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The Effect of Parents' Education and Income on Children's School Performance: the Mediating Role of the Family Environment and Children's Characteristics, and Gender Differences

Abstract: This study investigated the effects of family socioeconomic status on children's academic performance as mediated by their home environment and children's characteristics, with special attention to gender differences. Structural modeling was applied to a nationally representative Czech Household Panel Survey data (2015/2016). The results revealed that socioeconomic status had no significant direct effects on school performance after controlling for other family aspects. The effects of parental education and income were transmitted by parents' aspirations for their children, positive parenting, and literacy environment. Home environment, in turn, affected children's aspirations, general well-being, and interest in books, which directly enhanced children's school grades. Indeed, children's characteristics were found to be the strongest predictors of their school performance. The gender analyses showed that the effects of parental characteristics were directly related to boys' achievement; however, for girls, the effects of parental characteristics operated indirectly through girls' aspirations, well-being, and interest in books.

Keywords: school grades; socioeconomic status; educational aspirations; scholarly culture; gender differences; structural modeling

Introduction

Over the past several decades, a range of stratification research has focused on the positive relationship between the socioeconomic status (SES) of parents (i.e., parents' education and family income) and children's schooling outcomes (for more on education, see Klebanov et al. 1994; Sirin 2005; Davis-Kean 2005; for more on income, see Duncan & Brooks-Gunn 1997; Guo & Harris 2000; Yeung et al. 2002; Jenkins & Schluter 2002; Blanden & Gregg 2004).

Although some studies have demonstrated a direct effect of parents' SES on children's educational outcomes (Duncan et al. 2011; Morrisey et al. 2014), others have shown that the effect is mostly indirect. The most prominent explanations for an indirect socioeconomic effect in education link parents' education and income to children's academic achievement through the impact of both factors on parental behavior, skills, and attitudes. These explanations rely on the assumption that highly educated parents have positive attitudes toward education, give more encouragement and support, are more involved with their

children's education, and have higher aspirations for their children's educational attainment than less educated parents (Sewell & Hauser 1972; Alexander et al. 1994; Spera et al. 2009; Kirk et al. 2011; Park & Holloway 2017). These parents also provide cognitively stimulating learning environments (Bradley & Corwyn 2002; Davis-Kean 2005), use more complex and varied language with their children (Hoff et al. 2002), possess large cultural and educational resources (Sullivan 2007; Evans et al. 2014; Breinholt & Jæger 2020), and provide a warm social climate (Klebanov et al. 1994; Davis-Kean & Sexton 2009).

The mediating mechanisms are often addressed by separate studies that focus on only one or two aspects of parenting. Research has only recently begun to examine the various ways in which parents' socioeconomic background influences parenting and home environment, which, in turn, affect children's educational outcomes. A few researchers have based their research on models that aim to provide a comprehensive picture of these pathways. Davis-Kean's (2005) family process model hypothesized that both parents' education and family income influence parents' educational expectations for their children, the kinds of intellectual stimulation provided at home, parent–child warmth, and parent–child play activities. These family characteristics, in turn, affect children's school achievement (see also Davis-Kean & Sexton 2009; Dubow et al. 2009; Fergusson et al. 2008; Mensah & Kiernan 2010; Chen et al. 2018).

The existing models, which have tried to explain how parents' SES might indirectly affect children's educational outcomes, are still incomplete in several ways. The impact of parents' behaviors and expectations on children's academic performance might be mediated by children's attitudes, beliefs, and behavior (Eccles 2005). Indeed, the role that children play in this process has, thus far, been tested by few basic models, and even fewer utilizing nationally representative data. In addition, children's characteristics have commonly been considered only as control variables or indirect measures of parental attributes, not as a valid aspect of mediating pathways. Thus, research has left critical aspects of the mediating process unexamined.

The aim of this study was to address these issues and investigate both the direct and indirect effects of family SES on children's academic performance as mediated by children's home environments (i.e., parents' educational aspirations for their children, positive parenting, and literacy environment) and subsequently by children's characteristics (i.e., children's aspirations, general well-being, and interest in books). We hypothesized that particular aspects of the home environment might interact with one another, and therefore, should not be analyzed in isolation. The home literacy environment could benefit both children's reading behavior and aspirations; similarly, positive parenting could benefit both children's aspirations, well-being, and reading behavior.

The specific goals of this study were (a) to assess the total effect of parents' education and income on children's school performance, (b) to determine the strength of association between parents' education and income and home environment, (c) to assess the relationship between these parental factors and children's academic performance, and (d) to determine whether children's characteristics mediate the relationship between parental factors and children's performance. Prior research suggested that this educational influence may differ by gender (Davis-Kean 2005); therefore, we tested for gender differences in these pathways for predicting school performance.

Taking these different factors into account, we based this empirical study on the nationally representative Czech Household Panel Survey (CHPS 2015/2016), which collected extensive data regarding families' scholarly culture, educational aspirations, background characteristics, children's achievement, and attitudes. The analysis applied a structural model that controlled for complex survey data to estimate the effect of family income and education on the home environment and outcomes for children from middle childhood to adolescence (10–17 years of age). We included extensive control variables on the children's level in the analysis.

Theoretical Background

The Influence of Socioeconomic Status: Parental Education and Income

Previous studies have shown that parental education and family income are important SES factors in predicting children's educational and behavioral outcomes. Whereas the majority of the literature on parents' SES pertains to its direct positive influence on achievement, recent research has begun to examine the various ways in which parents' education and income influence parenting behaviors and beliefs, highlighting the indirect effects of family background on schooling (Davis-Kean 2005; Davis-Kean & Sexton 2009; Dubow et al. 2009).

Supposedly, parents' formal education influences parents' skills, values, and knowledge of the educational system, which, in turn, influences their educational practices at home and their ability to intervene in the educational system on their children's behalf (Eccles 2005). Previous studies have confirmed that highly educated parents have positive attitudes toward education, give more encouragement and support, and have higher aspirations for their children's educational attainment than less educated parents (Sewell & Hauser 1972; Alexander et al. 1994; Spera et al. 2009; Kirk et al. 2011). They are also more involved with their children's education and have the ability to help their children with schoolwork (Park & Holloway 2017). They provide cognitively stimulating learning environments (Bradley & Corwyn 2002; Davis-Kean 2005), use more varied and complex language with their children (Hoff et al. 2002), possess large cultural and educational resources, and attend cultural events frequently (Sullivan 2007; Evans et al. 2014; Breinholt & Jæger 2020). In addition, they provide a warm social climate (Klebanov et al. 1994; Davis-Kean & Sexton 2009) and have lower levels of hostility in parent–child interactions (Fox et al. 1995).

