



Parental involvement in elementary schools and children's academic achievement: A longitudinal analysis across educational groups in Finland[☆]

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ABSTRACT

Many educational initiatives emphasize parental involvement as a strategy to reduce socioeconomic achievement gaps in schools and enhance students' educational attainment. Despite extensive research, findings on the relationship between parental involvement and children's academic achievement remain inconsistent. This study uses longitudinal data (N = 2887) from Finland, a country with strong emphasis on equal educational opportunities, to examine the development of parental involvement and relationships between parental involvement and children's achievement during elementary school years. Specifically, the research focuses on three primary objectives: analyzing changes in parental involvement over time, assessing its relationship with academic outcomes, and exploring variations in its relationship across different educational groups.

Results: indicated that parental involvement generally decreases, as children grow older. While parental involvement was related to both GPA and reading comprehension when assessed separately, only the relationship with GPA remained significant in a combined model. Our findings indicate an overlap between the examined outcome variables but they also suggest a potential teacher-bias effect in grading influenced by parental involvement. Therefore, our findings suggest that the impact of parental involvement on achievement might be more about how teachers perceive and evaluate students rather than a direct effect on academic performance. Additionally, although parental involvement varied with socioeconomic status (SES), with higher levels observed among more educated mothers, its association with educational outcomes was relatively uniform across all groups but slightly stronger and statistically significant among middle educational groups. Therefore, our findings challenges the assumption that increasing parental involvement could effectively equalize socioeconomic differences in educational performance.

1. Introduction

It is well-known in the field of educational sociology that parental socio-economic resources are an important predictor of children's educational attainments. One potential mechanism for this intergenerational transmission is parental involvement. Parental involvement is considered to be a valuable practice in promoting children's educational attainments (Li et al., 2023), but it has also been seen to be tied to social class as socioeconomically advantaged families tend to invest more time and energy in their children's education (Cano, 2021). Consequently, fostering parental involvement is seen as a strategy to reduce socioeconomic disparities in educational achievement (Berger, 1991; Hill &

Tyson, 2009).

Studies focusing on parental involvement often distinguish between home-based and school-based involvement (Hill & Tyson, 2009; Pomerantz et al., 2007). While involvement in learning at home is probably the most typical form of involvement, making parents more involved at schools and supporting home-school collaboration have been identified to be especially beneficial and important in reducing socioeconomic gaps in achievement (Dearing et al., 2006; Pomerantz et al., 2007). By strengthening the partnership between homes and schools, parents and teachers are considered to be able to better communicate their potential concerns about a child's challenges and needs in learning. This in turn, underlines the importance of school involvement for parents, motivating

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them to become more involved in their children's learning and education.

Despite optimistic expectations, the body of research on the effects of parental involvement on children's academic achievement remains inconclusive. In their comprehensive second-order meta-analysis, Kim (2022) notes that although there is substantial evidence supporting a positive association between parental involvement and children's achievement, the predominance of cross-sectional studies complicates the establishment of clear causal relationships. Additionally, Kim (2022) highlights the need for more research on school-based parental involvement and studies conducted outside the U.S. context. In the present study, we contribute to addressing these gaps in the research by utilizing longitudinal data (N = 2887) from the Finnish context for examining the relationships between parental involvement and children's achievement outcomes in different educational groups. Specifically, we investigate how parental involvement evolves over time across different educational groups. Additionally, we examine the relationship between parental involvement and two key measures of academic achievement, GPA and reading comprehension skills, and explore whether these relationships differ between educational groups. Our research focuses on parental involvement in school-related activities, such as parental participation and activity in home-school collaboration, which not only plays a central role in measures of involvement (Li et al., 2023) but also aligns well with traditional forms of parental involvement in Finland (Rätty et al., 2009). The country context makes our analyses interesting: socioeconomic differences in learning in Finland are comparatively modest (Ahonen, 2021), and the encouragement for parents' involvement in school is part of the National Core Curriculum. Thus, if indeed there are benefits from parental involvement in reducing socioeconomic differences in learning, this could explain part of the success of the Finnish educational system.

In the following, we review the theory and previous research underpinning our research. First, we provide an overview of how parental involvement has become a central topic in education including the theoretical mechanisms through which it is thought to contribute to children's educational outcomes. Next, we review key findings from previous studies on parental involvement, focusing on its definitions, dimensions, and the nuanced relationships between different types of involvement and various academic outcomes. Following this, we discuss the dynamics of parental involvement over time, synthesizing what is known from longitudinal studies, and then explore the role of socioeconomic status (SES) in shaping parental involvement. Finally, we introduce the Finnish context, detailing the role of parental involvement within Finland's education system, which sets the stage for our research questions and hypotheses.

Evolution of parental involvement in education: from caregivers to catalysts for academic success

In her research on the history of parenting, Maryellen Schaub (2010) concluded that the increase in parental involvement during the twentieth century is associated with the expansion of education and institutionalization of mass schooling. While at the beginning of the century, parents were seen primarily as caregivers of their children, the expansion of education altered and expanded the expectations of parenting. Institutionalization of education legitimated cognitive performance and school success as a desirable currency in modern society, and during this development, it became self-evident that parents should provide support for their children's schooling (Schaub, 2010).

During the second half of the twentieth century, parents' engagement in their children's education increased continuously, and since the 1990's parental involvement in their children's education has become a normative expectation (Schaub, 2010; Lareau, 1987) and a sign of a "good parenting" (Ule et al., 2015, 332). Active parental involvement has been encouraged by many actors in the field of education (i.e., policymakers, child-care providers, teachers, and researchers)

(Desimone, 1999; Fan & Chen, 2001) as it has been considered to be "one of the best available means for parents to improve their children's educational outcomes" (Li et al., 2023, 1). Therefore, supporting the active involvement of parents in their children's education has been considered a way to reduce socioeconomic gaps in school achievement (Berger, 1991; Hill & Tyson, 2009).

Theoretically, parental involvement has been explained as contributing to children's educational outcomes through two primary mechanisms: skill development and motivation enhancement (Pomerantz et al., 2007). In skill development models, parents' involvement in children's academic lives contributes to improved cognitive and meta-cognitive skills by providing skill-related resources that enhance children's achievement (Pomerantz et al., 2007). For instance, parental engagement enables parents to gain insights into their children's learning processes, allowing them to offer more effective academic support at home (Baker & Stevenson, 1986; Pomerantz et al., 2007).

Furthermore, in motivation development models, the benefits of parental involvement are explained through the motivational resources it enhances (Pomerantz et al., 2007). Parental involvement signals to children that their parents value education, fostering positive motivational beliefs and attitudes that, in turn, promote learning (Dearing et al., 2006; Hill & Taylor, 2004).

Parental involvement in prior research: definitions and empirical insights

In research, parental involvement has often been described as active participation in children's education or schooling by helping children with everyday school tasks (e.g., homework) or more future-oriented tasks (e.g., course selection, educational choices) and by collaborating with school (e.g., attending school events) (Crosnoe, 2001). In a broader sense, parental involvement could be described as active participation in children's social, emotional, and academic development (Castro et al., 2015).

According to review studies and meta-analyses of the prior research (e.g., Castro et al., 2015; Fan & Chen, 2001; Powell-Smith et al., 2000; Wilder, 2014), especially the early research in the field suffered from the lack of a consistent definition and operationalization of parental involvement, which has led to somewhat inconsistent empirical findings. Therefore, current research has highlighted the importance of understanding parental involvement as a multidimensional construct (e.g., Fan & Williams, 2010; Epstein, 1995; Jeynes, 2011). Some theoretical and empirical suggestions have tried to capture the dimensions of parental involvement (e.g., Epstein, 1995). However, there is still a lack of clear consensus on the operationalization of the concept and its dimensions (Fan & Chen, 2001).

Parental involvement measures have been categorized in many ways. Li et al. (2023) distinguished action-based and attitudinal-based forms of involvement. In addition, studies (e.g. Avvisati et al., 2010; Pomerantz et al., 2007, Shumow & Miller, 2001) have made a distinction between parental involvement taking place at home versus at school. Action-based indicators of parental involvement have been at the core of measures of parental involvement (Li et al., 2023). These indicators refer to visible forms of parental involvement, such as helping children with homework (i.e. typical example of home-based involvement) and participating in school activities (i.e. typical example of school-based involvement) (Pomerantz et al., 2007). Some studies have made a further distinction between parental involvement and participation, the former referring more to upbringing and educating practices that parents do to support their children's academic skills, and the latter referring more to parents' active contribution in school activities (Menhere & Hooge, 2010). In several studies, however, parental involvement and participation have been considered as describing different aspects of the multidimensional involvement construct (e.g., Castro et al., 2015; Fishel & Ramirez, 2005). Attitudinal forms of involvement (e.g., parental expectations) refer to intangible forms of involvement that may not directly influence children's educational outcomes but may still be

influential by affecting the atmosphere at home and the interpretations that children do about their parents' parenting behavior (Castro et al., 2015; Li et al., 2023; Jeynes, 2010).

