among the worst performing students available in action. With the exception of Northern Hungary and the Northern Great Plain, it can be seen that in the case of the worst performing students, parents do not show any control or any involvement in school tasks.

CONCLUSION

We have formulated our practical suggestions in the discussion, and we have already mentioned this in our previous work (see Nyitrai et al., 2017). In this section, we would rather ask questions for those who face different aspects of parental involvement, even on a daily basis.

Our everyday experience and research also show that parents make a significant contribution to the student's academic performance. It is no coincidence that many families, even beyond their means, spend a lot of money, time and energy on their child's studies. There is a legitimate need to get a more accurate picture of the area in which the involvement of parents in their learning process promotes children's success, or which parental behaviors and activities support children's success the most. To find it out, researchers need to ask good questions.

What data should we use to decide whether or not a parent is involved in their child's schooling / upbringing? How do we measure a child's school performance? Who to ask – if we want, to get information about performance or involvement? What are the good questions to decide this?

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