Two different perspectives explain the possible negative effect of low family income. First, the investment theory emphasizes that parents invest time and money in their children, in their education, health, or good home environment. This involves not only housing quality, neighborhood, school quality, and extracurricular activities but also material and cultural resources, such as books and educational toys (Jenkins & Schluter 2002). Thus, the limited access of lower SES families to economic resources creates barriers that limit the educational achievements of children born into such families (Wang et al. 2016).

Second, the good parent theory assumes that having low paying, unstable, stressful jobs can negatively affect parents' mental health, making it difficult for poor parents to

provide cognitively stimulating experiences for their children (McLoyd 1998). These kinds of stresses can also lead to the overuse of negative control strategies, harsh or neglecting parenting, low warmth and responsiveness, and failure to monitor children adequately and provide a supportive and consistent home environment, as indicated in family stress models (Conger et al. 2002; Emmen et al. 2013). Guo and Harris (2000) found that the influence of income on intellectual development was mediated by the home environment, physical environment, and parenting style. Thus, having substantially lower income influenced both what parents provided in the home environment and how they interacted with their children.

Some scholars have argued that parents' education and income provide unique influences on the home environment and should be considered separate from each other (Sirin 2005). For example, Davis-Kean (2005) found that parents' educational attainment had an indirect influence on children's achievement, although income only had a negligible effect in these models (see also Løken 2010). Similarly, Klebanov et al. (1994) found that mothers' education and income were both important to the physical environment and learning experiences in home, but education alone was predictive of parental warmth. Other studies have shown that whereas the influence of family income declines as children age (Duncan & Brooks-Gunn 1997), the effects of parents' educational attainment continue from early childhood into adolescence (Breen & Jonsson 2005).

This study considered multiple pathways by exploring how both parental education and family income influence parents' aspirations for their children, positive parenting, and home literacy environment. We assumed that these parental environmental aspects would affect children's aspirations, well-being, and interest in books. Thus, we believed that both the family and children's characteristics would determine the children's school performance (see Figure 1). In the following sections, for every pathway in our structural model we discuss the theoretical justifications step by step.

The Links between the Family Environment and Children's Characteristics: Socialization Processes

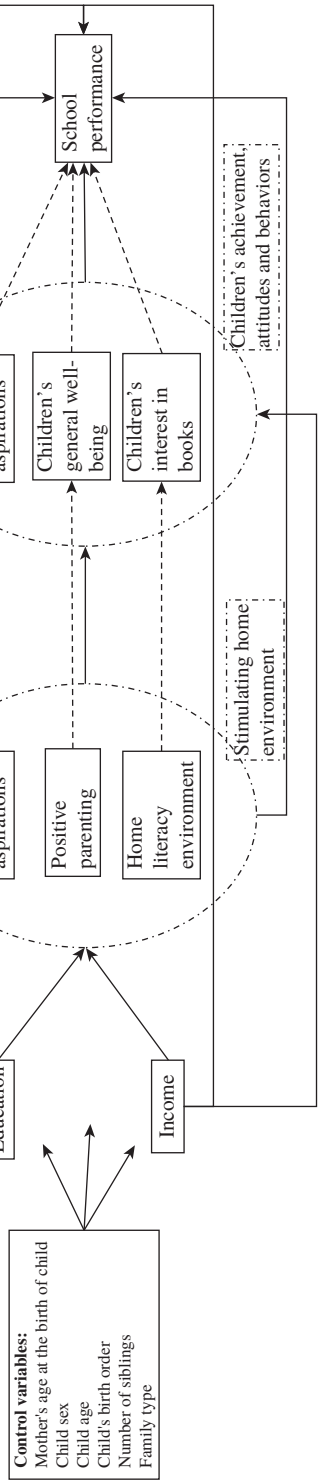
Parental and Children's Educational Aspirations

Studies have consistently shown that high-status parents demonstrate higher educational aspirations for their children (Kim & Sherraden 2011), suggesting educational aspirations as a possible mediator of the effects of parents' SES. In addition, a meta-analysis of parental involvement variables concluded that parental aspiration is the strongest predictor of children's academic achievement (Jeynes 2007).

Parental expectations influence students' academic outcomes through a variety of mechanisms. As socialization theory has shown, the family or parents play important role in the process when children internalized social norms, values, believes, and attitudes. The family has been considered the primary socialization agent and is the context whereby individuals develop aspirations for their future and cultural preferences across the transition to adulthood (Hitlin 2006). Thus, higher parental aspirations are positively related to children's setting of academic goals, academic self-efficacy and motivation, persistence in school, and children's own academic expectations; these, in turn, impact their achievement (Halle et al. 1997; Kirk et al. 2011). McLoyd (1998) found that the children of parents

Figure 1

Conceptual model: showing family environment mediators of parent's educational attainment and income on child school performance



Source: Authors' diagram.

who experience difficult economic times are more pessimistic about their educational and vocational futures. In contrast, parents with higher education encourage their children to strive for higher levels of educational achievement and occupational success. They serve as a model for achievement-related behaviors and foster positive expectations for academic performance (Eccles 2005).

Second, parental aspirations affect the resources parents devote to supporting their children's education (Yamamoto & Holloway 2010). Those with higher aspirations devote more time and resources to school-related activities (e.g., helping with homework). Such parents are more likely to buy more books and educational resources, to prefer reading, to read more often to preschool-age children, and to invest in extra-curriculum activities.

Parental and Children's Scholarly Culture

Another important mechanism is the scholarly culture of the home. Evans et al. (2010: 171) argues that scholarly culture refers to "the way of life in homes where books are numerous, esteemed, read, and enjoyed." Children from high-status families typically come from homes with a more scholarly culture (Roscigno & Ainsworth-Darnell 1999; Sullivan 2007; Evans et al. 2010). More educated or wealthier parents can provide more cultural resources at home that facilitate their children's success in school (DiMaggio 1982; De Graaf et al. 2000; Jæger & Breen 2016). Children who come from bookish homes display a greater interest in reading and obtain better grades than children who come from families with smaller home libraries (Park 2008).

Studies have also shown that a family's educational level is associated with children's reading skills through parental reading skills (van Bergen et al. 2017). There is comprehensive evidence that parental reading has an impact on children's reading; the children of scholarly parents are more likely to read themselves (Wollscheid 2013). Parents transfer cultural capital to their children during the socialization process—they teach them by reading to them in their early years, setting a good example through their reading habits, talking with their children about books, and giving books as gifts. Reading habits improve children's educational performance because they are substantively linked to cognitive skills and provide a larger vocabulary and greater cultural knowledge (Evans et al. 2014). This mechanism of transferring cultural capital could be framed into the extensive issue of intergenerational transmission of values that could determine children's school performance because when parents value books, they passed these values into the children and children reflect and internalize these cultural values. It has been documented that family socioeconomic status influences children's self-direction value orientations (Kohn, Slomczynski, Schoenbach 1986; Schwartz 1992), cultural preferences (Yaish and Katz-Gerro 2012) and occupational aspirations mediated by these values that also affect their school performance (Hitlin 2006).

