## Towards a more holistic understanding of inequalities in childhood:

Horoz, Nil

2024

***DOI (link to publisher)***
10.5463/thesis.834

***document version***
Publisher's PDF, also known as Version of record

# Towards a More Holistic Understanding of Inequalities in Childhood:

## A Multi-Context Approach to Parental Education and Child Development

Nil Horoz

# Towards a More Holistic Understanding of Inequalities in Childhood:

## A Multi-Context Approach to Parental Education and Child Development

**Nil Horoz**

## Colofon

ISBN: 978-94-6506-446-8


Printing: Ridderprint, www.ridderprint.nl
Cover design: Nil Horoz
Layout and design: Anna Bleeker, persoonlijkproefschrift.nl

The studies in the present thesis were funded by The Netherlands Organization for Health Research and Development (ZonMw) (grant numbers 531003013, 26200002 and 120620029), by the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation program (grant numbers 646594 and 648082), by the Netherlands Organization for Scientific Research, program medium sized investments (grant number 480-13-006) and by the Netherlands Organization for Health Research and Development, program Youth (grant number 15700.4001).

VRIJE UNIVERSITEIT

# TOWARDS A MORE HOLISTIC UNDERSTANDING OF INEQUALITIES IN CHILDHOOD: A MULTI-CONTEXT APPROACH TO PARENTAL EDUCATION AND CHILD DEVELOPMENT

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad Doctor of Philosophy aan
de Vrije Universiteit Amsterdam,
op gezag van de rector magnificus
prof.dr. J.J.G. Geurts,
in het openbaar te verdedigen
ten overstaan van de promotiecommissie
van de Faculteit der Gedrags- en Bewegingswetenschappen
op dinsdag 29 oktober 2024 om 13.45 uur
in een bijeenkomst van de universiteit,
De Boelelaan 1105

door

Nil Horoz

geboren te Mersin, Turkije

| | |
|---|---|
| promotor: | prof.dr. N.M. van Atteveldt |
| copromotor: | dr. J.M. Buil |
| promotiecommissie: | prof.dr. A.C. Huizink<br>prof.dr. R. Otten<br>prof.dr. S. Branje<br>dr. E. Brummelman<br>dr. M. Camphuijsen |

## TABLE OF CONTENTS


| | | |
|---|---|---|
| **Chapter 1** | General Introduction | 7 |
| **Part 1** | **Household- and School-Level Parental Education and Child Development** | |
| **Chapter 2** | Children's Behavioral and Emotional Problems and Peer Relationships Across Elementary School: Associations with Individual- and School-Level Parental Education | 35 |
| **Chapter 3** | Household- and School-level Parental Education and Academic Self-Concept Development in Elementary School | 87 |
| **Part 2** | **The Role of the Classroom Context In Inequalities In Child Development** | |
| **Chapter 4** | Context Matters: Norm Salience Towards Aggression Moderates the Association Between Parental Education and Childhood Aggression Development | 129 |
| **Chapter 5** | Moderators of an Intervention on Emotional and Behavioral Problems: Household- and School-Level Parental Education | 159 |
| **Chapter 6** | General Discussion | 183 |
| **Appendices** | Summary | 212 |
| | Samenvatting (Dutch Summary) | 216 |
| | Özet (Turkish Summary) | 220 |
| | Authorship Contributions | 224 |
| | Acknowledgements | 225 |
| | About the Author | 230 |

# CHAPTER 1

General Introduction

*Let's imagine that every child — regardless of their social background — were to have equal opportunities to reach their full potential in development.* Through their observations of and interactions with the world around them, children learn from the beginning of their lives. Coupled with biological influences, the conditions under which the child lives from the womb and from birth onwards influence their development, with some at an advantage due to more favorable conditions and some at a disadvantage due to less favorable conditions in their most immediate environments. More favorable conditions are likely to nurture positive development, while less favorable conditions can impede it. This likely results in differences in children's developmental trajectories from early on. Despite diverse conditions and experiences in their walks of life, every child deserves to have access to equal opportunities to build skills and competencies that enable them to fulfill their needs and potential and to foster overall well-being. These principles are laid down in the fundamental rights of children, which are outlined in articles 2, 4, 6.2 and 26 of the United Nations's "Convention on the Rights of the Child" (United Nations, 1989).

A powerful predictor of differences in developmental trajectories is socioeconomic status (SES), most commonly defined as attained education level, occupation, employment status, and income (Bradley & Corwyn, 2002; Davis-Kean et al., 2021; Reiss et al., 2019). Regardless of the country or society, SES hierarchies and inequalities exist and are growing worldwide, including in the Netherlands (Chancel et al., 2022; Mirowsky & Ross, 2005b; van den Bossche & WECF, 2019; Vrooman et al., 2023; World Bank, 2022). SES not only influences health outcomes but also impacts cognitive abilities, well-being, and psychopathology at different life-course stages. In general, individuals from lower SES backgrounds are more likely to be born prematurely, face more negative life events and have a higher childhood and adult mortality rate, less healthy life-styles, more physical and mental health problems and lower educational and occupational success compared to individuals from higher SES backgrounds (Bradley & Corwyn, 2002; Caro & Lenkeit, 2012; Caro et al., 2009; Houweling & Kunst, 2010; Letourneau et al., 2013; Peverill et al., 2021; Reiss, 2013; Ross & Mirowsky, 2011).

While SES is often used synonymously with income, attained education level, and occupation status, it should be noted that the present doctoral thesis focuses solely on arguably the most powerful indicator of SES: the attained education level (Davis-Kean et al., 2021; Mirowsky & Ross, 2003; Mirowsky & Ross, 2005b). It has been argued that education serves as the foundation of good health and shapes various aspects of life (Mirowsky & Ross, 2003; Mirowsky & Ross, 2005a, 2005b). In addition to being a resource in its own right, it enables people to create and access other resources. For instance, education increases the sense of control that individuals have over their lives and decreases feelings of powerlessness and helplessness by teaching individuals to identify, avoid and manage risky situations as well as to solve problems effectively (Mirowsky & Ross, 2003; Mirowsky & Ross, 2005a, 2005b). To provide an example, low-income but higher-educated individuals manage household resources and avoid economic hardship

better than low-income and lower-educated individuals (Mirowsky & Ross, 1999; Mirowksy & Ross, 2005a, 2005b).

More specifically, the attained education level of parents referred to as *parental education* is the central focus of the present thesis since this thesis concerns the development of elementary school children. Compared to other SES indices, parental education is not only a more reliable and stable index of SES over time but it also precedes and conditions other SES indices (Ross & Mirowsky, 2011). Furthermore, parental education's impact on children's environments surpasses that of income and occupation (Davis-Kean et al., 2021). For example, parental education has been shown to have a stronger influence on organizing resources and daily routines. In addition, it guides the knowledge and belief systems that parents refer to in their efforts to cultivate their children's development and skills (Davis-Kean et al., 2019). This may also explain why parental education in childhood has been retrospectively found to more strongly relate to the persistence and severity of mental health problems across the life course than other SES indices such as parental occupation and financial hardship (McLaughlin et al., 2011). The benefits of attained education level coupled with its stability and reliability make parental education a unique predictor in understanding children's development.



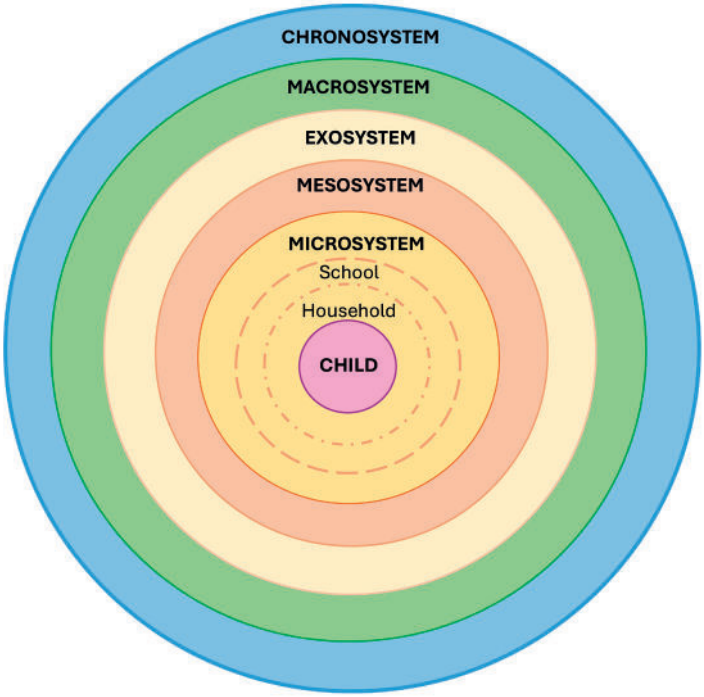
The household and the school environments are the most intimate and immediate environments that play irreplaceable roles in children's lives. Thus, parental education levels at children's two most immediate environments may influence their development. The present doctoral thesis specifically delves into the contributions of household-level parental education and school-level parental education to child development. Household-level parental education refers to the attained education level of children's parents. School-level parental education refers to the per school percentage of children of lower-educated parents.

**Theoretical Framework: Ecological Systems Theory**

Ecological systems theory, which was later renamed the bioecological model of human development, posits that development is shaped within nested environments, ranging from the most immediate to the broader settings which together influence individuals in unique ways (Bronfenbrenner, 1977, 1979, 1994; Bronfenbrenner & Morris, 2007) (See Figure 1).

**Figure 1**

*Illustration of the Ecological Systems Theory*




Within this theory there are five complex multi-person systems that affect the development of the individual child. As Bronfenbrenner proposes, the microsystem (1) refers to the relations between the individual and their most immediate environments. For example, both the household and school environments are in the microsystem; they are proximal and are embedded in one another. The mesosystem (2) encompasses the interactions between children's microsystems (i.e., the interactions between the household and school environments), including the classroom and peer context. The exosystem (3) is comprised of the environments that indirectly influence children, such as the neighborhood and local governmental policies. The macrosystem (4) refers to the most distal context which defines the larger society. For instance, it includes laws as well as national political, educational, and healthcare systems. The macrosystem exerts influence on the lower systems by impacting the norms, culture, beliefs, and priorities of the societies, thereby shaping the development of individuals, including young children. Lastly, the chronosystem (5) encompasses change or consistency over time not only in the characteristics of the individual child but also of the environment in which the child lives. It also takes historical changes and individual life transitions into account. In this way, the ecological systems theory provides a comprehensive framework for understanding a) how children's development can be influenced by their most immediate

environments and how different immediate environments interact and b) how higher systems (e.g., macrosystem) can exert influence on the lower systems (e.g., mesosystem, microsystem). That is, ecological systems theory explains how development is shaped by nested environments within multiple systems across the life course.

The present doctoral thesis uniquely contributes to advancing our understanding of the processes within the microsystem (1), mesosystem (2) and changes over time within the chronosystem (5). The microsystem provides the basis for the first main hypotheses of the present thesis: parental education at both the household and school levels may uniquely associate with children's development. The mesosystem provides the basis for the second main hypotheses: the interactions within the microsystem, such as the interaction between the household- and school-level parental education or the interaction between the household and the classroom contexts, may further explain children's development. While the aim of this thesis is to specifically focus on the way in which the household and the school environments might contribute to inequalities in children's development, it should be noted that our understanding needs to be considered under the light of the existing circumstances within the broader systems of the ecological model. That is, within the exosystem (3), the local educational policies for schools, such as provided resources and teacher qualifications and professional development (which are often associated with lower parental education or SES schools), indirectly influence children's development. Within the macrosystem (4), national educational policies, including equal access to high quality education, national curriculum and governmental funding, influence all lower systems of the ecological systems theory (Bronfenbrenner, 1977). As regards to the chronosystem (5), this doctoral thesis examines the (evolving) developmental trajectories of children spanning from kindergarten to the end of elementary school. In sum, ecological systems theory provides the framework for the present thesis by providing an understanding of the way that parental education levels within household and school contexts (i.e., microsystems) as well as their interactions (i.e., mesosystem) over time (i.e., chronosystem) may impact children's development throughout the elementary school years.



**Household- and School-Level Parental Education and Child Development**

Disparities in development related to parental education levels are already apparent during pregnancy, in childhood, and can persist throughout the life course (Härkönen et al., 2018; Houweling et al., 2022; Oude Groeniger et al., 2023; Reiss et al., 2019). Parental education inequalities, like broader SES inequalities, are also transmitted through generations (Davis-Kean et al., 2019; Sabol et al., 2021). The more challenging circumstances faced by children who grow up in lower-educated households and schools inhibit equal access to beneficial opportunities and resources making it much more difficult for these children to reach their full potential in development when compared with their counterparts who grow up in higher-educated contexts. This creates an unequal distribution of opportunities and capital and creates barriers for children growing up

in lower-educated households and schools. To give just one example, studies show that children who grow up in lower-educated households and attend lower parental education (or otherwise defined lower SES) schools are already at a disadvantage in elementary school entry because they are often less school-ready compared to those who grow up in higher-educated households or schools (Houweling et al., 2022; OECD, 2020; Schneider & Linberg, 2022). This indicates an unfair start (Unicef, 2019) and often the relative differences do not diminish over time. Children who grow up in lower-educated households and schools generally obtain lower educational attainment than those who grow up in higher-educated contexts (OECD, 2014; Palardy, 2008; Perry & McConney, 2010). This shows how inequalities related to household- and school-level parental education could be transmitted intergenerationally, leading to a persistence of educational inequality across generations (d'Addio, 2007) and to amplified difficulties (Ross & Mirowsky, 2011). Consequently, in order to foster children's development and to break the cycle of intergenerational transmission of inequality, it is imperative to enhance our knowledge of the role of parental education at both the household and school levels in children's holistic development throughout the elementary school years.

**The Importance of Social, Emotional, Behavioral, and Motivational Competencies**

For many years, schooling has been regarded as a means to promote development and 'level the playing field' between children who grow up in environments with more or less favorable conditions. While attained education levels have been increasing worldwide (OECD, 2021), relative inequalities have not been decreasing but rather increasing (Chmielewski, 2019; Ergas et al., 2022). How could this happen? Since the 1960s, educational policies across the globe have focused on increasing human capital (i.e., abilities, knowledge, skills) in the service of economic growth. Education has been viewed in increasingly instrumental terms with an emphasis on its contribution to the highly skilled workforce and productivity (Ergas et al., 2022). On the one hand, this led to an increase in rewarding academic achievement competencies and to a body of research focusing on academic and educational achievement outcomes. On the other hand, nurturing competencies with less direct links to economic advantages, such as social, emotional, behavioral, and motivational development, which are critical to healthy development and well-being (Domitrovich et al., 2017), has often been overlooked in educational policies and understudied in research.

While the effect of attained education on individual development, social mobility and economic growth is undeniable, attained education also plays an essential role in cultivating those competencies and skillsets that help individuals to lead fulfilling lives (Biesta, 2010; Duraiappah et al., 2021; Mirowsky & Ross, 2003). In other words, the role of attained education extends beyond academic learning. Education is also learning to be, to know, to think, to do, to become, to live together, to learn, and to live with nature (Duraiappah et al., 2021; Mirowsky & Ross, 2005a). Especially during childhood, it is critical to set the stage for children to gain skills and competencies in various domains such as

social, emotional, behavioral, and motivational development. This is imperative because skills accumulate over time and, more importantly, following a positive developmental trajectory stems from acquiring skills and competencies in various unique domains of development (Burt et al., 2008; van Lier & Koot, 2010). To this end, in addition to academic competencies it is necessary to nurture competencies that extend beyond academic learning because they are also necessary for young children to reach their full potential in development. That is, understanding inequalities in various domains such as social, emotional, behavioral, and motivational development should be considered to be as important as understanding inequalities in academic learning.



It is critical to study the aforementioned development of competencies that extend beyond academic learning for several reasons. First, it should be made clear that each domain of development relates to the others. Difficulties in one domain (e.g., behavioral development, peer relationships) may create difficulties in another (e.g., emotional development, academic achievement). This may lead to cascade effects of maladaptive development (Dodge et al., 2008; Gooren et al., 2011; Ladd, 2006; Ladd & Troop-Gordon, 2003; Lansford et al., 2010; Vaillancourt et al., 2013; van Lier & Koot, 2010; van Lier et al., 2012). Second, this cascade effect of maladaptive development could already be apparent in elementary school (Lansford et al., 2010; Liu et al., 2018; van Lier & Koot, 2010). For instance, an elementary school-aged child exhibiting higher levels of aggressive behavior may have negative peer relationships, which may lead to anxiety or depression symptoms, which may lead to less motivation in school and to lower grade point average (Brummelman & Sedikides, 2023; Lansford et al., 2010; Liu et al., 2018; Vaillancourt et al., 2013; van Lier et al., 2012). Third, the dynamic interplay between domains of development may not only impede positive outcomes during elementary school but it could also increase the risk of negative consequences in future life-course stages such as antisocial behavior, early school drop-out, substance use, mental health problems and unemployment (Dodge et al., 2008; Masten et al., 2005; OECD, 2021; Timmermans et al., 2009). Last, it becomes much more difficult to close the gap in development as children age and transition out of elementary school.

Yet, while decades of research have provided extensive evidence for the effect of parental education (or broader SES) both at the household and school levels on academic and educational achievement and attainment outcomes (Davis-Kean et al., 2019; Davis-Kean et al., 2021; Harding et al., 2015; Perry & McConney, 2010; Sirin, 2005), research focusing on domains of development that extend beyond academic learning is far less advanced. To date, this is especially the case throughout the elementary school period. The small number of studies that did touch on the aforementioned domains of development are either cross-sectional in nature and/or focused on only the household or the school context. In several ways this constitutes a serious gap in our knowledge of how household- and school-level parental education contribute to child development across the elementary school years. To begin with, not studying both household and

school levels of context may lead to the incomplete conclusion that the effects exist only either at the household or school level within the microsystem. Relatedly, studying only one level of context overlooks the influence of the mesosystem on the developing child. Furthermore, within the existing literature, most studies were conducted using one specific data point, which makes it impossible to study the change in developmental trajectories over time (i.e., chronosystem). Thus, it remains unknown whether there are differences in the domains of social, emotional, behavioral, and motivational development between children in lower- and higher-educated households and schools throughout elementary school years. By uncovering the role of household- and school-level parental education in various domains of development, specific context(s) and domain(s) that need extra (early) attention can be identified.

In sum, the overall aim of the present doctoral thesis is to understand whether and to what extent parental education at both the household and school levels plays a role in domains of development that extend beyond academic learning. With the present doctoral thesis, I hope to contribute not only to a more comprehensive and holistic understanding of inequalities in the aforementioned trajectories of child development (Part 1) but I also hope to identify avenues for prevention and intervention efforts (Part 2). **To this end, utilizing a multi-context and a holistic approach, the present doctoral thesis specifically examines the associations between household- and school-level parental education with children's social, emotional, behavioral, and motivational development throughout the elementary school period (Part 1). In addition, it examines the role of the classroom context in inequalities in trajectories of development (Part 2).** In the introduction to Part 1 below, I explain how parental education at both levels may associate with domains of development of interest and why it is important to consider these two contexts simultaneously. In the introduction to Part 2, I explain how classroom context may play a role in the development of children in higher- and lower-educated households and schools and how it could serve as an avenue for prevention and intervention efforts.

## PART 1: HOUSEHOLD- AND SCHOOL-LEVEL PARENTAL EDUCATION AND CHILD DEVELOPMENT

### Household-Level Parental Education

One of the most important contexts for children's development is the household environment. Via several pathways and mechanisms, this proximal context within the microsystem has been shown to influence child development (Bornstein & Bradley, 2014; Davis-Kean et al., 2019). Family investment and family stress models within the social causation theoretical framework explain how parental education may contribute to child development (Conger & Donnellan, 2007).

According to the family investment model (FIM), parents differ in their investment of resources and experiences in their children's development due to different opportunities

and access to capital (Bradley & Corwyn, 2002; Conger & Donnellan, 2007). Higher-educated parents are more likely to have greater access to economic, human, cultural, and social capital (Bourdieu & Passeron, 1990; Davis-Kean et al., 2019; Harding et al., 2015; Lareau, 2011). This opportunity to access to the various forms of capital influences parenting beliefs and practices and subsequently their children's development. For instance, higher-educated parents are more likely to have more opportunities to seek advice on parenting strategies and to synthesize and evaluate the information gained, thereby accumulating resources that cultivate children's environment and learning opportunities (Davis-Kean et al., 2019; Davis-Kean et al., 2021).



According to the family stress model, socioeconomic difficulties negatively affect child development through parental well-being and parenting practices (Conger & Donnellan, 2007; Masarik & Conger, 2017). Lower-educated parents are more likely to be exposed to financial stress (Oude Groeniger et al., 2023), which may also explain why they are more likely to have mental health problems (de Laat et al., 2018). The stress that parents experience due to socioeconomic difficulties may hinder their psychological well-being and disrupt parental practices, which may then affect children's development (Mistry et al., 2002). Taken together, these models may help us understand how household-level parental education associates with child development.

Although they are mostly limited to cross-sectional research designs (but see Meyrose et al., 2018; Schmiedeberg & Schumann, 2019), previous studies reported that children of lower-educated parents show more emotional, behavioral, and peer relationship difficulties and lower levels of psychological well-being compared to children of higher-educated parents (Kalff et al., 2001; Schmiedeberg & Schumann, 2019; von Rueden et al., 2006). They are also more likely to have lower self-perceived ability such as academic self-concept and self- efficacy and to view themselves as less worthy and deserving and less capable of growing their intelligence than higher SES children (see Brummelman & Sedikides, 2023). However, it remains unknown whether differences in social, emotional, behavioral, and motivational (e.g., academic self-concept) development exist in (early) elementary school years between children of higher- and lower-educated parents and whether these (potential) differences increase, decrease, or remain stable until the end of elementary school.

**School-Level Parental Education**

Elementary school is compulsory in many parts of the world, including the Netherlands. The importance of elementary school education in an individual's life is undeniable. With the transition to elementary school, children enter a formal setting in which they learn foundational academic skills, engage in structured activities, interact with authority figures (i.e., teachers, and school staff) and with similar-aged peers. They start to explore this new environment and learn to behave, follow the rules, and understand the norms. The interactions with teachers and with peers in this formal school setting provide unique

learning opportunities for children's development. Unraveling the potential effects of some characteristics of this proximal context within the microsystem may therefore be essential in understanding children's development.

One such characteristic of the schools is the aggregate parental education compositions at the school level, namely school-level parental education. Children of both lower- and higher-educated parents are more likely to attend elementary schools with a relatively high percentage of children from similar parental education backgrounds (European Commission, 2018, 2020; Netherlands Inspectorate of Education, 2018). This may be due to parents preferring schools that have similar socio-economic position as their own family (Musset, 2012). It may also be due to differences in access to capital between higher- and lower-educated parents. Higher-educated parents are more likely to reap the benefits of "school choice" and to have the time and monetary and logistic resources to seek out information on potential schools. Furthermore, they tend to have more knowledge about the education systems, more power and broader social networks (Lareau, 2011; Musset, 2012). They are also more likely to live in or commute to neighborhoods with higher SES schools (Granvik Saminathen et al., 2019; Karsten et al., 2003). Thus, they are more able to capitalize on the opportunities afforded by their social position when enrolling their children in (their) preferred schools. The "benefits" associated with growing up with higher educated parents or the "risk" associated with growing up with lower educated parents may be, to some extent, compounded with similar "benefits" and "risks" at the school level. Parental education may therefore operate at multiple proximal contexts within the microsystem (i.e., the household and the school). As such, it is necessary to identify the influence of each context to prevent incomplete conclusions.

In the present doctoral thesis, lower parental education schools are defined as schools with higher proportions of children with lower-educated parents (Netherlands Inspectorate of Education, 2015). Owing to potential differences in resources, attending higher and lower parental education schools may associate with differences in developmental trajectories. For instance, research generally shows that higher SES schools have greater material resources, superior management, higher average academic performance and expectations, fewer teacher mental health problems, teachers with higher qualifications, and stronger parent-school alignment when compared to lower SES schools (Crosnoe, 2009; OECD, 2012, 2016; Owens et al., 2016; Thrupp et al., 2002; Virtanen et al., 2007).

Although previous research to our knowledge did not specifically focus on the effect of school-level parental education, there is a small number of cross-sectional studies that examined the effect of school SES (e.g., percentage of students with free lunch or parental occupational status) on social, emotional, behavioral, and motivational outcomes. These studies found that children in lower SES schools had more emotional, behavioral, and peer relationship problems than children in higher SES schools (Flouri & Midouhas, 2016; Leadbeater et al., 2003; Papachristou et al., 2020). With regards to motivational outcomes

such as academic self-concept (ASC) mixed results were observed (Yang Hansen et al., 2022). Thus, although there is preliminary evidence that school-level parental education may associate with children's developmental outcomes in cross-sectional designs, it remains unclear whether there are initial level and growth rate differences between social, emotional, behavioral, and motivational development in higher versus lower parental education schools throughout the elementary school period.

**The Interplay Between Household- and School-Level Parental Education**



As previously stated, the elementary school period carries immense importance in children's lives and influences their developmental journey. In addition to exploring the associations within children's microsystems, the present doctoral thesis also examines the role played by the mesosystem in children's development. That is, do household- and school-level parental education interact to explain children's development? Does attending higher parental education schools have the capacity to "level the playing field" for children of lower-educated parents? Do children of lower-educated parents benefit from these schools to the same extent as their higher-educated counterparts?

These questions have been debated for years. One proposed solution to compensate the effects of growing up in less advantageous environments was to place children in more advantageous schools (Musset, 2012). However, the basis of the rationale of this proposed solution was rooted in academic achievement outcomes. In addition, empirical studies showed mixed effects with respect to academic achievement (e.g., Crosnoe, 2009; Granvik Saminathen et al., 2019; Özek, 2009). These mixed results underscore a gap in our knowledge of children's development. As noted previously, the dynamic interplay between the domains of development needs to be considered when interpreting findings. That is, investigating whether and how attending higher parental education schools influence outcomes that extend beyond academic learning would provide a more holistic understanding.

It could be argued that the more favorable characteristics and the superior resources of higher parental education schools may promote the development of children of lower-educated parents. This may be understood in terms of the 'collective resources model' which suggests that lower SES individuals in higher SES contexts may have better health outcomes than those in lower SES contexts (Stafford & Marmot, 2003). Conversely, the disparities between individual and area SES may lead to mental health problems as posited by the 'local social inequality model' (Stafford & Marmot, 2003). Within the school context, the characteristics and expectations of higher parental education schools may differ from those of the home environment of children of lower-educated parents. Thus, the contrast between the home and school environments may be larger for children of lower-educated parents compared to children of higher-educated parents. This may lead to a poor stage-environment fit, resulting in feelings of isolation and misfit and lower overall well-being (Eccles & Midgley, 1989; Wright et al., 1986). Similarly, children

of lower-educated parents may view their abilities more negatively when they are in higher parental education schools due to social comparisons posited in big-fish-little-pond effect (Marsh & Parker, 1984), which posits that children evaluate their abilities by comparing themselves to their classmates. In contrast, children of higher-educated parents may generally gain more from higher parental education schools because the norms and expectations of their household and school environment may align better.

To the best of our knowledge, there were no empirical studies that examined the interplay between household- and school-level parental education in the development of social, emotional, and behavioral competencies longitudinally throughout elementary school. Studies which were conducted in mid adolescence showed that lower SES adolescents in higher SES schools reported more psychosocial and psychological problems, less subjective well-being and lower school satisfaction than those attending lower SES schools (Crosnoe, 2009; Granvik Saminathen et al., 2019; Moore et al., 2017). Two cross-sectional studies on emotional and behavioral problems did not find a significant interaction between household and school SES (Flouri & Midouhas, 2016; Papachristou et al., 2020). With regards to motivational outcomes such as academic self-concept there was only one cross-sectional study that examined academic self-concept in elementary school (6$^{th}$ grade) and it did not find a significant interaction (Marsh & Parker, 1984). Taken together, there is a need to examine whether and how household- and school-level parental education interact to explain children's development within the behavioral, emotional, social, and motivational domains throughout the elementary school period.

**Present Thesis Part 1**

Notwithstanding the valuable findings in previous studies, our knowledge about the associations of household- and school-level parental education with children's social, emotional, behavioral, and motivational development throughout the elementary school period is incomplete. Are there differences in the development of children who grow up in lower- and higher-educated households and between children who attend higher parental education schools and lower parental education schools? What role does school-level parental education play in the development of children of higher- and lower-educated parents? Does attending higher parental education schools benefit children of higher- and lower-educated parents equally? Or does it exacerbate or compensate for the inequalities in development?

The objectives of Chapters 2 and 3 are to provide a comprehensive and holistic understanding of the contributions of household- and school-level parental education to a wide range of children's developmental outcomes that extend beyond academic learning. More specifically, using both peer- and teacher-reports, **the aim of Chapter 2 is to examine the main effect associations of household- and school-level parental education with children's emotional, behavioral, and peer relationship development from first to sixth grade of elementary school. Furthermore, Chapter 2 investigates whether the**

**association between household-level parental education and emotional, behavioral, and peer relationship development depend upon school-level parental education. The aim of Chapter 3 is to examine the main effect and cross-level interactions of household- and school-level parental education on children's (self-reported) academic self-concept development from fourth to sixth grade of elementary school. In addition, to better understand academic self-concept development, Chapter 3 investigates whether child- and school-level academic achievement mediate these associations.**



## PART 2: THE ROLE OF THE CLASSROOM CONTEXT IN INEQUALITIES IN CHILD DEVELOPMENT

While the objective of Part 1 is to identify the unique and simultaneous contributions of household- and school-level parental education to the various domains of child development, the aim of Part 2 is to detect factors that may influence the development of children growing up in higher- and lower-educated households and schools. Specifically, Part 2 explores the potential role of the classroom context, a context within the microsystem, in buffering or exacerbating the role of parental education in children's development.

The classroom environment provides opportunities for children to acquire (and strengthen) skills and competencies, such as effective communication and cooperation, conflict and social relationship management and coping strategies. For example, classrooms characterized by positive climate and teacher-child interactions, favorable peer norms, and by teachers who use evidence-based classroom management strategies show positive outcomes in social, emotional, and behavioral competencies. In contrast, classrooms characterized by negative classroom climate, negative peer contagion, aggressive peer norms, teachers with less motivation show unfavorable effects in child development (e.g., Madigan & Kim, 2021; Rucinski et al., 2018; Thomas et al., 2011; Wang et al., 2020; Witvliet et al., 2009). Given the importance of the classroom context, characteristics and strategies that may mitigate or exacerbate the effect of parental education on child development must be appropriately identified. In what follows, I describe two ways that the classroom context might play a role in child development.

**Peer Norms Within the Classroom Context**

One of the most influential characteristics of the classroom context is classroom peer norms. Peers can influence one another's behaviors, attitudes, motivation, learning and overall school experience. In classrooms, they contribute to the implicit social standards that determine the acceptability of certain behaviors: the norms. Because children, like all individuals, have a need to belong and feel accepted by their peer group (Baumeister & Leary, 1995), they may adjust their behavior towards the norm to gain social acceptance and approval. Children who conform to the norm are more likely to be accepted and included whereas those whose behavior deviates from the norm are more likely to be rejected or excluded (Wright et al., 1986). The present doctoral thesis specifically focuses

on norm salience. Norm salience is a type of norm that is operationalized by the within-classroom correlation between peer-nominated social preference and aggression scores and can be described as behaviors that are valued in a classroom. When compared to other types of norms (i.e., descriptive norm, injunctive norm), norm salience has shown to be the strongest driving factor in the behavioral adjustments of children and adolescents (Dijkstra & Gest, 2015; Henry et al., 2000; Laninga-Wijnen et al., 2018). It stands to reason that positive norms within classrooms may generally influence children in a positive way. In fact, research shows that children engage in prosocial behavior when the classroom norm toward prosocial behavior is positive (Busching & Krahé, 2020; Dijkstra & Gest, 2015). Similarly, norm salience towards defending behavior in the context of bullying was shown to predict better classroom climate perceptions and higher feelings of belongingness (Laninga-Wijnen et al., 2021).

But what happens when the classroom norm favors behaviors that may be risky and potentially inflict harm on others, such as classroom norm salience favoring aggressive behavior? Adhering to norms is unproblematic when they are harmless and risk-free. However, adhering to norms that may potentially cause harm to others is not risk-free. When the classroom norm salience favors aggressive behaviors, would all children conform to the norm equally and become more aggressive? Would this classroom context have a similar effect on aggressive behavior development of children of higher- and lower-educated parents? Or would there be differences in aggressive behavior development that could be explained by parental education levels?

Previous research provided evidence that salient aggressive norms increased aggressive behavior in middle school students and adolescents (Dijkstra et al., 2008; Juvonen & Ho, 2008; Laninga-Wijnen et al., 2017; Laninga-Wijnen et al., 2018). These findings indicate that norm salience plays a role in the behavioral adjustment of children in general, even when the classroom norm salience favors negative or potentially harmful behaviors such as aggression. Yet, it remains unknown whether the salient aggressive norm equally affects the behaviors of all children irrespective of their social backgrounds. Thus, Chapter 4 investigates whether the development of classroom norm salience towards aggression moderate the association between household-level parental education and overt aggressive behavior development from third to sixth grade of elementary school.

**Universal Intervention Within the Classroom Context**

The early elementary school period is one of the key periods to implement universal preventive interventions to foster children's skills and promote healthy development. Schools are accessible and practical settings for preventive intervention. Thus, implementation of universal interventions in early elementary school makes it possible to reach broader and heterogenous populations, including children who may be otherwise hard to reach. The objective of these kinds of interventions is to prevent the emergence of mental health problems in both at-risk and in healthy children. In addition, children

gain from early interventions the skills and competencies that enable them to profit from later interventions.

Indeed, universal school-based interventions have been shown to be effective in a wide range of outcomes fostering health behaviors, risk behaviors, social, emotional and behavioral competencies and academic development (Durlak et al., 2011; Lannie & McCurdy, 2007; Wilson & Lipsey, 2007). Nevertheless, less is known about whether universal interventions are equally or differentially effective across children and schools with varying parental education levels (or SES levels). To the best of our knowledge, majority of school-based intervention studies on children's development do not often report SES or only include SES as a descriptive or a study variable (Sanchez et al., 2018; Wilson & Lipsey, 2007). Moreover, some studies only focused on low SES samples and thus lacked a comparison group (Dietrichson et al., 2017; Farahmand et al., 2011). Other studies did not account for SES at both the household and school levels simultaneously (Bierman et al., 2010; Clinton et al., 2015; Holsen et al., 2009; Raimundo et al., 2013; Taylor et al., 2017; Wilson & Lipsey, 2007).