Prior research has shown that the effects of involvement may vary depending on the examined dimensions of involvement and outcomes (e.g., for meta-analysis or reviews on achievement outcomes, see Fan & Chen, 2001; Hill & Tyson, 2009; Kim, 2022; motivational, behavioral or social outcomes, Barger et al., 2019; Gonzalez-DeHass et al., 2005; Kim et al., 2020). In a qualitative meta-synthesis that combined the results of nine meta-analyses, Wilder (2014) concluded that parental involvement predicts academic achievement, irrespective of the metrics used to measure involvement or achievement. Kim (2022) reached similar conclusions in his second-order meta-analysis, which encompassed 23 meta-analyses. Both Wilder (2014) and Kim (2022), along with several other meta-analyses (e.g., Barger et al., 2019; Castro et al., 2015; Fan & Chen, 2001), have shown that the association between parental involvement and academic achievement tends to be weakest when involvement is defined as homework help. Conversely, other forms of involvement, including parental participation in school activities, have shown a stronger effect on achievement outcomes.

However, not all studies align with these findings; some report no significant relationship between parental involvement and achievement, especially in specific dimensions of the examined constructs (e.g., Shumow & Miller, 2001; El Nokali et al., 2010). For example, Shumow and Miller's (2001) study found that parental at-school involvement—which included measures such as parental school visits, parent-teacher organization memberships, and attentiveness to school issues—was positively associated with adolescents' academic grades but not with their achievement test scores. In a similar vein, El Nokali et al.'s (2010) research showed that parental involvement, measured as a composite score of encouragement, investment, and educational attitudes, significantly predicted children's behavioral and social skills but had no significant impact on academic achievement. Additionally, Domina (2005) analyzed longitudinal data from 1445 elementary school-aged children and discovered that once the effects of a child's prior academic achievement on parental involvement were controlled for, the positive association between involvement and academic achievement vanished. However, consistent with the findings of El Nokali et al. (2010), parental involvement was directly linked to a reduction in children's behavioral problems.

Moreover, the definition of academic achievement may influence the effect size between parental involvement and achievement but results are not straightforward. In their meta-analysis, Fan and Chen (2001) found that the relationship between parental involvement and achievement was stronger when academic achievement was measured with a global indicator (e.g., GPA) instead of subject-specific indicators (e.g., grade in one subject). However, a subsequent meta-analysis by Jeynes (2003) concluded the opposite, noting that the effect size of parental involvement was smaller when GPA was used as the measure, compared to other assessments like teacher ratings. These conflicting results may be attributed to differences in the source studies included in each meta-analysis. Notably, only five studies were common between Fan and Chen's (2001) and Jeynes's (2003) analyses, which had somewhat different objectives. Further complicating the picture, a recent meta-analysis by Kim (2022) also confirms these inconsistencies concerning different achievement outcomes. Therefore, these discrepancies underscore the need for further exploration of this issue. Addressing this gap, our study employs two different measures of academic achievement—GPA and reading comprehension tests—simultaneously in our analyses to better understand how different measures might influence the observed effects of parental involvement on achievement.

Dynamics of parental involvement over time

Despite the extensive research on parental involvement, relatively

few studies have utilized longitudinal data. Longitudinal studies that do exist, suggest that the impact of parental involvement may vary depending on the child's age. For instance, some studies indicate that parental involvement has a stronger association with academic achievement during the elementary school years than in later periods (Jeynes, 2007; Muller, 1995; Singh et al., 1995). However, findings have not been consistent; other meta-analyses (e.g., Castro et al., 2015; Jeynes, 2012; Kim, 2022) have reported larger effect sizes for older students.

Overall, longitudinal studies suggest that the intensity of parental involvement may vary depending on the child's age. For instance, Park and Holloway (2017) observed an increase in parental involvement from kindergarten through the third grade, followed by a slight decrease thereafter. In a study by Izzo et al. (1999), the decrease in involvement was apparent already from the first year of elementary school. Similar trends were observed in Crosnoe's (2001) study on college students, as well as in Catsambis and Garland's (1997) study on middle and high-school-aged students, both of which documented a decrease in parental involvement over the years. The findings of Catsambis and Garland (1997) showed that involvement may also take different forms over the years. In their study, they found that parents became less involved in monitoring students' behavior over time whereas involvement related to future educational choices (i.e. taking part and discussing course selection) increased. In the current study, we contribute to this line of research by utilizing longitudinal data to examine how parental involvement evolves over time across the elementary school years.

The role of social class in shaping parental involvement

Prior studies have consistently shown that parental involvement is linked to social class, with parents of higher socioeconomic status typically being more involved in their children's education than those from less advantaged backgrounds (e.g., Barg, 2019; Cano, 2021; Crosnoe, 2001; Hill et al., 2004; Kelly, 2004; Kohl et al., 2000; Roksa & Potter, 2011; Rätty et al., 2009; Wang et al., 2016). This disparity has been attributed to class-related resources and barriers that either facilitate or hinder participation (e.g., Camacho-Thompson et al., 2016; Lareau, 1987; Malone, 2017). Parents with higher socioeconomic status not only possess better economic resources to support their children's learning but are also often more motivated to use these resources as they tend to hold the education system in higher regard compared to lower-SES parents, who may not see the value of education similarly (e.g., Tessema et al., 2022). Yet, prior research has also shown that the association between parents' socioeconomic background and parental involvement may vary depending on the type of parental involvement (e.g., Park & Holloway, 2017; Shumow & Miller, 2001; Sui-Chu & Willms, 1996). For instance, in a study by Sui-Chu and Willms (1996), parental SES was positively associated with parental involvement at the school level when involvement was measured with dimensions focusing on parental volunteering at school and attendance at parental-teacher-organizations meetings. However, when involvement was defined with other dimensions (i.e. home discussion and supervision and communicating with school) the effects of SES on the school level involvement were less pronounced.

Studies have also shown that the efficacy of parental involvement may vary according to parents' socioeconomic class background (Tan et al., 2020). Scholars utilizing Bourdieu's (e.g., Bourdieu & Passeron, 1977) framework of cultural reproduction have suggested that parental involvement would be more effective for higher SES parents due to the cultural and social capital they possess (i.e. greater knowledge and experiences of the education system, social connections, etc.) (e.g., Lareau, 1987). However, the empirical evidence is mixed. Some studies confirm that parental involvement has a more substantial impact for children from upper SES backgrounds (e.g., McNeal, 2001), while others have reported contrary findings (e.g., Domina, 2005) or no SES-stratified

effects of involvement (e.g., [Sénéchal & Young, 2008](#)). Given these inconsistencies, our study aims to further explore whether the effects of parental involvement are consistent across different educational groups.

Parental involvement in the Finnish education system

Parental involvement has been promoted in many countries in various ways, with the aim of strengthening the partnership between schools and families to support students' success and well-being. These efforts often include strategies such as fostering open lines of communication between parents and educators, organizing parent-teacher conferences, encouraging participation in school governance and decision-making, providing resources for parents to support learning at home, and promoting engagement in extracurricular activities and school events ([Epstein, 2018](#)). In many countries, support for home-school cooperation is also enshrined in school legislation (e.g., in the US: increasing parental involvement was one of the target areas in the No Child Left Behind Act of 2001 and its successor, ESSA the Every Student Succeeds Act of 2015; similarly in the UK: Every Child Matters 2003) ([Avvisati et al., 2010](#); [Pomerantz et al., 2007](#); [Park et al., 2017](#)).

Also, in Finland, collaboration between school and home has been considered essential and described both in the educational legislation (i. e. [Basic Education Act, 1998](#)) and the National Core Curriculum ([Finnish National Board of Education, 2014](#)). In the National Core Curriculum, collaboration between school and home is described as part of the school's educational culture. A well-functioning cooperative relationship between school and home is seen to be beneficial, both for the individual student and for the whole school community. Finnish parents have been shown to emphasize the idea of partnership in their relationship with the school and with their children's teacher: teachers are thought to carry the pedagogical responsibility for the child's learning whereas the parents' role has been to support that and bear their responsibility for the child's rearing ([Böök & Perälä-Littunen, 2015](#)). The teaching profession has a strong tradition of respect in Finland, and teachers are highly educated and have high autonomy in their work ([Carlo et al., 2013](#); [Tirri, 2014](#)). This respect is also reflected in the relationship between schools and families; prior studies have shown that Finnish parents have high trust in the school institution and teachers ([Levinthal et al., 2021](#); [Wallenius et al., 2021](#)). In international comparison, Finnish parents have been shown to be less demanding for teachers than parents in other countries ([Niemi et al., 2018](#)), though this culture may be changing also in Finland ([Carlo et al., 2013](#)).