The majority of previous studies on the cultural capital effect have focused on only one aspect of scholarly culture, assuming that all measures of scholarly culture should be mutually correlated (e.g., Cheung & Andersen 2003; Park 2008; Evans et al. 2014). However, to examine the different channels through which home literacy environments contribute to school performance, in this paper, we clearly distinguish between the objectified dimension of scholarly culture (i.e., the number of books at home) and the embodied dimension (i.e., parental and children's interest in books and parent–preschooler reading).

Positive Parenting Behaviors and Children's Well-being

In Davis-Kean's (2005) family process model, the third mechanism for how parental education and family income affect children's academic achievement involves parent–child warmth and play activities. Parenting practices associated with children's academic achievement include in-home involvement (i.e., parental style and affection; verbal interaction; warmth, nurturance, and responsiveness; book reading; leisure activities; and parent–child play) and at-school involvement (i.e., parental expectations, achievement encouragement, helping with homework, and attendance and participation in school activities; see Halle et al. 1997; Davis-Kean 2005; Zhan 2006; Castro et al. 2015; See & Gorard 2015).

Jeynes' (2007) meta-analysis showed that aspects of home involvement—such as parental expectations, parent–child discussions of school activities, and supportive parenting—were more strongly related to student learning outcomes than aspects of school involvement, such as attendance and participation in school activities. Fernández-Alonso et al. (2017) concluded that indirect parental involvement, such as parent–child discussions and interaction during problem-solving activities, is more effective than direct interventions, such as school involvement or parental monitoring of children's homework completion.

Previous studies have found that parental SES is associated with parents' emotional well-being, better parenting, and higher quality parent–child instruction (Yeung et al. 2002; Duncan & Magnuson 2012). Kiernan and Mensah (2011) suggested that about one-half of the effects of child poverty and resource disadvantage may be attributed to the quality of parenting children receive in early childhood. However, there is a plethora of research suggesting that disadvantageous socioeconomic background is not only linked to parents' emotional well-being but also to children's well-being when considering parents' and children's reactions to stress-inducing conditions. Thus, disadvantaged students from lower socioeconomic backgrounds have reported lower life satisfaction than higher SES students (e.g. Bücker et al. 2018).

The SES effects on children's well-being are also moderated by family characteristics, such as positive parenting, parental support, attitudes, expectations, and styles of interaction with children (Bradley & Corwyn 2002). Extensive research has shown that cognitive stimulation, promotion of play and learning, security and warmth in relationships, sensitivity in interaction and responses to children's needs, and the maintenance of positive discipline are aspects of parenting that can enhance children's well-being (Kiernan & Mensah 2011).

Another area of literature has reported a positive relationship between students' academic achievement and life satisfaction (Crede et al. 2015) but lacks a clearly defined direction of this relationship. Bücker et al. (2018) showed that children's well-being has a positive effect on their internal locus of control, self-esteem, and intrinsic motivation. It also allows them to build new skills and resources, which may ultimately lead to enhanced academic achievement.

Gender Differences in Academic Achievement and Family Environment Effects

Recent studies have extensively documented that females surpass males in school grades, reading achievement, enrollment, and completion rates in higher education (Else-Quest et

al. 2010; Voyer & Voyer 2014). Some studies have found that girls tend to have higher educational aspirations, experience greater internal distress, evaluate themselves more negatively, and are more prone to worrying about their academic performance than boys (Pomerantz et al. 2002). Dumais (2008) also suggested that male and female teens are likely to engage in different types of after-school activities. These activities may have different associations with academic outcomes for males compared to females.

Existing studies on gender differences have focused on children's outcomes, activities, and investments. Research has rarely addressed whether the mechanisms linking families' socioeconomic conditions and school achievement differ for boys and girls. Nevertheless, it is plausible that such gender differences exist. For example, there is evidence that differences between boys and girls are smaller in higher SES families (de Zeeuw et al. 2019). This indicates that boys' school performance is more closely associated with their families' SES than girls' academic achievement. Hamplová and Raudenská (2021) demonstrated that scholarly culture stratifies gender differences in parental educational aspirations. Families with weaker scholarly culture hold higher aspirations for daughters than for sons, while families with stronger scholarly culture have similar aspirations for both boys and girls.

However, little is known about the specific mechanisms related to these findings. It is possible that lower SES families chose to invest fewer resources into their sons' education, as they expect that boys might more easily find a manual profession with decent financial prospects (indirect effect). There is evidence that parents tend to have higher educational aspirations for girls (DiPrete & Buchmann 2013) and are more involved in their daughters' education than in their sons' (Baker & Milligan 2016; Carter & Wojtkiewicz 2000). Female students reported more discussion at home, while male students reported considerably more parental communication with the school and slightly higher home supervision (Sui-Chu & Willms 1996). Moreover, some activities (such as interest in books) are less rewarding for boys' academic achievement (indirect effect). For example, there is evidence that cultural capital is more closely linked to female school performance (Dumais 2002).

Czech Educational and Cultural Context

The empirical analysis utilizes the data from the Czech Household Panel Survey that provides rich information on family situation. Reflecting the 'return' of the intergenerational reproduction of social status from parents to children, we assume that individuals from socio-economically advantaged backgrounds are the most likely to attain higher school performance (and attain higher formal education) not only due to higher skills but also directly due to the family background, including the effects of social networks, higher aspiration, positive parenting, and cultural advantages that accrue to individuals of upper status families (e.g., Brand & Xie 2010). Moreover, Smith, Anýžová, and Matějů (2018) showed the role of family background in formal education is stronger in countries with more stratified educational systems (and lower degrees of business sophistication and economic innovation), such as those in Central Europe, which generally differentiate three types of schools: academic, technical and vocational, which in turn lead to very different prospects for university entry and the labor market.