Chapter 5 aims to shed light onto the moderating role of household- and school-level parental education on the effectiveness of a school-based universal preventive intervention implemented within the classroom context, namely the Good Behavior Game (GBG; Barrish et al., 1969). The GBG is a classroom management intervention that aims to regulate disruptive behavior by creating a positive and safe classroom environment. The GBG has been shown effective in preventing behavioral and emotional problems across many studies, including diverse cultures and populations (e.g., Embry, 2002; Menting et al., 2015; Nolan et al., 2014; Vuijk et al., 2007). Yet, whether the GBG is equally or differentially effective in preventing emotional and behavioral problems among children in higher- and lower-educated households and schools is also unknown. Chapter 5 provides a unique opportunity to test two separate interactions (i.e., household-level parental education x GBG; and school-level parental education x GBG) within the mesosystem. Specifically, Chapter 5 investigates whether the effectiveness of the Good Behavior Game in preventing emotional and behavioral problems is moderated by household- and school-level parental education from kindergarten to second grade.

**Present Thesis Part 2**

Considered as a whole, the aim of Part 2 is to investigate the role of classroom context in the development of children in higher- and lower-educated contexts. Could certain characteristics of the classroom context (i.e., norm salience) exacerbate or alleviate the effect of household-level parent education on child development? Could preventive interventions (i.e., GBG) within the classroom context potentially have the capacity to prevent the development of problems equally among children growing up in higher- and lower-educated households and schools? Could they decrease developmental inequalities? **Chapter 4 investigates whether the development of classroom norm**

**salience towards aggression moderates the association between household-level parental education and overt aggressive behavior development from third to sixth grade. Chapter 5 examines the moderating effect of household- and school-level parental education on the effectiveness of a universal preventive intervention, the Good Behavior Game, in preventing emotional and behavioral problems from kindergarten to second grade.**

## Design

Data used in the present thesis came from four different datasets – retrieved from two separate research projects with longitudinal designs. Studies in this thesis used multi-informant (peers, teachers, students themselves, parents) designs and followed children from kindergarten to the end of elementary school. The study samples, research questions and dataset characteristics are described below and in Table 1.

**1. The Dutch elementary school sample**

The Dutch elementary school sample is a multi-informant longitudinal project that sought to examine children's social, emotional, and behavioral development throughout the elementary school years. Children were recruited from elementary schools located in two urban and one rural area of the Netherlands. The first schools that agreed to participate were included in the larger research project. Children who were studied in Chapter 2, part of Chapter 4, and Chapter 5 were participants of this project.

**2. Happy Children, Happy Adolescents (HCHA)**

Happy Children, Happy Adolescents (HCHA) project is a longitudinal multi-informant project that aimed to investigate children's social, emotional, behavioral, and cognitive development throughout elementary school and into the first years of secondary school. Children were recruited from elementary schools in rural and urban areas of the Netherlands. The first schools that agreed to participate were included in the larger research project. Children who were studied in Chapter 3 and part of Chapter 4 were participants of this project.

**Table 1**
*Study characteristics and research questions per empirical chapter*

| Chapter | Project | N | Grades | Design and Informants | Research Questions | Outcome variables |
|---|---|---|---|---|---|---|
| **Part 1** | | | | | | |
| 2 | The Dutch elementary school sample | 698 | 1st grade – 6th grade | Multi-level longitudinal design<br>Peer report, teacher report, parent report | Do household- and school-level parental education independently associate with emotional, behavioral, and peer relationship development from first to sixth grade? (main effect)<br>Do household- and school-level parental education interact to explain emotional, behavioral, and peer relationship development from first to sixth grade? (cross-level interactions) | Aggression (Peer report)<br>Peer Dislike (Peer report)<br>Relational victimization (Peer and teacher report)<br>Physical victimization (Peer and teacher report)<br>Conduct problems (Teacher report)<br>Oppositional defiant problems (Peer and teacher report)<br>Attention-deficit and hyperactivity problems (Peer and teacher report)<br>Anxiety (Peer and teacher report)<br>Depression (Peer and teacher report) |
| 3 | HCHA | 679 | 4th grade – 6th grade | Multi-level longitudinal design<br>Child self-report, parent report, standardized test scores | Do household- and school-level parental education independently associate with academic self-concept development from fourth to sixth grade? (main effect)<br>Do household- and school-level parental education interact to explain academic self-concept development from fourth to sixth grade? (cross-level interaction)<br>Do child- and school-level academic achievement mediate the associations between household- and school-level parental education with academic self-concept development? (mediation) | Academic self-concept (Child self-report)<br>Mediator variable: academic achievement (standardized test scores) |
| **Part 2** | | | | | | |
| 4 | HCHA, The Dutch elementary school sample | 1205 | 3rd grade – 6th grade | Multi-level longitudinal design<br>Peer report, teacher report, parent report | Does the development of classroom norm salience towards aggression moderate the association between household-level parental education and overt aggressive behavior development from third to sixth grade? (cross-level interaction) | Overt aggressive behavior (Teacher report)<br>Moderator (norm salience towards aggression): within classroom correlation between peer-reported social preference and aggression scores |
| 5 | The Dutch elementary school sample | 731 | Kindergarten – 2nd grade | Multi-level longitudinal design with clustered randomized control trial<br>Teacher report, parent report | Do household- and school-level parental education moderate the effect of the Good Behavior Game in preventing emotional and behavioral problem development from kindergarten to second grade? (between-level interaction and cross-level interaction) | Emotional problems (Teacher report)<br>Behavioral problems (Teacher report) |

## References


Barrish, H. H., Saunders, M., & Wolf, M. M. (1969). Good behavior game: Effects of individual contingencies for group consequences on disruptive behavior in a classroom 1. *Journal of Applied Behavior Analysis*, *2*(2), 119-124. https://doi.org/10.1901/jaba.1969.2-119

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Interpersonal Development*, 57-89. https://doi.org/10.4324/9781351153683-3

Bierman, K. L., Coie, J. D., Dodge, K. A., Greenberg, M. T., Lochman, J. E., McMahon, R. J., & Pinderhughes, E. (2010). The effects of a multiyear universal social–emotional learning program: The role of student and school characteristics. *Journal of Consulting and Clinical Psychology*, *78*(2), 156. https://doi.org/10.1037/a0018607

Biesta, G. (2010). *Good education in an age of measurement : ethics, politics, democracy*. Routledge, Taylor & Francis Group. https://doi.org/10.4324/9781315634319

Bornstein, M. H., & Bradley, R. H. (2014). *Socioeconomic status, parenting, and child development*. Routledge. https://doi.org/10.4324/9781410607027

Bourdieu, P., & Passeron, J.-C. (1990). *Reproduction in education, society and culture* (Vol. 4). Sage.

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, *53*(1), 371-399. https://doi.org/10.1146/annurev.psych.53.100901.135233

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, *32*(7), 513. https://doi.org/10.1037/0003-066X.32.7.513

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press. https://doi.org/10.1037//0003-066x.32.7.513

Bronfenbrenner, U. (1994). Ecological models of human development. *International Encyclopedia of Education*, *3*(2), 37-43. https://doi.org/10.4135/9781412952484.n105

Bronfenbrenner, U., & Morris, P. A. (2007). The Bioecological Model of Human Development. *Handbook of Child Psychology*. Portico. https://doi.org/10.1002/9780470147658.chpsy0114

Brummelman, E., & Sedikides, C. (2023). Unequal selves in the classroom: Nature, origins, and consequences of socioeconomic disparities in children's self-views. *Developmental Psychology*. https://doi.org/10.1037/dev0001599

Burt, K. B., Obradović, J., Long, J. D., & Masten, A. S. (2008). The interplay of social competence and psychopathology over 20 years: Testing transactional and cascade models. *Child Development*, *79*(2), 359-374. https://doi.org/10.1111/j.1467-8624.2007.01130.x

Busching, R., & Krahé, B. (2020). With a little help from their peers: the impact of classmates on adolescents' development of prosocial behavior. *Journal of Youth and Adolescence*, *49*(9), 1849-1863. https://doi.org/10.1007/s10964-020-01260-8

Caro, D. H., & Lenkeit, J. (2012). An analytical approach to study educational inequalities: 10 hypothesis tests in PIRLS 2006. *International Journal of Research & Method in Education*, *35*(1), 3-30. https://doi.org/10.1080/1743727X.2012.666718

Caro, D. H., McDonald, J. T., & Willms, J. D. (2009). Socio-economic status and academic achievement trajectories from childhood to adolescence. *Canadian Journal of Education/Revue canadienne de l'éducation*, *32*(3), 558-590.

Chancel, L., Piketty, T., Saez, E., & Zucman, G. (2022). *World inequality report 2022*.

Chmielewski, A. K. (2019). The global increase in the socioeconomic achievement gap, 1964 to 2015. *American Sociological Review*, *84*(3), 517-544. https://doi.org/10.1177/0003122419847165

Clinton, A. B., Edstrom, L., Mildon, H. A., & Davila, L. (2015). Social emotional learning in a Guatemalan preschool sample: Does socioeconomic status moderate the effects of a school-based prevention program? *School Psychology International*, *36*(1), 18-35. https://doi.org/10.1177/0143034314559868

Conger, R. D., & Donnellan, M. B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology*, *58*, 175-199. https://doi.org/10.1146/annurev.psych.58.110405.085551

Crosnoe, R. (2009). Low-income students and the socioeconomic composition of public high schools. *American Sociological Review*, *74*(5), 709-730. https://doi.org/10.1177/000312240907400502

d'Addio, A. C. (2007). *Intergenerational transmission of disadvantage: mobility or immobility across generations? A review of the evidence for OECD Countries*. E. a. M. W. P. N. OECD Social.

Davis-Kean, P. E., Tang, S., & Waters, N. E. (2019). Parent education attainment and parenting. In *Handbook of Parenting* (pp. 400-420). Routledge. https://doi.org/10.4324/9780429401459-12

Davis-Kean, P. E., Tighe, L. A., & Waters, N. E. (2021). The role of parent educational attainment in parenting and children's development. *Current Directions in Psychological Science*, *30*(2), 186-192. https://doi.org/10.1177/0963721421993116

Dolan, L. J., Jaylan, T., Werthamer, L., & Kellam, S. (1989). The good behavior game manual. *City of Baltimore: Department of Education and the Prevention Centre, The John Hopkins University*.

de Laat, S. A., Huizink, A. C., Hof, M. H., & Vrijkotte, T. G. (2018). Socioeconomic inequalities in psychosocial problems of children: mediating role of maternal depressive symptoms. *European Journal of Public Health*, *28*(6), 1062-1068.

Dietrichson, J., Bøg, M., Filges, T., & Klint Jørgensen, A.-M. (2017). Academic interventions for elementary and middle school students with low socioeconomic status: A systematic review and meta-analysis. *Review of Educational Research*, *87*(2), 243-282.

Dijkstra, J. K., & Gest, S. D. (2015). Peer norm salience for academic achievement, prosocial behavior, and bullying: Implications for adolescent school experiences. *The Journal of Early Adolescence*, *35*(1), 79-96. https://doi.org/https://doi.org/10.1177/0272431614524303

Dijkstra, J. K., Lindenberg, S., & Veenstra, R. (2008). Beyond the class norm: Bullying behavior of popular adolescents and its relation to peer acceptance and rejection. *Journal of Abnormal Child Psychology*, *36*(8), 1289-1299.

Dodge, K. A., Greenberg, M. T., Malone, P. S., & Group, C. P. P. R. (2008). Testing an idealized dynamic cascade model of the development of serious violence in adolescence. *Child Development*, *79*(6), 1907-1927. https://doi.org/https://doi.org/10.1111/j.1467-8624.2008.01233.x

Domitrovich, C. E., Durlak, J. A., Staley, K. C., & Weissberg, R. P. (2017). Social-emotional competence: An essential factor for promoting positive adjustment and reducing risk in school children. *Child Development*, *88*(2), 408-416. https://doi.org/10.1111/cdev.12739

Duraiappah, K., Atteveldt, N., Buil, J. M., Singh, K., & Wu, R. (2021). *Summary for Decision Makers, Reimagining Education: The International Science and Evidence based Education Assessment*. N. D. U. MGIEP. https://unesdoc.unesco.org/ark:/48223/pf0000380985

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, *82*(1), 405-432. https://doi.org/10.1111/j.1467-8624.2010.01564.x

Eccles, J. S., & Midgley, C. (1989). Stage-environment fit: Developmentally appropriate classrooms for young adolescents. *Research on Motivation in Education*, *3*(1), 139-186.

Embry, D. D. (2002). The Good Behavior Game: A best practice candidate as a universal behavioral vaccine. *Clinical Child and Family Psychology Review*, *5*, 273-297. https://doi.org/10.1023/a:1020977107086

Ergas, O., Gilead, T., & Singh, N. C. (2022). 'Introduction to ISEE Assessment Working Group 1 – education in and for flourishing' in Duraiappah, A.K., van Atteveldt, N.M., Borst, G., Bugden, S., Ergas, O., Gilead, T., Gupta, L., Mercier, J., Pugh, K., Singh, N.C. and Vickers, E.A. (eds.). In *Reimagining Education: The International Science and Evidence based Assessment*. https://unesdoc.unesco.org/ark:/48223/pf0000381872

Farahmand, F. K., Grant, K. E., Polo, A. J., Duffy, S. N., & DuBois, D. L. (2011). School-based mental health and behavioral programs for low-income, urban youth: A systematic and meta-analytic review. *Clinical Psychology: Science and Practice*, *18*(4), 372. https://doi.org/10.1111/j.1468-2850.2011.01265.x

Flouri, E., & Midouhas, E. (2016). School composition, family poverty and child behaviour. *Social Psychiatry and Psychiatric Epidemiology*, *51*, 817-826. https://doi.org/10.1007/s00127-016-1206-7

Gooren, E. M., van Lier, P. A., Stegge, H., Terwogt, M. M., & Koot, H. M. (2011). The development of conduct problems and depressive symptoms in early elementary school children: The role of peer rejection. *Journal of Clinical Child & Adolescent Psychology*, *40*(2), 245-253. https://doi.org/10.1080/15374416.2011.546045

Granvik Saminathen, M., Låftman, S. B., & Modin, B. (2019). School choice at a cost? Academic achievement, school satisfaction and psychological complaints among students in disadvantaged areas of Stockholm. *International Journal of Environmental Research and Public Health*, *16*(11), 1912. https://doi.org/0.3390/ijerph16111912

Harding, J. F., Morris, P. A., & Hughes, D. (2015). The relationship between maternal education and children's academic outcomes: A theoretical framework. *Journal of Marriage and Family*, *77*(1), 60-76. https://doi.org/10.1111/jomf.12156

Härkönen, J., Lindberg, M., Karlsson, L., Karlsson, H., & Scheinin, N. M. (2018). Education is the strongest socio-economic predictor of smoking in pregnancy. *Addiction*, *113*(6), 1117-1126. https://doi.org/10.1111/add.14158

Henry, D., Guerra, N., Huesmann, R., Tolan, P., VanAcker, R., & Eron, L. (2000). Normative influences on aggression in urban elementary school classrooms. *American Journal of Community Psychology*, *28*(1), 59-81. https://doi.org/10.1023/a:1005142429725

Holsen, I., Iversen, A. C., & Smith, B. H. (2009). Universal social competence promotion programme in school: Does it work for children with low socio-economic background? *Advances in School Mental Health Promotion*, *2*(2), 51-60. https://doi.org/10.1080/1754730x.2009.9715704

Houweling, T. A., & Kunst, A. E. (2010). Socio-economic inequalities in childhood mortality in low-and middle-income countries: a review of the international evidence. *British Medical Bulletin*, *93*(1), 7-26. https://doi.org/10.1186/s12939-022-01675-8

Houweling, T. A., Oude Groeniger, J., Jansen, P. W., van Lier, P., Horoz, N., Buil, M., & van Lenthe, F. J. (2022). Trajectories of socioeconomic inequality in early child development: a cohort analysis. *International Journal for Equity in Health*, *21*(1), 1-10. https://doi.org/10.1186/s12939-022-01675-8

Juvonen, J., & Ho, A. Y. (2008). Social motives underlying antisocial behavior across middle school grades. *Journal of Youth and Adolescence*, *37*, 747-756. https://doi.org/https://doi.org/10.1007/s10964-008-9272-0

Kalff, A., Kroes, M., Vles, J., Hendriksen, J., Feron, F. J., Steyaert, J., Van Zeben, T., Jolles, J., & van Os, J. (2001). Neighbourhood level and individual level SES effects on child problem behaviour: a multilevel analysis. *Journal of Epidemiology & Community Health*, *55*(4), 246-250. https://doi.org/10.1136/jech.55.4.246

Karsten, S., Ledoux, G., Roeleveld, J., Felix, C., & Elshof, D. (2003). School choice and ethnic segregation. *Educational Policy*, *17*(4), 452-477. https://doi.org/10.1177/0895904803254963

Ladd, G. W. (2006). Peer rejection, aggressive or withdrawn behavior, and psychological maladjustment from ages 5 to 12: An examination of four predictive models. *Child Development*, *77*(4), 822-846. https://doi.org/10.1111/j.1467-8624.2006.00905.x

Ladd, G. W., & Troop-Gordon, W. (2003). The role of chronic peer difficulties in the development of children's psychological adjustment problems. *Child Development*, *74*(5), 1344-1367. https://doi.org/10.1111/1467-8624.00611

Laninga-Wijnen, L., Harakeh, Z., Dijkstra, J. K., Veenstra, R., & Vollebergh, W. (2018). Aggressive and prosocial peer norms: Change, stability, and associations with adolescent aggressive and prosocial behavior development. *The Journal of Early Adolescence*, *38*(2), 178-203. https://doi.org/https://doi.org/10.1177/0272431616665211

Laninga-Wijnen, L., van den Berg, Y. H., Mainhard, T., & Cillessen, A. H. (2021). The role of defending norms in victims' classroom climate perceptions and psychosocial maladjustment in secondary school. *Research on Child and Adolescent Psychopathology*, *49*(2), 169-184.

Laninga-Wijnen, L., Harakeh, Z., Steglich, C., Dijkstra, J. K., Veenstra, R., & Vollebergh, W. (2017). The norms of popular peers moderate friendship dynamics of adolescent aggression. *Child Development*, *88*(4), 1265-1283. https://doi.org/https://doi.org/10.1111/cdev.12650

Lannie, A. L., & McCurdy, B. L. (2007). Preventing disruptive behavior in the urban classroom: Effects of the good behavior game on student and teacher behavior. *Education and Treatment of Children*, *30*(1), 85-98. https://doi.org/0.1353/etc.2007.0002

Lansford, J. E., Malone, P. S., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2010). Developmental cascades of peer rejection, social information processing biases, and aggression during middle childhood. *Development and Psychopathology*, *22*(3), 593-602. https://doi.org/10.1017/s0954579410000301

Lareau, A. (2011). University of California Press. https://doi.org/10.1525/9780520949904

Leadbeater, B., Hoglund, W., & Woods, T. (2003). Changing contexts? The effects of a primary prevention program on classroom levels of peer relational and physical victimization. *Journal of Community Psychology*, *31*(4), 397-418. https://doi.org/https://doi.org/10.1002/jcop.10057

Letourneau, N. L., Duffett-Leger, L., Levac, L., Watson, B., & Young-Morris, C. (2013). Socioeconomic status and child development: A meta-analysis. *Journal of Emotional and Behavioral Disorders*, *21*(3), 211-224. https://doi.org/10.1177/1063426611421007

Liu, J., Bullock, A., Coplan, R. J., Chen, X., Li, D., & Zhou, Y. (2018). Developmental cascade models linking peer victimization, depression, and academic achievement in Chinese children. *British Journal of Developmental Psychology*, *36*(1), 47-63. https://doi.org/10.1111/bjdp.12212

Madigan, D. J., & Kim, L. E. (2021). Does teacher burnout affect students? A systematic review of its association with academic achievement and student-reported outcomes. *International Journal of Educational Research*, *105*, 101714. https://doi.org/https://doi.org/10.1016/j.ijer.2020.101714

Marsh, H. W., & Parker, J. W. (1984). Determinants of student self-concept: Is it better to be a relatively large fish in a small pond even if you don't learn to swim as well? *Journal of Personality and Social Psychology*, *47*(1), 213. https://doi.org/10.1037//0022-3514.47.1.213

Masarik, A. S., & Conger, R. D. (2017). Stress and child development: A review of the Family Stress Model. *Current Opinion in Psychology*, *13*, 85-90. https://doi.org/10.1016/j.copsyc.2016.05.008

Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradović, J., Riley, J. R., Boelcke-Stennes, K., & Tellegen, A. (2005). Developmental cascades: linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology*, *41*(5), 733. https://doi.org/10.1037/0012-1649.41.5.733

McLaughlin, K. A., Breslau, J., Green, J. G., Lakoma, M. D., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2011). Childhood socio-economic status and the onset, persistence, and severity of DSM-IV mental disorders in a US national sample. *Social Science & Medicine*, *73*(7), 1088-1096. https://doi.org/10.1016/j.socscimed.2011.06.011

Menting, B., Koot, H., & van Lier, P. (2015). Peer acceptance and the development of emotional and behavioural problems: Results from a preventive intervention study. *International Journal of Behavioral Development*, *39*(6), 530-540. https://doi.org/10.1177/0165025414558853

Meyrose, A.-K., Klasen, F., Otto, C., Gniewosz, G., Lampert, T., & Ravens-Sieberer, U. (2018). Benefits of maternal education for mental health trajectories across childhood and adolescence. *Social Science & Medicine*, *202*, 170-178.

Mirowsky, J., & Ross, C. E. (1999). Economic Hardship across the Life Course. *American Sociological Review*, *64*(4), 548. https://doi.org/10.2307/2657255

Mirowsky, J. & Ross, C. E. (2003) *Education, social status, and health* (New York, Aldine de Gruyter).

Mirowsky, J., & Ross, C. E. (2005a). Education, cumulative advantage, and health. *Ageing International*, *30*, 27-62. https://doi.org/10.1007/bf02681006

Mirowsky, J., & Ross, C. E. (2005b). Education, learned effectiveness and health. *London Review of Education*. https://doi.org/10.1080/14748460500372366

Mistry, R. S., Vandewater, E. A., Huston, A. C., & McLoyd, V. C. (2002). Economic well-being and children's social adjustment: The role of family process in an ethnically diverse low-income sample. *Child Development*, *73*(3), 935-951. https://doi.org/10.1111/1467-8624.00448

Moore, G. F., Littlecott, H. J., Evans, R., Murphy, S., Hewitt, G., & Fletcher, A. (2017). School composition, school culture and socioeconomic inequalities in young people's health: Multi-level analysis of the Health Behaviour in School-aged Children (HBSC) survey in Wales. *British Educational Research Journal*, *43*(2), 310-329. https://doi.org/10.1002/berj.3265

Musset, P. (2012). School choice and equity: Current policies in OECD countries and a literature review. https://doi.org/https://www.oecd-ilibrary.org/education/school-choice-and-equity_5k9fq23507vc-en

Nolan, J. D., Houlihan, D., Wanzek, M., & Jenson, W. R. (2014). The Good Behavior Game: A classroom-behavior intervention effective across cultures. *School Psychology International*, *35*(2), 191-205. https://doi.org/10.1177/0143034312471473

OECD. (2012). *Equity and Quality in Education: Supporting disadvantaged students and schools*. https://www.oecd-ilibrary.org/education/equity-and-quality-in-education_9789264130852-en

OECD. (2014). Education at a Glance 2014: OECD Indicators. In: OECD Publishing.

OECD. (2016). *Low-Performing Students*. https://doi.org/doi:https://doi.org/10.1787/9789264250246-en

OECD. (2020). *Early Learning and Child Well-being*. https://doi.org/doi:https://doi.org/10.1787/3990407f-en

OECD. (2021). *Education at a Glance 2022: OECD Indicators*. O. Publishing. https://doi.org/10.1787/3197152b-en

Oude Groeniger, J., Houweling, T. A., Jansen, P. W., Horoz, N., Buil, J. M., van Lier, P. A., & van Lenthe, F. J. (2023). Social inequalities in child development: the role of differential exposure and susceptibility to stressful family conditions. *Journal of Epidemiology & Community Health*, *77*(2), 74-80. https://doi.org/10.1136/jech-2022-219548

Owens, A., Reardon, S. F., & Jencks, C. (2016). Income segregation between schools and school districts. *American Educational Research Journal*, *53*(4), 1159-1197. https://doi.org/https://doi.org/10.3102/0002831216652722

Özek, U. (2009). The Effects of Open Enrollment on School Choice and Student Outcomes. Working Paper 26. *National Center for Analysis of Longitudinal Data in Education Research*.

Palardy, G. J. (2008). Differential school effects among low, middle, and high social class composition schools: A multiple group, multilevel latent growth curve analysis. *School Effectiveness and School Improvement*, *19*(1), 21-49. https://doi.org/10.1080/09243450801936845

Papachristou, E., Flouri, E., Midouhas, E., Lewis, G., & Joshi, H. (2020). The role of primary school composition in the trajectories of internalising and externalising problems across childhood and adolescence. *Journal of Abnormal Child Psychology, 48*, 197-211. https://doi.org/10.1007/s10802-019-00584-9

Perry, L. B., & McConney, A. (2010). Does the SES of the school matter? An examination of socioeconomic status and student achievement using PISA 2003. *Teachers College Record, 112*(4), 1137-1162. https://doi.org/10.1177/016146811011200401

Peverill, M., Dirks, M. A., Narvaja, T., Herts, K. L., Comer, J. S., & McLaughlin, K. A. (2021). Socioeconomic status and child psychopathology in the United States: A meta-analysis of population-based studies. *Clinical Psychology Review, 83*, 101933. https://doi.org/10.1016/j.cpr.2020.101933

Raimundo, R., Marques-Pinto, A., & Lima, M. L. (2013). The effects of a social-emotional learning program on elementary school children: The role of pupils' characteristics *Psychology in the Schools*, *50*(2), 165-180. https://doi.org/doi.org/10.1002/pits.21667

Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: a systematic review. *Social Science & Medicine*, *90*, 24-31. https://doi.org/10.1016/j.socscimed.2013.04.026

Reiss, F., Meyrose, A.-K., Otto, C., Lampert, T., Klasen, F., & Ravens-Sieberer, U. (2019). Socioeconomic status, stressful life situations and mental health problems in children and adolescents: Results of the German BELLA cohort-study. *PloS One*, *14*(3), e0213700. https://doi.org/10.1371/journal.pone.0213700

Ross, C. E., & Mirowsky, J. (2011). The interaction of personal and parental education on health. *Social science & medicine*(72), 591-599. https://doi.org/10.1016/j.socscimed.2010.11.028

Rucinski, C. L., Brown, J. L., & Downer, J. T. (2018). Teacher–child relationships, classroom climate, and children's social-emotional and academic development. *Journal of Educational Psychology*, *110*(7), 992. https://doi.org/10.1037/edu0000240

Sabol, T. J., Sommer, T. E., Chase-Lansdale, P. L., & Brooks-Gunn, J. (2021). Intergenerational economic mobility for low-income parents and their children: A dual developmental science framework. *Annual Review of Psychology, 72*, 265-292. https://doi.org/10.1146/annurev-psych-010419-051001

Sanchez, A. L., Cornacchio, D., Poznanski, B., Golik, A. M., Chou, T., & Comer, J. S. (2018). The effectiveness of school-based mental health services for elementary-aged children: A meta-analysis. *Journal of the American Academy of Child & Adolescent Psychiatry*, *57*(3), 153-165. https://doi.org/10.1007/s12187-018-9606-8

Schmiedeberg, C., & Schumann, N. (2019). Poverty and adverse peer relationships among children in Germany: A longitudinal study. *Child Indicators Research*, *12*, 1717-1733. https://doi.org/10.1007/s12187-018-9606-8

Schneider, T., & Linberg, T. (2022). Development of socio-economic gaps in children's language skills in Germany. *Longitudinal and Life Course Studies*, *13*(1), 87-120. https://doi.org/10.1332/175795921x16233448663756

Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, *75*(3), 417-453. https://doi.org/10.3102/00346543075003417

Stafford, M., & Marmot, M. (2003). Neighbourhood deprivation and health: does it affect us all equally? *International Journal of Epidemiology*, *32*(3), 357-366. https://doi.org/10.1093/ije/dyg084

Taylor, R. D., Oberle, E., Durlak, J. A., & Weissberg, R. P. (2017). Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. *Child Development*, *88*(4), 1156-1171. https://doi.org/10.1111/cdev.12864

Thomas, D. E., Bierman, K. L., Powers, C., & Group, C. P. P. R. (2011). The influence of classroom aggression and classroom climate on aggressive–disruptive behavior. *Child Development*, *82*(3), 751-757. https://doi.org/10.1111/j.1467-8624.2011.01586.x

Thrupp, M., Lauder, H., & Robinson, T. (2002). School composition and peer effects. *International Journal of Educational Research*, *37*(5), 483-504. https://doi.org/https://doi.org/10.1016/S0883-0355(03)00016-8

Timmermans, M., van Lier, P. A., & Koot, H. M. (2009). Pathways of behavior problems from childhood to late adolescence leading to delinquency and academic underachievement. *Journal of Clinical Child & Adolescent Psychology*, *38*(5), 630-638. https://doi.org/0.1080/15374410903103502

Unicef. (2019). *An unfair start: Inequality in children's education in rich countries*. United Nations.

United Nations (1989). Convention on the Rights of the Child. *General Assembly resolution 44/25*

Vaillancourt, T., Brittain, H. L., McDougall, P., & Duku, E. (2013). Longitudinal links between childhood peer victimization, internalizing and externalizing problems, and academic functioning: Developmental cascades. *Journal of Abnormal Child Psychology*, *41*(8), 1203-1215. https://doi.org/10.1007/s10802-013-9781-5

van den Bossche, C., & WECF. (2019). *Inequalities in the Netherlands* (Make Europe Sustainable for All, Issue. https://www.sdgwatcheurope.org/wp-content/uploads/2019/06/10.3.a-report-NL.pdf

van Lier, P. A., & Koot, H. M. (2010). Developmental cascades of peer relations and symptoms of externalizing and internalizing problems from kindergarten to fourth-grade elementary school. *Development and Psychopathology*, *22*(3), 569-582. https://doi.org/10.1017/S0954579410000283

van Lier, P. A., Vitaro, F., Barker, E. D., Brendgen, M., Tremblay, R. E., & Boivin, M. (2012). Peer victimization, poor academic achievement, and the link between childhood externalizing and internalizing problems. *Child Development*, *83*(5), 1775-1788. https://doi.org/10.1111/j.1467-8624.2012.01802.x

Virtanen, M., Kivimäki, M., Elovainio, M., Linna, A., Pentti, J., & Vahtera, J. (2007). Neighbourhood socioeconomic status, health and working conditions of school teachers. *Journal of Epidemiology and Community Health*, *61*(4), 326. https://doi.org/10.1136/jech.2006.052878

Von Rueden, U., Gosch, A., Rajmil, L., Bisegger, C., & Ravens-Sieberer, U. (2006). Socioeconomic determinants of health related quality of life in childhood and adolescence: results from a European study. *Journal of Epidemiology & Community Health*, *60*(2), 130-135. https://doi.org/10.1136/jech.2005.039792

Vrooman, C., Boelhouwer, J., Iedema, J., & Van der Torre, A. (2023). *Eigentijdse ongelijkheid. De postindustriële klassenstructuur op basis van vier typen kapitaal* (Sociaal en Cultureel Planbureau, Issue.

Vuijk, P., van Lier, P. A., Crijnen, A. A., & Huizink, A. C. (2007). Testing sex-specific pathways from peer victimization to anxiety and depression in early adolescents through a randomized intervention trial. *Journal of Affective Disorders*, *100*(1-3), 221-226. https://doi.org/10.1016/j.jad.2006.11.003

Wang, M.-T., Degol, J. L., Amemiya, J., Parr, A., & Guo, J. (2020). Classroom climate and children's academic and psychological wellbeing: A systematic review and meta-analysis. *Developmental Review*, *57*, 100912. https://doi.org/10.1016/j.dr.2020.100912

Wilson, S. J., & Lipsey, M. W. (2007). School-based interventions for aggressive and disruptive behavior: Update of a meta-analysis. *American Journal of Preventive Medicine*, *33*(2), S130-S143. https://doi.org/10.1016/j.amepre.2007.04.011

Witvliet, M., Van Lier, P. A., Cuijpers, P., & Koot, H. M. (2009). Testing links between childhood positive peer relations and externalizing outcomes through a randomized controlled intervention study. *Journal of Consulting and Clinical Psychology*, *77*(5), 905. https://doi.org/10.1037/a0014597

World Bank. (2022). *Poverty and shared prosperity 2022: Correcting course* (1464818932). L. C. Commons & A. C. B. IGO.