Trust in teachers and the school institution is also visible in the assessment practices of both the educational system and individual students. No national-level high-stakes standardized tests have been implemented within the Finnish basic education system and teachers are responsible for giving grades to students according to the guidelines described in the National Core Curriculum ([Pitkänen, 2023](#); [Pulkkinen & Rautapuro, 2022](#)). Given this foundational trust, the Finnish education system provides a fascinating context for studying the effects of parental involvement on children's achievement. Since children's grades are not determined by standardized tests, we have a unique opportunity to examine teacher biases in assessing the impact of parental involvement. Furthermore, this setup allows us to investigate whether parental involvement truly enhances students' performance or primarily influences how teachers perceive and evaluate them.

Prior research on teachers' expectations has shown that teachers' expectations and perceptions may be influenced by a range of socio-demographic factors, including the child's social background (e.g., [Riegle-Crumb & Humphries, 2012](#); [Wang et al., 2018](#)). In our previous investigation (*Anonymized for peer review*), we observed that teachers' perceptions of children's academic schoolwork skills were influenced by the children's socio-economic background. Teachers perceived children with highly educated mothers more favorably in terms of schoolwork skills, even when test achievement was controlled. We interpreted our findings in alignment with research on the role of cultural capital in

educational attainment: children from more educated families often possess higher levels of cultural capital, which teachers may interpret as signs of academic ability, consequently rewarding these children with higher grades ([Bourdieu & Passeron, 1977](#); [Leopold & Shavit, 2013](#)). Therefore, the analytical approach of the current study is particularly significant as it enables us to explore whether parental involvement plays a role in this process and whether it affects how teachers perceive and evaluate students.

Basic education in Finland starts the year a child turns seven and consists of nine years of comprehensive school, covering primary school (grades one to six) and lower secondary school (grades seven to nine) ([Ministry of Education and Culture, 2022](#)). Most of the schools are publicly funded and supervised by municipalities and follow the guidelines of the National Core Curriculum ([Thrupp et al., 2023](#)). After comprehensive school, education continues in secondary education (academic and vocational tracks), which takes 3–4 years to complete. A key characteristic of the Finnish education system is its strong commitment to educational equity and universal access to the basic education (e.g., [Kupiainen et al., 2009](#)). The Finnish education system is primarily funded by the government, ensuring that education is free at all levels, from pre-primary to higher education (e.g., [Thrupp et al., 2023](#)). Tax-based, centralized funding model supports the principle of equality by providing consistent financial resources across the country (e.g., [Sahlberg, 2007](#); [Väljjarvi, 2003](#)). Free basic education in Finland also includes free educational materials, a warm school lunch, health-care services, and, when needed, transportation to school ([Väljjarvi, 2003](#)). The system is designed to provide high-quality education to all students, regardless of their socio-economic background, gender, place of residence, race, or ethnicity, ensuring that educational opportunities are equally distributed (e.g., [Thrupp et al., 2023](#)).

2. Present study

In the present study, we investigate how parental involvement evolves over time, its association with children's academic outcomes, and whether these relationships vary across different educational groups. Our focus is on the parental participation type of involvement, which has been at the core of the measures of parental involvement ([Li et al., 2023](#)). Building upon the gaps identified in prior research, this study is driven by three major goals. First, we explore the overall changes in parental involvement during the school years, a topic that has been relatively under-examined due to the dominance of cross-sectional studies in the field. Second, recognizing that previous research has shown that parental involvement impacts achievement differently depending on the outcome measures used (e.g., [Fan & Chen, 2001](#); [Jeynes, 2003](#)), we investigate the effects of involvement on both children's reading comprehension skills and GPA. Given the unique country context of our study (see chapter 1.5), this analysis allows us to examine the potential teacher bias in the effects of involvement and to investigate whether parental involvement truly enhances student achievement or primarily influences how teachers perceive children. Third, in line with studies (e.g., [Tan et al., 2020](#)) indicating that parental involvement is affected by social class, we examine its association with achievement across different educational groups

Our detailed research questions and hypotheses are:

RQ1. How does parental involvement change over time and are there differences in the amount of parental involvement between educational groups?

H1. Based on prior research (e.g., [Park & Holloway, 2017](#)), we expect to detect a decline in the magnitude of parental involvement over the years. In addition, we expect that the magnitude of involvement would be higher in groups with higher education levels ([Roksa & Potter, 2011](#); [Wang et al., 2016](#)).

RQ2. How does parental involvement predict children's GPA and reading comprehension skills?

H2. We expect that parental involvement will predict both GPA and

reading comprehension skills. However, due to the mixed findings in prior research (e.g., Fan & Chen, 2001; Jeynes, 2003), we do not establish a hypothesis regarding whether the effect of involvement will be stronger for one outcome over the other. Additionally, to detect potential teacher bias, we hypothesize that parental involvement might more strongly influence GPA than reading comprehension. However, we do not set a hypothesis for this and therefore leave it open for exploratory analysis.

RQ3. Does the relationship between parental involvement and achievement differ between educational groups?

H3. Given the contradictory results from previous studies (e.g., Domina, 2005 vs. McNeal, 2001), we opted not to formulate a hypothesis for this research question. Nevertheless, if parental involvement were to act as an equalizer, we would expect its effects to be most pronounced among those with the lowest levels of parental education. However, at this point, we decided to leave this aspect for exploratory analysis.

3. Methods

Data collection and participants

The data (N = 2934) consisted of two longitudinal learning-to-learn assessments collected within two large municipalities in the Southern of Finland by the Centre for Educational Assessment at the University of Helsinki (for a detailed description of the data collection see, *Anonymized for peer review*). For the purpose of the present study, data collection consisted of two measurement points in which children's reading comprehension skills were assessed (years 2010 and 2013). Additionally, questionnaires were administered to parents at both measurement points to gather background information on the families and their involvement in their child's schoolwork. Teachers also provided information on children's academic performance (GPA) at each measurement point.

In the first municipality, data collection was part of a broader nine-year longitudinal study involving a representative random sample from 16 schools. The study initially included all first graders (n = 744) in these schools. By the beginning of fourth grade, when the first measurement round relevant to this study was conducted in August–September 2010, the sample size had increased to 1038. This expansion was due to some students changing classes or schools, with the follow-up subsequently extended to include their new classmates as well. In the second municipality, data collection was similarly part of a larger project, encompassing the entire age cohort of third graders (n = 2096). This data was gathered at the end of the third grade during April and May of 2010. Due to the data being collected in two different municipalities and at slightly different time points, the municipality was controlled as a covariate in all analyses. The second round of the data collection took place in April 2016 when children in both municipalities were in the sixth grade.

As on any school day, at the time of the assessment, 5–10 % of the students were absent from most classes due to sickness or other personal reasons. In the first municipality, of all the targeted 1038 students, 950 were present on the day of data collection (52 % girls; mean age M = 10.22 years, SD = 0.33), and in the second municipality, 1984 of 2096 were present for the data collection (48 % girls; mean age M = 9.75 years, SD = 0.43). Sample sizes varied slightly across different years and variables. For instance, reading comprehension test score was available for 2768 students in the first measurement point and for 2863 students in the second measurement point. For both years, reading comprehension test score was available for 2431 students. Data from parent's questionnaire was available for 2338 students in the first measurement point and for 2378 students in the second measurement point. For both years, parental data was available for 1803 students. Missing data was taken into account in the analyses using Mplus's default technique for handling missing values, namely Full-Information Maximum Likelihood

(FIML).

Throughout the whole study, ethical standards described by the Finnish Advisory Board on Research Integrity (see, TENK, 2012) were met. Educational authorities of the municipalities reviewed the proposal of the study and gave permission for data collection. Families were informed about the study and participation was voluntary.

Measures

Parental involvement was collected from parents and measured with a scale assessing parent's participation and activity in school-home collaboration (i.e., "I actively participate in my child's school activities, such as excursions, parties, and school fairs", "I actively participate in my child's parent-teacher meetings", "I actively participate in parents' evenings at my child's school"). All items were answered with a seven-point Likert scale in which one meant not true at all and seven for very true.