We also suggest that the 'soft stratification characteristics' might be particularly important in this country. The Czech Republic belongs among countries with lowest levels

of income inequality in Europe, even surpassing the Scandinavian countries (EU-SILC 2021). Thus, it is possible that the 'softer' dimensions of capital might constitute a key resource used by upper-class families to preserve their status. Kraaykamp and Nieuwbeerta (2000) showed that, particularly in Bulgaria, the Czech Republic, and Slovakia, cultural reproduction is an important aspect of intergenerational transmission, much more so than in Western countries. This might be due to the fact that despite the communist agenda of equalization and seemingly higher social mobility (Breen & Jonsson 2005), opportunities for individual social mobility were in fact rather limited before 1989 in the Czech Republic (Kraaykamp & Nieuwbeerta 2000) and were skewed in favor of children from working-class families as opposed to children from higher-strata families (Betthauser 2019; Bodovski et al. 2017). Indeed, empirical studies show that cultural capital is still a significant social factor even among young generation (see Špaček 2017). However, it did not hold in Hungary and Poland (e.g., Mach 2004; Domanski et al. 2018). Yet, a generally little is known about the link between specific forms of cultural capital (scholarly culture) and school performance in the Czech context unlike other cultural context (e.g., DiMaggio 1982; De Graaf et al. 2000; Jæger & Breen 2016; for Eastern European cultural context, see Domanski et al. 2020). For these reasons, the Eastern European cultural context especially suited our aim of studying the role of family background on children's academic performance.

Hypotheses

We hypothesized that three distinctive, independent mediating mechanisms—reflected by three family environment aspects in the analysis—influence how socioeconomic background affects children's school performance. The proposed model (see Figure 1 for a conceptual model) suggested three specific hypotheses:

(H1) *Parents' education and family income affect children's school performance primarily indirectly through their association with parents' educational expectations, positive parenting, and the home literacy environment*;

(H2) *Parents' educational expectations, positive parenting, and home literacy environment also affect children's school performance indirectly through their association with children's aspirations, well-being, and interest in books*;

(H3) *These predictive family SES mechanisms are stronger for boys.*

Data and Methods

Data

This study analyzed data from the first two waves (2015/2016) of the CHPS, a nationally representative longitudinal survey that interviewed all adult household members and children aged from 10 to 17.[1] The households were selected by a two-stage stratified

[1] The free data source is available at Czech Social Science Data Archive after proper registration (official web link http://nesstar.soc.cas.cz/webview/).

probability sampling design. To study the link between socioeconomic background and children's school performance, we had to merge data from wave 1 and wave 2 (2015/2016), as some key variables were included in only one of these waves (see below). We had complete information for 600 children (291 boys and 309 girls) from the original 866 parent–child dyads in wave 1. The missing values were handled in the structural model by using the maximum likelihood estimation with robust standard errors (MLR) estimator, which yields standard errors that are robust to non-normality and handles missing data with full information maximum likelihood.

Variables

The data covered in wave 1 (2015) included information about school grades in three subject areas for all children in each household. The three variables of school performancewere measured using responses to the question "What was your grade for this subject in the last academic year: mathematics, Czech language, foreign language?" Children could choose from the following response categories: (1) the best mark to (5) the worst mark, according to the classification system used in the Czech school system. In the analysis, the scale was reverse-coded, with high marks indicating better academic performance. Given the high intercorrelation (around 0.6) between these items and their skewed distributions, a latent variable of *school performance* (with a normal distribution) was estimated in the structural model.

The indicators of the socioeconomic backgrounds of each family were used separately as we aimed to distinguish between their possible different effects: *parents' highest level of education* achieved by at least one of the parents, taken from wave 1 (elementary education, lower secondary, upper secondary, university degree), and *household income* (18 point scale variable), taken from wave 2 (2016), as household income measurements from wave 1 suffered from a large number of missing values.

Parents' educational aspirations for their children were measured in wave 1 based on the question "What is the highest level of education that you would like your child [name] to achieve?" Parents could choose from the following response categories: (1) elementary school, (2) secondary school without a high school diploma, (3) vocational secondary school with a high school diploma, (4) secondary general education, (5) university (bachelor degree), (6) university (master degree), and (7) university (doctorate). Parents answered separately for each child under 26 years of age living in the household and still participating in full-time education. *Children's aspirations* were measured in wave 2 by the question "What the highest level of education do you want to achieve: (1) elementary school, (2) secondary school without a high school diploma, (3) secondary school with a high school diploma, (4) tertiary education?"

Wave 1 also included information on the objectified scholarly culture (*home library size*). It was measured by the question "How many books do you have at home?" The responses were recorded on a 10-point scale, ranging from 1 (no books at home) to 10 (more than 1500 books at home). Parent respondents were instructed that one meter of books on a library shelf corresponds to approximately 50 books.

Embedded scholarly culture (*interest in books*) was measured in wave 2 (2016) with the following four statements: "1) Reading is one of my favorite hobbies, 2) I like talking

about books with others, 3) I like going to the library, 4) I am happy when I get a book as a present." The responses were recorded on a 4-point Likert scale, ranging from "strongly disagree" to "strongly agree."

In addition, wave 2 also included *reading frequency*, measured by the question "How often do you read for pleasure?" The six-category response scale ranged from "never" to "every day." As both parents and children were asked about their general interest in books and frequency of reading, we were able to produce the latent measure of embedded scholarly culture for both parents and children.

The indicator of *parent–preschooler reading* was measured in wave 2 as the frequency of parental reading to preschool-age children. The question posed was "How often did your parents read to you when you were young (until 6 years of age)?" The six-category response scale ranged from "never" to "every day."

Positive parenting was measured in wave 2 with the following two statements: "Parents find time to play with me and come up with new interesting activities" and "Parents explain to me why they want me to do something." The responses were recorded on a 4-point Likert scale, ranging from "strongly agree" to "strongly disagree." Scales were reverse-coded.

Children's general well-being was also measured in wave 1. It was measured by the question "How satisfied are you with your life as a whole?" The responses were recorded on a 7-point scale, ranging from 1 (extremely satisfied) to 7 (extremely unsatisfied). The scale was reverse-coded.

All models controlled for a set of children's characteristics and family background that helped eliminate omitted variable bias: *child's age*; *child's birth order* (firstborn child coded as 1, the subsequent children coded as 0); *number of siblings*; *mother's age when the child was born*; and *the presence of stepfather/stepmother in the family* (dummy variable with yes [=1] or no); *type of the family* (marriage/cohabitation with single-parent family as a reference category). We controlled our mediating mechanisms for the family structure because a study by Astone and McLanahan (1991) showed that family structure could alter the effect of parents' SES on offspring's outcomes as children living with single parents or step-parents during adolescence received fewer material resources, fewer expectations, and lower supervision and nurturing. They also experienced higher levels of family conflict and a lack of family cohesiveness than children living with both parents. All control variables were taken from wave 1. For a detailed statistical summary of the relevant variables, see Tables A1 and A2 in the Appendix.