Wright, J. C., Giammarino, M., & Parad, H. W. (1986). Social status in small groups: Individual–group similarity and the social" misfit.". *Journal of personality and social psychology*, *50*(3), 523. https://doi.org/10.1037/0022-3514.50.3.523

Yang Hansen, K., Radišić, J., Ding, Y., & Liu, X. (2022). Contextual effects on students' achievement and academic self-concept in the Nordic and Chinese educational systems. *Large-scale Assessments in Education*, *10*(1), 16. https://doi.org/10.1186/s40536-022-00133-9

# PART 1

Household- and School-Level Parental Education and Child Development

# CHAPTER 2

## Children's Behavioral and Emotional Problems and Peer Relationships Across Elementary School: Associations with Individual- and School-Level Parental Education

**This chapter is based on:**
Horoz, N., Buil, J. M., Koot, S., van Lenthe, F. J., Houweling, T. A., Koot, H. M., & van Lier, P. A. (2022). Children's behavioral and emotional problems and peer relationships across elementary school: Associations with individual- and school-level parental education. *Journal of School Psychology*, *93*, 119-137. https://doi.org/10.1016/j.jsp.2022.06.005

## Abstract

This study examined (a) whether growing up with lower-educated parents and attending lower parental education schools associated with children's problem development within the behavioral, emotional, and peer relationship domains; and (b) whether the association of lower individual-level parental education with children's development within these three domains depended upon school-level parental education. To this end, 698 children ($M_{age}$ = 7.08 in first grade) from 31 mainstream elementary schools were annually followed from first grade to sixth grade. Problems within the behavioral domain included conduct problems, oppositional defiant problems, attention-deficit and hyperactivity problems, and aggression. Problems within the emotional domain included depression and anxiety symptoms. Problems within the peer relationship domain included physical victimization, relational victimization, and peer dislike. Results from multi-level latent growth models showed that, as compared to children of higher-educated parents, children of lower-educated parents generally had higher levels of problems within all three domains in first grade and exhibited a faster growth rate of problems within the behavioral domain from first to sixth grade. Furthermore, as compared to children attending higher parental education schools, children attending lower parental education schools generally had higher levels of problems within the behavioral and emotional domains in first grade and showed a faster growth rate of peer dislike over time. In addition, cross-level interaction analyses showed that in higher parental education schools, children of lower-educated parents showed a faster growth rate of depression symptom levels than children of higher-educated parents. In lower parental education schools, the growth rate of depression symptom levels did not differ between children of higher- and lower-educated parents. Results highlight that addressing the needs of lower parental education schools and children growing up with lower-educated parents may be of primary importance.

*Keywords:* parental education, school SES, emotional and behavioral problems, peer relationships, multi-level latent growth models

Growing up with lower-educated parents may impede children's behavioral, emotional, and peer relationship development (Meyrose et al., 2018; Reiss, 2013) and reduce their academic performance (Martins & Veiga, 2010; Organisation for Economic Co-operation and Development [OECD], 2016). Furthermore, children of lower-educated parents are more likely to attend schools with children from similar parental education backgrounds (European Commission, 2018, 2020; Netherlands Inspectorate of Education, 2018; OECD, 2016). Attending schools with a higher proportion of children from lower parental education backgrounds (i.e., lower parental education schools) may also – independently or in interaction with household education levels – hamper children's development (Musset, 2012; OECD, 2012; Stafford & Marmot, 2003). In light of such apparent inequalities, it is suggested that placing children of lower-educated parents in schools attended by a majority of children from higher parental education backgrounds (i.e., higher parental education schools) could overcome the potential disadvantage of growing up with lower-educated parents. Indeed, there is some empirical evidence with respect to academic achievement in support of this argument (Musset, 2012; OECD, 2012; Perry & McConney, 2010). Yet, in contrast to the effects of individual-level parental education, little is known about the associations of school-level parental education with children's behavioral, emotional, and peer relationship problem development. In addition, the potential effect of placing children of lower-educated parents in higher parental education schools remains largely untested. Therefore, this study examined whether growing up with lower-educated parents and attending lower parental education schools associated with children's initial level and development of problems within the behavioral, emotional, and peer relationship domains. Furthermore, we investigated whether the association of lower individual-level parental education with children's development within these three domains depended upon school-level parental education in first grade and over time from first grade to sixth grade.



**Theoretical Perspectives and Empirical Findings on Individual- and School-Level Parental Education and Child Development**

Problems within the behavioral domain (e.g., symptoms of conduct problems, oppositional defiant problems, aggression, attention-deficit and hyperactivity problems), problems within the emotional domain (e.g., anxiety and depression symptoms), and problems within the peer relationship domain (e.g., being disliked or bullied by peers) hinder children's healthy development (Dodge et al., 2008; Obradović et al., 2009 Timmermans et al., 2008; van Lier & Koot, 2010). Stable-high or increasing levels of problems within these domains may independently or in concert contribute to the development of mental health problems. This, in turn, may relate to concurrent and future consequences, such as lower educational achievement, delinquency, substance abuse, and unemployment (Kokko & Pulkkinen, 2000; Lynne-Landsman et al., 2010; McLeod & Kaiser, 2004; Vaillancourt et al., 2013; van Lier et al., 2012; Woodward & Fergusson, 2000).

Theories, such as the *social causation hypothesis*, may explain the influence of early adverse contexts on children's maladaptive development. According to the social causation hypothesis, mental health problems emerge due to environmental adversity, disadvantage, and stress associated with socioeconomic deprivation, including having lower-educated parents in childhood. Indeed, previous studies have provided empirical evidence consistent with this hypothesis (e.g., Hollingshead & Redlich, 1958; Hudson, 1988, 2005; Ritsher et al., 2001).

Several factors have been adduced to explain how growing up with lower-educated parents may be associated with poorer child developmental outcomes. For instance, it has been suggested that lower-educated parents may be less informed about effective parenting strategies, less able to help their children with their school work, have fewer educational materials and resources at home, and spend less time on activities that align with their children's respective developmental stages than higher-educated parents (Bradley & Corwyn, 2002; Hoff et al., 2002; Kalil et al., 2012; Lareau, 2003; Morawska et al., 2009; OECD, 2016). Additionally, lower-educated parents are more likely to have mental health problems, such as higher levels of depression symptoms (de Laat et al., 2018), than higher-educated parents. All these factors accompanying lower parental education levels may in turn associate with children's maladaptive development (e.g., de Laat et al., 2018; Hoff et al., 2002; Querido et al., 2002; Thompson et al., 2003; Wang & Sheikh-Khalil, 2014).

Previous empirical studies that examined the associations of growing up with lower-educated parents with children's behavioral, emotional, and peer relationship problems focused exclusively on the individual household level. Furthermore, with two exceptions (Meyrose et al., 2018; Schmiedeberg & Schumann, 2019), these empirical studies were cross-sectional in nature. These studies showed that children of lower-educated parents had (a) lower levels of psychological well-being (von Rueden et al., 2006); (b) higher levels of behavioral, emotional (Kalff et al., 2001; Meyrose et al., 2018), and psychosocial problems (de Laat et al., 2018); and (c) more peer relationship difficulties (Schmiedeberg & Schumann, 2019) than children of higher-educated parents.

Apart from growing up with lower-educated parents (i.e., individual-level parental education), there is reason to believe that the aggregate parental education compositions at the *school level* may also associate with children's emotional, behavioral, and peer relationship problems. This is consistent with the ecological model of Bronfrenbrenner, which proposes that risk-factors at multiple levels (i.e., both proximal, such as children's home environment, as well as more distant, such as the school environment) may affect child development (Bronfrenbrenner, 1979, 1994). Children of both lower- and higher-educated parents are likely to attend elementary schools with a relatively high percentage of children from similar parental education backgrounds (European Commission, 2018, 2020; Netherlands Inspectorate of Education, 2018). Compared to higher-educated parents, lower-educated parents may have less access to information

on school characteristics (e.g., school quality assessment, achievement scores, student characteristics) and have fewer resources – monetary or logistic – to place their children in a school they prefer (Owens et al., 2016). They are also less likely to live in or commute to neighborhoods where schools with higher socioeconomic status (SES) are located (Granvik Saminathen et al., 2019; Karsten et al., 2003). Owing to the relatively homogeneous school compositions, the risk associated with growing up with lower-educated parents may be - to some extent - compounded with similar risks at the school level. Therefore, in investigating the associations of lower parental education with children's development within the behavioral, emotional, and peer relationship domains, we need to consider the possibility that this factor may operate at multiple levels and model it as such to prevent misleading conclusions.



In the Netherlands, where this study was conducted, lower parental education schools are defined as schools with higher proportions of children with lower-educated parents (Netherlands Inspectorate of Education, 2015). Attending lower (and higher) parental education schools may relate to children's developmental outcomes due to the characteristics of these schools. For instance, research shows that schools with lower socioeconomic compositions (a measurement closely related to parental education; Bradley & Corwyn, 2002) have, on average, less effective management and leadership, lower academic expectations of students, teachers with more mental health problems and lower qualifications, less supportive teacher-student relationships, and poorer parent-school alignment when compared to schools with higher socioeconomic compositions (Crosnoe, 2009; Granvik Saminathen et al., 2019; OECD, 2012, 2016; Owens et al., 2016; Thrupp et al., 2002; Virtanen et al., 2007).

Although, to our knowledge, previous research did not specifically focus on the effect of school-level parental education on child development, a few studies examined various school-level SES indicators, such as percentage of children qualifying for free lunch or receiving income assistance. These studies, which adjusted for individual-level SES, found that children in lower SES elementary schools had more behavioral and emotional problems (Flouri & Midouhas, 2016; Papachristou et al., 2020) and were subjected to higher levels of physical victimization by peers (Leadbeater et al., 2003) than children in higher SES elementary schools. Therefore, the abovementioned studies lend prima facie support to the hypothesis that school-level parental education, an indicator of SES (Bradley & Corwyn, 2002), may associate with children's development independently of individual-level parental education.

**The Interplay Between Individual- and School-Level Parental Education**

Aside from the independent contributions of individual- and school-level parental education, a largely unanswered question is whether the associations of lower individual-level parental education with children's behavioral, emotional, and peer relationship development across the elementary school period may depend upon school-level

parental education. One proposed avenue to counter the potential adverse effects of growing up with lower-educated parents, specifically for academic achievement, has been to place disadvantaged children in advantaged schools (Musset, 2012; OECD, 2012), insofar as the latter have better resources and more favorable characteristics. That is, the favorable management, teacher quality, school norms, and parent-teacher alignment characteristics of more advantaged schools may promote the positive development of children growing up with lower-educated parents (Crosnoe, 2009; Granvik Saminathen et al., 2019; OECD, 2012, 2016; Owens et al., 2016; Thrupp et al., 2002; Virtanen et al., 2007).

However, it is unclear whether placing children of lower-educated parents in higher parental education schools does indeed benefit their development. For instance, the local social inequality model (Stafford & Marmot, 2003) posits that disparities between individual and area SES may lead to mental health problems. Within the school context, expectations and social norms in higher parental education schools may conflict with those that children of lower-educated parents grow up with, resulting in social misfit (Wright et al., 1986). Similarly, the low proportions of children of lower-educated parents in higher parental education schools may lead to stigmatization and consequently to disengagement, isolation, and rejection of school norms (Crosnoe, 2009; Marsh & Hau, 2003; Moore et al., 2017; Stouffer et al., 1949). In agreement with these perspectives, efforts to place disadvantaged children in advantaged schools may be criticized for not reducing (or even increasing) the existing inequalities, but the basis of this critique has only been addressed with respect to academic achievement (Musset, 2012; OECD, 2012).

To our knowledge, there are no empirical studies examining school-by-individual interaction effects on behavioral, emotional, and peer relationship development across the elementary school period. However, there are a few studies that have focused on the mid-adolescence period. These studies found that lower SES adolescents attending higher SES schools reported less subjective well-being (Moore et al., 2017) and more psychosocial problems (Crosnoe, 2009) than those attending lower SES schools. Similarly, ninth graders living in disadvantaged areas who commuted to higher SES schools reported lower school satisfaction and more psychological problems than those attending schools in their own lower SES school district (Granvik Saminathen et al., 2019). Nevertheless, two studies focusing on children's emotional and behavioral problems found no interaction between school and individual SES but found that lower individual and school SES were associated with emotional and behavioral problems (Flouri & Midouhas, 2016; Papachristou et al., 2020). Taken together, these studies highlight the need for a closer examination of whether and how school- and individual-level parental education may interact to explain children's development within the behavioral, emotional, and peer relationship domains across the elementary school period.

**The Present Study**

This study aimed to extend previous research by disentangling the unique associations of individual- and school-level parental education and by testing main effects and school-by-individual level interactions on children's problem development within the behavioral, emotional, and peer relationship domains from first grade to sixth grade. To do this, we investigated a total of nine constructs: four constructs within the behavioral domain (i.e., conduct problems, oppositional defiant problems, attention-deficit and hyperactivity problems, and aggression), two within the emotional domain (i.e., depression and anxiety) and three within the peer relationship domain (i.e., relational victimization, physical victimization, and peer dislike). Annual reports from teachers and classroom peers were used to account for the shared, but also the unique, perspectives of teachers and peers on these nine constructs, leading to a total of 15 outcome variables (See Appendix A, Figure 1). Specifically, we tested whether lower individual- and school-level parental education were associated with the 15 outcome variables within the behavioral, emotional, and peer relationship domains in first grade and over time from first to sixth grade. Furthermore, we tested whether the association between lower individual-level parental education with the 15 outcome variables depended upon school-level parental education.



We hypothesized that children of lower-educated parents and children in lower parental education schools would have higher levels of problems within the behavioral, emotional, and peer relationship domains in first grade. Furthermore, because this study is, to our knowledge, novel in the way it follows children annually from first to sixth grade of elementary school and in the way that it examines associations of parental education at both the individual and school levels with the initial level and development of the outcome variables, we could not formulate strong hypotheses regarding associations of parental education with the developmental patterns of difficulties within the three domains. However, since parental education has been shown to retrospectively predict the persistency and severity of mental health problems in different life-course stages (McLaughlin et al., 2011), we tentatively hypothesized that lower parental education at both levels would associate with either a faster growth rate or not associate with growth at all. We did not expect that lower parental education would associate with a slower growth rate (or faster rate of decrease) in children's problems within the emotional, behavioral and peer relationship domains. Finally, because the existing evidence for interactive associations was mixed, we could not formulate specific hypotheses on the direction of potential interaction effects in first grade or over time.

## Method

### Participants

Participants came from a larger longitudinal research project on the behavioral, emotional, and social development of children followed across the elementary school period. Children were recruited from 31 mainstream elementary schools located in the Netherlands and were assessed annually from first to sixth grade of elementary school.

Inclusion criteria for the present study were having (a) parental consent, (b) data on individual- and school-level parental education, and (c) at least two completed waves of teacher- and peer-reported data between first grade and sixth grade. In total, out of 1,084 children who consented to participate, 740 children had available information on individual- and school-level parental education. Out of the 740 children, 698 children had at least two completed waves of teacher- and peer-reported data. Thus, the final sample resulted in 698 children (51% girls). Excluded children did not differ from included children with regard to gender distribution, $\chi^2(1) = 1.68$, $p = .20$. However, except for peer-reported anxiety, peer-reported depression, and peer-reported physical victimization, excluded children showed significantly higher levels of problems (i.e., higher average mean values across six years) on all outcome variables within the behavioral, emotional, and peer relationship domains as compared to included children (all $p$s $< .05$). Effect sizes of these differences were small (all $\eta^2 \leq .02$; $\eta^2 < .09$ = small effect size according to Salkind›s, 2010, definition of effect sizes in behavioral sciences).

Of the 698 children in our study, teacher-reported data were complete for 57% (i.e., across six waves); 13% had one, 14% two, 10% three, and 6% had four waves of missing data. Peer-reported data were complete for 59%; 10% had one, 11% two, 8% three, and 12% had four waves of missing data. Children stayed in the same elementary school across the six studied years. Children who moved away from the schools were lost to follow-up. Participants with complete data (85% higher educated) differed from participants with incomplete data (75% higher educated) with respect to individual-level parental education, $\chi^2(2) = 12.49$, $p = .002$. Participants who had complete data had on average somewhat lower scores in the outcome variables as compared to participants with missing data, except for peer-nominated depression and anxiety. However, the effect sizes of these differences were small, $\eta^2 \leq .075$ (Salkind, 2010).

At the first assessment, children were on average 7.08 years old ($SD = 0.51$). Parent reports showed that 62% of the children were from Dutch/Western backgrounds, which was determined by both parents being born in the Netherlands or in a Western country. Thirty-two percent of these children were from lower- and 72% were from higher-educated households. The remainder of the sample had at least one parent born in a non-western country (e.g., Morocco, Suriname), with 68% from lower- and 28% from higher-educated households.

**Procedure**

The data used in the present study were collected annually from the Spring of 2005 (Grade 1) to the Spring of 2010 (Grade 6). The yearly assessments were conducted towards the end of each school year (i.e., in Spring) to ensure that teachers and classroom peers were well acquainted with each child's behavioral, emotional, and peer relationship difficulties. Parents were asked to provide a signed parental consent form at the start of the study, were informed about the data collection plans each year, and could withdraw their consent for their child's participation at any time. Children were informed that they could stop participating at any time during the study. Parental education data were obtained through interviews conducted during home visits to families. Teacher-rated data were obtained by interviews at schools, where teachers responded to questionnaires concerning each child's behavioral and emotional adjustments and peer relationships. Note that in the Netherlands children generally have a different teacher in each grade; thus, data were collected from different teachers across the elementary school years. Peer-rated data were obtained in classrooms by asking children to nominate peers who fit descriptions of behavioral, emotional, and peer relationship difficulties. All interviews were conducted by (under)graduate psychology students who were trained by the lead investigators to conduct at-home and in-school interviews during a 1-day training course. More details about the study design and procedures are provided elsewhere (e.g., Evans et al., 2018; Witvliet et al., 2009)



**Measures**

*Individual-Level Parental Education*

Individual-level parental education was based on children's parents' education levels. The education level of the mother and the father of each participant was reported by the primary caregiver during home visit interviews either in 2005 or 2007. Educational levels were rated according to the Dutch Standard Education Classifications (Statistics Netherlands, 2008), which corresponds to the International Standard Classification of Education (ISCED; UNESCO Institute for Statistics, 2012). Following the ISCED classifications, parental education levels were coded using an 8-point scale, with education levels including the following: 0 = *no education/early education,* 1 = *primary education*, 2 = *lower secondary education* (e.g., junior secondary school, middle school, junior high school), 3 = *upper secondary education* (e.g., senior secondary school, [senior] high school), 4 = *post-secondary non-tertiary education* (e.g., technician diploma, primary professional education), 5 = *short-cycle tertiary education* (e.g., [higher] technical education, higher/advanced vocational training, associate degree), 6 = *bachelor's degree or equivalent*, and 7 = *master's degree, equivalent or higher*. In this study, individual-level parental education was based on the highest completed parental education level per household. That is, if a child had one parent with upper secondary education (i.e., 3) and another parent with a bachelor's degree (i.e., 6), then we coded this child's parental education

with bachelor's degree (i.e., 6). The individual-level parental education levels were reverse coded so that higher scores indicated lower individual-level parental education.

*School-Level Parental Education*

School-level socio-economic inequalities are measured by parental education levels in the Netherlands (Netherlands Inspectorate of Education, 2015). In each school, parental education levels were obtained from parents who reported their highest completed education level when their children entered elementary school. Based on the parental education data of each school, the Netherlands Inspectorate of Education (2015) assesses the school-level parental education levels by calculating the per-school percentage scores of children of low-educated parents. Low-education refers to either both parents completing no more than elementary school education or one parent completing no more than elementary education and the other parent completing no more than lower level secondary education (i.e., practical training or basic/middle-management track of preparatory vocational secondary education). Based on these percentages, the inspectorate identifies schools that qualify for additional governmental resources. The per-school percentage scores of parental education levels are publicly available in the Netherlands (www.duo.nl). Thus, in the present study, low school-level parental education was determined by the per-school percentage score of children of low-educated parents of the entire school population, not just the children included in this study. The scale of school-level parental education ranged from 0%–100%, with higher percentages indicating a higher percentage of children of low-educated parents in the school. School-level parental education scores were Z-standardized to ease interpretation.

*Teacher-ratings of Children's Problems Within the Behavioral and Emotional Domains*

Teacher-ratings of children's problems within the behavioral and emotional domains were obtained with the Problem Behavior at School Interview (PBSI; Erasmus, 2000). The PBSI is a 39-item questionnaire that is administered via interview. The PBSI uses a 5-point Likert scale ranging from 0 (*never applicable*) to 4 (*often applicable*) to measure the levels of problems within the *behavioral domain,* namely conduct problems, oppositional defiant problems, and attention-deficit and hyperactivity problems, as well as those within the *emotional domain,* namely anxiety and depression symptoms. Conduct problems were assessed by 12 items (e.g., "Destroys someone's property", "Starts fights"; Cronbach's α range across Grades 1–6: α = .88–.93). Oppositional defiant problems were assessed by 7 items (e.g., "Is disobedient", "Is rebellious"; Cronbach's α range = .86–.91). Attention-deficit and hyperactivity problems were assessed by 8 items (e.g., "Is impulsive", "Easily distracted"; Cronbach's α range = .85–.91). Anxiety symptoms were assessed by 5 items (e.g., "Is fearful", "Is anxious"; Cronbach's α range = .63–.84). Depression symptoms were assessed by 7 items (e.g., "Cries or is sad at school", "Feels inferior"; Cronbach's α range = .76–.84). Higher scores indicated higher levels of problems within the behavioral or emotional domain. A previous study within the same sample showed the convergent validity of the PBSI by estimating the correlations between the behavioral and emotional

scales of the PBSI and the Teacher's Report Form (Achenbach, 1991). The correlations for behavioral problems were .75 ($p < .01$) and were .55 for emotional problems ($p < .01$) (Witvliet et al., 2010).

*Teacher-ratings of Children's Problems Within the Peer Relationship Domain*

Teacher-ratings of children's problems within the peer relationship domain, such as physical and relational victimization, were obtained using the Social Experience Questionnaire-Teacher Report (SEQ-T; Cullerton-Sen & Crick, 2005). Physical victimization was measured by 3 items (e.g., "Gets kicked or beaten by classmates", "Physically threatened by classmates"; Cronbach's α range = .81–.90). Relational victimization was also measured by 3 items (e.g., "Excluded when a classmate is angry with him or her", "Ignored when a classmate is angry with him or her"; Cronbach's α range = .87–.92). The SEQ-T uses a 5-point Likert scale ranging from 0 (*never*) to 4 (*almost always*). Higher scores indicated higher levels of physical and relational victimization.



**Measurement invariance** was tested for teacher ratings of the outcome variables within the behavioral, emotional, and peer relationship domains to assess whether the comparisons at the individual level and at the school level were meaningful. That is, at the individual level we tested whether the mean differences between children of lower- and higher-educated parents reflected true mean differences in each outcome rather than rater (i.e., teacher) differences. At the school level we tested whether the mean differences between children in lower parental education schools and in higher parental education schools reflected true mean differences in each outcome variable rather than rater differences. To do this, we used the multiple indicator, multiple cause (MIMIC) approach to test for differential item functioning due to individual- and school-level parental education on the intercept. Overall, our results mostly showed positive associations of lower individual- and lower school-level parental education with the item intercepts of the outcome variables. This indicates that the thresholds for teachers to rate children of lower-educated parents and in lower parental education schools as having higher problems is lower than the thresholds for children of higher-educated parents and in higher parental education schools. However, the effects of the measurement invariance violations of individual- and school-level parental education were all negligible to small. More information regarding the methods of measurement invariance testing, its results and interpretations can be found in Supplementary Material (Supplementary Method and sTables 1-22).

*Peer-reports of Children's Problems Within the Behavioral, Emotional, and Peer Relationship Domains*

Peer-reports of children's problems within the behavioral, emotional, and peer relationship domains were obtained annually via peer-nominations. Children were asked to nominate classmates who fit the following problems within the *behavioral domain* descriptions: "Who starts fights?" and "Who hits other children?" (i.e., aggression), "Who

has difficulty obeying school rules?" (i.e., oppositional defiant behavior), "Who cannot sit still in class?" (i.e., attention-deficit and hyperactivity). Within the *emotional domain*, descriptions included: "Who is quickly scared?" (i.e., anxiety), "Who gets sad easily?" (i.e., depression symptom). Within the *peer relationship domain*, descriptions included: "Who gets beaten up?" (i.e., physical victimization), "Who is the target of gossiping?" (i.e., relational victimization), and "Who do you like the least?" (i.e., being disliked). The metric used to compute the peer-reported outcomes calculated the proportion of received nominations for each outcome. For example, if in a classroom of 16 students, 10 peers nominated peer X as aggressive, then peer X's individual-received-peer-nomination score would be 0.66 (10 ÷ (16-1); self-nomination was not allowed). The scores ranged from 0 (*no nominations*) to 1 (*nominated by all classmates*). Higher scores indicated more problems.

*Control Variables*

Gender was dummy coded as 0 = *girl* and 1 = *boy* and was used as a control variable to account for potential differences in initial levels and development of problems within the behavioral, emotional, and peer relationship domains between boys and girls.

Intervention status was coded as 0 = *control* and 1 = *intervention* and was controlled for because our data came from a study which tested the effectiveness of a classroom management intervention program (the Good Behavior Game [GBG]; Barrish et al., 1969), which was implemented in 21 schools (randomly assigned) during Grades 1–2. Schools were free to implement the GBG or any other intervention after the first 2 years and this was no longer monitored (Witvliet et al., 2009a).

Cluster size (i.e., number of participating children per school) was used to account for the unequal cluster sizes. In our sample, there were on average 22 participating children per school (*SD* = 17.66, range = 6–101, mode = 15, median = 18). Cluster size was grand-mean centered to ease interpretation as the intercepts now reflect the intercept-estimate at the mean school size in our sample.

## Statistical Approach

To test the hypotheses, multi-level latent growth curve models (ML-LGMs) were used. In our ML-LGMs, the latent intercept represented the initial level of problems towards the end of first grade and the latent slope represented rate of change over time from first grade to sixth grade. Our ML-LGMs had a 2-level time-nested-within-individual data structure. Level 1 represented variation across individuals and Level 2 represented variation across schools. Given the complexity of our models and limited number of schools, we could not study multiple outcome variables in concert due to convergence problems. Therefore, separate ML-LGMs were fitted for each of the 15 outcome variables in Mplus version 8.0 (Muthén & Muthén, 2017a).

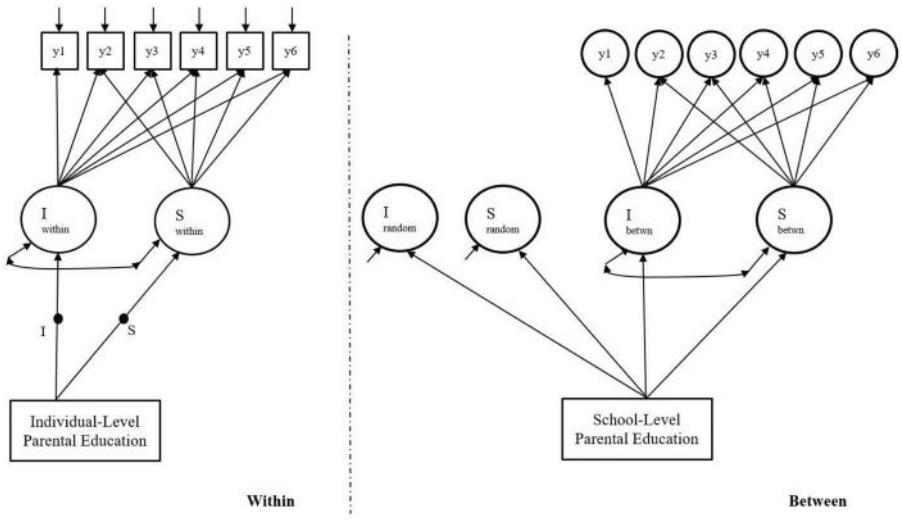
Before fitting our ML-LGMs in Mplus, we tested whether accounting for school-level clustering was needed. To do this, we calculated design effects of school-level clustering (Design Effects = 1+ ($n_c$ -1)*ICC*; Peugh, 2010). Design effect values larger than 2.00 suggest a need for multi-level modeling (Peugh, 2010). For the outcome variables that needed a 2-level structure, we tested the main effect associations of individual- and school-level parental education. Furthermore, we tested whether we could run cross-level interactions between individual- and school-level parental education on the outcome variables. A graphical representation of the model can be seen in Figure 1.

To test for possible cross-level (school-to-individual) interactions, we first considered a (potential) random intercept and a random slope in which the intercept and slope of the outcome variables were regressed on individual-level parental education. Then, on the between level, we inspected whether these (potential) random intercepts and random slopes varied due to our cluster variable 'school' (indicated by improved model fit when adding a random intercept and, or random slope to the model; see Table 2). If the model fit improved when random intercept and/or random slope parameters were added, this indicated that the effects of individual-level parental education on the intercept and/or slope parameters of the outcome variables varied by schools (and are therefore random instead of fixed).



**Figure 1**

*The Graphical Representation of the Multi-level Latent Growth Model with Random Intercept and Random Slope to Test for Cross-level Interactions Between Individual- and School-level Parental Education*




*Note.* $I_{within}$ = intercept at the within level. $S_{within}$ = slope at the within level. $I_{betwn}$ = intercept at the between level. $S_{betwn}$ = slope at the between level. $I_{random}$ = random intercept. $S_{random}$ = random slope. Random intercept and random slope were placed at the individual level reflecting the cross-level interactions at the between level.

Next, we tested whether the (potential) variation in the random intercepts and slopes due to the cluster variable school could be explained – in part – by school-level parental education. This was done by regressing the random intercept or random slope on school-level parental education at the between level. A significant cross-level interaction of the random intercept parameter would suggest that the magnitude and direction of the association between individual-level parental education and children's behavioral, emotional, and peer relationship problems towards the end of first grade depended on school-level parental education. Cross-level interaction of the random slope parameter would imply that the magnitude and direction of the association between individual-level parental education and the development of children's behavioral, emotional, and peer relationship problems across the six elementary school years depended on school-level parental education. When significant, the cross-level interactions were probed by estimating the associations of individual-level parental education with the intercept and/or slope parameters in higher parental education schools (*M* - 0.5 *SD*), and in lower parental education schools (*M* + 0.5 *SD*).

Maximum likelihood estimation with robust standard errors (MLR-estimator) was used to account for the possible non-normal distribution of data. Deviations from normality were all within the normal range of values per outcome variables across 6 years (Skewness range = 0.50 – 2.54; Kurtosis range = -0.28 – 8.87). Missing data were handled using Full Information Maximum Likelihood (FIML) estimations (Muthén & Muthén, 2017b). Associations of parental education were controlled for children's gender at the within level and intervention status and school size at the between level. Model fit values were determined for the within and between level using Chi-Square Test of Model Fit, as well as the Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) with critical values $\geq$ 0.90 (Bentler & Bonett, 1980), Root Mean Square Error of Approximation (RMSEA, critical value $\leq$ .08; Marsh et al., 2004) and Standardized Root Mean Residual (SRMR, critical value $\leq$ 0.08; Asparouhov & Muthén, 2018). For cluster sizes smaller than 100, the between-level SRMR cut-off value of 0.08 is considered too strict (Asparouhov & Muthén, 2018). Therefore, Satorra-Bentler Chi-Square Difference tests were used to test the between level models to ensure that model fit at the between level was acceptable for each outcome (see Asparouhov & Muthén, 2018). Mplus code and output files are available in OSF (https://osf.io/u6wpe/?view_only=6375c7dd92f5410b938ed8bc6b2d7c2b).

## Results

### Descriptive Statistics of Individual- and School-Level Parental Education

At the individual-level, 14% of parents had a master's degree, equivalent or higher; 21% had a bachelor's or equivalent degree; 26% had short-cycle tertiary education; 7% had post-secondary tertiary education; 13% had upper secondary education; 10% had lower secondary education; 7% had primary education; and 2% had early childhood education. The percentage of those having completed at most primary education in

our sample was lower than the general population around the beginning of the study (13.00%; Statistics Netherland, 2004) and equal to the current estimates (9.00%; Statistics Netherland, 2018). At the school-level, the mean percentage score of low school-level parental education was 16.41% (range = 0.00%–76.49%, *SD* = 19.18%). Although the range was similar, the mean lower-education percentage score of the schools in the present study was higher than the overall mean percentage score of schools in the Netherlands (*M* = 5.54%, *SD* = 10.89%, range = 0.00%–77.18%; www.duo.nl). The correlation between individual-level parental education and school-level parental education was positive and moderate in magnitude ($r = .41$, $p < .001$), indicating a tendency toward similar individual- and school-level parental education backgrounds.



**Unconditional Growth Models of Problem Development Within the Behavioral, Emotional and Peer Relationship Domains**

Intra-class correlations, model fit indices, and means and variances of intercepts and slopes of the unconditional ML-LGMs are presented in Table 1. Design effects were larger than 2.00 for all outcome variables except for peer-nominated depression (1.61) and oppositional problems (1.84), suggesting a need for using a 2-level structure to analyze the data for all but these two outcome variables (see Table 2). Overall, the model fit values were acceptable for all 15 outcome variables at the within and the between levels.

The significant positive slope parameter means of the unconditional ML-LGMs in Table 1 indicated an increase in teacher-reported depression symptoms, peer-reported anxiety, peer-reported peer dislike, and peer-reported attention-deficit and hyperactivity problems over time. The non-significant slope parameter means of the remaining outcome variables indicated stable levels over time. The majority of the variances of the intercept and slope parameters of the outcome variables at both individual and school levels were significant, indicating that there was significant variability in first grade and in growth rates over time.

To test for possible cross-level interactions, model fit difference testing of multi-level modeling with random intercepts, random slopes, and random intercept and random slopes versus fixed effects were administered. Satorra Bentler Chi-Square Difference tests showed that fitting random intercepts and/or random slopes improved the model fit of seven of the 15 outcome variables (see Table 2). More specifically, fitting both random intercept and random slope resulted in improved model fit of three outcome variables: (a) teacher-reported oppositional defiant problems, (b) teacher-reported attention-deficit and hyperactivity problems, and (c) peer-reported anxiety. Fitting random intercept only improved the model fit of teacher-reported conduct problems and peer-reported attention-deficit and hyperactivity problems. Fitting random slope only improved the model fit of teacher-reported depression symptoms and peer-reported dislike.