Children's achievement outcomes were measured by their reading comprehension test score and Grade-Point-Average (GPA). The reading comprehension test that was used in the assessment was based on the theoretical framework of Kintsch and van Dijk (1978). Students were asked to read a one-page text and then assess 16 statements based on the text. GPA was collected from teachers at the beginning of the assessment. Since students had not yet received traditional letter grades or numerical scores at this stage of their schooling, teachers were asked to evaluate each student's current performance in math, science, and foreign languages using school grades ranging from 4 (failed) to 10 (excellent).

Covariates that were used in the analyses were gender, mother's educational level¹ (collected from parents and grouped into four categories: primary education; secondary education; lower academic i.e. postsecondary education or bachelor's degree; upper academic i.e. Master's degree or higher), and municipality. In addition, the variable 'discussion with parents' was included as a control in the models to distinguish the effects of involvement from other parental influences related to home-school interaction.² This variable was collected from children in both measurement points with a seven-point Likert scale statement (i.e., "I discuss things related to my schoolwork with my parents") in which one stood for not true at all and seven for very true.

Data analysis

The data were analyzed with structural equation modeling (SEM) performed with the Mplus statistical program version 8.6 (Muthén & Muthén, 2018). First, the measurement invariance of latent parental involvement factors was examined both over time and between groups by hierarchically imposing restrictions on the model parameters and then comparing fit indices of different models (Widaman et al., 2010). Measurement invariance testing included restricting factor loadings to be equal (i.e. metric invariance) and intercepts of the latent factors to be equal (i.e. scalar invariance) first over time and then between groups. The cutoff criteria for determining whether the model deteriorated or not were adapted from suggestions by Chen (2007). For measurement

¹ Mother's education level was chosen as a measure for parental education as prior studies have shown that mother's are usually those who carry the main responsibility of their children's schooling (e.g., Rätty et al., 2009).

² Due to the secondary nature of our research, our data set did not enable us to investigate all the aspects of the multidimensional parental involvement construct. However, our data included children's assessment of how much they talk with their guardians about their schooling. By using this variable as a control variable in our model, we were able to control its effects on achievement and thereby to distinguish the effects of general participation at home (such as discussing schoolwork with a child) from participation that focuses more on home-school interactions.

Table 1
Measurement invariance of latent factors over time and between groups.

Model	Hypothesis	χ^2	df	CFI	RMSEA	SRMR
Parental involvement (invariance over time)						
Mi1	Configural invariance	2.359	6	1.00	.000	.005
Mi2	Metric invariance	14.008	8	.998	.016	.025
Mi3	Scalar invariance	30.000	10	.993	.026	.034
Parental involvement (invariance between educational groups)						
Mi4	Configural invariance	33.489	24	.996	.024	.024
Mi5	Metric invariance	45.355	36	.996	.019	.048
Mi6	Scalar invariance	56.247	48	.996	.016	.051

invariance over time, the cut-off criteria for equal sample sizes were used. Therefore, for metric invariance a change of less than 0.010 in CFI combined with a change of less than 0.015 in RMSEA or 0.030 in SRMR were considered acceptable. For scalar invariance, the change of CFI must be less than 0.010 combined with a change of less than 0.015 in RMSEA or 0.010 in SRMR (Chen, 2007). For group comparisons, cut-off criteria for unequal sample sizes were adopted. For metric invariance, a change of less than 0.005 in CFI combined with a change of less than 0.010 in RMSEA or 0.025 in SRMR are acceptable. For scalar invariance, the change of CFI must be less than 0.005 combined with a change of less than 0.010 in RMSEA and 0.005 in SRMR. As can be seen from Table 1, a sufficient level of measurement invariance was achieved both over time and across educational groups.

After the measurement invariance of latent factors had been investigated, the analyses proceeded so that first the overall relationships with parental involvement and achievement were estimated with cross-lagged panel models with two time points. To understand the effect of involvement on different types of achievement outcomes, the models were built in stages. First, we examined the effect of involvement on a child's reading comprehension skills and second after that, on GPA. Finally, we combined these models.

The student's gender, municipality, mother's education, and discussion with parents were included as covariates in all the models. To take into account the nested data structure (i.e. students' nested into classes³), type complex option with class id as a cluster were utilized (see Muthén & Muthén, 2018; Little, 2013). Due to the skewness and kurtosis of some of the items of the dependent variables, a maximum likelihood estimator with robust standard errors (MLR) was used as an estimator in the analyses. A simplified illustration of the analysis model is presented in Fig. 2, and more detailed systems of equations for the models are provided in the Appendix.

For examining differences in parental involvement between educational groups, multiple group option in Mplus was used (see Muthén & Muthén, 2018; Little, 2013). For comparing the mean differences in parental involvement, reading comprehension skills, and GPA between different educational groups, confidence intervals for the estimates were produced by bootstrapping models with 1000 replicates (Wright et al., 2011).

4. Results

Descriptive statistics and correlations between the variables are shown in Table 2.⁴ We can see that involvement in both fourth grade (T1) and sixth (grade) are correlated with both achievement measures at both time points; involvement at both time points are also highly

³ The intraclass correlation coefficients (ICCs) for the reading comprehension test scores were .149 at the first measurement point in fourth grade and .116 at the second measurement point in sixth grade.

⁴ Possible signs of multicollinearity among the independent variables were examined through the correlation table, and no significant indications were found.

correlated with each other. In addition, maternal education is correlated with involvement at both time points as well as both achievement measures at both time points.

All the analyzed models fit the data well (see Table 3).⁵ Overall, as we expected, parental involvement decreased slightly over time (the relative change of parental involvement at time point two compared to time point one as a reference being fixed to zero, was $\Delta M = -.124$, $p < .000$).

Following our expectations, parental involvement was associated with the level of parental education i.e. involvement was higher in groups of parents with higher levels of education (see Table 4 and Fig. 1). Based on multiple group comparisons by mother's educational level we could see that mothers with a lower education level were less involved in their children's education than more educated mothers. All the differences between education groups were significant, except for mothers with lower and upper academic degrees, who did not differ from each other in the magnitude of their involvement at either of the time points. In addition, the group comparisons showed that even though the magnitude of parental involvement seemed to decrease over the years when it was examined with the entire data, the decrease was statistically significant only in one education group, namely mothers with secondary education.

Also regarding our second research question, the results were in line with our expectations. Parental involvement predicted higher reading comprehension skills and GPA when the outcomes were measured separately (see Models 1 and 2 in Table 5). However, in a combined final model, involvement was significantly associated with GPA but not with children's reading comprehension skills indicating an overlap between these two achievement outcomes (see Fig. 2 and Model 3 in Table 5).

Regarding our third research question, the multiple group analyses revealed that the association between parental involvement and achievement differed slightly across educational groups (see Fig. 3 and Table 6). Parental involvement was significantly associated with achievement only in the two middle education groups. More specifically, in a model with reading comprehension score as an outcome the association was significant in the secondary education and lower academic degree groups; in a model with GPA as well in a model with both achievement outcomes, the association was significant in the secondary education group whereas in the lowest and highest educational groups the associations between parental involvement and achievement were non-significant.

5. Discussion

Many educational initiatives and programs have sought to promote collaboration between schools and homes and to encourage parental involvement (e.g., Berger, 1991; Desimone, 1999). Parental involvement has been seen as a means of reducing socioeconomic achievement gaps in schools and has been shown to positively affect students' educational attainment (e.g., Fan & Chen, 2001; Kim, 2022). In this study, we examined the relationship between parental involvement and children's performance in the Finnish context. Despite a vast number of studies focusing on the effects of parental involvement, the majority of previous studies have been carried out in Anglo-Saxon countries with cross-sectional data. A major strength of our study was, therefore, the longitudinal data collected from the Finnish context, which made it possible to explore three main objectives. The longitudinal data set enabled us to investigate change in parental involvement across time, which was the first research question of our study. Furthermore, the longitudinal design allowed us to explore the relationships between parental involvement and achievement outcomes in greater depth than cross-sectional studies, addressing our second research question. In

⁵ In order to obtain a sufficient model fit, residual correlations between same items in different time points were allowed for parental involvement items.

Table 2
Descriptive statistics and correlations among variables.