Methods

Due to the hierarchical nature of the CHPS data, structural equation modeling with complex survey data was used in the present study. This technique enabled us to estimate the direct, indirect, and total effects of family characteristics, to model latent variables based on the multi-item measurement, and to estimate multiple-group analysis for boys and girls. We used clustered standard errors to account for children being nested within families. All analyses were carried out using Mplus (version 7).[2]

[2] Model scripts are available at: https://www.soc.cas.cz/sites/default/files/publikace/model_script.docx_.pdf

The structural model encompassing all the relevant relationships between the variables is displayed in Figure 1. As was already suggested, the model supposed that parents' educational aspirations for their children, home literacy environment, and positive parenting moderate the association between parental SES (parental education and income) and children's school performance. We also assumed that the effects of the family environment on children's school performance are mediated by children's characteristics (e.g., interest in books, aspirations, and well-being); hence, we paid special attention to the total effects of family background characteristics in the results.

The model further assumed that children's characteristics, such as age, gender, number of siblings, and birth order, affect children's academic achievement and characteristics. Similarly, family background characteristics, such as mother's age when a child is born and the type of family, were assumed to affect parental level factors. To examine whether the mediating pathways differed across gender, we estimated a two-group (males, females) structural equation model. Although this model did not allow a direct comparison of the strength of the effects between the male and female groups, it helped to understand how differently the relevant mechanisms operate.

We should also note that we tested a cross-sectional model. Even though causality cannot be tested in a cross-sectional model, structural equation modeling can determine whether a model provides a plausible fit for the data. If it does, one is justified in gathering and testing longitudinal data (Davis-Kean 2005). All models were evaluated using the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the Bayesian information criterion (see Hu & Bentler 1999).

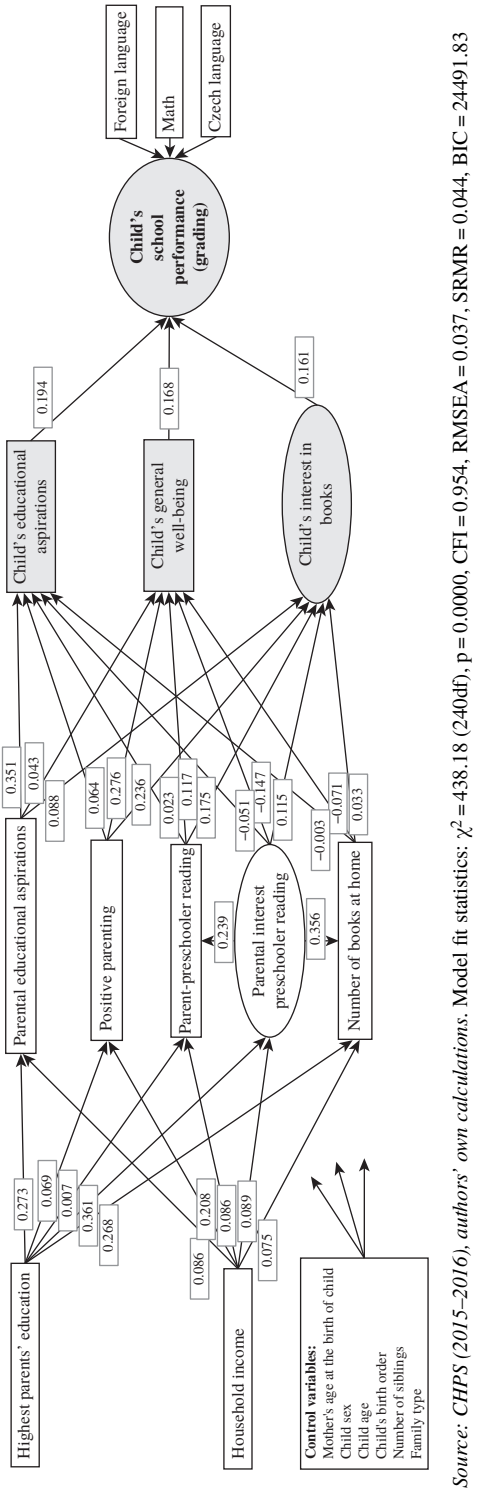
Results

In the baseline model, we estimated the link between parental education and income and children's school performance, mediated by parental and children's characteristics. As suggested in the theoretical model, all direct and indirect pathways were tested. Applying common cut-off criteria, the hypothesized model fit the data well ($\chi^2 = 438.18$ df(240), $p = 0.0000$, CFI = 0.954, RMSEA = 0.037). The results supported our hypothesis that parents' education and family income were indirectly related to children's achievement through parental and children's characteristics. First, parents' education had significant, positive direct effects on parental aspirations for their children ($\beta = 0.273$; $p < 0.001$), parental interest in books ($\beta = 0.361$; $p < 0.001$), and home library size ($\beta = 0.268$; $p < 0.001$). In addition, family income strongly affected positive parenting ($\beta = 0.208$; $p < 0.001$), see Figure 2.

The results also revealed that parents' education ($\beta = 0.04$) and family income ($\beta = 0.008$) had no statistically significant direct effects on children's school performance, suggesting that the effect of socioeconomic background was derived entirely from the indirect effect on achievement (see Table 1). The effect of parents' highest education on school performance was mediated by parental and children's aspirations ($\beta_{indirect} = 0.115$, $p < 0.001$; see Table 2) and their interest in books ($\beta_{indirect} = 0.035$, $p < 0.001$), but not by positive parenting or children's well-being. In comparison, the effect of family income was mediated by all included parental and children's characteristics: parental and chil-

Figure 2

Parental influence on children's school performance; standardized regression effects in structural modelling



Source: CHPS (2015–2016), authors' own calculations. Model fit statistics: $\chi^2 = 438.18$ (240df), p = 0.0000, CFI = 0.954, RMSEA = 0.037, SRMR = 0.044, BIC = 24491.83

dren's aspirations ($\beta_{indirect} = 0.058$, $p < 0.001$), positive parenting and children's well-being ($\beta_{indirect} = 0.015$, $p < 0.05$), and family scholarly culture ($\beta_{indirect} = 0.018$, $p < 0.01$). However, the overall total effect of parental educational attainment on children's achievement was much stronger than the total effect of income.