**Table 1**

*ICC, Model Fit Indices and Means and Variances of Growth Parameters of the Unconditional Multi-level Latent Growth Models*

| | ICC | Model Fit Indices Within | | | | | | Model Fit Indices Between | | | | | | Mean | | Variance (within/between) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | χ2 | df | RMSEA | CFI | TLI | SRMR | χ2 | df | RMSEA | CFI | TLI | SRMR | I | S | I | S |
| **Behavioral Domain** | | | | | | | | | | | | | | | | | |
| Conduct problems (T) | .10-.23 | 24.29** | 21 | .015 | .995 | .993 | .029 | 52.64** | 19 | .051 | .952 | .924 | .170* | .535** | .002 | .161** / .042** | .004* / .003* |
| Aggression (P) | .01-.13 | 89.64** | 17 | .081 | .935 | .885 | .045 | 75.61** | 18 | .070 | .948 | .914 | .181* | .142** | .001 | .036** / .001 | .001** / .000 |
| OD problems (T) | .10-.26 | 32.45** | 21 | .028 | .989 | .984 | .025 | 35.58** | 18 | .038 | .983 | .971 | .179* | .875** | .023 | .310** / .063** | .007** / .004* |
| OD problems[a] (P) | - | 47.73** | 16 | .055 | .965 | .967 | .064 | - | - | - | - | - | - | .135** | .000 | .027** / - | .001** / - |
| ADH problems (T) | .05-22 | 30.72** | 21 | .026 | .992 | .989 | .025 | 90.31** | 19 | .074 | .942 | .909 | .377* | 1.025** | .036 | .472** / .135* | .009** / .012** |
| ADH problems (P) | .01-.06 | 40.65** | 11 | .064 | .968 | .942 | .031 | 64.07** | 15 | .071 | .947 | .929 | .422* | .145** | .008* | .019** / .000 | .001** / .000 |
| **Emotional Domain** | | | | | | | | | | | | | | | | | |
| Anxiety (T) | .10-.32 | 26.56** | 18 | .026 | .982 | .970 | .044 | 69.17** | 18 | .064 | .889 | .814 | .275* | .894** | .040 | .164** / .095** | .002/ .015** |
| Anxiety (P) | .04-.12 | 68.28** | 17 | .068 | .924 | .866 | .052 | 56.23** | 18 | .057 | .943 | .906 | .185* | .081** | .004* | .002** / .001* | .000** / .000 |
| Depression sympt. (T) | .12-.31 | 25.80 | 16 | .030 | .978 | .959 | .040 | 63.69** | 18 | .061 | .899 | .832 | .282* | .728** | .043* | .125** / .105** | .003** / .009** |
| Depression sympt.[a] (P) | - | 66.34** | 15 | .072 | .919 | .919 | .071 | - | - | - | - | - | - | .079** | .003 | .006** / - | .001** / - |
| **Peer Relationship Domain** | | | | | | | | | | | | | | | | | |
| Physical vict. (T) | .11-.34 | 9.42 | 12 | .000 | 1.00 | 1.03 | .014 | 13.51 | 12 | .013 | .991 | .984 | .152 | .523** | -.027 | .089** / .082** | .008** / .008** |
| Physical vict. (P) | .18-.30 | 2.47 | 8 | .000 | 1.00 | 1.07 | .014 | 23.22* | 11 | .046 | .941 | .892 | .250* | .159** | -.002 | .006** / .004** | .001** / .000** |
| Relational vict. (T) | .20-.38 | 7.63 | 13 | .000 | 1.00 | 1.08 | .037 | 16.11 | 11 | .026 | .950 | .909 | .212* | .588** | .011 | .107** / .048 | .008 / .008* |
| Relational vict. (P) | .17-.30 | 51.08** | 14 | .070 | .878 | .826 | .034 | 40.66** | 11 | .071 | .903 | .823 | .166* | .161** | .005 | .001* / .002* | .000** / .001** |
| Being Disliked (P) | .03-.18 | 42.65** | 14 | .055 | .961 | .944 | .026 | 48.11** | 13 | .064 | .950 | .924 | .284* | .168** | .011** | .015** / .000 | .001** / .000 |

*Note.* (T) = Teacher report. (P) = Peer report. I = Intercept. S = Slope. OD problems = Oppositional Defiant problems. ADH problems = Attention-Deficit and Hyperactivity problems. sympt. = symptoms. vict = victimization. "a" = outcomes for which multi-level modeling is not needed. Within-level fit indices were derived by saturating the between level. Between-level fit indices were derived by saturating the within level (Hsu et al., 2019). When cluster size at the between level is small, between-level SRMR values may be above the cut off value of .08. In such cases, Satorra-Bentler Chi-Square Difference Tests using Loglikelihood were used to test whether the models at the between level were well fitting (see Asparouhov & Muthén, 2018). The ˙ next to the SRMR value at the between level suggests that the results from Satorra-Bentler Chi-Square Difference Tests do not reject the null hypotheses and thus suggests that the between level models are acceptable. Growth trajectories other than linear were explored and the linear model fit was better for all cases. Even when the variance in the slope growth factor is close to zero, the addition of the covariates may show that they significantly explain variation in the slope. ˙$p < .05$. ¨$p < .01$.

**Table 2**

*Model Fit Difference Testing of Multi-level Modeling with Random Intercept Only, Random Slope Only, and Random Intercept and Random Slope versus Fixed Effects*

| | Design Effects | Fixed Effects Model | | | Fixed Effect vs Random Intercept Only Model | | | | Random Intercept Only vs Random Intercept + Random slope | | | | Fixed Effects vs Random Slope Only | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *AIC* | *BIC* | *aBIC* | *AIC* | *BIC* | *aBIC* | $\chi^2$(df) | *AIC* | *BIC* | *aBIC* | $\chi^2$(df) | *AIC* | *BIC* | *aBIC* | $\chi^2$(df) |
| **Behavioral Domain** | | | | | | | | | | | | | | | | |
| Conduct problems (T) | 4.18 | 4186 | 4281 | 4215 | **4181** | **4281** | **4211** | **5.52(1)*** | 5599 | 5703 | 5630 | -82(2) | - | - | - | - |
| Aggression (P) | 2.59 | **-3557** | **-3454** | **-3527** | -3557 | -3450 | -3526 | 2.24(1) | - | - | - | - | -3555 | -3447 | -3524 | .14(1) |
| OD problems (T) | 4.24 | 6648 | 6748 | 6678 | 6643 | 6747 | 6674 | 22.00(1)** | **6645** | **6754** | **6678** | **13(1)**** | - | - | - | - |
| OD problems[a] (P) | 1.84 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ADH problems (T) | 3.19 | 7387 | 7483 | 7416 | 7386 | 7486 | 7416 | 8.80(1)** | **7388** | **7493** | **7420** | **4.18(1)*** | - | - | - | - |
| ADH problems (P) | 2.05 | -2545 | -2464 | -2521 | **-2542** | **-2457** | **-2517** | **7.54(1)**** | # | # | # | # | - | - | - | - |
| **Emotional Domain** | | | | | | | | | | | | | | | | |
| Anxiety (T) | 5.57 | **6720** | **6833** | **6754** | 6722 | 6840 | 6757 | .02(1) | - | - | - | - | 6721 | 6839 | 6757 | .53(1) |
| Anxiety (P) | 2.57 | -5935 | -5827 | -5903 | -5957 | -5836 | -5922 | 67.26(1)** | **-5959** | **-5833** | **-5922** | **7.09(1)**** | - | - | - | - |
| Depression sympt. (T) | 5.83 | 6072 | 6195 | 6109 | 6069 | 6196 | 6108 | 2.66(1) | - | - | - | - | **6070** | **6197** | **6108** | **14.39(1)**** |
| Depression sympt.[a] (P) | 1.61 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Peer Relationship Domain** | | | | | | | | | | | | | | | | |
| Physical vict.(T) | 5.91 | **4369** | **4473** | **4400** | 4370 | 4479 | 4402 | .49(1) | - | - | - | - | 4371 | 4480 | 4404 | 1.28(1) |
| Physical vict. (P) | 4.79 | **-3416** | **-3296** | **-3385** | -3413 | -3289 | -3381 | 3.42(1) | - | - | - | - | # | # | # | # |
| Relational vict. (T) | 6.42 | **5860** | **5965** | **5892** | 5859 | 5968 | 5892 | 2.82(1) | - | - | - | - | 5859 | 5968 | 5892 | 2.76(1) |
| Relational vict. (P) | 5.19 | **-4716** | **-4609** | **-4688** | # | # | # | # | - | - | - | - | # | # | # | # |
| Being Disliked (P) | 2.85 | **-3118** | **-3124** | **-3191** | -3216 | -3317 | -3187 | .18(1) | - | - | - | - | **-3217** | **-3118** | **-3188** | **28.76(1)**** |

*Note.* (T) = Teacher report. (P) = Peer report. OD problems = Oppositional Defiant problems. ADH problems = Attention-Deficit and Hyperactivity problems. sympt. = symptoms. vict. = victimization. # = model did not converge. Satorra-Bentler Chi-Square Difference Tests using Loglikelihood were used to compare the fit of the models. Best fitting models are presented in bold. For the outcomes that had negative chi-square values when using the Satorra-Bentler Chi-Square Difference Tests, we computed strictly positive Satorra-Bentler Chi-Square Tests (see Asparouhov & Muthén, 2010). If negative chi-square values remained after using the strictly positive Satorra-Bentler Chi-Square Tests, we concluded that the addition of the random intercept or slope did not improve the model. This conclusion was based on the variances of the random intercepts or random slopes, which were low and on the AIC (Akaike, 1998), BIC (Schwarz, 1978), and aBIC (Sclove, 1987) values, where lower values of AIC, BIC, aBIC indicate a better model fit. "a" = models without multi-level structure. *$p < .05$. **$p < .01$.

**Individual- and School-Level Main Effect Associations of Parental Education**

Main effect associations of parental education were found on the intercept and/or slope parameters at the individual, school, or on both levels for 10 of the 15 outcome variables (see Table 3). Overall, all significant main effect associations suggested that in first grade, children of lower-educated parents or in lower parental education schools had higher initial levels of problems within the behavioral, emotional, and peer relationship domains than children of higher-educated parents or in higher parental education schools (i.e., individual- and/or school-level associations with the intercept parameters). Furthermore, and with the exception of one association (i.e., the individual-level slope parameter of peer-reported anxiety, which was negative), the positive associations between lower individual- and school-level parental education with the slope parameters of the outcome variables suggested a faster growth rate of problems for children of lower-educated parents and children in lower parental education schools than for children of higher-educated parents and children in higher parental education schools.

*Associations of Concurrent Individual- and School-Level Parental Education with the Outcome Variables*

The initial level in first grade and/or development of the outcome variables of teacher-reported conduct problems, teacher-reported oppositional defiant problems, peer-reported anxiety and peer-reported dislike were associated with both lower individual- and school-level parental education. Specifically, children of lower-educated parents had (a) higher initial levels of teacher-reported conduct problems, peer-reported anxiety, and peer-reported dislike in first grade; (b) a faster growth rate of teacher-reported conduct problems and teacher-reported oppositional defiant problems; and (c) a slower growth rate of peer-reported anxiety symptoms from first to sixth grade than children of higher-educated parents. Furthermore, children in lower parental education schools had (a) higher initial levels of teacher-reported conduct problems, teacher-reported oppositional defiant problems, and peer-reported anxiety in first grade; and (b) a faster growth rate over time in peer-reported dislike than children in higher parental education schools. No other main effect associations of concurrent individual- and school-level parental education were found.

*Associations of Individual-Level Parental Education Only with the Outcome Variables*

The initial levels and/or development of the outcome variables of teacher- and peer-reported attention-deficit and hyperactivity problems, peer-reported oppositional problems, teacher-reported physical victimization, and teacher-reported relational victimization were associated only with lower individual-level parental education. Children of lower-educated parents had (a) higher initial levels of peer-reported oppositional defiant problems, peer-reported attention-deficit and hyperactivity problems, teacher-reported physical victimization, and teacher-reported relational victimization in first grade; and (b) a faster growth rate of teacher-reported attention-deficit and hyperactivity problems

over time than children of higher-educated parents. No other main effect associations of individual-level parental education were found.

*Associations of School-Level Parental Education Only with the Outcome Variables*
The initial level of the outcome variable peer-reported aggression was only associated with lower school-level parental education. That is, children in lower parental education schools had higher initial levels of peer-reported aggression than children in higher parental education schools in first grade. No other main effect associations of school-level parental education were found.

**Cross-level Interactions Between Individual- and School-Level Parental Education**
Adding a random intercept and/or random slope resulted in better model fit for seven outcome variables, including (a) teacher-reported conduct problems, (b) teacher-reported oppositional defiant problems, (c) teacher- and peer-reported attention-deficit and hyperactivity problems, (d) teacher-reported depression symptoms, (e) peer-reported dislike, and (f) peer-reported anxiety symptoms (see Table 4). This indicated that for these outcome variables, the associations of lower individual-level parental education with the slope and/or intercept parameters varied between schools. However, as indicated by a significant cross-level interaction, only for teacher-reported depression symptoms was this variation between schools (partially) explained by school-level parental education ($B$ = - .007, $p$ = .007, 95% CI [-.012, -.002]).

Probing the cross-level interaction effect of the random slope at 0.5 *SD* above and below the mean of school-level parental education indicated that in higher parental education schools there was a significant and positive association between lower individual-level parental education and the development of depression symptoms ($B$ = .012, $p$ = .007, 95% CI [.003, .020]). That is, in higher parental education schools, children of lower-educated parents showed a faster growth rate of depression symptom levels than children of higher-educated parents from first to sixth grade. In lower parental education schools, no significant association between lower individual-level parental education and the development of depression symptoms was found ($B$ = .005, $p$ = .187, 95% CI [-.002, .012]). This suggests that in lower parental education schools the growth rate of depression symptoms between children of lower- and higher-educated parents did not differ over time. A visual representation of the cross-level interaction effect can be seen in Figure 2, in which the calculations of the developmental patterns of depression symptoms were depicted at 0.50 *SD* above and below the mean of individual- and school-level parental education.

**Table 3**

*Main Effect Associations of Individual- and School-Level Parental Education with Behavioral, Emotional, and Peer Relationship Development*

| | Within (Lower Individual-Level Parental Education) | | | | | | | | Between (Lower School-Level Parental Education) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intercept | | | | Slope | | | | Intercept | | | | Slope | | | |
| | *B* | *S.E.* | 95% CI | *R2* | *B* | *S.E.* | 95% CI | *R2* | *B* | *S.E.* | 95% CI | *R2* | *B* | *S.E.* | 95% CI | *R2* |
| **Behavioral Domain** | | | | | | | | | | | | | | | | |
| Conduct problems(T) | .038 | .016 | .007, .069* | .030 | .006 | .002 | .001, .011* | .026 | .093 | .039 | .017, .169* | .208 | .009 | .008 | -.008, .025 | .037 |
| Aggression (P) | .009 | .005 | -.001, .019 | .009 | .002 | .001 | -.001, .004 | .009 | .024 | .012 | .001, .047* | .729 | -.003 | .004 | -.011, .005 | .050 |
| OD problems (T) | .023 | .024 | -.025, .071 | .005 | .011 | .004 | .003, .018** | .055 | .120 | .052 | .019, .222* | .250 | .013 | .011 | -.009, .034 | .046 |
| OD problems [a] (P) | .016 | .003 | .009, .023** | .032 | .002 | .001 | .000, .004 | .010 | - | - | - | - | - | - | - | - |
| ADH problems (T) | .031 | .023 | -.014, .076 | .007 | .010 | .004 | .001, .019* | .035 | .042 | .081 | -.117, .202 | .009 | .007 | .022 | -.036, .049 | .004 |
| ADH problems (P) | .011 | .004 | .003, .018** | .012 | .000 | .001 | -.002, .003 | .000 | .009 | .008 | -.006, .024 | .627 | .005 | .004 | -.003, .012 | .232 |
| **Emotional Domain** | | | | | | | | | | | | | | | | |
| Anxiety (T) | -.009 | .015 | -.039, .021 | .002 | .002 | .004 | -.007, .010 | .004 | -.018 | .056 | -.128, .092 | .006 | .014 | .020 | -.026, .053 | .025 |
| Anxiety (P) | .005 | .002 | .001, .008** | .035 | -.003 | .001 | -.004,-.001** | .062 | .013 | .005 | .003, .024* | .373 | .000 | .002 | -.003, .003 | .000 |
| Depression sympt.[a](P) | .004 | .002 | .000, .008 | .009 | -.001 | .001 | -.003, .000 | .008 | - | - | - | - | - | - | - | - |
| **Peer Relationship Domain** | | | | | | | | | | | | | | | | |
| Physical vict. (T). | .035 | .010 | .015, .054** | .048 | -.002 | .003 | -.008, .003 | .005 | -.003 | .050 | -.101, .095 | .001 | .018 | .014 | -.010, .045 | .050 |
| Physical vict. (P) | .003 | .002 | .000, .007 | .012 | .000 | .001 | -.002, .002 | .001 | .015 | .009 | -.003, .034 | .113 | -.004 | .004 | -.013, .004 | .061 |
| Relational vict. (T) | .028 | .013 | .003, .054* | .027 | .001 | .005 | -.008, .010 | .000 | .108 | .073 | -.034, .250 | .289 | -.003 | .023 | -.048, .043 | .000 |
| Relational vict.(P) | .000 | .002 | -.004, .004 | .003 | .000 | .001 | -.002, .002 | .002 | .005 | .007 | -.009, .019 | .043 | .005 | .005 | -.004, .014 | .068 |
| Being Disliked (P) | .011 | .003 | .005, .018** | .026 | -.001 | .001 | -.004, .001 | .006 | .003 | .006 | -.009, .016 | .042 | .009 | .003 | .003, .016** | .656 |

*Note.* (T) = Teacher report. (P) = Peer report. OD problems = Oppositional Defiant problems. ADH problems = Attention-Deficit and Hyperactivity problems. sympt. = symptoms. vict. = victimization. CI = confidence intervals. "a" = models without multi-level structure. The regression coefficient *B* is unstandardized. $R^2$ values were estimated without covariates. In some cases, slope variances at the between level were small (see Table 1), which may lead to inflated between-level $R^2$ values. Therefore, the between-level $R^2$ values should be interpreted with caution. *$p < .05$. **$p < .01$.

**Table 4**

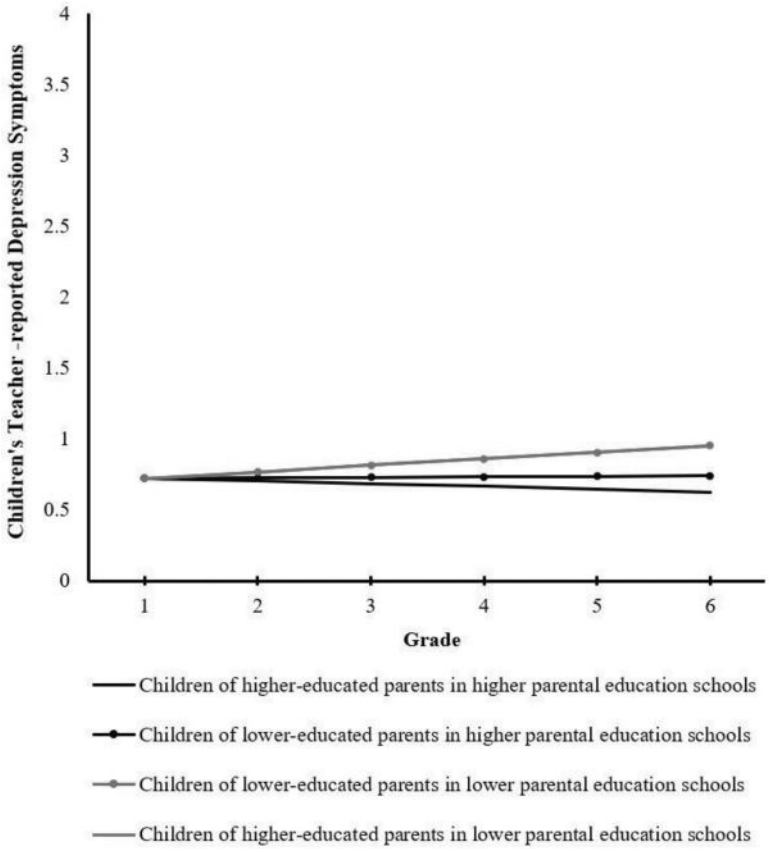
*Cross-level Interactions Between Individual- and School-Level Parental Education*

| | Within (Lower Individual-Level Parental Education) | | | | | | Between (Lower School-Level Parental Education) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Outcome** | **Intercept** | | | **Slope** | | | **Intercept** | | | **Slope** | | | **Random Intercept (cross-level interaction)** | | | **Random Slope (cross-level interaction)** | | |
| | ***B*** | ***S.E.*** | **95% CI** | ***B*** | ***S.E.*** | **95% CI** | ***B*** | ***S.E.*** | **95% CI** | ***B*** | ***S.E.*** | **95% CI** | ***B*** | ***S.E.*** | **95% CI** | ***B*** | ***S.E.*** | **95% CI** |
| **Behavioral D.** | | | | | | | | | | | | | | | | | | |
| CD (T) | - | - | - | .006 | .002 | .001,.011* | .117 | .036 | .047, .186** | .014 | .009 | -.002,.031 | -.008 | .011 | -.030, .014 | - | - | - |
| OD (T) | - | - | - | - | - | - | .137 | .050 | .038, .235** | .021 | .011 | -.001, .042 | -.011 | .019 | -.048,.026 | .002 | .003 | -.005,.009 |
| ADH (T) | - | - | - | - | - | - | .063 | .079 | -.092, .217 | .014 | .023 | -.031,.059 | -.013 | .019 | -.051,.024 | .005 | .003 | -.001,.012 |
| ADH (P) | - | - | - | .001 | .001 | -.001,.004 | .017 | .008 | .001, .033* | .005 | .004 | -.002, .012 | -.001 | .004 | -.008,.006 | - | - | - |
| **Emotional D.** | | | | | | | | | | | | | | | | | | |
| Anxiety (P) | - | - | - | - | - | - | .016 | .006 | .005, .027** | -.002 | .002 | -.005, .001 | -.003 | .001 | -.006,.000 | -.001 | .001 | -.003, .000 |
| Dep. (T) | .023 | .013 | -.003,.049 | - | - | - | .041 | .041 | -.038, .121 | .013 | .012 | -.011, .037 | - | - | - | -.007 | .003 | -.012,-.002** |
| **Peer Rela. D.** | | | | | | | | | | | | | | | | | | |
| Dislike (P) | .012 | .004 | .005, .019** | - | - | - | .011 | .007 | -.002, .025 | .008 | .003 | .003, .013** | - | - | - | .000 | .001 | -.003, .002 |

*Note*. (T) = Teacher report. (P) = Peer report. Behavioral D. = Behavioral Domain. Emotional D. = Emotional Domain. Peer Rela. D. = Peer Relationship Domain. CD = Conduct problems. OD = Oppositional Defiant problems. ADH = Attention-Deficit and Hyperactivity problems. Dep = Depression Symptoms. CI = confidence intervals. The regression coefficient *B* is unstandardized. $^{*}p < .05$. $^{**}p < .01$.

**Figure 2**

*The Cross-level Interaction Between Individual-Level Parental Education and School-Level Parental Education on the Development of Children's Teacher-reported Depression Symptoms*




*Note.* The slopes of children of higher- and lower-educated parents in lower parental education schools (gray lines) overlap because the intercept and slope estimates do not differ significantly. The calculations of the slopes are based on the values at 0.5 *SD* above and below the mean of individual- and school-level parental education.

## Discussion

This study examined (a) the main effect associations of lower individual- and school-level parental education with children's problem development within the behavioral, emotional, and peer relationship domains; and (b) whether the association of lower individual-level parental education with children's development within the three domains depended upon school-level parental education in first grade and over time from first to sixth grade. We examined nine constructs rated by teachers and peers within the three domains,

leading to a total of 15 outcome variables (for an overview of our outcome variables, see Appendix A, Figure 1).

**Individual- and School-Level Parental Education and Child Development**

Overall, results showed significant associations for all nine constructs within the behavioral, emotional, and peer relationship domains, but not always across both informants (i.e., teacher and peer), both levels (i.e., individual and school levels), or both growth parameters (i.e., intercept and slope). Main effect associations showed that lower parental education was associated with higher initial levels of problems in first grade and/or a faster growth rate of problems within the behavioral, emotional, and peer relationship domains at the individual, school, or at both levels. Our discussion of main effect associations begins with initial level differences in first grade, and then proceeds to growth pattern differences.



Regarding initial level differences in first grade, results showed that compared to children of higher-educated parents, children of lower-educated parents had higher levels of problems within the behavioral (i.e., conduct problems, oppositional defiant problems, and attention-deficit and hyperactivity problems), emotional (i.e., anxiety symptoms), and peer relationship domains (i.e., physical victimization, relational victimization, and peer dislike). Similarly, children who attended lower parental education schools had higher levels of problems within the behavioral (i.e., aggression, oppositional defiant problems, and conduct problems) and emotional domains (i.e., anxiety symptoms) in first grade as compared to children who attended higher parental education schools.

These results are consistent with those of previous studies indicating higher levels of problems among children of lower-educated parents or in lower SES schools (e.g., Flouri & Midouhas, 2016; Kalff et al., 2001; Leadbeater et al., 2003; von Rueden et al., 2006). Previous research has shown that children of lower-educated parents exhibit less school readiness than children of higher-educated parents (Janus & Duku, 2007). The present study adds to the literature by showing that in addition to less optimal school readiness, children who have lower-educated parents but who also attend lower parental education schools may already show problems in non-academic domains of development in first grade. It should, however, be noted that kindergarten attendance (from age 4) is an integrated part of formal schooling in the Netherlands. This means that children in the Netherlands have already been within the school system for approximately 3 years upon reaching the end of first grade (the time of this study's initial assessment). Therefore, it is also plausible that the differences found at the end of first grade developed within these first years of formal schooling. Alternatively, it could have been that children of lower-educated parents entered kindergarten with more difficulties and that these difficulties were compounded at the school level due to the relatively homogenous school compositions.

Regarding growth pattern differences, we found significant associations of individual- or school-level parental education with five outcome variables. These results showed that, except for one association (i.e., individual-level peer-reported anxiety), children of lower-educated parents had a faster growth rate of problems within the behavioral domain (i.e., conduct problems, oppositional defiant problems, and attention-deficit and hyperactivity problems) and that children in lower parental education schools were disliked by an increasing number of peers over the 6 years (peer relationship domain).

These novel results provide the first insights into the growth rates of elementary school problem development due to parental education at both the individual and school levels. Previous research suggests that parental education has the strongest effects in childhood and predicts the persistency and severity of mental health problems (McLaughlin et al., 2011; Reiss, 2013). Lower-educated parents may have less access to resources such as mental health services (McLaughlin et al., 2011) and might be more likely to stigmatize mental health problems (Corrigan & Watson, 2007). Therefore, their children may not be able to receive the necessary resources to prevent or combat mental health problems and this may explain the persistence, or in some cases, the faster growth rate of problems found in our study.

The majority of the main effect associations are consistent with both developmental theories and the previous empirical studies on associations of lower parental education, or other SES indicators, at either the individual- or school-level with children's (development of) difficulties within the behavioral, emotional, and peer relationship domains (e.g., Bevilacqua et al., 2021; Flouri & Midouhas, 2016; Kalff et al., 2001; McLaughlin et al., 2011; Reiss, 2013; Schmiedeberg & Schumann, 2018; Walsh et al., 2019). Yet, it is noteworthy that one association was not in the expected direction. Our results showed that, according to their classmates, children of lower-educated parents were generally more anxious in first grade, but their anxiety levels had a slower growth rate from first to sixth grade than children of higher-educated parents. We speculate that children of lower-educated parents could have progressively seemed less anxious in their peers' eyes because our results also showed that peers viewed children of lower-educated parents as becoming increasingly aggressive throughout elementary school, which might have affected their ratings on anxiety. Taken together, our results extend prior studies by suggesting that the differences between children from lower- and higher-educated contexts are already apparent in early elementary school and (with a few exceptions) may persist, or even increase, over the entire elementary school period.

The second research question examined whether the associations of lower individual-level parental education with the initial level or the development of problems within the behavioral, emotional, and peer relationship domains depended upon school-level parental education. For all outcomes, except for one, no interaction effects were found. This is consistent with previous studies that found no interaction effects between

individual- and school-level SES on externalizing and internalizing problems (Flouri & Midouhas, 2016; Papachristou et al., 2020). However, for teacher-reported depression symptoms, a significant cross-level interaction of the random slope was found. That is, in higher parental education schools, children of lower-educated parents showed a faster growth rate of depression symptom levels than children of higher-educated parents. This suggests that attending higher parental education schools does not benefit children of lower-educated parents to the same extent as it does children of higher-educated parents with regard to the development of depression symptom levels.

The processes that may account for the effects of the interaction between individual- and school-level parental education on the development of depression symptoms remain unknown. However, in agreement with the 'social misfit' perspective (Wright et al., 1986), the expectations and social norms of higher parental education schools may not be commensurate with those of lower-educated households, potentially resulting in feelings of isolation. The disproportionally low number of children of lower-educated parents in higher parental education schools ("frog pond perspective", Marsh & Hau, 2003; relative deprivation theory, Stouffer et al., 1949) may make them "the odd one out."



In addition to this interaction association, some potential beneficial effects were found for children of lower-educated parents attending higher parental education schools. That is, for behavioral problems, peer-reported anxiety, and peer dislike we found school-level main effect associations. This suggests that children of lower-educated parents (similar to those of higher-educated parents) in higher parental education schools may show fewer behavioral problems and anxiety symptoms and increasingly enjoy a more positive peer environment than children of lower-educated parents in lower parental education schools.

Taken together, the main effect associations suggest that if children of lower-educated parents are enrolled in lower parental education schools, they may encounter a new level of risk – the school level – which may negatively affect these children's healthy behavioral, emotional, and peer relationship development. If children of lower-educated parents enroll in higher parental education schools, they may experience some beneficial effects with regard to behavioral outcomes, anxiety symptoms, and peer acceptance, but may show a faster rate of growth in their depression symptom levels as compared to children of higher-educated parents. Collectively, our results may suggest that investing in and supporting the needs of lower parental education schools and individual children from lower-educated households may be of primary importance. This is crucial because the problems that develop in elementary school may persist into adolescence and (young) adulthood (Obradović et al., 2009) and may lead to negative outcomes in new domains of risk such as substance use, risky sexual behavior (Timmermans et al., 2008), school drop-out, and reduced employment opportunities (Woodward & Fergusson, 2000).

**Implications for Research, Schools, and Policy**

Our results have implications for researchers, policy makers and schools. They highlight the need to study individual- and school-level factors in concert when trying to understand the influence of parental education on children's developmental outcomes. Furthermore, determining the factors that operate within lower parental education schools is also necessary to prevent maladaptive outcomes in childhood. Thus, (research) policy makers should advocate for studies focusing on identifying the exact underlying factors and subsequently formulate policies that address them. In the Netherlands, as in many countries, there are policies aimed at reducing inequalities between schools (European Commission, 2018, 2020; Mizala & Torche, 2017; OECD, 2016), such as providing funds for extra staff and other resources (Ministry of Education, Culture and Science, 2013). However, previous research shows that, despite these policies, teachers in Dutch lower parental education schools report inadequate preparation for dealing with diverse student populations, as well as strain caused by witnessing the adversity experienced by some of their students at home (Gaikhorst et al., 2017). Teachers in lower parental education schools could therefore be offered mentoring programs as well as skills and professional training that effectively align with the needs of their schools' student bodies (OECD, 2012). It is also important to note that the allocation of resources within schools is important. Therefore, constructively allocating resources to address challenges faced in schools may aid in the most effective usage of resources and in improving equity. In addition, policies and efforts could be geared towards parents; providing lower-educated parents with more support and better information about the school choice procedures and offering solutions for those who do not have the means to send their children to their preferred schools may help prevent relatively homogeneous school compositions.

Our findings further suggest investing in interventions that foster healthy behavioral, emotional, and peer relationship development, particularly in lower parental education schools. Because cascade effects of psychopathology and poor peer relationships may emerge during early elementary school (van Lier & Koot, 2010), programs geared toward school-wide social-emotional competence training (Durlak et al., 2011) should be implemented from preschool onwards.

**Limitations and Future Directions**

The following limitations should be noted when interpreting the findings of the present study. The sample used in this study was a convenience sample. It was not a sample representing the Dutch parental education distribution at the individual or school level. Furthermore, the children excluded from our study and those who had missing data had on average slightly higher levels of problems than included children and children who had complete data, respectively, which indicates selective attrition. Moreover, our sample was relatively large at the individual level, relatively small at the school cluster level, and we tested 15 outcome variables. We may have overestimated effects due to multiple testing (falsely rejected the null hypothesis; Type 1 error) or underestimated effects due

to having lower power to detect school-level main effects and school-by-individual level interactions (falsely supported the null hypothesis; Type 2 error). Our study, therefore, should be regarded as an initial explorative study meant to stimulate further investigation. Replication studies using multiple informants and broader samples, including more schools, are necessary before firm conclusions can be reached. Furthermore, our data were based on teacher and peer perceptions. Children's self-reports were not available across the entire elementary school period due to the ages of children in earlier grades. Lastly, our results do not imply that parental education itself plays a causal role since parental education is often associated with factors at the individual (e.g., household wealth, exposure to children's learning opportunities at home, immigrant status, mother tongue) and school levels (e.g., school climate, school management, staff development) that may account for the observed associations. After replication of our findings, future studies are encouraged to investigate the factors that may underly these associations.