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Involvement T1	1										
2. Reading T1	.07	1									
3. GPA 1	.24	.16	1								
4. Discussion T1	.03	−.04	−.02	1							
5. Involvement T2	.69	.05	.19	.01	1						
6. Reading T2	.11	.25	.27	.00	.12	1					
7. GPA T2	.25	.16	.30	−.01	.25	.36	1				
8. Discussion T2	.07	.01	.01	.31	.08	−.03	.04	1			
9. Municipality	.01	−.03	−.01	−.08	.01	−.13	−.04	−.07	1		
10. Gender	−.02	.05	.06	.07	−.02	.06	.15	.05	-	1	
11. Mother's education	.19	.14	.30	−.01	.19	.21	.32	−.01	-	-	1
M	5.56	5.39	8.13	4.89	5.42	6.29	7.99	4.93	-	-	-
SD	1.30	2.63	0.97	1.85	1.37	3.26	1.01	1.65	-	-	-
Range	1–7	0–15	4–10	1–7	1–7	0–16	4–10	1–7	-	-	-

Note. Statistically significant correlations ($p < .05$) are presented in bold.

Table 3
Goodness of Fit Statistics for different models.

Model		N	χ^2	df	p	CFI	TLI	RMSEA	SRMR
M1	Only reading	2907	148.249	41	.000	.971	.947	.030	.032
M2	Only GPA	2911	143.660	41	.000	.979	.961	0.29	.034
M3	Both reading and GPA	2912	160.540	49	.000	.980	.958	.028	.030
M4	Multiple group reading	2900	212.557	153	.000	.984	.973	.023	.040
M5	Multiple group GPA	2900	217.510	153	.000	.987	.978	.024	.041
M6	Multiple group both	2900	253.501	185	.000	.988	.976	.023	.037

Table 4
Confidence intervals of the means of different educational groups.

Variables	Means with confidence intervals	Mother's educational level			
		Basic education	Secondary education	Lower academic	Upper academic
Parental involvement 4th grade (T1)	CI low	−1075	−0296	−0075	0
	M	−0845	−0185	0033	0
	CI high	−0625	−0079	0151	0
Parental involvement 6th grade (T2)	CI low	−1053	−0466	−0178	−0185
	M	−0819	−0346	−0036	−0081
	CI high	−0634	−0225	0102	0019

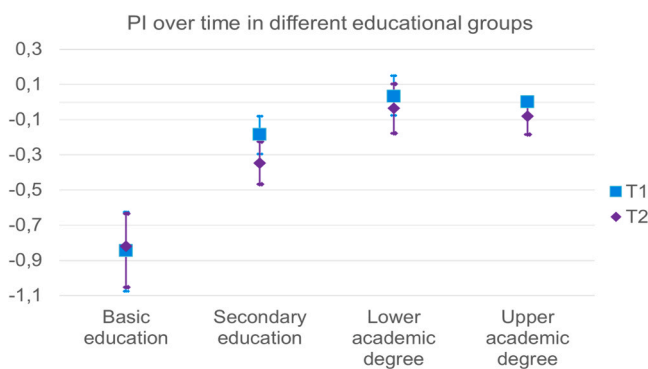


Fig. 1. PI in different educational groups in 4th grade (T1) and 6th grade (T2).

addition, our data allowed us to examine the relationship between parental involvement and two distinct achievement outcomes: GPA and reading comprehension skills. Since the data was collected in a context where teachers are highly autonomous in their grading practices (e.g. grading is not based on national standardized tests, e.g., Pitkänen, 2023), we had a unique opportunity to investigate teacher-bias in the effects of involvement. We could examine whether parental involvement is associated with students' achievement or primarily influences how teachers perceive and evaluate them. Thirdly, our data set gave us a

chance to explore differences in parental involvement across different educational groups. Regarding this, our aims were twofold. First, we were interested in the differences between educational groups in involvement magnitude. Secondly, we wanted to know whether the relationship between involvement and achievement differed between different educational groups.

Our findings showed that parents became less involved in their children's schooling over time. This finding aligns with what we could expect based on prior studies (e.g., Crosnoe, 2001; Park & Holloway, 2017), and logically, it makes sense. Parents may see that their participation in their children's schooling is more crucial during the first school years. When the child grows, participation may take different forms and the home-school type of participation (which was the focus of this research) may become less relevant. However, it is possible that other aspects of involvement replace this (Catsambis & Garland, 1997), with the overall level of involvement remaining constant. While we could not address this with our data, this is an area for future research.

Also regarding our second research question, our study confirmed the findings of prior studies (e.g., Wilder, 2014; Kim, 2022) and showed a positive relationship between parental involvement and achievement outcomes. Parental involvement predicted both the child's reading comprehension skills and GPA when the outcomes were measured separately. However, in a combined final model, the association of involvement was significant only in relation to the child's GPA. Closely resembling the findings of our study are the results of Shumow and

Table 5
Standardized model estimates in different models.

Model	Variable/Time point	Involvement T2			Reading T2			GPA T2			Discussion T2		
		β	S.E.	p	β	S.E.	p	β	S.E.	p	β	S.E.	p
M1	Involvement T1	.68	.03	.000	.06	.02	.005	-	-	-	.06	.02	.000
	Reading T1	-.00	.02	.874	.21	.02	.000	-	-	-	.02	.02	.341
	Discussion T1	-.02	.02	.390	-.01	.02	.561	-	-	-	.30	.02	.000
	Municipality	-.02	.04	.690	-.27	.02	.000	-	-	-	.17	.05	.001
	Gender	-.04	.03	.227	.10	.04	.011	-	-	-	.14	.04	.000
	Mother's Education	.06	.02	.005	.16	.02	.000	-	-	-	-.01	.02	.542
M2	Involvement T1	.68	.03	.000	-	-	-	.06	.02	.000	.06	.02	.012
	GPA T1	.00	.01	.855	-	-	-	.69	.01	.000	.01	.02	.789
	Discussion T1	-.02	.02	.324	-	-	-	-.01	.01	.32	.30	.02	.000
	Municipality	-.03	.05	.559	-	-	-	-.05	.06	.303	-.10	.051	.048
	Gender	-.04	.04	.319	-	-	-	.21	.03	.000	.06	.04	.139
	Mother's Education	.05	.02	.031	-	-	-	.11	.02	.000	-.02	.02	.336
M3	Involvement T1	.68	.03	.000	.02	.02	.311	.05	.02	.000	.06	.02	.002
	Reading T1	-.00	.02	.808	.19	.02	.000	.02	.02	.139	.02	.02	.362
	GPA T1	.00	.01	.807	.23	.02	.000	.69	.01	.000	.00	.02	.856
	Discussion T1	-.02	.02	.325	-.00	.02	.795	-.01	.02	.389	.30	.02	.000
	Municipality	-.03	.05	.571	-.26	.06	.000	-.06	.06	.318	-.10	.05	.047
	Gender	-.04	.04	.315	.07	.04	.045	.21	.03	.000	.06	.04	.151
Mother's Education	.05	.02	.030	.11	.02	.000	0.11	.02	.000	-.02	.02	.286	

Note. Standardized model estimates presented in the Table are based on STDYX-standardization in Mplus except for binary variables STDY-standardization is used

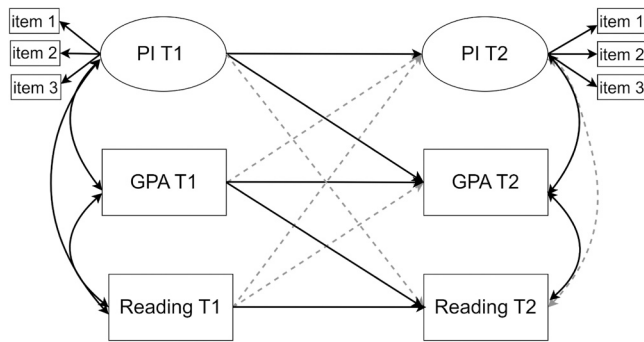


Fig. 2. Final model with both achievement outcomes (covariates are not illustrated in the figure). Note. Statistically significant paths are visualized with solid black lines, non-significant paths with dashed grey lines. For visualization purposes, covariates (i.e. mother's education, gender, municipality, discussion with parents) are not depicted in the figure. The primary focus of our analyses is to examine the association between T1 parental involvement and T2 outcomes while controlling prior achievement in T1.