In line with our third hypothesis, the specifics of this indirect relationship differed across male and female groups. The multi-group SEM model fit fairly well ($\chi^2 = 651.81$ df(470), $p = 0.0000$, CFI = 0.958, RMSEA = 0.036). For boys, parental education was indirectly related to children's achievement through parental and children's aspirations only ($\beta_{indirect} = 0.149$, $p < 0.001$). However, for girls, it was similarly mediated by parental and children's aspirations ($\beta_{indirect} = 0.077$, $p < 0.05$) and family scholarly culture ($\beta_{indirect} = 0.054$, $p < 0.01$) with a slightly stronger total effect. Regarding family income, this effect was mediated primarily by parental and children's aspirations for both boys and girls. However, family income was also indirectly related to children's achievement through family scholarly culture for boys ($\beta_{indirect} = 0.036$, $p < 0.05$) and positive parenting and well-being for girls ($\beta_{indirect} = 0.058$, $p < 0.05$).

In line with our second hypothesis, the results confirmed well-documented direct links of parental characteristics to particular children's characteristics (see Figure 2): parental aspirations for their children had the strongest positive effect on children's aspirations ($\beta = 0.351$; $p < 0.001$); positive parenting significantly affected children's well-being ($\beta = 0.276$; $p < 0.001$) and interest in books ($\beta = 0.236$; $p < 0.001$); and parental interest in books ($\beta = 0.175$; $p < 0.001$) and parent–preschooler reading ($\beta = 0.115$; $p < 0.001$) had positive effects on children's interest in books. The results did not reveal home library size as significantly benefitting children's interest in books.

In addition, parental characteristics were indirectly related to children's school performance through children's characteristics. The only exception was parental educational aspirations for their children, which had both a statistically significant direct effect ($\beta = 0.218$, $p < 0.001$) on children's achievement and an indirect effect through children's aspirations ($\beta_{indirect} = 0.068$, $p < 0.001$). Other parental characteristics, such as positive parenting or parent–preschooler reading, only had statistically significant indirect effects on children's school performance either through children's general well-being or interest in books. The results did not indicate that parental interest in books or home library size had any significant direct or indirect effects on children's school performance compared to educational aspirations. As for other covariates, it was confirmed that the presence of step-parents in the family had a negative direct effect on boys' ($\beta = -0.187$, $p < 0.001$) and girls' ($\beta = -0.142$, $p < 0.05$) achievement in school. In contrast, the higher age of a mother when a child was born ($\beta = 0.095$, $p < 0.05$) had a positive effect on the child's subsequent academic performance.

In line with the third hypothesis, it seems that the effects of parental characteristics were directly related to boys' achievement, suggesting that the direct relationship of parental characteristics to school performance was not explained by the observed indirect paths through children's characteristics. In comparison, for girls, the pathways operated mainly indirectly through observed girls' aspirations, well-being, and interest in books. For instance, whereas the direct effect of parental aspirations for their children ($\beta = 0.413$, $p < 0.001$) on school performance was much stronger for boys (see also Zhang et al. 2011),

the indirect effect through children's aspirations was significant for girls ($\beta_{indirect} = 0.085$, $p < 0.01$). A similar pattern could also be found for positive parenting or parent–preschooler reading, even though positive parenting (i.e., parent–child play activities and instructions) had a moderately negative direct effect on boys' performance ($\beta = -0.275$, $p < 0.05$). Some studies have found that parents are more involved with and pay more attention to children with worse school outcomes, which could explain the observed negative effect of positive parenting. Astone and McLanahan (1991) found a small negative effect of parents talking with their children on a range of educational outcomes.

In general, children's characteristics were detected as the strongest predictors of their school performance. Children's aspirations ($\beta = 0.194$, $p < 0.001$), general well-being ($\beta = 0.168$, $p < 0.001$), and interest in books ($\beta = 0.161$, $p < 0.05$) had statistically significant, positive direct effects on achievement, especially for girls. Holding other factors constant, the results regarding the variables used as controls indicate that girls had slightly better school grades than boys ($\beta = 0.128$, $p < 0.01$). Being female was significantly related to higher amounts of reading ($\beta = 0.389$, $p < 0.001$). Younger children had better school grades ($\beta = 0.332$, $p < 0.001$), lower educational aspirations ($\beta = 0.125$, $p < 0.01$), more interest in books ($\beta = -0.160$, $p < 0.001$), and played with their parents more often ($\beta = -0.100$, $p < 0.1$) than older children. Boys with a greater number of siblings had worse school grades ($\beta = 0.152$, $p < 0.01$).

Discussion and Conclusion

This study examined the family processes that might indirectly link parental education and family income with children's achievement. We hypothesized that this indirect link would work through the parents' educational aspirations for their children, the home literacy environment, and positive parenting on one side, and children's aspirations, interest in books, and well-being on the other side. In previous studies, these mediating pathways were addressed separately. Therefore, we suggested a comprehensive model that aimed to provide a full picture of the process through which family background might influence children's academic achievement, focusing on the mediating role that children's characteristics play in this process.

Based on the CHPS (2015/2016), the proposed theoretical model helped to explain the role of parents' educational attainment and family income in predicting children's academic achievement in Czech families. The results showed that parents' education and family income had statistically significant, positive indirect effects, rather than direct effects, on school performance, suggesting that this model fully explained pathways through which parental education and family income might influence children's achievement. The effects of parental education and family income were transmitted via parents' educational aspirations for their children, positive parenting, and home literacy environments. Parental education and family income positively affected the types of literacy-related material, parents' expectations for their children, and the affective relationship between parents and children. Thus, parents' human capital and economic situation are important components in understanding how family environments are created.

Table 1

Unstandardized and standardized direct effects for relevant predictors in the structural model determining children's school performance

Dependent variable: school performance	Children			Boys			Girls		
	B	S.E.	*Beta**	B	S.E.	*Beta*	B	S.E.	*Beta*
Family environment predictors									
Parents' highest education	0.040	0.046	0.040	−0.020	0.063	−0.019	0.118	0.065	0.127
Household income	0.002	0.016	0.008	0.009	0.020	0.028	−0.007	0.022	−0.026
Mother's age at the birth of child	0.016*	0.008	0.095	0.026**	0.010	0.155	0.013	0.011	0.080
Single-parent family	−0.079	0.106	−0.040	−0.202	0.143	−0.092	0.084	0.150	0.047
Stepparent family	−0.377***	0.087	−0.179	−0.363***	0.105	−0.187	−0.325*	0.133	−0.142
Parents' educational aspirations	0.099***	0.024	0.218	0.181**	0.030	0.413	0.042	0.029	0.093
Positive parenting	−0.116	0.072	−0.126	−0.254*	0.106	−0.275	0.016	0.089	0.020
Parental scholarly culture	0.006	0.048	0.006	−0.063	0.059	−0.065	0.080	0.068	0.085
Parent-preschooler reading	0.033	0.025	0.067	0.101**	0.034	0.193	−0.045	0.030	−0.096
Number of books at home	−0.017	0.021	−0.037	−0.012	0.028	−0.024	−0.026	0.030	−0.058
Children's predictors									
Children's sex	0.197**	0.066	0.128	—	—	—	—	—	—
Children's age	−0.111***	0.015	−0.332	−0.132***	0.018	−0.396	−0.091***	0.022	−0.282
Child's birth order	0.130†	0.068	0.082	0.070	0.088	−0.044	0.183†	0.096	0.118
Number of siblings	−0.011	0.036	−0.014	−0.129**	0.047	−0.152	0.086	0.053	0.120
Children's educational aspirations	0.224***	0.062	0.194	0.056	0.080	0.049	0.341***	0.078	0.307
Children's general well-being	0.115***	0.035	0.168	0.117**	0.043	0.165	0.119*	0.051	0.184
Children's interest in books	0.099*	0.040	0.161	0.119†	0.065	0.169	0.090†	0.049	0.150