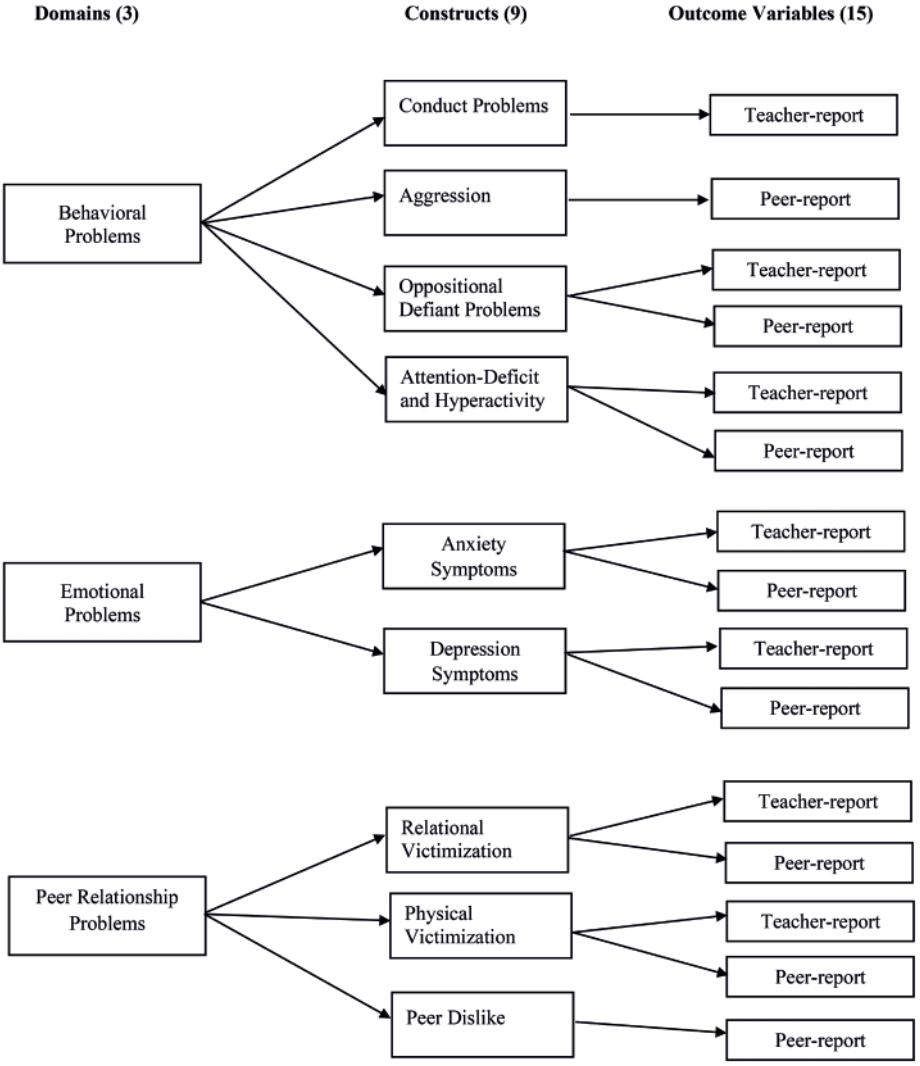
## Conclusion

The elementary school period, apart from being essential for mastering academic skills, is of profound importance for children's healthy behavioral, emotional, and peer relationship development. Our results suggest that growing up with lower-educated parents and attending lower parental education schools may independently associate with higher levels of behavioral, emotional, and peer relationship difficulties in first grade and a faster growth rate over time from first to sixth grade. In addition, results suggest that with respect to behavioral problems, anxiety, and peer relationships, attending higher parental education schools may have some beneficial effects for children of lower-educated parents. With respect to depression symptoms, results suggest that children of lower-educated parents may not benefit from attending higher parental education schools to the same extent as children of higher-educated parents. Results highlight the importance of identifying and addressing the needs of lower parental education schools and children growing up with lower-educated parents.

## Appendix A

**Figure 1**

*Overview of the Outcome Variables Within the Behavioral, Emotional, and Peer Relationship Domains*



## Supplementary Method

**Measurement Invariance Testing**

Measurement invariance was tested for teacher ratings of outcome variables within the behavioral, emotional, and peer relationship domains (for an overview of the outcome variables, see Appendix A, Figure 1) to assess whether the group comparisons at the individual and school levels were meaningful across time. That is, at the individual level we tested whether the mean differences between children of lower- and higher-educated parents reflected true mean differences in each outcome variable rather than rater (teacher) differences. At the school level, we tested whether the mean differences between children in lower parental education schools and in higher parental education schools reflected true mean differences in each outcome variable rather than rater differences.



Measurement invariance testing was conducted in four steps. First, we tested longitudinal measurement invariance. Following the recommendations of Widaman and Reise (1997), Meredith (1993) and Reise et al. (1993), we started by specifying a *configural invariance* model as the baseline model to test whether the same factor structure was found across grades. Next, we specified a *metric invariance* model to test whether the factor loadings were equivalent across grades. Then, we specified a *scalar invariance* model to determine whether the intercepts were equivalent across grades. Last, we specified a *strict invariance* model to test whether the residuals were equivalent across grades. Achieving metric, scalar, and strict longitudinal invariance suggest that the same constructs are measured equally across different time points to ensure that changes in observed scores over time can be attributed to actual developmental changes in the construct under investigation. Invariance is achieved when after constraining a factor loading, intercept, or residual there is no significant worsening of model fit. To do this, we estimated models using MLR in MPLUS and compared the nested models using Satorra-Bentler Chi-Square Difference Testing. However, if constraining a factor loading, intercept, or residual to be equal in any of the models lead to a significantly worse model fit than a freely estimated loading/intercept/residual, we then removed the constrains on that specific parameter that contributed to the poor model fit. If after removing the constrains on the specific parameter the model no longer led to a significantly worsening of the model fit, then we achieved a partial invariance. If there were still significant differences after removing the constrains, we removed constrains from the specific parameters until the model did not lead to a significantly worse fit.

Second, if partial invariance was achieved, we tested to what extent the (potential) violations of longitudinal measurement invariance influenced the factor means of the outcome variables under scrutiny. That is, we compared the latent means of the fully invariant model with the latent means of the model with measurement invariance violations allowed ((partial) longitudinal invariance model). Then, based on Cohen's *d*,

we assessed whether the latent mean differences were very small ($0.2 < d$), small ($0.2 \leq d < 0.5$), medium ($0.5 \leq d < 0.8$), or large ( $d \geq 0.8$) in magnitude (Cohen, 1988).

Third, after testing longitudinal measurement invariance, we used a multiple indicator, multiple cause (MIMIC) approach to test for differential item functioning due to teachers rating children with differential individual- and school-level parental education levels. MIMIC models allow differential item functioning to be tested by including individual- and school-level parental education as an exogenous covariate of the factor indicators. Note that differential item functioning with continuous/ordinal predictors can be tested for the intercepts only and that measurement invariance for loadings and residual variances must be assumed (Woods & Grimm, 2011). Differential item functioning would be present if individual- or school-level parental education significantly predicts item response (Woods, 2009). That is, a significant effect of individual- or school-level parental education on the intercept suggests a violation of intercept invariance. A significant positive effect of individual- or school-level parental education on the intercept would suggest that children of higher-educated parents or children in higher parental education schools had to show higher levels of emotional, behavioral and peer relationship problems than children of lower-educated parents or children in lower parental education schools before teachers would rate them as showing symptoms of emotional, behavioral, and peer relationship problems, for those items that were found significant. In other words, a positive significant effect would suggest that the threshold for rating children of lower-educated parents or children in lower parental education schools as having higher symptoms of problems is lower than that of children of higher-educated parents or children in higher parental education schools.

As the fourth and the final step, when MIMIC revealed violations of measurement invariance, we tested to what extent these measurement invariance violations influenced factor means. That is, we compared the latent means of the model with measurement invariance violations allowed ((partial) longitudinal invariance model) with the latent means of the MIMIC model where we add individual- and school-level parental education as a covariate of the factor indicators. Then, based on Cohen's *d*, we assessed whether the effect of measurement invariance violations on the latent mean differences of the constructs under scrutiny were very small ($0.2 < d$), small ($0.2 \leq d < 0.5$), medium ($0.5 \leq d < 0.8$), or large ( $d \geq 0.8$) in magnitude (Cohen, 1988).

## Supplementary Results

Violations of longitudinal measurement invariance were found (see sTable 1 for specifics). However, these violations did not influence the factor means to a large extent, with the magnitude of effects of measurement violations on the constructs' factor means ranging from -.040 to .002 for conduct problems, -.058 to .047 for oppositional defiant problems, -.035 to .022 for attention-deficit hyperactivity problems, -.023 to .098 for depression symptoms, -.115 to .068 for anxiety symptoms, -.008 to .010 for relational victimization, and -.031 to .027 for physical victimization (see sTable 2 to sTable 8).



Next, the results of the MIMIC models per each outcome showed that individual-level parental education, when significant, was mostly positively associated with the scale items of all of our teacher-reported outcomes (data available upon request). However, the effects of these individual-level parental education measurement invariance violations were all negligible to small with Cohen's *d* ranging from -.005 to -.015 for conduct problems, -.261 to .175 for oppositional defiant problems, -.175 to .122 for attention-deficit hyperactivity problems, -.199 to .059 for depression symptoms, -.245 to .250 for anxiety symptoms, -.071 to .073 for relational victimization, and -.050 to .065 for physical victimization. The differences between the latent means model with longitudinal measurement invariance violations and the latent means of the MIMIC models with measurement invariance violations per each outcome for individual-parental education can be found in sTables 9-15.

Furthermore, MIMIC models showed that school-level parental education, when significant, was positively associated with the scale items of oppositional defiant symptoms, attention-deficit hyperactivity problems, depression symptoms, anxiety symptoms, relational victimization, and physical victimization. Conduct problems showed mixed results with 5 items with negative associations and the other 5 items with positive associations. However, the effects of the measurement invariance violations of school-level parental education were all negligible to small with Cohen's d ranging from -.003 to .021 for conduct problems, -.058 to .097, for oppositional defiant problems, -.032 to .040 for attention-deficit hyperactivity problems, -.042 to .063 for depression symptoms, -.049 to .124 for anxiety symptoms, -.074 to .075 for relational victimization, and -.082 to .064 for physical victimization. The differences between the latent means model with longitudinal measurement invariance violations and the latent means of the MIMIC models with measurement invariance violations per each outcome for school-level parental education can be seen in sTables 16-22.

**sTable 1**

*Results of the Longitudinal Measurement Invariance Testing of Teacher-reported Outcomes*

| | Configural Invariance | | | | | Metric Invariance | | Partial Metric Invariance | | Scalar Invariance | | Partial Scalar Invariance | | Strict Invariance | | Partial Strict Invariance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\chi^2$ | df | RMSEA | CFI | SRMR | $_{\Delta}\chi^2$ | df | $_{\Delta}\chi^2$ | df | $_{\Delta}\chi^2$ | df | $_{\Delta}\chi^2$ | df | $_{\Delta}\chi^2$ | df | $_{\Delta}\chi^2$ | df |
| Conduct problems | 4346* | 2290 | .036 | .903 | .054 | 199* | 2345 | 55 | 2331 | 370* | 2385 | 46 | 2364 | 157* | 2424 | 63 | 2416 |
| OD problems | 1847* | 579 | .056 | .896 | .049 | 117* | 603 | 23 | 594 | 352* | 618 | 17 | 605 | 67* | 634 | 36 | 631 |
| ADH problems | 2058* | 674 | .054 | .908 | .085 | 55* | 700 | 28 | 697 | 145* | 723 | 20 | 715 | 101* | 746 | 30 | 738 |
| Depression symp. | 1033* | 458 | .042 | .917 | .070 | 150* | 479 | 12 | 468 | 81* | 486 | 17 | 478 | 348* | 501 | 13 | 487 |
| Anxiety symp. | 609* | 309 | .037 | .942 | .046 | 34* | 326 | 21 | 321 | 276* | 338 | 8 | 328 | 46* | 349 | 23 | 346 |
| Relational vict. | 104* | 80 | .021 | .994 | .031 | 12 | 88 | - | - | 25* | 96 | 8 | 94 | 91* | 106 | 9 | 101 |
| Physical vict. | 147* | 80 | .035 | .980 | .045 | 64* | 88 | 9 | 86 | 69* | 94 | 5 | 92 | 44* | 104 | 14 | 102 |

*Note.* OD problems = Oppositional Defiant problems. ADH problems = Attention-Deficit and Hyperactivity problems. symp. = symptoms. vict. = victimization. $^{*}p < .05$.

**sTable 2**

*Latent Mean Differences Due to Longitudinal Measurement Invariance Violations for Conduct Problems*

| | Latent means original (fully invariant) model | | Latent means model with longitudinal MI violations | | Cohen's *d* |
|---|---|---|---|---|---|
| Grade 1 | mean | .094 | mean | 0.144 | |
| | standard error | .044 | standard error | 0.050 | -0.040 |
| | standard deviation | 1.161 | standard deviation | 1.319 | |
| Grade 2 | mean | -0.091 | mean | -0.090 | |
| | standard error | 0.040 | standard error | 0.038 | -0.001 |
| | standard deviation | 1.055 | standard deviation | 1.003 | |
| Grade 3 | mean | -0.070 | mean | -0.028 | |
| | standard error | 0.041 | standard error | 0.042 | -0.038 |
| | standard deviation | 1.082 | standard deviation | 1.108 | |
| Grade 4 | mean | 0.010 | mean | -0.013 | |
| | standard error | 0.050 | standard error | 0.049 | 0.018 |
| | standard deviation | 1.319 | standard deviation | 1.293 | |
| Grade 5 | mean | -0.130 | mean | -0.099 | |
| | standard error | 0.044 | standard error | 0.043 | -0.019 |
| | standard deviation | 1.161 | standard deviation | 1.134 | |
| Grade 6 | mean | -0.052 | mean | -0.028 | |
| | standard error | 0.047 | standard error | 0.047 | 0.002 |
| | standard deviation | 1.240 | standard deviation | 1.240 | |

**sTable 3**

*Latent Mean Differences Due to Longitudinal Measurement Invariance Violations for Oppositional Defiant Problems*

| | Latent means original (fully invariant) model | | Latent means model with longitudinal MI violations | | Cohen's *d* |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.129 | mean | 0.066 | |
| | standard error | 0.047 | standard error | 0.055 | 0.047 |
| | standard deviation | 1.240 | standard deviation | 1.451 | |
| Grade 2 | mean | -0.126 | mean | -0.060 | |
| | standard error | 0.043 | standard error | 0.046 | -0.056 |
| | standard deviation | 1.134 | standard deviation | 1.214 | |
| Grade 3 | mean | -0.033 | mean | 0.032 | |
| | standard error | 0.044 | standard error | 0.046 | -0.055 |
| | standard deviation | 1.161 | standard deviation | 1.214 | |
| Grade 4 | mean | 0.187 | mean | 0.246 | |
| | standard error | 0.059 | standard error | 0.072 | -0.038 |
| | standard deviation | 1.557 | standard deviation | 1.899 | |
| Grade 5 | mean | -0.018 | mean | 0.011 | |

**sTable 3** *Continued*

| | Latent means original (fully invariant) model | | Latent means model with longitudinal MI violations | | Cohen's *d* |
|---|---|---|---|---|---|
| | standard error | 0.050 | standard error | 0.051 | -0.022 |
| | standard deviation | 1.319 | standard deviation | 1.345 | |
| Grade 6 | mean | 0.125 | mean | 0.206 | |
| | standard error | 0.053 | standard error | 0.053 | -0.058 |
| | standard deviation | 1.398 | standard deviation | 1.398 | |

**sTable 4**

*Latent Mean Differences Due to Longitudinal Measurement Invariance Violations for Attention-Deficit Hyperactivity Problems*

| | Latent means original (fully invariant) model | | Latent means model with longitudinal MI violations | | Cohen's *d* |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.136 | mean | 0.158 | |
| | standard error | 0.043 | standard error | 0.044 | -0.019 |
| | standard deviation | 1.134 | standard deviation | 1.161 | |
| Grade 2 | mean | -0.143 | mean | -0.161 | |
| | standard error | 0.042 | standard error | 0.043 | 0.016 |
| | standard deviation | 1.108 | standard deviation | 1.134 | |
| Grade 3 | mean | -0.164 | mean | -0.188 | |
| | standard error | 0.041 | standard error | 0.042 | 0.022 |
| | standard deviation | 1.082 | standard deviation | 1.108 | |
| Grade 4 | mean | -0.086 | mean | -0.099 | |
| | standard error | 0.049 | standard error | 0.050 | 0.010 |
| | standard deviation | 1.293 | standard deviation | 1.319 | |
| Grade 5 | mean | -0.154 | mean | -0.170 | |
| | standard error | 0.048 | standard error | 0.047 | 0.013 |
| | standard deviation | 1.266 | standard deviation | 1.240 | |
| Grade 6 | mean | 0.010 | mean | 0.057 | |
| | standard error | 0.050 | standard error | 0.052 | -0.035 |
| | standard deviation | 1.319 | standard deviation | 1.372 | |

**sTable 5**

*Latent Mean Differences Due to Longitudinal Measurement Invariance Violations for Depression Symptoms*

| | **Latent means original (fully invariant) model** | | **Latent means model with longitudinal MI violations** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.021 | mean | -0.130 | |
| | standard error | 0.051 | standard error | 0.076 | 0.090 |
| | standard deviation | 1.345 | standard deviation | 2.005 | |
| Grade 2 | mean | 0.165 | mean | 0.199 | |
| | standard error | 0.057 | standard error | 0.057 | -0.023 |
| | standard deviation | 1.504 | standard deviation | 1.504 | |
| Grade 3 | mean | -0.005 | mean | -0.019 | |
| | standard error | 0.052 | standard error | 0.051 | 0.010 |
| | standard deviation | 1.372 | standard deviation | 1.345 | |
| Grade 4 | mean | 0.227 | mean | 0.195 | |
| | standard error | 0.069 | standard error | 0.065 | 0.018 |
| | standard deviation | 1.820 | standard deviation | 1.715 | |
| Grade 5 | mean | 0.331 | mean | 0.183 | |
| | standard error | 0.067 | standard error | 0.048 | 0.098 |
| | standard deviation | 1.768 | standard deviation | 1.266 | |
| Grade 6 | mean | 0.246 | mean | 0.174 | |
| | standard error | 0.056 | standard error | 0.054 | 0.050 |
| | standard deviation | 1.477 | standard deviation | 1.425 | |

**sTable 6**

*Latent Mean Differences Due to Longitudinal Measurement Invariance Violations for Anxiety*

| | **Latent means original (fully invariant) model** | | **Latent means model with longitudinal MI violations** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.011 | mean | -0.093 | |
| | standard error | 0.055 | standard error | 0.061 | 0.068 |
| | standard deviation | 1.451 | standard deviation | 1.609 | |
| Grade 2 | mean | -0.012 | mean | 0.085 | |
| | standard error | 0.059 | standard error | 0.066 | -0.059 |
| | standard deviation | 1.557 | standard deviation | 1.741 | |
| Grade 3 | mean | -0.084 | mean | 0.085 | |
| | standard error | 0.050 | standard error | 0.062 | -0.114 |
| | standard deviation | 1.319 | standard deviation | 1.636 | |
| Grade 4 | mean | -0.089 | mean | 0.056 | |
| | standard error | 0.059 | standard error | 0.064 | -0.089 |
| | standard deviation | 1.557 | standard deviation | 1.688 | |
| Grade 5 | mean | -0.016 | mean | 0.194 | |
| | standard error | 0.065 | standard error | 0.073 | -0.115 |
| | standard deviation | 1.715 | standard deviation | 1.926 | |
| Grade 6 | mean | 0.067 | mean | 0.219 | |
| | standard error | 0.060 | standard error | 0.065 | -0.092 |
| | standard deviation | 1.583 | standard deviation | 1.715 | |

**sTable 7**

*Latent Mean Differences Due to Longitudinal Measurement Invariance Violations for Relational Victimization*

| | **Latent means original (fully invariant) model** | | **Latent means model with longitudinal MI violations** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | -0.004 | mean | -0.016 | |
| | standard error | 0.054 | standard error | 0.054 | 0.008 |
| | standard deviation | 1.425 | standard deviation | 1.425 | |
| Grade 2 | mean | 0.005 | mean | 0.018 | |
| | standard error | 0.061 | standard error | 0.064 | -0.008 |
| | standard deviation | 1.609 | standard deviation | 1.688 | |
| Grade 3 | mean | 0.093 | mean | 0.092 | |
| | standard error | 0.055 | standard error | 0.056 | 0.001 |
| | standard deviation | 1.451 | standard deviation | 1.477 | |
| Grade 4 | mean | 0.052 | mean | 0.035 | |
| | standard error | 0.064 | standard error | 0.065 | 0.010 |
| | standard deviation | 1.688 | standard deviation | 1.715 | |
| Grade 6 | mean | 0.145 | mean | 0.142 | |
| | standard error | 0.068 | standard error | 0.068 | 0.002 |
| | standard deviation | 1.794 | standard deviation | 1.794 | |

*Note.* Relational Victimization data were not collected in Grade 5.

**sTable 8**

*Latent Mean Differences Due to Longitudinal Measurement Invariance Violations for Physical Victimization*

| | **Latent means original (fully invariant) model** | | **Latent means model with longitudinal MI violations** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.162 | mean | 0.185 | |
| | standard error | 0.061 | standard error | 0.050 | -0.016 |
| | standard deviation | 1.609 | standard deviation | 1.319 | |
| Grade 2 | mean | -0.148 | mean | -0.185 | |
| | standard error | 0.052 | standard error | 0.050 | 0.027 |
| | standard deviation | 1.372 | standard deviation | 1.319 | |
| Grade 3 | mean | -0.207 | mean | -0.236 | |
| | standard error | 0.056 | standard error | 0.053 | 0.020 |
| | standard deviation | 1.477 | standard deviation | 1.398 | |
| Grade 5 | mean | -0.315 | mean | -0.269 | |
| | standard error | 0.055 | standard error | 0.057 | -0.031 |
| | standard deviation | 1.451 | standard deviation | 1.504 | |
| Grade 6 | mean | -0.306 | mean | -0.328 | |
| | standard error | 0.055 | standard error | 0.053 | 0.015 |
| | standard deviation | 1.451 | standard deviation | 1.398 | |

*Note.* Physical Victimization data were not collected in Grade 4.

**sTable 9**

*Differences in Latent Means of Conduct Problems Due to Violations of Measurement Invariance because of Individual-level Parental Education*

| | **Latent means model with longitudinal MI violations** | | **Latent means of the MIMIC model** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.144 | mean | 0.156 | |
| | standard error | 0.050 | standard error | 0.050 | -0.009 |
| | standard deviation | 1.319 | standard deviation | 1.319 | |
| Grade 2 | mean | -0.090 | | -0.075 | |
| | standard error | 0.038 | standard error | 0.041 | -0.014 |
| | standard deviation | 1.003 | standard deviation | 1.082 | |
| Grade 3 | mean | -0.028 | mean | -0.020 | |
| | standard error | 0.042 | standard error | 0.045 | -0.007 |
| | standard deviation | 1.108 | standard deviation | 1.187 | |
| Grade 4 | mean | -0.013 | mean | -0.007 | |
| | standard error | 0.049 | standard error | 0.049 | -0.005 |
| | standard deviation | 1.293 | standard deviation | 1.293 | |
| Grade 5 | mean | -0.099 | mean | -0.082 | |
| | standard error | 0.043 | standard error | 0.044 | -0.015 |
| | standard deviation | 1.134 | standard deviation | 1.161 | |
| Grade 6 | mean | -0.028 | mean | -0.009 | |
| | standard error | 0.047 | standard error | 0.050 | -0.015 |
| | standard deviation | 1.240 | standard deviation | 1.319 | |

**sTable 10**

*Differences in Latent Means of Oppositional Defiant Problems Due to Violations of Measurement Invariance because of Individual-level Parental Education*

| | **Latent means model with longitudinal MI violations** | | **Latent means of the MIMIC model** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.066 | mean | -0.399 | |
| | standard error | 0.055 | standard error | 0.146 | 0.175 |
| | standard deviation | 1.451 | standard deviation | 3.852 | |
| Grade 2 | mean | -0.060 | | 0.358 | |
| | standard error | 0.046 | standard error | 0.120 | -0.191 |
| | standard deviation | 1.214 | standard deviation | 3.166 | |
| Grade 3 | mean | 0.032 | mean | 0.258 | |
| | standard error | 0.046 | standard error | 0.122 | -0.102 |
| | standard deviation | 1.214 | standard deviation | 3.219 | |
| Grade 4 | mean | 0.246 | mean | 0.955 | |
| | standard error | 0.059 | standard error | 0.147 | -0.261 |
| | standard deviation | 1.557 | standard deviation | 3.878 | |
| Grade 5 | mean | 0.011 | mean | 0.446 | |
| | standard error | 0.051 | standard error | 0.139 | -0.174 |
| | standard deviation | 1.345 | standard deviation | 3.667 | |
| Grade 6 | mean | 0.206 | mean | 0.779 | |
| | standard error | 0.053 | standard error | 0.139 | -0.226 |
| | standard deviation | 1.398 | standard deviation | 3.667 | |

**sTable 11**

*Differences in Latent Means of Attention-Deficit Hyperactivity Problems Due to Violations of Measurement Invariance because of Individual-level Parental Education*

| | **Latent means model with longitudinal MI violations** | | **Latent means of the MIMIC model** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.158 | mean | -0.088 | |
| | standard error | 0.044 | standard error | 0.109 | 0.122 |
| | standard deviation | 1.161 | standard deviation | 2.876 | |
| Grade 2 | mean | -0.161 | mean | 0.128 | |
| | standard error | 0.043 | standard error | 0.114 | -0.140 |
| | standard deviation | 1.134 | standard deviation | 3.008 | |
| Grade 3 | mean | -0.188 | mean | -0.266 | |
| | standard error | 0.042 | standard error | 0.105 | 0.040 |
| | standard deviation | 1.108 | standard deviation | 2.770 | |
| Grade 4 | mean | -0.099 | mean | 0.310 | |
| | standard error | 0.050 | standard error | 0.127 | -0.175 |
| | standard deviation | 1.319 | standard deviation | 3.350 | |
| Grade 5 | mean | -0.170 | mean | 0.024 | |

**sTable 11** *Continued*

| | Latent means model with longitudinal MI violations | | Latent means of the MIMIC model | | Cohen's *d* |
|---|---|---|---|---|---|
| | standard error | 0.047 | standard error | 0.127 | -0.085 |
| | standard deviation | 1.240 | standard deviation | 3.350 | |
| Grade 6 | mean | 0.057 | mean | 0.318 | |
| | standard error | 0.052 | standard error | 0.133 | -0.107 |
| | standard deviation | 1.372 | standard deviation | 3.509 | |

**sTable 12**

*Differences in Latent Means of Depression Symptoms Due to Violations of Measurement Invariance because of Individual-level Parental Education*

| | Latent means model with longitudinal MI violations | | Latent means of the MIMIC model | | Cohen's *d* |
|---|---|---|---|---|---|
| Grade 1 | mean | -0.130 | mean | -0.352 | |
| | standard error | 0.076 | standard error | 0.209 | 0.059 |
| | standard deviation | 2.005 | standard deviation | 5.514 | |
| Grade 2 | mean | 0.199 | mean | 0.609 | |
| | standard error | 0.057 | standard error | 0.140 | -0.158 |
| | standard deviation | 1.504 | standard deviation | 3.693 | |
| Grade 3 | mean | -0.019 | mean | 0.070 | |
| | standard error | 0.051 | standard error | 0.127 | -0.038 |
| | standard deviation | 1.345 | standard deviation | 3.350 | |
| Grade 4 | mean | 0.195 | mean | 0.771 | |
| | standard error | 0.065 | standard error | 0.154 | -0.199 |
| | standard deviation | 1.715 | standard deviation | 4.063 | |
| Grade 5 | mean | 0.183 | mean | 0.497 | |
| | standard error | 0.048 | standard error | 0.131 | -0.133 |
| | standard deviation | 1.266 | standard deviation | 3.456 | |
| Grade 6 | mean | 0.174 | mean | 0.540 | |
| | standard error | 0.054 | standard error | 0.122 | -0.158 |
| | standard deviation | 1.425 | standard deviation | 3.219 | |

**sTable 13**

*Differences in Latent Means of Anxiety Symptoms Due to Violations of Measurement Invariance because of Individual-level Parental Education*

| | **Latent means model with longitudinal MI violations** | | **Latent means of the MIMIC model** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | -0.093 | mean | -0.810 | |
| | standard error | 0.061 | standard error | 0.156 | 0.250 |
| | standard deviation | 1.609 | standard deviation | 4.116 | |
| Grade 2 | mean | 0.085 | | 0.870 | |
| | standard error | 0.066 | standard error | 0.177 | -0.245 |
| | standard deviation | 1.741 | standard deviation | 4.670 | |
| Grade 3 | mean | 0.085 | mean | 0.284 | |
| | standard error | 0.062 | standard error | 0.149 | -0.071 |
| | standard deviation | 1.636 | standard deviation | 3.931 | |
| Grade 4 | mean | 0.056 | mean | 0.762 | |
| | standard error | 0.064 | standard error | 0.169 | -0.230 |
| | standard deviation | 1.688 | standard deviation | 4.459 | |
| Grade 5 | mean | 0.194 | mean | 0.850 | |
| | standard error | 0.073 | standard error | 0.204 | -0.180 |
| | standard deviation | 1.926 | standard deviation | 5.382 | |
| Grade 6 | mean | 0.219 | mean | 0.608 | |
| | standard error | 0.065 | standard error | 0.157 | -0.133 |
| | standard deviation | 1.715 | standard deviation | 4.142 | |

**sTable 14**

*Differences in Latent Means of Relational Victimization Due to Violations of Measurement Invariance because of Individual-level Parental Education*

| | **Latent means model with longitudinal MI violations** | | **Latent means of the MIMIC model** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | -0.016 | mean | -0.215 | |
| | standard error | 0.054 | standard error | 0.154 | 0.073 |
| | standard deviation | 1.425 | standard deviation | 4.063 | |
| Grade 2 | mean | 0.018 | | 0.250 | |
| | standard error | 0.064 | standard error | 0.183 | -0.071 |
| | standard deviation | 1.688 | standard deviation | 4.828 | |
| Grade 3 | mean | 0.092 | mean | -0.028 | |
| | standard error | 0.056 | standard error | 0.144 | 0.045 |
| | standard deviation | 1.477 | standard deviation | 3.799 | |
| Grade 4 | mean | 0.035 | mean | 0.215 | |
| | standard error | 0.065 | standard error | 0.180 | -0.056 |
| | standard deviation | 1.715 | standard deviation | 4.749 | |
| Grade 6 | mean | 0.142 | mean | 0.315 | |
| | standard error | 0.068 | standard error | 0.195 | -0.050 |
| | standard deviation | 1.794 | standard deviation | 5.144 | |

*Note.* Relational Victimization data were not collected in Grade 5.

**sTable 15**

*Differences in Latent Means of Physical Victimization Due to Violations of Measurement Invariance because of Individual-level Parental Education*

| | Latent means model with longitudinal MI violations | | Latent means of the MIMIC model | | Cohen's *d* |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.185 | mean | 0.072 | |
| | standard error | 0.050 | standard error | 0.161 | 0.041 |
| | standard deviation | 1.319 | standard deviation | 4.247 | |
| Grade 2 | mean | -0.185 | | -0.061 | |
| | standard error | 0.050 | standard error | 0.137 | -0.050 |
| | standard deviation | 1.319 | standard deviation | 3.614 | |
| Grade 3 | mean | -0.236 | mean | -0.401 | |
| | standard error | 0.053 | standard error | 0.138 | 0.065 |
| | standard deviation | 1.398 | standard deviation | 3.641 | |
| Grade 5 | mean | -0.269 | mean | -0.365 | |
| | standard error | 0.057 | standard error | 0.167 | 0.032 |
| | standard deviation | 1.504 | standard deviation | 4.406 | |
| Grade 6 | mean | -0.328 | mean | -0.389 | |
| | standard error | 0.053 | standard error | 0.144 | 0.023 |
| | standard deviation | 1.398 | standard deviation | 3.799 | |

*Note.* Physical Victimization data were not collected in Grade 4.