Miller's (2001) study, according to which parental involvement was associated positively with adolescents' academic grades but not with their achievement test scores. Several meta-analyses (e.g., Fan & Chen, 2001) have concluded that the relationship between parental involvement and students' achievement may differ depending on the outcome variables that have been used, but few studies have investigated multiple outcome variables simultaneously. Therefore, the findings of our study may offer some interesting insights related to this. Our findings indicate an overlap between the examined outcome variables but they may also suggest that parental involvement may not have a substantial direct impact on children's achievement but rather that it influences how teachers perceive and evaluate the performance of the child. In other words, teachers might reward children with actively participating parents with higher grades. This finding is highly interesting as it suggests that parental involvement may play a role in the reproduction of capitals through education, potentially benefiting middle-class children (Bourdieu & Passeron, 1977; Leopold & Shavit, 2013). Previous research (e.g., Wang et al., 2018) indicates that children's social background may shape teachers' expectations and perceptions, which, in turn, can influence children's academic achievements and self-perceptions. Studies on teacher expectations have further demonstrated that these

expectations can act as a self-fulfilling prophecy, manifesting in the children's behavior and attitudes (Weinstein, 2002; Jussim et al., 2009). In the context of social inequalities in educational transitions, the influence of teachers and their potentially biased evaluations of children has been termed a tertiary effect (Barg, 2013; Esser, 2016), in addition to the primary and secondary effects of social origin identified by Boudon (1974). In Finland, while teachers do not make direct recommendations on children's educational transitions, teacher-given grades are crucial determinants of educational transitions, particularly at the end of ninth grade and, in some cases, at the end of sixth grade. Thus, our results suggest that parental involvement may inadvertently contribute to educational inequalities by influencing teachers' grading practices, which could have long-term effects on students' educational paths.

Our third research objective was to investigate the differences between educational groups in the magnitude of parental involvement and in the relationship between parental involvement and achievement. As anticipated based on prior studies (e.g., Wang et al., 2016), the magnitude of involvement was related to parental SES, with higher levels of involvement observed among groups of highly educated mothers. However, our results did not provide strong evidence for SES-stratified involvement effects as described by Tan et al. (2020). The association between involvement and children's educational outcomes was relatively similar across all educational groups but was slightly stronger and statistically significant in the middle groups (i.e., mothers with secondary education and lower academic degrees for a model with only reading as an outcome, and mothers with secondary education for models with only GPA and for both outcomes simultaneously in the model). However, it is possible that the association between involvement and outcomes might have been significant in high-SES groups, but due to ceiling effects in the involvement scale, it did not become apparent. Even so, it is clear that our results do not support the conclusion (e.g., McNeal, 2001) that higher SES children would benefit more from parental involvement (at least not directly, but potentially indirectly through teacher bias, as discussed above). Neither did our results support the findings of Domina (2005) according to which low-SES parents' involvement has more favorable influence on their children's outcomes than the involvement of higher-SES parents. While our results showed, that association between involvement and outcomes was slightly stronger in middle educational groups, suggesting that involvement could act as an equalizer of socio-economic differences within the Finnish educational system, this argument is not robust given that the effect was not significant in the lowest educational group.

Even though in general, the setting of our research with a

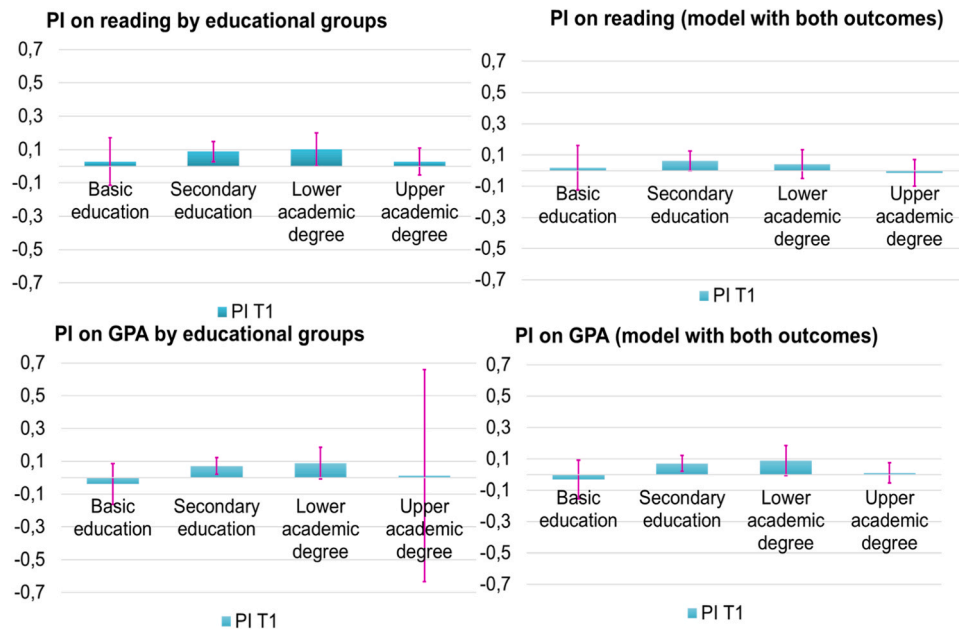


Fig. 3. Standardized regression coefficients in models with only one outcome (left side) and with both outcomes (right side).

longitudinal approach was quite strong, our study also included some limitations which should be taken into account. The most important limitation concerns the measures we used for parental involvement. In the present study, involvement was measured only with a narrow scale focusing on parental participation in activities at school. While prior studies have shown this aspect of involvement to be a significant component of the broader parental involvement construct (Li et al., 2023), and we viewed it as particularly relevant for describing parental involvement in the Finnish context (Räty et al., 2009), it only captures a limited facet of what is, in reality, a multidimensional construct (e.g., Fan & Williams, 2010). As Jeynes, (2010); (2011) suggests, parental involvement also includes more subtle, home-based forms that can be particularly influential for children's development. These forms of involvement, such as family expectations, encouragement, and at-home learning activities, are not covered by the present study's data. This is especially relevant given research (e.g., Day & Dotterer, 2018; Jeynes, 2011) suggesting that if these subtle forms of involvement are not considered, the effects of parental involvement may be underestimated among ethnically diverse groups and those from low-SES backgrounds. In this regard, our reliance on school-focused measures may not fully capture the ways in which parental involvement operates across diverse socio-economic and cultural contexts.

Additionally, our study had the advantage of examining involvement in relation to both GPA and children's reading comprehension skills, which adds depth to our findings. However, some limitations should be considered regarding these outcome variables. While GPA is a widely used indicator of academic achievement, it may not be entirely comparable across different schools and classes due to variations in grading practices and teacher expectations (e.g., Sahlberg, 2007). Therefore, future studies should simultaneously utilize information from standardized tests, which unfortunately were not available in our data due to the Finnish context, where such tests are not applied at the basic education level. In terms of reading comprehension, the test which was used in assessing children's reading comprehension skills was not a high-stakes test (i.e. children knew that the test did not influence their grades). Because of this, it is possible that all children did not exert their maximum effort in the task. Therefore, future studies should elaborate on these findings and validate them using high-stakes achievement tests.

As is often the case with regression models, our study also faces the possibility that external variables, not included in our analyses, could

influence the results. While our longitudinal design and analytical choices mitigate some of these concerns, the possibility of endogeneity cannot be fully excluded. Specifically, unmeasured background factors may simultaneously influence both parental involvement and academic outcomes, which could bias the observed relationships. Therefore, future studies should aim to address these limitations by incorporating additional measures that capture potential unmeasured factors and explore the possibility of using (quasi-)experimental methods where parental involvement is exogenously influenced.

While the Finnish context offers an opportunity to explore the effects of parental involvement within an egalitarian educational setting, it also presents challenges for generalizing these results to other countries with different systems. A defining characteristic of the Finnish education system is its strong commitment to educational equity, demonstrated by centralized government funding that ensures consistent resources nationwide, resulting in minimal differences between schools compared to other countries (e.g., Ahonen, 2021). In contrast, much of the research on parental involvement has been conducted in countries like the United States, where educational disparities between schools and areas often arise from funding models based on local property taxes, creating significant gaps between affluent and low-income communities (Itkonen & Jahnukainen, 2007). These contextual differences shape the forms that parental involvement may take in each setting. In Finland, the commitment to educational equity, combined with the strong cultural trust in the education system and teachers (e.g., Levinthal et al., 2021; Sahlberg, 2007), may reduce the need for parents to supplement their child's education with additional resources, as the school system provides a robust and consistent foundation for all students. Additionally, this trust may influence the nature of parental involvement, making it more supportive and indirect compared to countries where educational disparities prompt parents to play a more active role in their child's schooling.

Putting together the main findings of our study, we argue that seeing involvement as one of the most efficient tools for parents to influence their children's educational outcomes (see Li et al., 2022) is an exaggeration. Even though parental involvement was a statistically significant predictor of children's achievement outcomes, overall its effect was quite weak. Therefore, the findings of our study align with those from critical studies (e.g., Domina, 2005; White et al., 1992) that challenge the wide-ranging positive effects of parental involvement, questioning

Table 6
Standardized model estimates in different educational groups.