Source: CHPS (2015–2016), authors' own calculations. Levels of statistical significance: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$.* B = unstandardized regression coefficient, Beta = standardized regression coefficients in SEM.

Note 1: Model fit statistics—Chi-square = 438.18 (240df), $p = 0.0000$, CFI = 0.954, RMSEA = 0.037, SRMR = 0.044, BIC = 24491.83 (type = complex).
Note 2: Model fit statistics (grouping)—Chi-square = 651.81 (470df), $p = 0.0000$, CFI = 0.958, RMSEA = 0.036, SRMR = 0.053, BIC = 25032.75 (type = complex).

** Corrections to the standard errors and chi-square test of model fit that took into account non-independence of observations and unequal probability of selection were obtained by using the TYPE = COMPLEX option of the ANALYSIS command.

Table 2

Standardized direct, indirect, and total effects of family environment predictors and children's characteristics on children's school performance

Dependent variables / *Family environment predictors*		School performance		
		Children	**Boys**	**Girls**
Parents' highest education	Direct effect	0.040	–0.019	0.127
	Total indirect effect	0.148***	0.154**	0.116**
	Total effect	0.188***	0.135*	0.243***
	Via educational aspirations	0.115***	0.149***	0.077*
	Via positive parenting or well-being	–0.002	–0.005	–0.015
	Via scholarly culture	0.035***	0.010	0.054**
Household income	Direct effect	0.008	0.028	–0.026
	Total indirect effect	0.091**	0.054	0.149**
	Total effect	0.100	0.081	0.123
	Via educational aspirations	0.058***	0.030*	0.091*
	Via positive parenting or well-being	0.015*	–0.012	0.058*
	Via scholarly culture	0.018**	0.036*	0.000
Parents' educational aspirations	Direct effect	0.218***	0.413***	0.093
	Total indirect effect	0.092***	0.038	0.117***
	Total effect	0.311***	0.451***	0.210***
	Via children's educational aspirations	0.068***	0.021	0.085**
	Via children's general well-being	0.007	0.010	0.004
	Via children's interest in books	0.017†	0.007	0.028
Positive parenting	Direct effect	–0.126	–0.275**	0.020
	Total indirect effect	0.101**	0.068	0.135**
	Total effect	–0.025	–0.207**	0.154†
	Via children's educational aspirations	0.012	–0.004	0.037
	Via children's general well-being	0.044*	0.027	0.054*
	Via children's interest in books	0.045*	0.045	0.044
Parental scholarly culture	Direct effect	0.006	–0.065	0.085
	Total indirect effect	0.038	0.098†	–0.001
	Total effect	0.044	0.034	0.084
	Via children's educational aspirations	–0.010	–0.006	–0.001
	Via children's general well-being	–0.023	–0.017	–0.033
	Via children's interest in books	0.023*	0.029	0.022
Parent-preschooler reading	Direct effect	0.067	0.193**	–0.058
	Total indirect effect	0.057***	0.068*	0.076**
	Total effect	0.123*	0.261***	–0.020
	Via children's educational aspirations	0.004	–0.004	0.004
	Via children's general well-being	0.018	0.019	0.012
	Via children's interest in books	0.034*	0.052	0.005
Number of books at home	Direct effect	–0.037	–0.024	–0.058
	Total indirect effect	0.013	0.009	0.033
	Total effect	–0.024	–0.015	–0.025
	Via children's educational aspirations	–0.001	–0.001	0.004
	Via children's general well-being	–0.012	–0.034	0.012
	Via children's interest in books	0.006	0.006	0.005

Source: CHPS (2015–2016), authors' own calculations. Levels of statistical significance: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$.

Home environment affected children's aspirations, general well-being, and interest in books, which, in turn, directly enhanced children's school grades. Indeed, children's characteristics were identified as the strongest predictors of their school performance, suggesting that the impact of parents on children's academic achievement can be mediated through children's attitudes and preferences. The results supported our hypothesis that much of this association could be mediated via three pathways related to parent–child educational aspirations, parent–child interest in books, and the relationship between positive parenting and children's well-being. However, home library size—an objectified dimension of scholarly culture—did not mediate the association once parental scholarly culture and parent–preschooler reading had been controlled for. This questions whether the number of books in a home is a reliable predictor of school achievement worldwide (Evans et al. 2010).

The specifics of the indirect process of how parents' educational attainment and family income affected children's achievement differed for boys and girls. For boys, the effects of parental characteristics were directly related to their achievement, suggesting that the direct relationship between parental characteristics and school performance was not explained by the observed indirect pathways through boys' attitudes and beliefs. In comparison, for girls, the pathways operated indirectly through their aspirations, well-being, and interest in books. Thus, our hypothesis of gender differences in the processes linking parental SES and children's achievement was supported. Understanding the sources of these differences is an important task for future research.

It should be noted that our findings are subject to several limitations. One of the strongest limitations was the use of cross-sectional data to test process models. Thus, it was not possible to examine these processes longitudinally, which would have provided a better test of our somewhat causal hypotheses. The other limitation of this study was the limited scope of the included variables. It is likely that psychological moderators, such as children's self-esteem, locus of control, emotional and behavioral dispositions, and cognitive ability, also relate to their school performance. Unfortunately, we were not able to include such extensive explanatory variables in the model due to the limitation of the data.

Our analyses also relied exclusively on self-reported grades. The parent–child play activities and instructions were also reported by children, not by parents. Thus, the direction of the relationship between positive parenting and children's well-being could be questioned because more satisfied children could perceive their parents as warmer and more active at home. Essentially, issues relevant to social desirability would allow potentially limiting conclusions to be drawn from the findings. Likewise, due to the low sample size, we did not have sufficient statistical power to detect group differences sufficiently. Therefore, the results of this analysis are suggestive rather than conclusive. These issues call for replication of this analysis with data that address these deficiencies.