**sTable 16**

*Differences in Latent Means of Conduct Problems Due to Violations of Measurement Invariance because of School-level Parental Education*

| | Latent means model with longitudinal MI violations | | Latent means of the MIMIC model | | Cohen's *d* |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.144 | mean | 0.136 | |
| | standard error | 0.050 | standard error | 0.050 | 0.006 |
| | standard deviation | 1.319 | standard deviation | 1.319 | |
| Grade 2 | mean | -0.090 | | -0.095 | |
| | standard error | 0.038 | standard error | 0.039 | 0.005 |
| | standard deviation | 1.003 | standard deviation | 1.029 | |
| Grade 3 | mean | -0.028 | mean | -0.043 | |
| | standard error | 0.042 | standard error | 0.043 | 0.013 |
| | standard deviation | 1.108 | standard deviation | 1.134 | |
| Grade 4 | mean | -0.013 | mean | -0.009 | |
| | standard error | 0.049 | standard error | 0.050 | -0.003 |
| | standard deviation | 1.293 | standard deviation | 1.319 | |
| Grade 5 | mean | -0.099 | mean | -0.116 | |
| | standard error | 0.043 | standard error | 0.043 | 0.015 |
| | standard deviation | 1.134 | standard deviation | 1.134 | |
| Grade 6 | mean | -0.028 | mean | -0.054 | |
| | standard error | 0.047 | standard error | 0.049 | 0.021 |
| | standard deviation | 1.240 | standard deviation | 1.293 | |

**sTable 17**

*Differences in Latent Means of Oppositional Defiant Problems Due to Violations of Measurement Invariance because of School-level Parental Education*

| | Latent means model with longitudinal MI violations | | Latent means of the MIMIC model | | Cohen's *d* |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.066 | mean | 0.164 | |
| | standard error | 0.055 | standard error | 0.072 | -0.058 |
| | standard deviation | 1.451 | standard deviation | 1.899 | |
| Grade 2 | mean | -0.060 | | -0.151 | |
| | standard error | 0.046 | standard error | 0.060 | 0.065 |
| | standard deviation | 1.214 | standard deviation | 1.583 | |
| Grade 3 | mean | 0.032 | mean | -0.032 | |
| | standard error | 0.046 | standard error | 0.060 | 0.046 |
| | standard deviation | 1.214 | standard deviation | 1.583 | |
| Grade 4 | mean | 0.246 | mean | 0.113 | |
| | standard error | 0.059 | standard error | 0.072 | 0.077 |
| | standard deviation | 1.557 | standard deviation | 1.899 | |
| Grade 5 | mean | 0.011 | mean | -0.072 | |
| | standard error | 0.051 | standard error | 0.063 | 0.055 |
| | standard deviation | 1.345 | standard deviation | 1.662 | |
| Grade 6 | mean | 0.206 | mean | 0.053 | |
| | standard error | 0.053 | standard error | 0.066 | 0.097 |
| | standard deviation | 1.398 | standard deviation | 1.741 | |

**sTable 18**

*Differences in Latent Means of Attention-Deficit Hyperactivity Problems Due to Violations of Measurement Invariance because of School-level Parental Education*

| | Latent means model with longitudinal MI violations | | Latent means of the MIMIC model | | Cohen's *d* |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.158 | mean | 0.140 | |
| | standard error | 0.044 | standard error | 0.057 | 0.014 |
| | standard deviation | 1.161 | standard deviation | 1.504 | |
| Grade 2 | mean | -0.161 | | -0.153 | |
| | standard error | 0.043 | standard error | 0.057 | -0.006 |
| | standard deviation | 1.134 | standard deviation | 1.504 | |
| Grade 3 | mean | -0.188 | mean | -0.146 | |
| | standard error | 0.042 | standard error | 0.056 | -0.032 |
| | standard deviation | 1.108 | standard deviation | 1.477 | |
| Grade 4 | mean | -0.099 | mean | -0.134 | |
| | standard error | 0.050 | standard error | 0.064 | 0.023 |
| | standard deviation | 1.319 | standard deviation | 1.688 | |
| Grade 5 | mean | -0.170 | mean | -0.185 | |

**sTable 18** *Continued*

| | Latent means model with longitudinal MI violations | | Latent means of the MIMIC model | | Cohen's *d* |
|---|---|---|---|---|---|
| | standard error | 0.047 | standard error | 0.060 | 0.011 |
| | standard deviation | 1.240 | standard deviation | 1.583 | |
| Grade 6 | mean | 0.057 | mean | -0.005 | |
| | standard error | 0.052 | standard error | 0.066 | 0.040 |
| | standard deviation | 1.372 | standard deviation | 1.741 | |

**sTable 19**

*Differences in Latent Means of Depression Symptoms Due to Violations of Measurement Invariance because of School-level Parental Education*

| | Latent means model with longitudinal MI violations | | Latent means of the MIMIC model | | Cohen's *d* |
|---|---|---|---|---|---|
| Grade 1 | mean | -0.130 | mean | -0.034 | |
| | standard error | 0.076 | standard error | 0.096 | -0.042 |
| | standard deviation | 2.005 | standard deviation | 2.533 | |
| Grade 2 | mean | 0.199 | mean | 0.206 | |
| | standard error | 0.057 | standard error | 0.073 | -0.004 |
| | standard deviation | 1.504 | standard deviation | 1.926 | |
| Grade 3 | mean | -0.019 | mean | 0.005 | |
| | standard error | 0.051 | standard error | 0.063 | -0.016 |
| | standard deviation | 1.345 | standard deviation | 1.662 | |
| Grade 4 | mean | 0.195 | mean | 0.083 | |
| | standard error | 0.065 | standard error | 0.069 | 0.063 |
| | standard deviation | 1.715 | standard deviation | 1.820 | |
| Grade 5 | mean | 0.183 | mean | 0.123 | |
| | standard error | 0.048 | standard error | 0.049 | 0.047 |
| | standard deviation | 1.266 | standard deviation | 1.293 | |
| Grade 6 | mean | 0.174 | mean | 0.084 | |
| | standard error | 0.054 | standard error | 0.063 | 0.058 |
| | standard deviation | 1.425 | standard deviation | 1.662 | |

**sTable 20**

*Differences in Latent Means of Anxiety Symptoms Due to Violations of Measurement Invariance because of School-level Parental Education*

| | **Latent means model with longitudinal MI violations** | | **Latent means of the MIMIC model** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | -0.093 | mean | 0.002 | |
| | standard error | 0.061 | standard error | 0.085 | -0.049 |
| | standard deviation | 1.609 | standard deviation | 2.242 | |
| Grade 2 | mean | 0.085 | | -0.011 | |
| | standard error | 0.066 | standard error | 0.090 | 0.047 |
| | standard deviation | 1.741 | standard deviation | 2.374 | |
| Grade 3 | mean | 0.085 | mean | 0.062 | |
| | standard error | 0.062 | standard error | 0.083 | 0.012 |
| | standard deviation | 1.636 | standard deviation | 2.190 | |
| Grade 4 | mean | 0.056 | mean | -0.178 | |
| | standard error | 0.064 | standard error | 0.079 | 0.124 |
| | standard deviation | 1.688 | standard deviation | 2.084 | |
| Grade 5 | mean | 0.194 | mean | 0.008 | |
| | standard error | 0.073 | standard error | 0.092 | 0.085 |
| | standard deviation | 1.926 | standard deviation | 2.427 | |
| Grade 6 | mean | 0.219 | mean | 0.124 | |
| | standard error | 0.065 | standard error | 0.084 | 0.048 |
| | standard deviation | 1.715 | standard deviation | 2.216 | |

**sTable 21**

*Differences in Latent Means of Physical Victimization Due to Violations of Measurement Invariance because of School-level Parental Education*

| | **Latent means model with longitudinal MI violations** | | **Latent means of the MIMIC model** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | 0.185 | mean | 0.329 | |
| | standard error | 0.050 | standard error | 0.083 | -0.082 |
| | standard deviation | 1.319 | standard deviation | 2.190 | |
| Grade 2 | mean | -0.185 | | -0.281 | |
| | standard error | 0.050 | standard error | 0.064 | 0.064 |
| | standard deviation | 1.319 | standard deviation | 1.688 | |
| Grade 3 | mean | -0.236 | mean | -0.270 | |
| | standard error | 0.053 | standard error | 0.070 | 0.021 |
| | standard deviation | 1.398 | standard deviation | 1.847 | |
| Grade 5 | mean | -0.269 | mean | -0.314 | |
| | standard error | 0.057 | standard error | 0.069 | 0.027 |
| | standard deviation | 1.504 | standard deviation | 1.820 | |
| Grade 6 | mean | -0.328 | mean | -0.407 | |
| | standard error | 0.053 | standard error | 0.066 | 0.050 |
| | standard deviation | 1.398 | standard deviation | 1.741 | |

*Note.* Physical Victimization data were not collected in Grade 4.

**sTable 22**

*Differences in Latent Means of Relational Victimization Due to Violations of Measurement Invariance because of School-level Parental Education*

| | **Latent means model with longitudinal MI violations** | | **Latent means of the MIMIC model** | | **Cohen's *d*** |
|---|---|---|---|---|---|
| Grade 1 | mean | -0.016 | mean | -0.135 | |
| | standard error | 0.054 | standard error | 0.066 | 0.075 |
| | standard deviation | 1.425 | standard deviation | 1.741 | |
| Grade 2 | mean | 0.018 | | 0.162 | |
| | standard error | 0.064 | standard error | 0.083 | -0.074 |
| | standard deviation | 1.688 | standard deviation | 2.190 | |
| Grade 3 | mean | 0.092 | mean | 0.170 | |
| | standard error | 0.056 | standard error | 0.069 | -0.047 |
| | standard deviation | 1.477 | standard deviation | 1.820 | |
| Grade 4 | mean | 0.035 | mean | 0.081 | |
| | standard error | 0.065 | standard error | 0.080 | -0.024 |
| | standard deviation | 1.715 | standard deviation | 2.111 | |
| Grade 6 | mean | 0.142 | mean | 0.160 | |
| | standard error | 0.068 | standard error | 0.082 | -0.009 |
| | standard deviation | 1.794 | standard deviation | 2.163 | |

*Note.* Relational Victimization data were not collected in Grade 5.

## References


Achenbach, T. M. (1991). *Manual for Teacher's Report Form and 1991 Profile*. University of Vermont Department of Psychiatry.

Akaike, H. (1998). Information theory and an extension of the maximum likelihood principle. In *Selected papers of hirotugu akaike* (pp. 199–213). https://doi.org/10.1007/978-1-4612-1694-0_15

Asparouhov, T., & Muthén, B. (2010). Computing the strictly positive Satorra-Bentler chi-square test in Mplus. *Mplus Web Notes*, *12*, 1–12. https://www.statmodel.com/examples/webnotes/SB5.pdf

Asparouhov, T., & Muthén, B. (2018). *SRMR in Mplus*. http://www.statmodel.com/download/SRMR2.pdf.

Barrish, H. H., Saunders, M., & Wolf, M. M. (1969). Good Behavior Game: Effects of individual contingencies for group consequences on disruptive behavior in a classroom 1. *Journal of Applied Behavior Analysis, 2,* 119–124. https://doi.org/10.1901/jaba.1969.2-119

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*, 588–606. https://doi.org/10.1037/0033-2909.88.3.588

Bevilacqua, L., Kelly, Y., Heilmann, A., Priest, N., & Lacey, R. E. (2021). Adverse childhood experiences and trajectories of internalizing, externalizing, and prosocial behaviors from childhood to adolescence. *Child Abuse & Neglect*, *112*, 104890. https://doi.org/10.1016/j.chiabu.2020.104890

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology, 53,* 371–399. https://doi.org/10.1146/annurev.psych.53.100901.135233

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

Bronfenbrenner, U. (1994). Ecological models of human development. In T. Husen & T. N. Postlethwaite (Eds.), *International encyclopedia of education* (2nd ed., Vol. 3, pp. 1643–1647). Pergamon Press and Elsevier Science.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. https://doi.org/10.4324/9780203771587

Corrigan, P. W., & Watson, A. C. (2007). The stigma of psychiatric disorders and the gender, ethnicity, and education of the perceiver. *Community Mental Health Journal*, *43*, 439–458. https://doi.org/10.1007/s10597-007-9084-9

Crosnoe, R. (2009). Low-income students and the socioeconomic composition of public high schools. *American Sociological Review, 74,* 709–730. https://doi.org/10.1177/000312240907400502

Cullerton-Sen, C., & Crick, N. R. (2005). Understanding the effects of physical and relational victimization: the utility of multiple perspectives in predicting social-emotional adjustment. *School Psychology Review, 34,* 147–160. https://doi.org/10.1080/02796015.2005.12086280

de Laat, S. A., Huizink, A. C., Hof, M. H., & Vrijkotte, T. G. (2018). Socioeconomic inequalities in psychosocial problems of children: mediating role of maternal depressive symptoms. *European Journal of Public Health, 28,* 1062–1068. https://doi.org/10.1093/eurpub/cky125

Dodge, K. A., Greenberg, M. T., Malone, P. S., & Conduct Problems Prevention Research Group. (2008). Testing an idealized dynamic cascade model of the development of serious violence in adolescence. *Child Development, 79,* 1907–1927. https://doi.org/10.1111/j.1467-8624.2008.01233.x

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school based universal interventions. *Child Development*, *82*, 405–432. https://doi.org/10.1111/j.1467-8624.2010.01564.x

Erasmus, M. C. (2000). *Problem behavior at school interview*. Department of Child and Adolescent Psychiatry, Erasmus MC.

European Commission (2018). *Education and Training Monitor 2018*. https://op.europa.eu/en/publication-detail/-/publication/d576345f-e888-11e8-b69001aa75ed71a1/language-en

European Commission (2020). *Education and Training Monitor 2020*. https://op.europa.eu/webpub/eac/education-and-training-monitor2020/en/chapters/foreword.html

Flouri, E., & Midouhas, E. (2016). School composition, family poverty and child behaviour. *Social Psychiatry and Psychiatric Epidemiology, 51,* 817–826. https://doi.org/10.1007/s00127-016-1206-7

Gaikhorst, L., Beishuizen, J., Roosenboom, B., & Volman, M. (2017). The challenges of beginning teachers in urban primary schools. *European Journal of Teacher Education, 40,* 46–61. https://doi.org/10.1080/02619768.2016.1251900

Granvik Saminathen, M., Låftman, S. B., & Modin, B. (2019). School choice at a cost? Academic achievement, school satisfaction and psychological complaints among students in disadvantaged areas of Stockholm. *International Journal of Environmental Research and Public Health, 16,* 1912. https://doi.org/10.3390/ijerph16111912

Hoff, E., Laursen, B., Tardif, T., & Bornstein, M. H. (2002). Handbook of parenting. *Biology and ecology of parenting. Socioeconomic status and parenting* (2nd ed). *Lawrence Erlbaum Associates, 2,* 231–252. https://doi.org/10.4324/9780429401459-13

Hollingshead, A. B., & Redlich, F. C. (1958). *Social class and mental illness: Community study.* John Wiley & Sons Inc. https://doi.org/10.1093/sw/3.4.113

Hsu, H. Y., Lin, J. J., Skidmore, S. T., & Kim, M. (2019). Evaluating fit indices in a multilevel latent growth curve model: A Monte Carlo study. *Behavior Research Methods*, *51*, 172–194. https://doi.org/10.3758/s13428-018-1169-6

Hudson, C. G. (1988). The social class and mental illness correlation: Implications of the research for policy and practice. *Journal of Sociology & Social Welfare, 15,* 27–54.

Hudson, C. G. (2005). Socioeconomic status and mental illness: tests of the social causation and selection hypotheses. *American Journal of Orthopsychiatry*, *75*, 3–18. https://doi.org/10.1037/0002-9432.75.1.3

Janus, M., & Duku, E. (2007). The school entry gap: Socioeconomic, family, and health factors associated with children's school readiness to learn. *Early Education and Development*, *18*, 375–403. https://doi.org/10.1080/10409280701610796a

Kalff, A. C., Kroes, M., Vles, J. S. H., Hendriksen, J. G. M., Feron, F. J., Steyaert, J., ... & van Os, J. (2001). Neighbourhood level and individual level SES effects on child problem behaviour: A multilevel analysis. *Journal of Epidemiology & Community Health, 55,* 246–250. https://doi.org/10.1136/jech.55.4.246

Kalil, A., Ryan, R., & Corey, M. (2012). Diverging destinies: Maternal education and the developmental gradient in time with children. *Demography, 49,* 1361–1383. https://doi.org/10.1007/s13524-012-0129-5

Karsten, S., Ledoux, G., Roeleveld, J., Felix, C., & Elshof, D. (2003). School choice and ethnic segregation. *Educational Policy, 17,* 452–477. https://doi.org/10.1177/0895904803254963

Kokko, K., & Pulkkinen, L. (2000). Aggression in childhood and long-term unemployment in adulthood: A cycle of maladaptation and some protective factors. *Prevention & Treatment, 3*(1). doi:10.1037/1522-3736.3.1.332a

Lareau, A. (2003). *Unequal childhoods: Class, race, and family life.* University of California Press.

Leadbeater, B., Hoglund, W., & Woods, T. (2003). Changing contexts? The effects of a primary prevention program on classroom levels of peer relational and physical victimization. *Journal of Community Psychology, 31,* 397–418. https://doi.org/10.1002/jcop.10057

Lynne-Landsman, S. D., Bradshaw, C. P., & Ialongo, N. S. (2010). Testing a developmental cascade model of adolescent substance use trajectories and young adult adjustment. *Development and Psychopathology, 22*, 933–948. https://doi.org/10.1017/S0954579410000556

Marsh, H. W., & Hau, K. T. (2003). Big-Fish--Little-Pond effect on academic self-concept: A cross-cultural (26-country) test of the negative effects of academically selective schools. *American Psychologist, 58,* 364–367. https://doi.org/10.1037/0003-066x.58.5.364

Marsh, H. W., Hau, K. T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling, 11,* 320–341. https://doi.org/10.1207/s15328007sem1103_2

Martins, L., & Veiga, P. (2010). Do inequalities in parents' education play an important role in PISA students' mathematics achievement test score disparities? *Economics of Education Review*, *29*, 1016–1033. https://doi.org/10.1016/j.econedurev.2010.05.001

McLaughlin, K. A., Breslau, J., Green, J. G., Lakoma, M. D., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2011). Childhood socio-economic status and the onset, persistence, and severity of DSM-IV mental disorders in a US national sample. *Social Science & Medicine, 73,* 1088–1096. https://doi.org/10.1016/j.socscimed.2011.06.011

McLeod, J. D., & Kaiser, K. (2004). Childhood emotional and behavioral problems and educational attainment. *American Sociological Review*, *69*, 636–658. https://doi.org/10.1177/000312240406900502

Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika, 58,* 525–543. https://doi.org/10.1007/bf02294825

Meyrose, A. K., Klasen, F., Otto, C., Gniewosz, G., Lampert, T., & Ravens-Sieberer, U. (2018). Benefits of maternal education for mental health trajectories across childhood and adolescence. *Social Science & Medicine, 202,* 170–178. https://doi.org/10.1016/j.socscimed.2018.02.026

Ministry of Education, Culture and Science. (2013). *Key Figures 2009–2013 Education, Culture and Science.* https://www.government.nl/documents/reports/2014/08/12/key-figures2009-2013ministry-of-education-culture-and-science

Mizala, A., & Torche, F. (2017). Means-tested school vouchers and educational achievement: Evidence from Chile's universal voucher system. *The ANNALS of the American Academy of Political and Social Science*, *674*, 163–183. https://doi.org/10.1177%2F0002716217732033

Moore, G. F., Littlecott, H. J., Evans, R., Murphy, S., Hewitt, G., & Fletcher, A. (2017). School composition, school culture and socioeconomic inequalities in young people's health: Multi-level analysis of the Health Behaviour in School-aged Children (HBSC) survey in Wales. *British Educational Research Journal*, *43*, 310–329. https://doi.org/10.1002/berj.3265

Morawska, A., Winter, L., & Sanders, M. (2009). Parenting knowledge and its role in the prediction of dysfunctional parenting and disruptive child behaviour. *Child: Care, Health and Development, 35,* 217–226. https://doi.org/10.1111/j.1365-2214.2008.00929.x

Musset, P. (2012). *School choice and equity: Current policies in OECD countries and a literature review.* OECD Education Working Papers, No. 66. *OECD Publishing (NJ1).* https://doi.org/10.1787/5k9fq23507vc-en

Muthén, L., & Muthén, B. (2017a). Mplus Editor (version 8.0) [Software]. *Muthén & Muthén.*

Muthén, L. K., & Muthén, B. (2017b). *Mplus user's guide: Statistical analysis with latent variables, user's guide*. Muthén & Muthén.

Netherlands Inspectorate of Education (2015). *Toelichting Gewichtenregeling basisonderwijs per 1 januari 2015* [Explanation of Weight Scheme for Primary Education].

Netherlands Inspectorate of Education (2018). *Summary report: The state of education 2016/2017*. https://www.onderwijsinspectie.nl/documenten/rapporten/2018/11/14/thestate-of education-in-the-netherlands-2016-2017

Obradović, J., Burt, K. B., & Masten, A. S. (2009). Testing a dual cascade model linking competence and symptoms over 20 years from childhood to adulthood. *Journal of Clinical Child & Adolescent Psychology, 39*, 90–102. https://doi.org/10.1080/15374410903401120

OECD (2012). *Equity and quality in education: Supporting disadvantaged students and schools*. OECD Publishing. https://doi.org/10.1787/9789264130852-en

OECD (2016). *Low-performing students: Why they fall behind and how to help them succeed*. OECD Publishing. https://doi.org/10.1787/9789264250246-en.

Owens, A., Reardon, S. F., & Jencks, C. (2016). Income segregation between schools and school districts. *American Educational Research Journal, 53,* 1159–1197. https://doi.org/10.3102/0002831216652722

Papachristou, E., Flouri, E., Midouhas, E., Lewis, G., & Joshi, H. (2020). The role of primary school composition in the trajectories of internalising and externalising problems across childhood and adolescence. *Journal of Abnormal Child Psychology, 48,* 197–211. https://doi.org/10.1007/s10802-019-00584-9

Perry, L. B., & McConney, A. (2010). Does the SES of the school matter? An examination of socioeconomic status and student achievement using PISA 2003. *Teachers College Record*, *112*, 1137–1162. http://www.tcrecord.org/Content.asp?ContentId=15662

Peugh, J. L. (2010). A practical guide to multilevel modeling. *Journal of School Psychology, 48,* 85–112. https://doi.org/10.1016/j.jsp.2009.09.002

Querido, J. G., Warner, T. D., & Eyberg, S. M. (2002). Parenting styles and child behavior in African American families of preschool children. *Journal of Clinical Child and Adolescent Psychology, 31,* 272–277. https://doi.org/10.1207/s15374424jccp3102_12

Reise, S. P., Widaman, K. F., & Pugh, R. H. (1993). Confirmatory factor analysis and item response theory: Two approaches for exploring measurement invariance. *Psychological Bulletin, 114*, 552–566.

https://doi.org/10.1037/0033-2909.114.3.552

Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science & Medicine, 90,* 24–31. https://doi.org/10.1016/j.socscimed.2013.04.026

Ritsher, J. E., Warner, V., Johnson, J. G., & Dohrenwend, B. P. (2001). Inter-generational longitudinal study of social class and depression: a test of social causation and social selection models. *The British Journal of Psychiatry, 178,* 84–90. https://doi.org/10.1192/bjp.178.40.s84

Salkind, N. J. (Ed.; 2010*). Encyclopedia of research design* (Vol. 1). Sage. https://doi.org/10.4135/9781412961288

Satorra, A., & Bentler, P.M. (2001). A scaled difference chi square test statistic for moment structure analysis. *Psychometrika, 66,* 507–514. https://doi.org/10.1007/bf02296192

Schmiedeberg, C., & Schumann, N. (2019). Poverty and adverse peer relationships among children in Germany: A longitudinal study. *Child Indicators Research, 12,* 1717–1733. https://doi.org/10.1007/s12187-018-9606-8

Schwarz, G. (1978). Estimating the dimension of a model. *The Annals of Statistics*, 461-464. https://doi.org/10.1214/aos/1176344136

Sclove, S. L. (1987). Application of model-selection criteria to some problems in multivariate analysis. *Psychometrika*, *52*, 333-343. https://doi.org/10.1007/bf02294360

Stafford, M., & Marmot, M. (2003). Neighbourhood deprivation and health: does it affect us all equally? *International Journal of Epidemiology, 32,* 357–366. https://doi.org/10.1093/ije/dyg084

Statistics Netherlands (2004). *Statistical yearbook of the Netherlands 2004*. Voorburg/Heerlen, The Netherlands. https://www.cbs.nl

Statistics Netherlands (2008). *Dutch Standard Classification of Education, SOI 2006*. Voorburg/Heerlen, The Netherlands. https://www.cbs.nl

Statistics Netherlands (2018). *Trends in the Netherlands 2018.* Den Haag/Heerlen, The Netherlands: Netherlands Central Bureau of Statistics. *Statistics Netherland*.

Stouffer, S. A., Lumsdaine, A. A., Lumsdaine, M. H., Williams Jr, R. M., Smith, M. B., Janis, I. L., ... & Cottrell Jr, L. S. (1949). The American soldier: Combat and its aftermath. (Studies in social psychology in World War II), Vol. 2.

Thompson, A., Hollis, C., & Richards, D. (2003). Authoritarian parenting attitudes as a risk for conduct problems. *European Child & Adolescent Psychiatry, 12,* 84–91. https://doi.org/10.1007/s00787-003-0324-4

Thrupp, M., Lauder, H., & Robinson, T. (2002). School composition and peer effects. *International Journal of Educational Research, 37,* 483–504. https://doi.org/10.1016/s0883-0355(03)00016-8

Timmermans, M., van Lier, P. A., & Koot, H. M. (2008). Which forms of child/adolescent externalizing behaviors account for late adolescent risky sexual behavior and substance use? *Journal of Child Psychology and Psychiatry,* 49, 386–394. https://doi.org/10.1111/j.1469-7610.2007.01842.x

UNESCO Institute for Statistics. (2012). *International standard classification of education: ISCED 2011*. UNESCO Institute for Statistics.

Vaillancourt, T., Brittain, H. L., McDougall, P., & Duku, E. (2013). Longitudinal links between childhood peer victimization, internalizing and externalizing problems, and academic functioning: Developmental cascades. *Journal of Abnormal Child Psychology, 41,* 1203–1215. https://doi.org/10.1007/s10802-013-9781-5

van Lier, P. A., & Koot, H. M. (2010). Developmental cascades of peer relations and symptoms of externalizing and internalizing problems from kindergarten to fourth-grade elementary school. *Development and Psychopathology, 22,* 569–582. https://doi.org/10.1017/s0954579410000283

van Lier, P. A., Vitaro, F., Barker, E. D., Brendgen, M., Tremblay, R. E., & Boivin, M. (2012). Peer victimization, poor academic achievement, and the link between childhood externalizing and internalizing problems. *Child Development, 83,* 1775–1788. https://doi.org/10.1111/j.1467-8624.2012.01802.x

Virtanen, M., Kivimäki, M., Elovainio, M., Linna, A., Pentti, J., & Vahtera, J. (2007). Neighbourhood socioeconomic status, health and working conditions of school teachers. *Journal of Epidemiology & Community Health, 61,* 326–330. https://doi.org/10.1136/jech.2006.052878

von Rueden, U., Gosch, A., Rajmil, L., Bisegger, C., & Ravens-Sieberer, U. (2006). Socioeconomic determinants of health related quality of life in childhood and adolescence: results from a European study. *Journal of Epidemiology & Community Health, 60,* 130–135. https://doi.org/10.1136/jech.2005.039792

Walsh, D., McCartney, G., Smith, M., & Armour, G. (2019). Relationship between childhood socioeconomic position and adverse childhood experiences (ACEs): A systematic review. *Journal of Epidemiology & Community Health, 73,* 1087–1093. https://doi.org/10.1136/jech-2019-212738

Wang, M. T., & Sheikh-Khalil, S. (2014). Does parental involvement matter for student achievement and mental health in high school? *Child Development, 85,* 610–625. https://doi.org/10.1111/cdev.12153

Widaman, K. F., & Reise, S. P. (1997). *Exploring the measurement invariance of psychological instruments: Applications in the substance use domain.* In K.J. Bryant, M. Windle, & S.G. West (Eds.), *The science of prevention: Methodological advances from alcohol and substance abuse research* (pp. 281–324). American Psychological Association. https://doi.org/10.1037/10222-009

Witvliet, M., van Lier, P. A. C., Cuijpers, P., & Koot, H. M. (2009). Testing links between childhood positive peer relations and externalizing outcomes through a randomized controlled intervention study. *Journal of Consulting and Clinical Psychology*, *77*, 905–15. https://doi.org/10.1037/a0014597

Witvliet, M., van Lier, P. A. C., Cuijpers, P., & Koot, H. M. (2010). Change and stability in childhood clique membership, isolation from cliques, and associated child characteristics. *Journal of Clinical Child and Adolescent Psychology, 39*, 12–24. https://doi.org/10.1080/15374410903401161

Woods, C. M. (2009). Evaluation of MIMIC-model methods for DIF testing with comparison to two-group analysis. *Multivariate Behavioral Research*, *44*, 1–27. https://doi.org/10.1080/00273170802620121

Woods, C. M., & Grimm, K. J. (2011). Testing for nonuniform differential item functioning with multiple indicator multiple cause models. *Applied Psychological Measurement*, *35*, 339–361. https://doi.org/10.1177/0146621611405984

Woodward, L. J., & Fergusson, D. M. (2000). Childhood peer relationship problems and later risks of educational under-achievement and unemployment. *The Journal of Child Psychology and Psychiatry and Allied Disciplines, 41,* 191–201. https://doi.org/10.1111/1469-7610.00600

Wright, J. C., Giammarino, M., & Parad, H. W. (1986). Social status in small groups: Individual–group similarity and the social "misfit". *Journal of Personality and Social Psychology, 50*, 523–536. https://doi.org/10.1037/0022-3514.50.3.523

# PART 2

The Role of the Classroom Context
in Inequalities in Child Development

# CHAPTER 4

## Context Matters: Norm Salience Towards Aggression Moderates the Association Between Parental Education and Childhood Aggression Development

**This chapter is based on**:
Horoz, N., van Atteveldt, N., van Lier, P. A., Houweling, T. A., Oude Groeniger, J., van Lenthe, F. J., Koot, H.M., Buil, J. M. (In Press). Context matters: Norm salience toward aggression moderates the association between parental education and childhood aggression development. *International Journal of Behavioral Development.* https://doi.org/10.1177/01650254241279794

## Abstract

This longitudinal study investigated whether classroom norm salience towards aggression moderated the association between parental education and children's overt aggressive behavior development from third to sixth grade of elementary school. Children (*N* = 1,205, 51% girls) from 46 Dutch elementary schools were annually followed from third to sixth grade. Norm salience was operationalized by within classroom correlations between individual-children's peer-nominated social preference and aggression scores. Results from multi-level latent growth models showed that norm salience development from third to sixth grade, but not norm salience in third grade, was a significant moderator. That is, results suggested that in third grade, children of lower-educated parents showed higher levels of overt aggressive behavior than children of higher-educated parents, irrespective of the norm. However, in classrooms where norm salience became more favorable towards aggression over time, children of lower-educated parents showed a slower growth rate of overt aggressive behavior than children of higher-educated parents from third to sixth grade. In classrooms where norm salience became less favorable towards aggression over time, the development of overt aggressive behavior was similar for all children. Findings suggest that classroom norm salience may become more important in the later elementary school years and that children of higher-educated parents may be more able to adapt their behavior towards the classroom norm.

*Keywords*: parental education, SES, aggressive behavior, norm salience, elementary school, peer social context

Children's experiences in elementary school may set the stage for (mal)adaptive developmental trajectories (Dodge et al., 2008; van Lier & Koot, 2010). Overt aggression, such as physically attacking or threatening others, is a common childhood behavior that usually decreases in frequency when children grow older (Bongers et al., 2004; Coie & Dodge, 1998). However, if children show increases or stable-high levels of aggressive behavior throughout elementary school, they run the risk of a myriad of problems including social skills and peer relationship difficulties, lower academic achievement, mental health problems, future substance use problems and criminal behavior (Fergusson et al., 2005; Loeber, 1990; van Lier & Koot, 2010; van Lier et al., 2012).

One important factor that is associated with aggressive behavior is parental education. In fact, parental education is a robust predictor of children's development, with its effects being stronger in childhood than in later life course stages such as in adolescence (Reiss, 2013). Parental education relates to child development through several mechanisms including parenting strategies, financial stress, social and cultural capital, and parental mental health (e.g., Conger & Donnellan, 2007). As regards aggressive behavior, children of lower-educated parents are, on average, more likely to exhibit (stable-) higher or a faster growth rate of aggressive behavior levels than children of higher-educated parents throughout elementary school. That is, compared to children of higher-educated parents, children of lower-educated parents not only show higher levels of aggressive behavior at the beginning but also at the end of elementary school (Horoz et al., 2022a). This puts children of lower-educated parents at risk for developing mental health problems both during and after their elementary school years. Indeed, parental education in childhood has been shown to associate with the severity and persistence of behavioral problems, including problems with aggression, in adolescence and adulthood (McLaughlin et al., 2011). It is therefore critical to identify factors that may exacerbate or impede development of aggressive behavior in children with varying parental education backgrounds. Identifying factors at a formative stage like that of the elementary school may yield novel insights and thereby contribute to early aggression prevention and intervention efforts.

Previous research provided valuable insights into the factors that play a role in the aggressive behavior development of children of higher- and lower-educated parents. These studies examined individual child or household level moderators such as stressful life situations and mediators such as social competence, parenting practices, marital conflict between parents, and financial hardship (Cabello et al., 2017; Hosokawa & Katsura, 2017; Oude Groeniger et al., 2023; Reiss et al., 2019). Yet, social ecological theory posits that understanding the interplay between individual-level characteristics and broader social contexts, also those beyond the household level, is critical to understand human development, including aggressive behavior development (Bronfenbrenner, 1977; Espelage, 2014). Therefore, studying factors that are within children's social contexts, but that extend beyond the individual and household levels, could contribute to our understanding of aggressive behavior development of children with varying parental

education backgrounds. One such social context might be the peer social context within the classroom environment, particularly classroom norm salience. This longitudinal study, therefore, investigated whether the development of classroom norm salience towards aggression moderated the association between parental education and children's overt aggressive behavior development from third to sixth grade of elementary school.

**Classroom norm salience**

Classroom norms are implicit social standards which determine the acceptability of certain behaviors. Norm salience is defined by within-classroom correlations between children's social status among peers (e.g., how socially preferred they are, how popular they are) and their specific behavior (e.g., aggressive behavior) and can therefore be regarded as an indicator of behaviors that are valued and influential in classrooms (Dijkstra & Gest, 2015; Dijkstra et al., 2008). Note that in the present study norm salience is based upon *social preference*, which refers to how well a child is liked by the peers in their classroom, and not upon popularity, which measures the extent to which a child is perceived to be popular by their peers. Norm salience, when compared to descriptive (i.e., the frequency of the behavior within the classroom) and injunctive norms (i.e., the attitudes towards a specific behavior within the classroom), has been shown to be the strongest driving factor in the behavioral adjustment of children and adolescents (e.g., Dijkstra & Gest, 2015; Laninga-Wijnen et al., 2017).

Children have a fundamental need to belong and to feel accepted by their peer group (Baumeister & Leary, 1995). Children whose behavior deviates from the norm are more likely to be rejected or excluded, while children who conform to the norm are more likely to be accepted and included (Wright et al., 1986). Hence, the fundamental need to belong and to feel accepted may influence children's behavior. This can be further explained by the Social Impact Theory (SIT; Latané, 1981), which suggests that individuals' behaviors are influenced by the presence or the actions of others. It explains social impact as a "social force field" which pressures or pushes individuals to behave in a certain way. More specifically, it states that the strength (i.e., the status of the source of influence), the immediacy (i.e., the closeness in space or time), and the number of people who are the source of influence may determine the impact of the "social source field." Peers may, thus, imitate the behaviors of higher status peers in order to profit from social benefits such as peer acceptance, development of friendships and the maintenance or enhancement of their own peer status. Therefore, in classrooms where norm salience is more favorable towards aggression (i.e., where more aggressively behaving children are more socially preferred), children may imitate behaviors of more socially preferred peers out of a fear of not fitting in or out of a fear of being rejected within the classroom. In classrooms where norm salience is less favorable towards aggression (i.e., where more aggressively behaving children are less socially preferred), being aggressive would be regarded as norm-defying and children may be more likely to refrain from such behaviors insofar as they do not lead to social benefits.

Previous studies in adolescent samples showed that in classrooms where higher (vs lower) levels of aggressive behavior were associated with higher status (measured by popularity), adolescents exhibited more aggressive behavior and sought to affiliate with aggressive peers (e.g., Dijkstra et al., 2008; Laninga-Wijnen et al., 2017). Most studies operationalized norm salience using popularity scores (but see Brendgen et al., 2015; Correia et al., 2022; Tieskens et al., 2019). Children with higher status, those who are popular and socially preferred, not only are on top of the social ladder but also maintain a central position and social control among their peers. Yet, while the two dimensions (i.e., popularity and social preference) of social status are related, and moderately statistically correlated, they are also distinct. That is, not all socially preferred children are popular, and not all popular children are socially preferred (van den Berg et al., 2020). In line with this, Garandeau and colleagues (2022) found that there was a non-significant correlation between bullying-popularity norm and bullying-rejection norm, suggesting that in classrooms where more aggressively behaving children were more popular, they may not be necessarily liked and accepted. Moreover, social preference is primarily related to communal social goals whereas popularity is primarily related to agentic social goals (Caravita & Cillessen, 2012; van den Berg et al., 2020) and that the association between social preference and popularity weakens from childhood to adolescence (van den Berg et al., 2020). Therefore, operationalizing norm salience based upon social preference rather than popularity could offer novel insights into the development of norm salience, thereby complementing the existing literature on norm salience based upon popularity.