Model	Variable/Time	Involvement T2			Reading T2			GPA T2			Discussion T2				
		β	S.E.	p	β	S.E.	p	β	S.E.	p	β	S.E.	p		
4	Basic education	Involvement T1	.68	.09	.000	.03	.07	.696	-	-	-	.10	.08	.226	
		Reading T1	.05	.07	.439	.05	.07	.501	-	-	-	.06	.06	.351	
		Discussion T1	.01	.06	.855	-.03	.07	.606	-	-	-	.30	.06	.000	
	Secondary education	Municipality	-.18	.13	.188	-.01	.14	.950	-	-	-	-.21	.13	.088	
		Gender	.01	.05	.844	.01	.06	.926	-	-	-	.03	.05	.567	
		Involvement T1	.70	.03	.000	.09	.03	.005	-	-	-	.03	.03	.294	
	Lower academic degree	Reading T1	-.01	.03	.786	.19	.03	.000	-	-	-	.06	.03	.053	
		Discussion T1	-.01	.03	.620	.03	.03	.217	-	-	-	.26	.03	.000	
		Municipality	.06	.06	.363	-.13	.07	.039	-	-	-	-.06	.06	0.318	
	Upper academic degree	Gender	-.03	.03	.280	.04	.03	.177	-	-	-	.00	0.03	0.957	
		Involvement T1	.66	.07	.000	.10	.05	.048	-	-	-	.13	.06	.026	
		Reading T1	.05	.05	.278	.21	.05	.000	-	-	-	-.01	.05	.922	
	5	Basic education	Discussion T1	-.06	.05	.253	-.01	.05	.919	-	-	-	.33	.05	.000
			Municipality	-.20	.10	.047	-.34	.11	.002	-	-	-	-.11	.10	.260
			Gender	-.03	.05	.618	.05	.05	.287	-	-	-	.06	.05	.164
Secondary education		Involvement T1	.57	.06	.000	.03	.04	.498	-	-	-	.01	.05	.871	
		Reading T1	-.05	.05	.246	.29	.04	.000	-	-	-	-.06	.04	.174	
		Discussion T1	-.01	.05	.779	-.07	.04	.092	-	-	-	.35	.04	.000	
Lower academic degree		Municipality	.03	.09	.78	-.44	.08	.000	-	-	-	-.13	.08	.101	
		Gender	-.03	.04	.447	.06	.04	.152	-	-	-	.06	.04	.143	
		Involvement T1	.69	.08	.000	-	-	-	-.04	.06	.551	.10	.08	.234	
Upper academic degree		GPA T1	-.03	.04	.481	-	-	-	.64	.04	.000	.00	.07	.967	
		Discussion T1	.04	.07	.529	-	-	-	.02	.05	.729	.30	.06	.000	
		Municipality	-.08	.16	.642	-	-	-	.03	.11	.750	-.19	.12	.121	
Secondary education		Gender	.05	.06	.380	-	-	-	.21	.04	.000	.03	.05	.538	
		Involvement T1	.69	.03	.000	-	-	-	.07	.03	.006	.04	.03	.256	
		GPA T1	.05	.03	.108	-	-	-	.70	.02	.000	.02	.03	.546	
Lower academic degree	Discussion T1	-.01	.03	.658	-	-	-	-.02	.02	.385	.26	.03	.000		
	Municipality	.06	.06	.307	-	-	-	.01	.05	.832	-.06	.06	.338		
	Gender	-.03	.03	.324	-	-	-	.13	.02	.000	.01	.03	.897		
Upper academic degree	Involvement T1	.65	.07	.000	-	-	-	.09	.05	.071	.13	.06	.039		
	GPA T1	-.02	.04	.590	-	-	-	.68	.03	.000	.06	.05	.210		
	Discussion T1	-.06	.05	.244	-	-	-	.00	.04	.999	.32	.05	.000		
6	Basic education	Municipality	-.20	.10	.046	-	-	-	-.06	.08	.463	-.19	.10	.055	
		Gender	-.02	.02	.762	-	-	-	.07	.04	.059	.02	.05	.719	
		Involvement T1	.57	.06	.000	-	-	-	.01	.03	.679	.01	.05	.799	
	Secondary education	GPA T1	.00	.05	.933	-	-	-	.76	.03	.000	-.05	.04	.244	
		Discussion T1	.01	.05	.908	-	-	-	.02	.03	.544	.35	.04	.000	
		Municipality	.03	.09	.725	-	-	-	-.20	.06	.000	-.13	.08	.118	
	Lower academic degree	Gender	-.03	.04	.480	-	-	-	.05	.03	.081	.06	.04	.118	
		Involvement T1	.69	.08	.000	.02	.07	.808	-.03	.06	.639	.10	.08	.243	
		Reading T1	.08	.07	.271	.06	.07	.386	-.01	.05	.833	.06	.06	.340	
	Upper academic degree	GPA T1	-.05	.05	.301	.13	.06	.029	.63	.04	.000	.00	.07	.982	
		Discussion T1	.04	.07	.565	-.02	.07	.778	.01	.05	.799	.31	.06	.000	
		Municipality	-.10	.16	.529	-.04	.14	.753	.05	.11	.675	-.21	.12	.094	
	Secondary education	Gender	.05	.06	.409	.01	.06	.917	.21	.04	.000	-.03	.06	.957	
		Involvement T1	.69	.03	.000	.06	.03	.048	.07	.03	.006	.03	.03	.313	
		Reading T1	-.01	.03	.653	.17	.03	.000	.01	.02	.780	.05	.03	.064	
Lower academic degree	GPA T1	.05	.03	.103	.19	.03	.000	.70	.02	.000	.01	.03	.704		
	Discussion T1	-.01	.03	.675	.05	.03	.100	-.02	.02	.411	.26	.03	.000		
	Municipality	.06	.06	.188	-.11	.06	.091	.01	.05	.263	-.06	.06	.344		
Upper academic degree	Gender	-.03	.03	.319	.03	.03	.243	.13	.02	.000	.00	.03	.977		
	Involvement T1	.66	.07	.000	.04	.05	.358	.09	.05	.065	.13	.06	.039		
	Reading T1	.06	.05	.230	.17	.05	.001	.07	.04	.054	-.01	.05	.802		
Basic education	GPA T1	-.03	.05	.540	.31	.04	.000	.68	.03	.000	.06	.05	.229		
	Discussion T1	-.06	.05	.258	-.02	.05	.637	.00	.04	.978	.32	.05	.000		
	Municipality	.20	.10	.045	-.32	.10	.002	-.06	.08	.450	-.11	.10	.272		
Secondary education	Gender	-.04	.05	.411	.04	.04	.345	.06	.04	.090	.06	.05	.169		
	Involvement T1	.57	.06	.000	-.02	.04	.716	.01	.03	.734	.01	.05	.792		
	Reading T1	-.05	.05	.265	.24	.04	.000	.02	.03	.580	-.05	.04	.218		
Lower academic degree	GPA T1	.01	.05	.925	.25	.04	.000	.76	.03	.000	-.04	.04	.408		
	Discussion T1	-.01	.05	.873	-.05	.04	.189	.02	.03	.481	.35	.04	.000		
	Municipality	.02	.09	.523	-.43	.08	.000	-.20	.06	.000	-.14	.08	.097		
Upper academic degree	Gender	-.05	.05	.235	.02	.04	.523	.05	.03	.070	.06	.04	.128		

the prevailing notion that such involvement is a panacea for eliminating social disparities in schools and enhancing children’s learning outcomes. Furthermore, echoing the sentiments of Grolnick and Pomerantz (2022), our results underscore the need for more in-depth analyses and critical reflection both by researchers and policymakers to identify which forms

of involvement truly are beneficial. As Mapp et al. (2008) emphasize, it is essential to consider what types of efforts and outreach strategies might foster more meaningful parental engagement and promote students’ academic achievement. Understanding the specific approaches that effectively engage parents from various backgrounds could help to

maximize the positive impact of parental involvement in diverse educational contexts.

Additionally, our results challenge the assumption that increasing parental involvement would effectively equalize socioeconomic differences in educational performance, as the effect of involvement was relatively similar across educational groups. However, our results provided evidence for the potential teacher bias effect, suggesting that parental involvement may influence how teachers perceive and evaluate children's academic performance rather than directly impacting achievement. Given that these biases could contribute to educational inequalities and affect students' long-term educational trajectories, our findings highlight the urgent need for further research to investigate the role of parental involvement in shaping teacher perceptions and grading practices.