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Appendix

Table A1
Summary statistics of the key variables

	Percentage			Mean			Std. Dev.			Min	Max
	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Data set	Data set
Children's sex	—	51.4%	48.6%	—	—	—		—	—	0	1
Children's age	—	—	—	13.4	13.3	13.4	2.30	2.33	2.26	10	17
Child's birth order (the first one)	38%	40.7%	35.6%	—	—	—	—	—	—	0	1
Number of siblings	—	—	—	1.42	1.40	1.43	0.99	0.93	1.05	0	7
Mother's age at the birth of child	—	—	—	28.3	28.5	28.1	4.72	4.68	4.76	16	59
Parents' highest education	—	—	—	3.03	3.05	3.00	0.80	0.77	0.83	1	4
Average grades of children (reverse scale)											
—math	—	—	—	3.79	3.72	3.85	1.01	1.03	0.99	1	5
—Czech language	—	—	—	3.85	3.62	4.10	0.89	0.88	0.84	1	5
—foreign language	—	—	—	4.06	3.95	4.18	0.90	0.92	0.86	1	5
Average number of books in the household	—	—	—	6.58	6.64	6.52	1.64	1.64	1.64	1	10
Parent—bookreading is his/her hobby (reverse scale)	—	—	—	2.81	2.84	2.78	0.88	0.88	0.89	1	4
—likes to discuss books with other people (reverse scale)	—	—	—	2.56	2.60	2.53	0.81	0.80	0.82	1	4
—likes to go to the library or bookshops (reverse scale)	—	—	—	2.61	2.63	2.59	0.91	0.90	0.92	1	4
—is happy when receives book as a gift (reverse scale)	—	—	—	2.90	2.93	2.88	0.87	0.86	0.89	1	4
Parental reading in childhood	—	—	—	4.44	4.45	4.42	1.55	1.53	1.58	1	6
Children—bookreading for enjoyment (reverse scale)	—	—	—	2.79	2.44	3.16	1.67	1.52	1.74	1	6
—likes to discuss books with other people (reverse scale)	—	—	—	2.30	2.07	2.53	0.96	0.90	0.97	1	4
—likes to go to the library or bookshops (reverse scale)	—	—	—	2.40	2.09	2.72	1.10	1.03	1.08	1	4
—is happy when receives book as a gift (reverse scale)	—	—	—	2.79	2.54	3.05	1.01	1.00	0.97	1	4
—reads books frequently (scale of never to everyday)	—	—	—	1.96	1.75	2.17	0.85	0.76	0.88	1	6
Children's general well-being (rs)	—	—	—	6.01	6.09	5.92	1.15	1.10	1.20	1	7
Parents can find time to play with me. (rs)				3.34	3.53	3.34	1.12	1.08	1.16	1	5
Parents explain to me when they ask me to do something.				3.71	3.82	3.60	1.01	0.98	1.04	1	5
Single-parent family/Stepparent family	18/16%	15/19%	21/13%	—	—	—	—	—	—	0	1
Parental educational aspiration	—	—	—	4.60	4.39	4.82	1.72	1.76	1.67	1	7
Children's educational aspiration	—	—	—	3.51	3.43	3.59	0.66	0.65	0.67	1	4
Household income		—			12.87			2.67		1	18

Source: CHPS (2015–2016), authors' own calculations. Weighted by W_papi_child.

Table A2
Correlation Matrices for Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Parent and family characteristics																					
1 Parents' education																					
2 Family income	**.41**																				
3 Single-parent family	**−.15**	**−.49**																			
4 Stepparent family	**−.09**	.07	**−.17**																		
5 Mother's age at the birth of child	**.20**	.02	.01	**−.16**																	
Child characteristics																					
6 Age	**−.09**	−.06	.06	.03	**−.22**																
7 Sex of child	−.03	**−.10**	**.07**	**−.08**	−.04	.04															
8 Birth order	**.10**	**.17**	**−.36**	.06	**−.30**	.02	−.05														
9 Number of siblings	−.06	.007	−.05	.008	**.10**	.02	.01	**−.26**													
Educational aspirations																					
10 Parental aspirations	**.35**	**.18**	−.01	**−.13**	.06	−.003	**.13**	.009	−.03												
11 Child's aspirations	**.35**	**.27**	−.03	−.07	.06	.05	**.12**	**.08**	−.07	**.49**											
Home literacy environment																					
12 Parental scholarly culture	**.34**	**.09**	**.14**	**−.11**	**.15**	.06	−.04	**−.11**	−.02	**.21**	**.15**										
13 The number of books at home	**.45**	**.23**	**−.07**	**−.09**	**.27**	.01	−.04	−.02	−.008	**.24**	**.24**	**.43**									
14 Parent-preschooler reading	**.16**	**.24**	−.03	−.05	**.16**	**−.10**	−.01	.06	**−.17**	**.10**	**.19**	**.24**	**.23**								
15 Child's interest in books	**.27**	**.14**	−.003	**−.09**	**.12**	**−.17**	**.32**	.05	−.04	**.22**	**.32**	**.25**	**.21**	**.30**							
Positive parenting																					
16 Parent-child play	**.16**	**.20**	−.04	−.07	**.16**	**−.16**	−.09	.01	−.05	.09	**.15**	**.15**	.08	**.34**	**.23**						
17 Parent-child instruction	.07	**.14**	−.08	−.05	.09	**−.09**	**−.11**	.05	−.02	−.007	.06	.04	−.02	**.23**	**.15**	**.44**					
18 Child's general well-being	.05	**.15**	−.06	−.04	.05	**−.16**	−.08	.06	.04	.02	.03	−.08	−.06	**.19**	.05	**.28**	**.26**				
Achievement																					
19 Czech language	**.28**	**.16**	**−.09**	**−.18**	**.16**	**−.29**	**.27**	**.09**	**−.07**	**.34**	**.35**	.07	**.15**	**.20**	**.37**	**.11**	.06	**.13**			
20 foreign language	**.23**	**.12**	−.05	**−.15**	**.13**	**−.27**	**.13**	.02	−.05	**.32**	**.35**	.07	**.15**	**.20**	**.30**	.08	**.11**	**.19**	**.68**		
21 math	**.28**	**.14**	−.04	**−.18**	**.15**	**−.38**	.06	**.09**	**−.09**	**.31**	**.37**	**.06**	**.16**	**.22**	**.29**	**.14**	**.11**	**.20**	**.67**	**.60**	

Source: CHPS (2015–2016), authors' own calculations. Weighted by W_papi_child. Note: Significant two-tailed correlations at the $p \leq 0.05$ level are in boldface.