While there is a considerable amount of research on adolescent classroom norms in general (Brendgen et al., 2015; Dijkstra & Gest, 2015; Dijkstra et al., 2008; Laninga-Wijnen et al., 2017), to our knowledge there are no studies examining classroom norm salience towards aggression longitudinally across consecutive elementary school grades (but see Correia et al., 2022; Velásquez et al., 2021). Yet, already in elementary school, the dynamic interplay between peer experiences and externalizing behaviors including aggression becomes apparent (van Lier et al., 2012). Additionally, social hierarchies become increasingly important from early to middle childhood (Stauffacher & DeHart, 2006). Therefore, it is necessary to consider the peer social context longitudinally, such as the development of classroom norm salience, when studying aggressive behavior development in this fundamental period.

**Norm salience as a moderator of the association between parental education and overt aggressive behavior**

The majority of the studies (but see Brendgen et al., 2013, 2015) examined whether norm salience towards aggression impacts the behavioral adjustment of all children. However, norm salience could also affect aggressive behavior development of children with various social backgrounds differently, such as children of parents with different education backgrounds. Drawing upon SIT, the association between parental education and overt aggressive behavior may be more pronounced in classrooms where norm

salience is *more favorable* towards aggression than in classrooms where norm salience is *less favorable* towards aggression.

In formulating our hypotheses, we regarded lower parental educational attainment as a social vulnerability as it is often correlated with indicators of socioeconomic deprivation such as financial stress, lower family income, and parental mental health problems, which may increase children's risk of developing mental health difficulties (e.g., Hosokawa & Katsura, 2017; Oude Groeniger et al., 2023). Indeed, lower parental education was associated with higher levels of problems across a wide range of outcomes, including aggressive behavior, throughout elementary school (Horoz et al., 2022a). Moreover, we consider being a member of a classroom where norm salience is more favorable towards aggression to be a risk factor, given the higher levels of aggressive behavior present in such classrooms (e.g., Dijkstra et al., 2008). In what follows we explain our hypotheses of direction of the associations in classrooms where norm salience is more favorable towards aggression and in classrooms where norm salience is less favorable towards aggression.

*Classrooms where norm salience is more favorable towards aggression*
Due to their more vulnerable social backgrounds, children of lower-educated parents may be affected by the risk environment in two distinct ways:

On the one hand, in classrooms where norm salience is more favorable towards aggression, children of lower-educated parents may show higher levels or a faster increase of aggressive behavior than children of higher-educated parents. Risk factors for aggression development in multiple domains (i.e., individual(household) and classroom levels) have been shown to have an effect on aggression development (Dodge et al., 2008; Espelage 2014). The risk of developing aggressive behavior for child X, who is growing up in a lower-educated household (i.e., social vulnerability) may be exacerbated when they are in a classroom where aggression is positively reinforced by peers (i.e., risk factor for aggression) compared to child Y, who is growing up in a higher-educated household. A previous study examining moderation effects showed that children of lower-educated parents exhibited more mental health problems, including behavioral problems, in stressful life situations, including problems in school, than children of higher-educated parents (Reiss et al., 2019).

In contrast, it is also conceivable that in classrooms where norm salience is *more favorable* towards aggression, children of lower-educated parents may have *lower levels* or a *slower increase* of aggressive behavior than children of higher-educated parents. In such classrooms, children of higher-educated parents may use their resources to maximize their social status through peer acceptance. Children of higher-educated parents on average show better cognitive flexibility, working memory, inhibitory control and social information processing skills (Bookhout et al., 2021; Cabello et al., 2017; Ursache et al., 2016). Consequently, they may be better at processing social cues in their environment

and also at selecting behaviors that "fit in," that meet the expectations of their peers, and that are likely to help them become more socially preferred. In other words, in such classrooms, they may use aggression as a strategy to gain social benefits. In comparison, children of lower-educated parents may be slower in interpreting and responding to environmental cues and may face more challenges in adjusting their behavior towards the norm. A previous study found that more vulnerable children (i.e., children who are victimized by peers) showed increases in risk-taking behavior when norm salience based on social preference was unfavorable towards risk-taking and showed decreases in risk-taking when norm salience was favorable towards risk-taking (Tieskens et al., 2019). These results suggest that more vulnerable children may be less able to adjust their behavior towards the norm and may even engage in norm-defying behavior (Tieskens et al., 2019). Thus, in the context of the present study, it is also possible that children of lower-educated parents may be less able to adapt their behavior towards the salient classroom norm than children of higher-educated parents.



*Classrooms where norm salience is less favorable towards aggression*

In classrooms where norm salience is *less favorable* towards aggression, behaving aggressively would be considered to be norm-defying since in these classrooms aggression may be less valued and not be positively reinforced. Therefore, children may be less likely to engage in aggressive behavior. Yet it is still conceivable that children of lower-educated parents may exhibit higher levels of aggressive behavior than children of higher-educated parents since lower parental education was previously associated with aggressive behavior development throughout elementary school (Horoz et al., 2022a). In contrast, children of higher-educated parents may be more likely to refrain from aggressive behavior since in these classrooms aggression may not lead to social benefits.

## Present study

The present study aimed to extend previous research by investigating whether the development of norm salience towards aggression moderated the association between parental education and overt aggressive behavior development from third to sixth grade. To our knowledge the present study was the first to examine classroom norm salience longitudinally across consecutive elementary school grades and to consider a classroom-level moderator in the association between parental education and aggressive behavior. Specifically, we tested whether the level of classroom norm salience towards aggression in third grade as well as its development (i.e., rate of change from third to sixth grade) moderated the association between parental education and the level and development of children's overt aggressive behavior from third to sixth grade of elementary school. The present study aimed to provide insights into the developmental nature of norm salience based on social preference and into the potential context-dependent nature of aggressive behavior development of children of higher- and lower-educated parents

across the late elementary school years. Thus, the knowledge gained from this study could inform classroom level interventions in elementary school.

It should be noted that our study was relatively exploratory in nature. We expected norm salience towards aggression in third grade and over time to be significant moderators. Because of the novelty of this study and the mixed findings in the literature, in classrooms where norm salience is *more favorable* towards aggression in third grade and over time we have competing hypotheses on the direction of the associations between parental education and overt aggressive behavior development in third grade and over time. In classrooms where norm salience is *less favorable* towards aggression in third grade and over time, we hypothesized that children of lower-educated parents would have higher levels in third grade and a faster increase or slower decrease in overt aggressive behavior levels over time than children of higher-educated parents, but less so than their counterparts in classrooms where norm salience is *more favorable* towards aggression.

## Method

### Participants

Participants came from two similar longitudinal research projects (Project A; de Wilde et al., 2016 and Project B; Witvliet et al., 2009a) on children's behavioral, emotional, and social development that followed children annually throughout elementary school. Both projects used convenience samples and recruited the first schools that agreed to participate upon invitation. Inclusion criteria for the present study were (i) parental consent, (ii) data on household-level parental education, and (iii) at least two completed (teacher-reported) assessments of overt aggressive behavior between third and sixth grade. The final sample consisted of 1,205 children from 46 schools and within, on average, 126 classrooms across each studied year. Of the 1,205 children, 714 came from Project A and 491 came from the Project B. Children were on average 9.11 ($SD$ = 0.45) years old in third grade and 51% were girls. Furthermore, 78% had a native Dutch background (both parents born in the Netherlands), which is comparable to the general population in the Netherlands (75%; Statistics Netherlands, 2022). The rest of the sample had at least one parent born elsewhere, such as Türkiye (4.5%), Morocco (4.0%), Suriname (1.8%), and other countries (9.5%).

Children who did not meet the inclusion criteria (i.e., excluded children) did not differ from included children with regard to gender distribution ($\chi^2(1) = 2.46$, $p = 0.116$). In third grade, included children ($N$= 1,173, $M$ = 9.11, $SD$ = 0.46) were younger than excluded children ($N$= 1,576, $M$ = 9.20, $SD$ = 0.53), $t(2747) = -4.96$, $p < 0.001$, Cohen's $d$ = 0.50. Furthermore, except for sixth grade, excluded children showed higher levels of overt aggressive behavior than included children across all years ($p$s $\leq$ 0.001), but the effect sizes of the mean differences were always small (Cohen's $d$s < 0.18).

Children from Project B had higher levels of overt aggressive behavior and parents with lower education levels compared to children from Project A. Norm salience towards aggression and the school-level percentage of children with lower-educated parents (i.e., school-level parental education) did not significantly differ between schools in the two projects. See Supplementary Document, sTable 1 for the descriptive statistics of children from both projects.

**Procedure**

Procedures were similar between the two research projects. Data were collected annually for four years from the spring of third grade to the spring of sixth grade. At the start of both studies, all parents/caregivers were asked for active written informed consent. Each subsequent year, children and parents/caregivers were informed about the data collection plans and could withdraw their consent and revoke participation at any time (i.e., passive informed consent). Parents of new children who entered a classroom that participated in the study were asked for active written informed consent. Parental education data and teacher-reported overt aggressive behavior were obtained from parents and teachers via online questionnaires, respectively. In both studies, teachers were asked the same questions. Peer nominations were obtained in classrooms during a regular school day. Children received a list of classroom peers and could nominate an unlimited number of peers that they liked and disliked and that fit the description of showing aggression. During the measurement, children were supervised by trained research assistants and were seated in exam style to ensure privacy.



It should be noted that through a randomized control trial, a preventive classroom management intervention was implemented in first and second grades within some schools of Project B. Schools in control and intervention conditions of Project B were free to implement any intervention from grade 3 (the first wave of this present study) onwards but this was no longer monitored. Similarly, whether schools in Project A implemented interventions within the study period was also not monitored. Of the 1,205 participants, 340 participants were in the intervention condition in first and second grades. More details of the study design and procedures of both projects are described elsewhere (de Wilde et al., 2016; Witvliet et al., 2009a). This study was approved by the Medical Ethics Review Committees of Vrije Universiteit Amsterdam and Erasmus University Medical Center.

## Measures

**Parental education**

Parental education was measured using parents' highest completed education rated according to the Dutch Standard Education Classifications (Statistics Netherlands, 2008), which are in line with International Standard Classification of Education (ISCED; UNESCO Institute for Statistics, 2012). Following the ISCED classifications, parental education levels were coded using an 8-point scale, with education levels ranging from 0 = no education/ early education, 1 = primary education, 2 = lower secondary education, 3 = upper

secondary education, 4 = post-secondary non-tertiary education, 5 = short-cycle tertiary education, 6 = bachelor's degree or equivalent, to 7 = master's degree, equivalent or higher. Parental education scores were based on the highest completed parental education level per household. That is, if a child had one parent with upper secondary education (3) and another parent with a short-cycle tertiary education (5) then we coded this child's parental education level as having short-cycle tertiary education (5). The parental education levels were reverse coded so that higher scores indicated lower parental education levels.

**Classroom norm salience towards aggression**

Classroom norm salience towards aggression was operationalized by within-classroom correlation between individual children's social preference scores and their aggression scores, both assessed via peer nominations. In each classroom, each participating child nominated classmates by answering the following questions: "Who hits other children?" (aggression nomination), "Who do you like?" (like nomination) and "Who do you dislike?" (dislike nomination). The peer nominated aggression, like and dislike scores were calculated for each child by using the proportion of received nominations for each construct. These scores could range from 0 (no nominations) to 1 (nominated by all classmates). For example, if in a classroom of 20 students, 14 peers nominated peer X as aggressive, then peer X's individual-received-peer-nomination score would be 0.74 (14 ÷ (20–1); self-nomination was not allowed). Higher aggression scores indicated more aggression nominations. Social preference scores were calculated by subtracting children's dislike scores from like scores. Social preference scores therefore ranged from 1 to -1, with higher scores indicating more social preference. Classroom size for norms calculations ranged from 5 to 31 students, with a mean of 12. Rates of peer nominations within these classrooms ranged from 77% - 100%, with a mode and median of 100%. Per class correlations of aggression and social preference scores were then calculated and subsequently transformed to Fisher z-scores to obtain a normal distribution. This was done by following the formula :z′ = .5[ln(1 + r) − ln(1-r)] (Fisher, 1925; Laninga-Wijnen et al., 2020).

**Children's overt aggressive behavior**

Overt aggressive behavior was measured by the overt aggression items of the conduct problem subscale of the Problem Behavior at School Interview (PBSI; Erasmus, 2000). The PBSI employs a 5-point Likert scale ranging from 0 (never applicable) to 4 (often applicable). Overt aggressive behavior was assessed by six items such as "starts fights" and "attacks others physically." Higher scores indicated higher levels of teacher-reported overt aggressive behavior. Cronbach's alpha across grades ranged from 0.921 to 0.936. A previous study using a subsample of this study showed adequate convergent validity, by showing a correlation of 0.75 ($p < 0.01$) between the behavioral scale of the PBSI and the Teacher's Report Form (Achenbach, 1991; Witvliet et al., 2009b). Furthermore, another study found no major violations of longitudinal measurement invariance of the conduct problems subscale between children of lower- and higher-educated parents. This suggests that teachers' ratings of children's

aggressive behavior reflect the true mean differences between children of higher- and lower-educated parents and do not reflect teacher (rater) bias or differences (Horoz et al., 2022a).

**Cluster Variable**

**Classroom membership profile**

Classroom compositions could change as children transitioned from one grade to another in elementary schools in the Netherlands. Following the procedure used in a previous study (Tieskens et al., 2019), classroom membership profile was computed for each child and was used as the cluster variable in our multilevel model. To compute classroom membership profiles for each child, we assessed whether they transitioned into a classroom with the same classmates or (partly) new classmates. Children who transitioned into the same classroom from third to sixth grade were categorized into the same classroom membership profile. However, it was also possible that due to slightly different classroom compositions from year to year, some children did not transition into the same classroom. Note that classroom membership profiles could only be calculated for children who participated in this study within the participating classrooms and that classroom membership profiles do not refer to classroom size. Classroom norm salience calculations were computed within third, fourth, fifth and sixth grade classrooms and not within classroom membership trajectories. There were 192 classroom membership profiles that included at least two children and 135 singletons (i.e., clusters with only one child which represent children who did not transition to the exact same classrooms with other peers across the four years). The number of children within a membership profile with more than one child ranged from 2 to 21, with an average number of 6 children.



## Statistical Analyses

We used a multi-level latent growth curve model (ML-LGM) to test our hypotheses in MPLUS version 8.0 (Muthén & Muthén, 2017). Our ML-LGM had a two-level time-nested-within-individual data structure. Level 1 represented variation across individuals and Level 2 represented variation across clusters (i.e., classroom membership profiles). The development of both overt aggressive behavior and of norm salience towards aggression from third to sixth grade were estimated by latent growth parameters: latent intercepts and latent slopes. The latent intercepts represented overt aggressive behavior levels and strength of norm salience towards aggression in third grade and the latent slopes represented rate of change in overt aggressive behavior levels and norm salience towards aggression from third grade to sixth grade. For a graphical representation of our model, see sFigure 1 in Supplementary Document.

We used multi-level latent growth models with cross-level interactions to test whether intercept and slope parameters of classroom norm salience towards aggression moderated the association between parental education and the intercept and slope

parameters of overt aggressive behavior. For more specific details, see the Supplementary Document. When significant, simple slopes were calculated to estimate the associations of parental education and overt aggressive behavior in classrooms where norm salience was (i) more (M + 1 SD) and (ii) less favorable (M – 1 SD) towards aggression in third grade and over time. We controlled for the effect of gender on within-level overt aggressive behavior and for the effect of school-level parental education on cluster-level overt aggressive behavior and on norm salience. In addition, cluster-level overt aggressive behavior was regressed on norm salience.

Two sensitivity analyses were performed to ensure that our results were robust a) across samples (controlling for project A and B) and b) when excluding singletons. Mplus code and output files are publicly available in OSF (https://osf.io/w6gaf/?view_only=ff866d7a318047cc91d3a5d93b22d11a)

## Results

**Descriptive statistics, unconditional latent growth models, and main effect model**

Descriptive statistics of the study variables, results from unconditional growth models and from the main effect model are presented in detail in the Supplementary Document. Results from unconditional growth models (see sTable 3) showed that overall children's overt aggressive behavior levels decreased from third to sixth grade. Furthermore, results showed that in third grade, children exhibiting higher levels of aggressive behavior were less socially preferred (i.e., there was a negative correlation between peer-nominated aggression and social preference; norm is less favorable towards aggression) than children exhibiting lower levels of aggressive behavior. However, norm salience towards aggression on average became less negative from third to sixth grade (positive slope parameter of the norm), indicating that children exhibiting higher levels of aggressive behavior became more socially preferred (i.e., less disliked or more liked) over time. Additionally, main effect results showed that in third grade children of lower-educated parents and children in lower parental education schools showed higher levels of overt aggressive behavior. For more details on main effect results, see the Supplementary Document.

**Classroom norm salience as a moderator in the association between parental education and overt aggressive behavior**

Results from ML-LGMs with cross-level interactions are presented in Table 1. Results showed that the intercept parameter of norm salience did not moderate the association between parental education and intercept and slope parameters of overt aggressive behavior. In other words, the association between parental education and aggressive behavior did not depend on norm salience in third grade. However, the slope parameter of norm salience was a significant moderator in the association between parental education and the development of overt aggressive behavior. This indicates that the overt aggressive behavior

development of children of higher- and lower-educated parents depended upon the rate of change of the classroom norm salience towards aggression from third to sixth grade.

Probing the interaction effects showed that in classrooms where norm salience became *more favorable* towards aggression over time, children of lower-educated parents showed a slower growth rate of overt aggressive behavior levels compared to children of higher-educated parents (*B* = -.027, *S.E.*= .013, *p* = .034, 95% CI [-.052, -.002]). However, in classrooms where norm salience became *less favorable* towards aggression over time, no significant association between parental education and the slope parameter of overt aggressive behavior was found (*B* = .004, *S.E.*= .008, *p* = .648, 95% CI [-.012, .019]). In such classrooms, the development of overt aggressive behavior of children of higher- and lower-educated parents did not differ (See Figure 1).

The two sensitivity analyses showed no changes in the interpretations of our results (See Supplementary Material, sTables 4 and 5).

**Table 1**

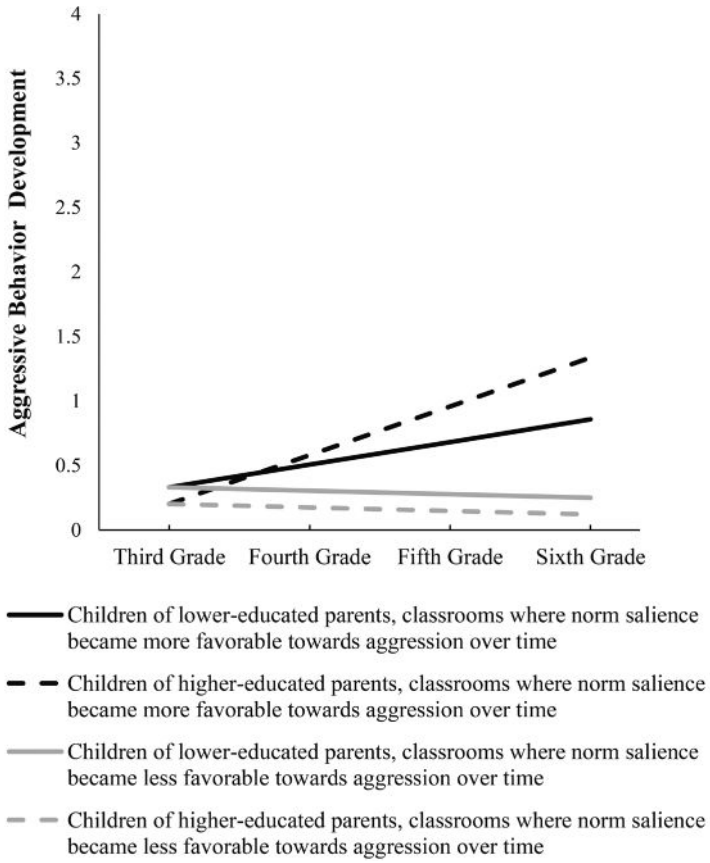
*Classroom norm salience towards aggression as a moderator of the association between parental education and overt aggressive behavior*

| | Overt Aggressive Behavior | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Intercept | | | | Slope | | | |
| | *Estimate* | *S.E.* | *p* | CI (95%) | *Estimate* | *S.E.* | *p* | CI (95%) |
| ***Within Level*** | | | | | | | | |
| Gender | .377 | .040 | < .001* | .299, .455 | .000 | .015 | .990 | -.030, .030 |
| **Between Level** | | | | | | | | |
| Lower School-level Parental Education | .015 | .002 | < .001* | .011, .020 | -.001 | .001 | .642 | -.003, .002 |
| Aggression norm $T_1$ (intercept norm) | .090 | .051 | .078 | -.010, .190 | -.050 | .032 | .113 | -.112, .012 |
| Aggression norm $T_1$ – $T_4$ (slope norm) | - | - | - | - | -.062 | .058 | .289 | -.176, .052 |
| Intercept random intercept[a] | .043 | .025 | .086 | -.006, .092 | | | | |
| Intercept random slope[b] | - | - | - | - | -.007 | .008 | .383 | -.022, .008 |
| **Cross-level Interaction (random intercept)** | | | | | | | | |
| Aggression norm $T_1$ (intercept norm) | -.028 | .029 | .341 | -.085, .029 | - | - | - | - |
| **Cross-level Interaction (random slope)** | | | | | | | | |
| Aggression norm $T_1$ (intercept norm) | - | - | - | - | -.016 | .012 | .178 | -.039, .007 |
| Aggression norm $T_1$ – $T_4$ (slope norm) | - | - | - | - | -.065 | .028 | .022* | -.120, - .009 |

*Note.* [a]Random intercept: the association between parental education and individual-level overt aggressive behavior in third grade. [b]Random slope: the association between parental education and the development of individual-level overt aggressive behavior from third to sixth grade. Aggression norm $T_1$ (intercept norm): classroom norm salience towards aggression in third grade. Aggression norm $T_1$ – $T_4$ (slope norm): the development of classroom norm salience towards aggression from third to sixth grade. Gender was dummy coded (0 = girls, 1 = boys).

**Figure 1**

*The Cross-level Interaction Between Parental Education and the Development of Norm Salience Towards Aggression on the Development of Children's Overt Aggressive Behavior*




*Note.* The slopes were calculated using 1 *SD* above and below the mean of norm salience towards aggression, and, for illustration purposes only, at having completed *upper secondary education* to depict the developmental paths of overt aggressive behavior of children of lower-educated parents and at having completed *bachelor's degree or equivalent* to depict the developmental paths of overt aggressive behavior of children of higher-educated parents. While we chose parental education contrast groups for illustrative purposes in this figure, it should be noted that, across the whole range of parental education, as the differences between parental education levels become larger, the differences in growth rates also become larger.

## Discussion

This longitudinal study investigated whether the development of classroom norm salience towards aggression moderated the association between parental education and children's overt aggressive behavior development from third to sixth grade of elementary school. It is noteworthy that the results from unconditional models showed that consistent with previous research (Bongers et al., 2004), aggressive behavior levels on average decreased

from third to sixth grade. With respect to norm salience, more aggressively behaving children were less socially preferred than less aggressively behaving children in third grade. Although the correlation between aggression and social preference remained negative from third to sixth grade, in general more aggressively behaving children became more socially preferred (i.e., less disliked or more liked) over time. Norm salience in this study was an implicit rather than an explicit norm. Thus, our novel findings show that such implicit classroom norms are already present in elementary school and evolve over time.

The main results of this study showed that norm salience towards aggression in third grade was not a significant moderator of parental education and overt aggressive behavior development, but the rate of change (i.e., development) of norm salience from third to sixth grade was. Thus, the results partly supported the hypotheses. They showed that in third grade, children of lower-educated parents exhibited higher levels of overt aggressive behavior than children of higher-educated parents, independent of the salient norm. Yet, in classrooms where norm salience became *more favorable* towards aggression over time, the growth rate of overt aggressive behavior differed between children of higher- and lower-educated parents. That is, children of lower-educated parents showed a slower growth rate of overt aggressive behavior levels than children of higher-educated parents from third to sixth grade. In contrast, in classrooms where norm salience became *less favorable* towards aggression over time, the relative difference found in third grade between children of higher- and lower-educated parents remained stable until sixth grade.

These findings are striking because, in general, research shows that children of lower-educated parents exhibit higher levels or growth rates of aggressive behavior than children of higher-educated parents throughout elementary school (Horoz et al., 2022a). The results of the present study showed that while children of lower-educated parents exhibited higher levels of aggressive behavior in third grade, the development of aggressive behavior of children of higher- and lower-educated parents depended upon classroom norm salience. The effect of the interaction was small; thus, results should be interpreted with caution before they are replicated. Nevertheless, results suggest that context may matter: classroom peer context may provoke a faster growth rate of aggressive behavior levels in children of higher-educated parents than in children of lower-educated parents. Thus, results extend the literature by showing that the rate of change of the salient norm in elementary school influences children from different social backgrounds differently. Furthermore, they highlight the context-dependent nature of aggressive behavior development.

Our results lend support to the social-ecological framework, which posits that aggressive behavior development does not only stem from individual (and household) characteristics but also from interactions within broader environmental contexts, such as peer relations, classrooms, and schools (Bronfenbrenner 1977; Espelage 2014). The results also supported SIT by showing that the "social force field" had a differential impact on the

aggressive behavior development of children of lower- and higher-educated parents. Results indicate that children of higher-educated parents may be more able to adapt their behavior to social norms than children of lower-educated parents. These results are partly supported by a previous study which showed that vulnerable children (i.e., children who were victimized) were less likely to adapt to the classroom norm salience towards risk-taking than less vulnerable children (Tieskens et al., 2019). Furthermore, research has shown that children of higher-educated parents exhibit better skills in social information processing and executive functioning (e.g., Bookhout et al., 2021; Ursache et al., 2016). One might conjecture that they may be more able to process and interpret social cues in their classroom environment, to evaluate and select favorable responses for desired outcomes, and thereby to redirect their behavior towards the salient norm more effectively than children of lower-educated parents. In other words, children of higher-educated parents may be more able to use their resources to take advantage of their environment to gain or maintain social acceptance. This could also suggest that children of higher-educated parents may engage in more proactive aggression rather than reactive aggression and contribute to the salient classroom norm.



It is noteworthy that the development of the norm, but not the norm in third grade, was a significant moderator. This may be due to peers becoming increasingly important from early to middle childhood (Stauffacher & DeHart, 2006), but also to the general increase of norm salience found in this study (unconditional models). It could be that children realize and appreciate the social rewards of behaving aggressively over time. It is also plausible that the social-cognitive skills, which are important for processing and navigating social cues, may not be fully developed in the early elementary school years.

Taken together, our results suggest that classrooms where norm salience became *more favorable* towards aggression over time may serve as a risk factor for aggressive behavior for all children, but a stronger one for children of higher-educated parents. In contrast, classrooms where norm salience became *less favorable* towards aggression may serve as a protective factor against aggressive behavior development (for all children). This is because children in these classrooms followed the normative trajectory of decreasing aggression levels, which is similar to previous findings on normative aggression development from early childhood to late adolescence (Bongers et al., 2004).

**Implications for practice and research**

Our findings have several implications for practice and research. School leaders and staff should be keen to note a potential increase in aggression appreciation towards the end of elementary school years (result from unconditional models). Since school-level parental education did not play a role in the development of norm salience, all schools, irrespective of their parental education compositions, should work toward modifying aggression appreciation. For instance, strategies within classrooms that offer meaningful and prosocial roles to children as alternatives to aggressive behavior could be used (see Ellis et al., 2016).

Moreover, our results suggest that aggression may be an adaptive and context-dependent behavior, which can be used as a tool to enhance or maintain social preference within the peer group. From a developmental perspective, our results highlight the dynamic nature of norm salience and aggressive behavior. Thus, results show that in addition to the general recommendation to closely monitor and support children of lower-educated parents, there is also a need to monitor children of higher-educated parents when they are in classrooms where aggression is increasingly valued over time. This is necessary because using aggression as a strategy to gain social acceptance may manifest itself in future risk environments (e.g., involvement with deviant peers). Therefore, early identification and prevention efforts are needed to support children who are at risk of developing aggression in such settings. For instance, prevention efforts could include implementing universal classroom management interventions, like the Good Behavior Game, with proven effectiveness across parental education backgrounds (Horoz, et al, 2022b) or could specifically focus on social norms in classrooms (Tolmatcheff et al., 2022). While the need to target social norms in intervention efforts has been acknowledged, it is necessary to investigate whether such interventions have similar benefits for all children, regardless of their social backgrounds.

Furthermore, our results suggest that already in elementary school, children of higher-educated parents may be better at leveraging their resources and maneuvering within their social environments. To better understand the underlying processes in found associations, further research can investigate underlying mechanisms (e.g., skills in social information processing and executive function) that could contribute to the differences in aggressive behavior development between children of higher- and lower-educated parents in classrooms where norm salience became more favorable towards aggression. It would also be insightful to uncover whether the aggressive behavior observed in this study was proactive or reactive in nature.

**Limitations and future directions**

Limitations should be considered when interpreting the findings of this study. First, we used a convenience sample. Compared to the national percentage of low educational attainment in the Netherlands, parents in our study had higher levels of education (Statistics Netherlands, 2018) and the children excluded from our study had on average slightly higher levels of aggressive behavior than included children, which indicates selective attrition. Second, cluster sizes were small. We were not able to study three-way interactions (e.g., parent education x gender x norm) due to low power. Third, although social preference scores were used in conceptualizing norm salience in previous studies (Brendgen et al., 2013, 2015; Tieskens et al., 2019), other studies operationalized norm salience using popularity scores (e.g., Dijkstra et al., 2008; Laninga-Wijnen et al., 2017, 2020). We were unable to calculate such norms because we did not have data on popularity in this age group. While popularity and social preference are moderately related to each other, they are also distinct (van den Berg et al., 2020). For instance, it

was found that in classrooms where more popular children were more aggressive, they were not necessarily liked or accepted (Garandeau et al., 2022). In addition, popularity is primarily related to agentic social goals (Caravita & Cillessen, 2012). When interpreting the results of the present study it is important to consider the similarities and differences between these two dimensions of social status. Furthermore, we also did not have child self-report data on aggressive behavior. Fourth, we assumed that salient aggression norms would influence aggressive behavior. When possible, future studies should control for the bidirectional associations and explore the processes behind how the salient aggression norm develops with respect to parental education. Fifth, future studies could explore different types of aggressive behavior used to gain or maintain social benefits, such as relational aggression. Relational aggression refers to the intent to harm or hurt peers' relationships or social status. It includes behaviors such as ignoring, ostracizing, and gossiping. Relational aggression has been shown to be positively related to popularity but negatively to social preference (Kraft & Mayeux, 2018). As such, future studies could also consider different types of aggressive behavior when operationalizing norm salience and when studying aggression as an outcome, since distinct results could be found (e.g., Correia et al., 2022; Kraft & Mayeux, 2018). Lastly, parental education should not be regarded as the sole explanatory factor behind our findings. Due to data unavailability, we were not able to control for factors that are often associated with parental education such as household income, financial stress, and learning materials at home. While our findings provide novel insights, our study should be considered exploratory and calls for replication and further investigation.

## Supplementary Method

### Statistical Analyses

Multi-level latent growth models with cross-level interactions were used to test whether intercept and slope parameters of classroom norm salience towards aggression moderated the association between parental education and the intercept and slope parameters of overt aggressive behavior (See sFigure1). Before fitting such models, we first estimated a (potential) random intercept and a random slope in which the intercept and slope parameters of the outcome variable were regressed on the group-mean centered parental education variable (Peugh, 2010). Then, on the between level, we examined whether these (potential) random intercepts and slopes varied due to our cluster variable. We used Chi-Square Difference Testing using Loglikelihood to determine whether the addition of random intercept and random slope improved the fit of the model in which the intercept and slope were fixed, suggesting that the association between parental education on overt aggressive behavior varied by our cluster variable.

If the model fit improved by adding the random intercept and random slope, we tested for cross-level interactions. That is, at the between level, we regressed the random intercept on the intercept parameter of the norm and random slope on the intercept and slope parameters of the norm. A significant cross-level interaction of the random intercept would suggest that the magnitude and direction of the association between parental education with children's overt aggressive behavior levels in third grade depended on the intercept parameter of norm salience towards aggression. Cross-level interaction of the random slope parameter would imply that the magnitude and direction of the association between parental education and the development of children's overt aggressive behavior from third to sixth grade depended on the intercept and, or the slope parameters of norm salience towards aggression. When significant, simple slopes were calculated to estimate the associations of parental education and overt aggressive behavior in classrooms where norm salience was *more favorable* towards aggression and in classrooms where norm salience was *less favorable* towards aggression in third grade and, or over time.

Kolmogorov-Smirnov and Shapiro-Wilk tests were used to determine the normality of the data. Maximum likelihood estimation with robust standard errors (MLR-estimator) were used to account for the non-normal distribution of data. Full Information Maximum Likelihood (FIML) estimations were used to handle missing data (Muthén & Muthén, 2017). Model fit values were determined for the within and between levels using Chi-Square Test of Model Fit, Root Mean Square Error of Approximation (RMSEA, critical value ≤ .08; (Marsh et al., 2004)), Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) with critical values ≥ .90 (Bentler & Bonett, 1980), and Standardized Root Mean Residual (SRMR, critical value ≤ .08; (Asparouhov & Muthén, 2018).

## Supplementary Results

### Descriptive Statistics

Descriptive statistics of parental education are presented in sTable 2. The Kolmogorov-Smirnov and Shapiro-Wilk tests of normality showed that overt aggressive behavior was not normally distributed from third to sixth grade ($p < .001$). However, the values of skewness (range: 1.897 – 2.267) and kurtosis (range: 3.475 – 6.049) were within the critical bounds of 3.00 and 7.00. Fisher transformed classroom norms ranged from -2.06 to 0.95 ($M$ = -0.63, $SD$ = 0.52) in third, - 1.57 to 1.25 ($M$ = -0.55, $SD$ = 0.51) in fourth, in -2.06 to 0.87 ($M$ = -0.41, $SD$ = 0.52) fifth and -1.77 to 2.13 ($M$ = -0.34, $SD$ = 0.59) in sixth grade. Note that norm salience towards aggression on average was negative throughout the four years, suggesting that children with higher levels of aggressive behavior were less socially preferred than children with lower levels of aggressive behavior. Furthermore, the average parental education levels per classroom were not correlated with classroom norm salience across the four years ($p$s > .05). In addition, in grades three and four, children of higher-educated parents were more socially preferred than children of lower-education parents ($r$ = .11, $p < .001$; $r$ = .06, $p$ = .035, respectively), however this was no longer the case in grades five and six ($r$ = -.007, $p$ = .823; $r$ = -.027, $p$ = .370, respectively).