CRedit authorship contribution statement

Elina Kilpi-Jakonen: Writing – review & editing, Conceptualization. **Satu Koivuhovi:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Data curation. **Mari-Paullina Vainikainen:** Methodology, Data curation. **Jani Erola:** Writing – review &

editing, Conceptualization.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used Chat GPT and Grammarly for assistant with fluent academic writing (i.e. grammar and style check). After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Declaration of Competing Interest

Declaration of Interest Statement attached with submission entitled: Parental Involvement in Elementary Schools and Children's Academic Achievement: A Longitudinal Analysis Across Educational Groups in Finland

Neither the co-authors nor I have any personal or institutional conflicts of interest that could be construed as influencing the research presented in our manuscript.

Appendix: System of equations for the models

All the models were analysed with structural equation modeling (SEM) performed with the Mplus statistical program version 8.6 (Muthén & Muthén, 2018). SEM-model comprised of measurement model of parental involvement factors in two time points and a cross-lagged panel model, including measures from two time points (T1 and T2). With these cross-lagged panel-models we regressed a set of variables measured in Time 2 on a set of predictors measured in Time 1, while controlling for the stability of the all measures. Thus, we estimated to which degrees our grade-four-measures predict a change in the rank order of the grade-six-measures. To understand the effect of involvement on different types of achievement outcomes, the models were built in stages. First, we examined the effect of involvement on a child's reading comprehension skills and second after that, on GPA. Finally, we combined these models. The student's gender, municipality, mother's education, and discussion with parents were included as covariates in all the models. To examine differences between educational groups in parental involvement both in terms of magnitude and its strength in relation to outcomes, the multiple group option in Mplus was used. Here we present the systems of equations of these different models.

All the models include a measurement model of Parental Involvement (PI) factors

First, the measurement invariance of the factors was examined over time and between groups (see, [Widaman et al., 2010](#)). First, a configural model with no restrictions was established. After that, first factor loadings (λ) (metric invariance) and then intercepts of each item pairs were set equal between time points or groups. The cutoff criteria for determining whether the model deteriorated or not were adapted from suggestions by [Chen \(2007\)](#).

Below is the system of equation of the measurement model of parental involvement factors.

$$PI\ T1 = \lambda_1 \cdot item1T1 + \lambda_2 \cdot item2T1 + \lambda_3 \cdot item3T1 + \epsilon$$

$$PI\ T2 = \lambda_1 \cdot item1T2 + \lambda_2 \cdot item2T2 + \lambda_3 \cdot item3T2 + \epsilon$$

Model 1. Reading as an outcome

After measurement invariance testing three different models were run in stages. First model included reading comprehension and parental involvement in two time points as well as covariates (i.e., Discussion, ME = mother's education, Gender, Municipality). In the following equations, intercept terms are omitted for clarity.

$$Reading\ T1 = \beta_6 \cdot ME + \beta_7 \cdot Gender + \beta_8 \cdot Municipality + \epsilon$$

$$PI\ T1 = \beta_6 \cdot ME + \beta_7 \cdot Gender + \beta_8 \cdot Municipality + \epsilon$$

$$Discussion\ T1 = \beta_6 \cdot ME + \beta_7 \cdot Gender + \beta_8 \cdot Municipality + \epsilon$$

$$Y_{Reading\ T2} = \beta_1 \cdot Reading\ T1 + \beta_2 \cdot PI\ T1 + \beta_3 \cdot Discussion\ T1 + \beta_4 \cdot ME + \beta_5 \cdot Gender + \beta_6 \cdot Municipality + \epsilon$$

$$Y_{PI\ T2} = \beta_1 \cdot PI\ T1 + \beta_2 \cdot Reading\ T1 + \beta_3 \cdot Discussion\ T1 + \beta_4 \cdot ME + \beta_5 \cdot Gender + \beta_6 \cdot Municipality + \epsilon$$

$$Y_{Discussion\ T2} = \beta_1 \cdot Discussion\ T1 + \beta_2 \cdot Reading\ T1 + \beta_3 \cdot PI\ T1 + \beta_4 \cdot ME + \beta_5 \cdot Gender + \beta_6 \cdot Municipality + \epsilon$$

Model 2. GPA as an outcome

Second model included GPA and parental involvement in two time points as well as covariates (i.e., Discussion, ME = mother's education, Gender, Municipality). In the following equations, intercept terms are omitted for clarity.

$$\text{GPA T1} = \beta_6 \cdot \text{ME} + \beta_7 \cdot \text{Gender} + \beta_8 \cdot \text{Municipality} + \epsilon$$

$$\text{PI T1} = \beta_6 \cdot \text{ME} + \beta_7 \cdot \text{Gender} + \beta_8 \cdot \text{Municipality} + \epsilon$$

$$\text{Discussion T1} = \beta_6 \cdot \text{ME} + \beta_7 \cdot \text{Gender} + \beta_8 \cdot \text{Municipality} + \epsilon$$

$$Y_{\text{GPA T2}} = \beta_1 \cdot \text{GPA T1} + \beta_2 \cdot \text{PI T1} + \beta_3 \cdot \text{Discussion T1} + \beta_4 \cdot \text{ME} + \beta_5 \cdot \text{Gender} + \beta_6 \cdot \text{Municipality} + \epsilon$$

$$Y_{\text{PI T2}} = \beta_1 \cdot \text{PI T1} + \beta_2 \cdot \text{GPA T1} + \beta_3 \cdot \text{Discussion T1} + \beta_4 \cdot \text{ME} + \beta_5 \cdot \text{Gender} + \beta_6 \cdot \text{Municipality} + \epsilon$$

$$Y_{\text{Discussion T2}} = \beta_1 \cdot \text{Discussion T1} + \beta_2 \cdot \text{GPA T1} + \beta_3 \cdot \text{PI T1} + \beta_4 \cdot \text{ME} + \beta_5 \cdot \text{Gender} + \beta_6 \cdot \text{Municipality} + \epsilon$$

Model 3. Both reading and GPA as outcomes

Third model included reading, GPA and parental involvement in two time points as well as covariates (i.e., Discussion, ME = mother's education, Gender, Municipality). In the following equations, intercept terms are omitted for clarity.

$$\text{Reading T1} = \beta_6 \cdot \text{ME} + \beta_7 \cdot \text{Gender} + \beta_8 \cdot \text{Municipality} + \epsilon$$

$$\text{GPA T1} = \beta_6 \cdot \text{ME} + \beta_7 \cdot \text{Gender} + \beta_8 \cdot \text{Municipality} + \epsilon$$

$$\text{PI T1} = \beta_6 \cdot \text{ME} + \beta_7 \cdot \text{Gender} + \beta_8 \cdot \text{Municipality} + \epsilon$$

$$\text{Discussion T1} = \beta_6 \cdot \text{ME} + \beta_7 \cdot \text{Gender} + \beta_8 \cdot \text{Municipality} + \epsilon$$

$$Y_{\text{Reading T2}} = \beta_1 \cdot \text{Reading T1} + \beta_2 \cdot \text{PI T1} + \beta_3 \cdot \text{GPA T1} + \beta_4 \cdot \text{Discussion T1} + \beta_5 \cdot \text{ME} + \beta_6 \cdot \text{Gender} + \beta_6 \cdot \text{Municipality} + \epsilon$$

$$Y_{\text{GPA T2}} = \beta_1 \cdot \text{GPA T1} + \beta_2 \cdot \text{PI T1} + \beta_3 \cdot \text{Reading T1} + \beta_4 \cdot \text{Discussion T1} + \beta_5 \cdot \text{ME} + \beta_6 \cdot \text{Gender} + \beta_6 \cdot \text{Municipality} + \epsilon$$

$$Y_{\text{PI T2}} = \beta_1 \cdot \text{GPA T1} + \beta_2 \cdot \text{PI T1} + \beta_3 \cdot \text{Reading T1} + \beta_4 \cdot \text{Discussion T1} + \beta_5 \cdot \text{ME} + \beta_6 \cdot \text{Gender} + \beta_6 \cdot \text{Municipality} + \epsilon$$

$$Y_{\text{Discussion T2}} = \beta_1 \cdot \text{Discussion T1} + \beta_2 \cdot \text{PI T1} + \beta_3 \cdot \text{Reading T1} + \beta_4 \cdot \text{GPA T1} + \beta_5 \cdot \text{ME} + \beta_6 \cdot \text{Gender} + \beta_6 \cdot \text{Municipality} + \epsilon$$

Multiple group models

For comparing the mean differences in parental involvement, reading comprehension skills, and GPA between different educational groups, multiple group option in Mplus was utilised and confidence intervals for the estimates were produced by bootstrapping models with 1000 replicates (Wright et al., 2011). To examine differences in parental involvement between educational groups, the multiple group option in Mplus was utilized (see Muthén & Muthén, 2018; Little, 2013). Models 1–3 were run with all covariates included, while mother's education level served as the grouping variable.

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