### Model Building Results

Intra-class correlations ranged from 0.212 to 0.329 across the four years. Overall, model fit was acceptable at both the individual ($\chi^2$ = 26.53, $p < .05$; RMSEA = .044; SRMR = .028; CFI = .982; TLI = .973,) and cluster ($\chi^2$ = 30.35, $p < .05$; RMSEA = .053; SRMR = .113; CFI = .977; TLI = .961) levels.

Chi-square Difference Testing using Loglikelihood showed that fitting random intercept improved the model fit compared to the fixed effects model, $\chi^2(1) = 4.23$, $p = .04$, and fitting both random intercept and random slope improved the model fit compared to the random intercept model $\chi^2(1) = 7.53$, $p = .006$. Therefore, a cross-level interaction model with random intercept and random slope was used as the final model.

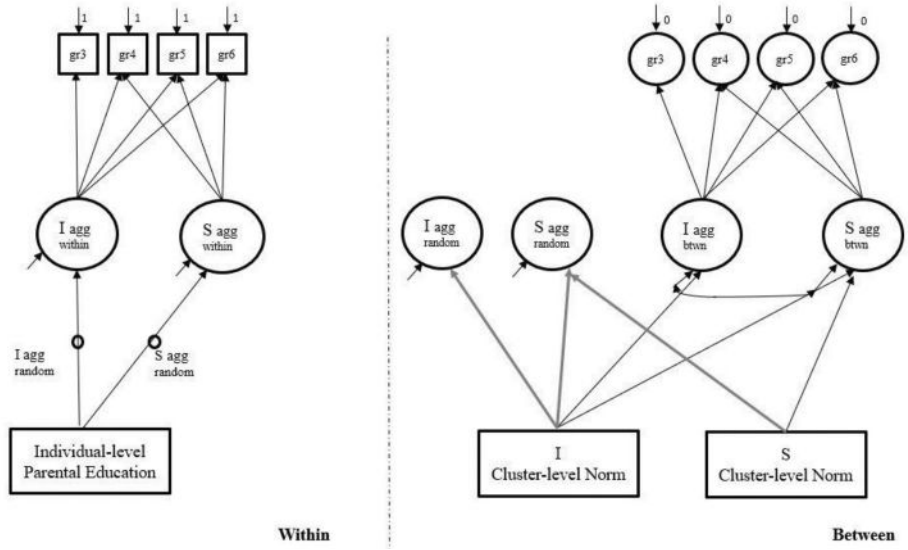
### Main Effect Associations

Main effect results showed significant association between parental education and the intercept parameter ($B$ = .058, β = .136, $p < .001$, 95% CI [0.028, 0.088]), but not the slope parameter of individual-level overt aggressive behavior ($B$ = -.001, β = -.011, $p$ = .886, 95% CI [-0.012, 0.010]). Similarly, school-level parental education was also associated with the intercept ($B$ = .015, β = .590, $p < .001$, 95% CI [0.010, 0.020]), but not with the slope parameter of cluster-level overt aggressive behavior ($B$ = -.001, β = -.072, $p$ = .561, 95% CI [-0.003, 0.002]). Results of the main effect associations suggest that children of lower-educated parents and children in lower parental education schools showed higher levels of overt aggressive behavior in third grade than children in higher-educated households and schools. When not taking the classroom norm into account, the differences found

between children of lower- and higher-educated parents as well as between lower and higher parental education schools remained stable across the four years. Furthermore, there was no significant association between school-level parental education and intercept and slope parameters of norm salience (*B* = -.001, β = -.028, *p* = .728, 95% CI [-0.007, 0.005]; *B* = .002, β = .102, *p* = .112, 95% CI [0.000, 0.004], respectively). That is, the variance in the norm was not explained by school-level parental education. Lastly, the intercept parameter of norm salience was not associated with the intercept and slope parameters of cluster-level overt aggressive behavior (*B* = .093, β = .132, *p* = .068, 95% CI [-0.007, 0.193]; *B* = -.044, β = -.166, *p* = .147, 95% CI [-0.104, 0.016], respectively) and the slope parameter of the norm was not associated with the slope parameter of cluster-level overt aggressive behavior, (*B* = -.044), β = -.087, *p* = .422, 95% CI [-0.151, 0.063]).

**sFigure 1**

*The Graphical Representation of the Multi-level Latent Growth Model with Random Intercept and Random Slope to Test for Cross-level Interactions Between Parental Education and Norm Salience Towards Aggression*




*Note.* I agg $_{within}$ = intercept parameter of individual-level overt aggressive behavior at the within level. S agg $_{within}$ = slope parameter of individual-level overt aggressive behavior at the within level. I agg $_{btwn}$ = intercept parameter of cluster-level overt aggressive behavior at the between level. S agg $_{btwn}$ = slope parameter of cluster-level overt aggressive behavior at the between level. $I_{Cluster\text{-}level\ Norm}$ = intercept parameter of norm salience towards aggression at the between level. $S_{Cluster\text{-}level\ Norm}$ = slope parameter of norm salience towards aggression at the between level. I agg $_{random}$ = random intercept. S agg $_{random}$ = random slope. Random intercept and random slope were estimated at the within level and – at the between level – regressed on the parameters of norm salience towards aggression reflecting the cross-level interactions. Gray lines display the interaction paths.

**sTable 1**

*Descriptive statistics of children from two research projects (Project A and B) used in the present study*

| | B | | A | | | | |
|---|---|---|---|---|---|---|---|
| | ***M*** | ***SD*** | ***M*** | ***SD*** | ***t*-test** | ***p*** | **Cohen's *d*** |
| **Parental Education** | 4.58 | 1.89 | 5.86 | 1.30 | 13.10 | < .001 | 0.82 |
| **School-level Parental Education** | 17.00 | 19.97 | 7.01 | 10.93 | -1.94 | .059 | 0.58 |
| **Overt Aggressive Behavior** | | | | | | | |
| Grade 3 | 0.58 | 0.76 | 0.37 | 0.76 | -5.26 | < .001 | 0.31 |
| Grade 4 | 0.64 | 0.82 | 0.33 | 0.55 | -7.68 | < .001 | 0.45 |
| Grade 5 | 0.53 | 0.73 | 0.24 | 0.46 | -8.14 | < .001 | 0.49 |
| Grade 6 | 0.58 | 0.70 | 0.26 | 0.47 | -8.94 | < .001 | 0.55 |
| **Norm Salience Towards Aggression** | | | | | | | |
| Grade 3 | -0.56 | 0.59 | -0.68 | 0.46 | -1.02 | .309 | 0.22 |
| Grade 4 | -0.56 | 0.51 | -0.55 | 0.50 | 0.10 | .923 | 0.02 |
| Grade 5 | -0.47 | 0.34 | -0.39 | 0.60 | 0.49 | .627 | 0.11 |
| Grade 6 | -0.29 | 0.50 | -0.37 | 0.64 | -0.63 | .534 | 0.13 |

*Note.* Parental education levels could range between 0-7. School-level parental education could range between 0%-100%, representing the per school percentage score of children from low-educated households. Overt aggressive behavior scores which were reported by teachers could range between 0-4. Norm salience towards aggression values are fisher transformed.

**sTable 2**

*Descriptive statistics of parental education*

| **Parental Education (*N*=1205)** | **N (%)** |
|---|---|
| Early education | 10 (0.8%) |
| Primary education | 33 (2.7%) |
| Lower secondary education | 76 (6.3%) |
| Upper secondary education | 78 (6.5%) |
| Post-secondary non-tertiary education | 57 (4.7%) |
| Short-cycle tertiary education | 266 (22.1%) |
| Bachelor's or equivalent degree | 336 (27.9%) |
| Master's degree, equivalent, or higher | 349 (29.0%) |

**sTable 3**

*Means and Variances of Growth Parameters of Norm Salience and Overt Aggressive Behavior from Unconditional Models*

| | Mean | | Variance | |
|---|---|---|---|---|
| | I | S | I | S |
| Norm Salience (Cluster-level) | -.639*** | .084*** | .092** | .018* |
| Overt Aggressive Behavior (Individual-level) | .458*** | -.023*** | .290*** | .011** |

Note. ***$p < .001$. ** $p < .01$. * $p < .05$. I = intercept. S = slope.

**sTable 4**

*Sensitivity Analysis A: Classroom norm salience towards aggression as a moderator of the association between parental education and overt aggressive behavior controlling for project (A, B)*

| | Overt Aggressive Behavior | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Intercept | | | | Slope | | | |
| | *Estimate* | *S.E.* | *p* | CI (95%) | *Estimate* | *S.E.* | *p* | CI (95%) |
| **Within Level** | | | | | | | | |
| Gender | .376 | .040 | < .001* | .298, .453 | .000 | .015 | .978 | -.030, .029 |
| Project (0 = A, 1 = B) | .077 | .060 | .199 | -.041, .195 | .072 | .024 | .002* | .026, .119 |
| **Between Level** | | | | | | | | |
| Lower School-level Parental Education | .014 | .003 | < .001* | .009, .019 | -.002 | .001 | .141 | -.004, .001 |
| Norm Salience $T_1$ ( intercept norm) | .086 | .051 | .089 | -.013, .186 | -.050 | .030 | .102 | -.110, .010 |
| Norm Salience $T_1$ – $T_4$ (slope norm) | - | - | - | - | -.057 | .057 | .318 | -.169, .055 |
| Intercept random intercept[a] | .043 | .025 | .086 | -.006, .092 | - | - | - | - |
| Intercept random slope[b] | - | - | - | - | -.007 | .008 | .383 | -.022, .008 |
| **Cross-level Interaction (random intercept)** | | | | | | | | |
| Norm Salience $T_1$ ( intercept norm) | -.028 | .029 | .342 | -.085, .030 | - | - | - | - |
| **Cross-level Interaction (random slope)** | | | | | | | | |
| Norm Salience $T_1$ (intercept norm) | - | - | - | - | -.016 | .012 | .176 | -.039, .007 |
| Norm Salience $T_1$ – $T_4$ (slope norm) | - | - | - | - | -.065 | .028 | .022* | -.121, -.009 |

*Note.* [a]Random intercept: the association between parental education and individual-level overt aggressive behavior in third grade. [b]Random slope: the association between parental education and the development of individual-level overt aggressive behavior from third to sixth grade. Norm Salience $T_1$ (intercept norm): classroom norm salience towards aggression in third grade. Norm Salience $T_1$ – $T_4$ (slope norm): the development of classroom norm salience towards aggression from third to sixth grade.

**sTable 5**

*Sensitivity Analysis B: Classroom norm salience towards aggression as a moderator of the association between parental education and overt aggressive behavior when excluding singletons (N = 1070)*

| | Overt Aggressive Behavior | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Intercept | | | | Slope | | | |
| | *Estimate* | *S.E.* | *p* | CI (95%) | *Estimate* | *S.E.* | *p* | CI (95%) |
| **Within Level** | | | | | | | | |
| Gender | .347 | .042 | <.001* | .265, .429 | .005 | .016 | .765 | -.026, .036 |
| **Between Level** | | | | | | | | |
| Lower School-level Parental Education | .015 | .003 | <.001* | .009, .020 | .000 | .001 | .911 | -.004, .001 |
| Norm Salience $T_1$ (intercept norm) | .100 | .051 | .052 | -.003, .003 | -.023 | .030 | .435 | -.082, .035 |
| Norm Salience $T_1 - T_4$ (slope norm) | - | - | - | - | -.025 | .064 | .695 | -.151 .101 |
| Intercept random intercept[a] | .042 | .025 | .086 | -.007, .090 | - | - | - | - |
| Intercept random slope[b] | - | - | - | - | -.007 | .008 | .379 | -.021, .008 |
| **Cross-level Interaction (random intercept)** | | | | | | | | |
| Norm Salience $T_1$ ( intercept norm) | -.029 | .029 | .315 | -.087, .028 | - | - | - | - |
| **Cross-level Interaction (random slope)** | | | | | | | | |
| Norm Salience $T_1$ (intercept norm) | - | - | - | - | -.016 | .012 | .176 | -.039, .007 |
| Norm Salience $T_1 - T_4$ (slope norm) | - | - | - | - | -.064 | .029 | .026* | -.120, -.008 |

*Note.* [a]Random intercept: the association between parental education and individual-level overt aggressive behavior in third grade. [b]Random slope: the association between parental education and the development of individual-level overt aggressive behavior from third to sixth grade. Norm Salience $T_1$ (intercept norm): classroom norm salience towards aggression in third grade. Norm Salience $T_1 - T_4$ (slope norm): the development of classroom norm salience towards aggression from third to sixth grade.

## References


Achenbach, T. M. (1991). *Manual for Teacher's Report Form and 1991 Profile.*

Asparouhov, T., & Muthén, B. (2018). SRMR in Mplus. http://www.statmodel.com/download/SRMR2.pdf

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*(3), 588. https://doi.org/10.1037//0033-2909.88.3.588

Bongers, I. L., Koot, H. M., Van Der Ende, J., & Verhulst, F. C. (2004). Developmental trajectories of externalizing behaviors in childhood and adolescence. *Child Development*, *75*(5), 1523-1537. https://doi.org/10.1111/j.1467-8624.2004.00755.x

Bookhout, M. K., Hubbard, J. A., Zajac, L., Mlawer, F. R., & Moore, C. C. (2021). Validation of the Social Information Processing Application (SIP-AP) across genders, socioeconomic levels, and forms of aggression. *Psychological Assessment*, *33*(8), 716. https://doi.org/10.1037/pas0001013

Brendgen, M., Girard, A., Vitaro, F., Dionne, G., & Boivin, M. (2013). Do peer group norms moderate the expression of genetic risk for aggression? *Journal of Criminal Justice*, *41*(5), 324-330. https://doi.org/10.1016/j.jcrimjus.2013.06.004

Brendgen, M., Girard, A., Vitaro, F., Dionne, G., & Boivin, M. (2015). Gene-environment correlation linking aggression and peer victimization: do classroom behavioral norms matter? *Journal of Abnormal Child Psychology*, *43*(1), 19-31. https://doi.org/10.1007/s10802-013-9807-z

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, *32*(7), 513. https://doi.org/10.1037/0003-066X.32.7.513

Cabello, R., Gutiérrez-Cobo, M. J., & Fernandez-Berrocal, P. (2017). Parental education and aggressive behavior in children: a moderated-mediation model for inhibitory control and gender. *Frontiers in Psychology*, *8*, 1181. https://doi.org/10.3389/fpsyg.2017.01181

Caravita, S. C., & Cillessen, A. H. (2012). Agentic or communal? Associations between interpersonal goals, popularity, and bullying in middle childhood and early adolescence. *Social Development*, *21*(2), 376-395.

https://doi.org/10.1111/j.1467-9507.2011.00632.x

Conger, R. D., & Donnellan, M. B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology.*, *58*, 175-199.

Correia, S., Brendgen, M., & Vitaro, F. (2022). The role of norm salience in aggression socialization among friends: Distinctions between physical and relational aggression. *International Journal of Behavioral Development*, *46*(5), 390-400. https://doi.org/10.1177/0165025419854133

de Wilde, A., Koot, H. M., & van Lier, P. A. (2016). Developmental links between children'sworking memory and their social relations with teachers and peers in the early school years. *Journal of Abnormal Child Psychology*, *44*, 19-30. https://doi.org/10.1007/s10802-015-0053-4

Dijkstra, J. K., & Gest, S. D. (2015). Peer norm salience for academic achievement, prosocial behavior, and bullying: Implications for adolescent school experiences. *The Journal of Early Adolescence*, *35*(1), 79-96. https://doi.org/10.1177/0272431614524303

Dijkstra, J. K., Lindenberg, S., & Veenstra, R. (2008). Beyond the class norm: Bullying behavior of popular adolescents and its relation to peer acceptance and rejection. *Journal of Abnormal Child Psychology*, *36*(8), 1289-1299. https://doi.org/10.1007/s10802-008-9251-7

Dodge, K. A., Greenberg, M. T., Malone, P. S., & Group, C. P. P. R. (2008). Testing an idealized dynamic cascade model of the development of serious violence in adolescence. *Child Development*, *79*(6), 1907-1927. https://doi.org/10.1111/j.1467-8624.2008.01233.x

Ellis, B. J., Volk, A. A., Gonzalez, J. M., & Embry, D. D. (2016). The meaningful roles intervention: An evolutionary approach to reducing bullying and increasing prosocial behavior. *Journal of Research on Adolescence*, *26*(4), 622-637. https://doi.org/10.1111/jora.12243

Espelage, D. L. (2014). Ecological theory: Preventing youth bullying, aggression, and victimization. *Theory into Practice*, *53*(4), 257-264. https://doi.org/10.1080/00405841.2014.947216

Fisher, R. (1925). Statistical methods for research workers, 13e. *London: Oliver and Loyd, Ltd*, 99-101.

Garandeau, C. F., Vermande, M. M., Reijntjes, A. H., & Aarts, E. (2022). Classroom bullying norms and peer status: Effects on victim-oriented and bully-oriented defending. *International Journal of Behavioral Development*, *46*(5), 401-410. https://doi.org/10.1177/0165025419894722

Horoz, N., Buil, J. M., Koot, S., van Lenthe, F. J., Houweling, T. A., Koot, H. M., & Van Lier, P. A. (2022a). Children's behavioral and emotional problems and peer relationships across elementary school: Associations with individual-and school-level parental education. *Journal of School Psychology*, *93*, 119-137. https://doi.org/10.1016/j.jsp.2022.06.005

Horoz, N., Buil, J. M., Koot, S., van Lenthe, F. J., Houweling, T. A., Oude Groeniger, J., Koot, H. M., & van Lier, P. A. (2022b). Moderators of an intervention on emotional and behavioural problems: household-and school-level parental education. *European Journal of Public Health*, *32*(6), 864-870. https://doi.org/10.1093/eurpub/ckac143

Hosokawa, R., & Katsura, T. (2017). A longitudinal study of socioeconomic status, family processes, and child adjustment from preschool until early elementary school: the role of social competence. *Child and Adolescent Psychiatry and Mental Health*, *11*(1), 1-28. https://doi.org/10.1186/s13034-017-0206-z

Kraft, C., & Mayeux, L. (2018). Associations among friendship jealousy, peer status, and relational aggression in early adolescence. *The Journal of Early Adolescence*, *38*(3), 385-407. https://doi.org/10.1177/0272431616670992

Laninga-Wijnen, L., Harakeh, Z., Dijkstra, J. K., Veenstra, R., & Vollebergh, W. (2020). Who sets the aggressive popularity norm in classrooms? It's the number and strength of aggressive, prosocial, and bi-strategic adolescents. *Research on Child and Adolescent Psychopathology*, *48*(1), 13-27.

Laninga-Wijnen, L., Harakeh, Z., Steglich, C., Dijkstra, J. K., Veenstra, R., & Vollebergh, W. (2017). The norms of popular peers moderate friendship dynamics of adolescent aggression. *Child Development*, *88*(4), 1265-1283. https://doi.org/10.1111/cdev.12650

Latané, B. (1981). The psychology of social impact. *American Psychologist*, *36*(4), 343. https://doi.org/10.1037/0003-066X.36.4.343

Marsh, H. W., Hau, K.-T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling*, *11*(3), 320-341. https://doi.org/10.1207/s15328007sem1103_2

McLaughlin, K. A., Breslau, J., Green, J. G., Lakoma, M. D., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2011). Childhood socio-economic status and the onset, persistence, and severity of DSM-IV mental disorders in a US national sample. *Social Science & Medicine*, *73*(7), 1088-1096. https://doi.org/10.1016/j.socscimed.2011.06.011

Muthén, L., & Muthén, B. (2017). Mplus Editor (version 8.0)[Software]. *Los Angeles, CA: Muthen & Muthen*.

Muthén, L. K., & Muthén, B. (2017). *Mplus user's guide: Statistical analysis with latent variables, user's guide*. Muthén & Muthén. https://www.statmodel.com/download/usersguide/Mplus%20user%20guide%20Ver_7_r _web.pdf

Statistics Netherlands (2008). *The Dutch standard classification of education*. Voorburg/Heerlen, The Netherlands. https://www.cbs.nl

Statistics Netherlands (2018). *Trends in the Netherlands 2018*. Den Haag/Heerlen, The Netherlands: Netherlands Central Bureau of Statistics.

Statistics Netherlands (2022). *Population; key figures*. Den Haag/Heerlen: Netherlands Central Bureau of Statistics. https://www.cbs.nl/en-gb/figures/detail/37296eng

Oude Groeniger, J., Houweling, T. A., Jansen, P. W., Horoz, N., Buil, J. M., van Lier, P. A., & van Lenthe, F. J. (2023). Social inequalities in child development: the role of differential exposure and susceptibility to stressful family conditions. *Journal of Epidemiology & Community Health*, *77*(2), 74-80. http://dx.doi.org/10.1136/jech-2022-219548

Peugh, J. L. (2010). A practical guide to multilevel modeling. *Journal of School Psychology*, *48*(1), 85-112. https://doi.org/10.1016/j.jsp.2009.09.002

Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: a systematic review. *Social Science & Medicine*, *90*, 24-31. https://doi.org/10.1016/j.socscimed.2013.04.026

Reiss, F., Meyrose, A.-K., Otto, C., Lampert, T., Klasen, F., & Ravens-Sieberer, U. (2019). Socioeconomic status, stressful life situations and mental health problems in children and adolescents: Results of the German BELLA cohort-study. *PloS One*, *14*(3), e0213700. https://doi.org/10.1371/journal.pone.0213700

Stauffacher, K., & DeHart, G. B. (2006). Crossing social contexts: Relational aggression between siblings and friends during early and middle childhood. *Journal of Applied Developmental Psychology*, *27*(3), 228-240. https://doi.org/10.1016/j.appdev.2006.02.004

Tieskens, J. M., Buil, J. M., Koot, S., & van Lier, P. A. (2019). Relational victimization and elementary schoolchildren's risk-taking behavior: Impact of the classroom norm toward risk-taking. *International Journal of Behavioral Development*, *46*(5), 411–419. https://doi.org/10.1177/0165025419880617

Tolmatcheff, C., Galand, B., Roskam, I., & Veenstra, R. (2022). The effectiveness of moral disengagement and social norms as anti-bullying components: A randomized controlled trial. *Child Development*, *93*(6), 1873-1888. https://doi.org/10.1111/cdev.13828

UNESCO Institute for Statistics (2012). *International standard classification of education: ISCED 2011*. UNESCO Institute for Statistics.

Ursache, A., Noble, K. G., Pediatric Imaging, N., & Study, G. (2016). Socioeconomic status, white matter, and executive function in children. *Brain and Behavior*, *6*(10), e00531. https://doi.org/10.1002/brb3.531

van den Berg, Y. H., Lansu, T. A., & Cillessen, A. H. (2020). Preference and popularity as distinct forms of status: A meta-analytic review of 20 years of research. *Journal of Adolescence*, *84*, 78-95. https://doi.org/10.1016/j.adolescence.2020.07.010

van Lier, P. A., Vitaro, F., Barker, E. D., Brendgen, M., Tremblay, R. E., & Boivin, M. (2012). Peer victimization, poor academic achievement, and the link between childhood externalizing and internalizing problems. *Child Development*, *83*(5), 1775-1788. https://doi.org/10.1111/j.1467-8624.2012.01802.x

Velásquez, A. M., Saldarriaga, L. M., Castellanos, M., & Bukowski, W. M. (2021). The effect of classroom aggression-related peer group norms on students' short-term trajectories of aggression. *Aggressive Behavior*, *47*(6), 672-684. https://doi.org/10.1002/ab.21988

Witvliet, M., Van Lier, P. A., Cuijpers, P., & Koot, H. M. (2009a). Testing links between childhood positive peer relations and externalizing outcomes through a randomized controlled intervention study. *Journal of Consulting and Clinical Psychology*, *77*(5), 905-915. https://doi.org/10.1037/a0014597

Witvliet, M., Van Lier, P. A., Cuijpers, P., & Koot, H. M. (2009b). Change and stability in childhood clique membership, isolation from cliques, and associated child characteristics. *Journal of Clinical Child & Adolescent Psychology*, *39*(1), 12-24. https://doi.org/10.1080/15374410903401161

Wright, J. C., Giammarino, M., & Parad, H. W. (1986). Social status in small groups: Individual–group similarity and the social" misfit.". *Journal of Personality and Social Psychology*, *50*(3), 523. https://doi.org/10.1037//0022-3514.50.3.523

# CHAPTER 5

## Moderators of an Intervention on Emotional and Behavioural Problems: Household-and School-level Parental Education

**This chapter is based on:**
Horoz, N., Buil, J. M., Koot, S., van Lenthe, F. J., Houweling, T. A., Oude Groeniger, J., Koot, H. M., & van Lier, P. A. (2022). Moderators of an intervention on emotional and behavioural problems: household-and school-level parental education. *European Journal of Public Health*, *32*(6), 864-870. https://doi.org/10.1093/eurpub/ckac143

## Abstract

Children of lower-educated parents and children in schools with a relatively high percentage of peers with lower-educated parents (lower parental education schools) are more likely to develop emotional and behavioural problems compared to children in higher-educated households and schools. Universal school-based preventive interventions, such as the Good Behaviour Game (GBG), are generally effective in preventing the development of emotional and behavioural problems, but information about potential moderators is limited. This study examined whether the effectiveness of the GBG in preventing emotional and behavioural problems differs between children in lower-educated and higher-educated households and schools. Using a longitudinal multi-level randomized controlled trial design, 731 children ($M_{age}$= 6.02 towards the end of kindergarten) from 31 mainstream schools (intervention arm: 21 schools, 484 children; control arm: 10 schools, 247 children) were followed annually from kindergarten to second grade (2004 to 2006). The GBG was implemented in first and second grades. Overall, the GBG prevented the development of emotional and behavioural problems. However, for emotional problems, the GBG-effect was slightly more pronounced in higher parental education schools than in lower parental education schools ($B_{\text{higher parental education schools}}$ = -0.281, $p$ < .001; $B_{\text{lower parental education schools}}$ = -0.140, $p$= .016). No moderation by household-level parental education was found. Studies into universal school-based preventive interventions, and in particular the GBG, should consider and incorporate school-level factors when studying the effectiveness of such interventions. More attention should be directed towards factors that may influence universal prevention effectiveness, particularly in lower parental education schools.

*Keywords:* Good Behaviour Game; emotional problems; behavioural problems; parental education; school SES

Poor mental health among school-aged children, including emotional and behavioural problems, is a global public health concern (1). Without intervention, emotional and behavioural problems that develop during elementary school have been shown to increase the risk of many concurrent and future negative outcomes, such as mental disorders, physical health problems, academic failure, criminality and unemployment in adulthood (1-3). Mental health problems cause a large proportion of the global disease burden and are estimated to account for 32.4% of years lived with disability and 13% of disability adjusted life years (4). Therefore, early prevention of emotional and behavioural problems is an urgent matter. Elementary schools are accessible and practical settings for the implementation of preventive (universal) interventions. Universal school-based preventive interventions (i.e., those delivered to all children) may be key to effective preventive efforts. One such program is the Good Behaviour Game (GBG) (5), which has been proven effective in preventing the development of children's behavioural and emotional problems (6-9).

The GBG has previously been referred to as a "behavioural vaccine" due to its cost-effectiveness and its ability to prevent mental health problems across diverse cultures and populations (6). It aims to prevent mental health problems in healthy children and in children at risk of developing mental health problems. When implemented on a large scale in early primary education, universal school-based interventions like the GBG have the capacity to reach large quantities of broad populations, including children who may be otherwise hard to reach. However, in more recent research, it has been shown that the GBG may differentially affect children with varying risk profiles and that its benefit may not equally extend to children with higher family-demographic risk profiles (10). This challenges the notion that the GBG is a "behavioural vaccine" and should be further explored. Thus, we investigate whether the effect of the GBG is moderated by a well-established risk factor at both household and school levels.



Across nations, a robust risk factor of poor child mental health at both the household and school level is low socioeconomic status (SES)(11). In the Netherlands, where the present study was conducted, school-level socioeconomic inequalities within and between schools are measured by children's parents' education levels (12). Children of lower-educated parents (and higher-educated parents) are likely to attend schools with children from similar parental education backgrounds (13). Already in elementary school, children of lower-educated parents and children in schools with a high percentage of students with lower-educated parents (lower parental education schools) are at a higher risk of developing emotional and behavioural problems (14). This may be due to the risk factors that are associated with lower-educated households (e.g., less resources at home, less cultivating parenting strategies) and with lower parental education schools (e.g., less effective school management, teacher distress) (15, 16). On the one hand, interventions like the GBG may have the potential to decrease inequalities in the prevalence of mental health problems in children from lower- and higher-educated contexts. On the other, they may

be less effective in decreasing inequalities owing to factors related to lower household- and school-level parental education because these factors may reduce the effectiveness of the intervention. However, it remains unknown whether the impact of the GBG indeed differs between children from lower- and higher-educated households and schools.

The majority of the school-based intervention studies on children's emotional and behavioural problems have not included household- or school-level parental education or only included SES as a descriptive or a study variable (17, 18). Some of these studies examined either children from low SES households (10, 19) or low SES schools alone (19-23) and thereby lack a comparison group. Additionally, studies that did use SES as a moderator did not account for SES at both the household and school levels (17, 18, 24-28). Not accounting for SES at both levels may lead to the misleading conclusion that the effects are explained solely by either household- or school-level SES(14). Therefore, this study provides a novel approach by allowing a more detailed examination of the moderating role of a well-established risk factor at both levels. Specifically, we examine whether household- and school-level parental education moderate the effectiveness of the GBG in preventing the development of Dutch children's emotional and behavioural problems from kindergarten to second grade.

## Methods

### Sample

Participants were recruited from the first 31 elementary schools in rural and urban areas of the Netherlands that agreed to participate in the research project. Schools could participate if they were willing to implement the GBG (if randomly selected in the intervention arm) or if they were willing to be on a waiting list (if randomly selected in the control arm).

Children's emotional and behavioural problems were annually assessed for three years, from kindergarten ($M_{age}$ = 6.02, *SD* = 0.46) to second grade (in spring). Inclusion criteria were (i) active parental consent, (ii) data on school-level parental education and (iii) at least two out of three completed waves of teacher-reported data on emotional and behavioural problems. In total, out of 825 children who were initially included in the study, 731 (50% girls) fulfilled these criteria (see the flowchart in Figure 1). All children had complete data on school-level parental education, 18.5 % had missing data on household-level parental education and 24% had missing data on emotional and behavioural problems for one wave.

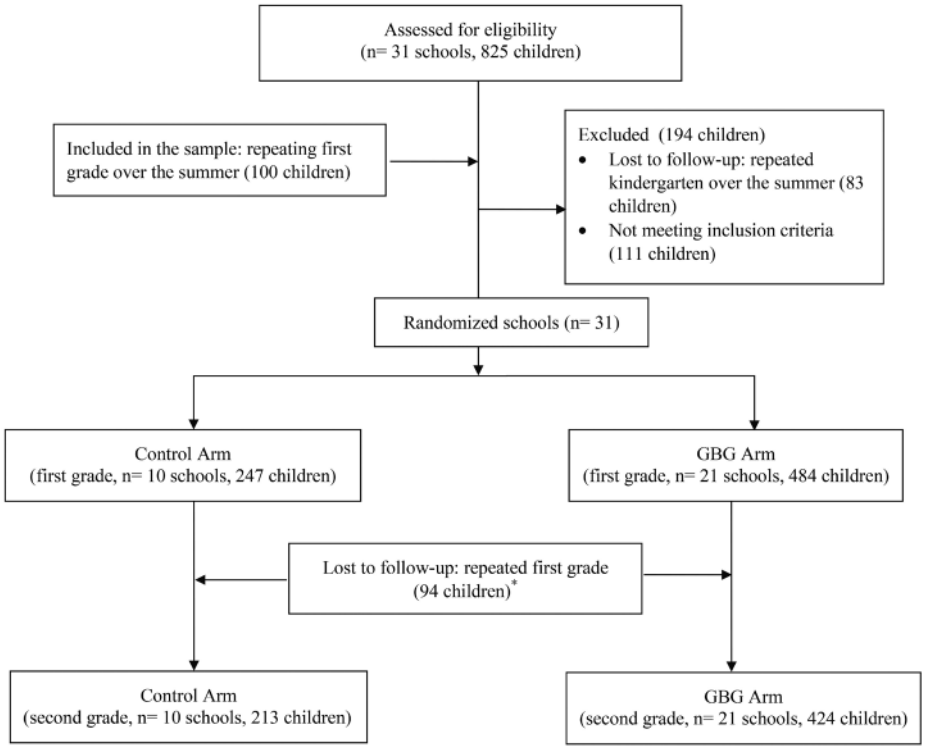
### Design and procedure

Participating schools were randomly assigned, with an oversampling of intervention schools, to either the control (10 schools, *n* = 247 children) or the GBG intervention arm (21 schools, *n* = 484 children). See Appendix A for sample size determination. The

first assessments of emotional and behavioural problems were conducted in the Spring of 2004 when participants were in kindergarten (pre-intervention). In first and second grades, the GBG intervention was implemented and the second and third assessments were conducted.

**Figure 1**

*Flowchart of the cluster randomized participants included in the randomized control trial, adapted with permission from Witvliet and colleagues (30)*




*Note*. *94 children with missing data in second grade are included in the analyses and missing data is handled using FIML (see methods section).

**The GBG**

The GBG is a classroom-based preventive intervention that aims to prevent disruptive behaviour by creating a positive and a predictable classroom environment where children work in teams and stimulate each other to show appropriate classroom behaviour. The GBG is implemented in classrooms by teachers for 15–60-minute periods while students are working on regular school tasks. Before the GBG period, teachers and students select positively formulated classroom rules. Teachers then identify and assign children to teams of 4-5 students with an equal number of disruptive and non-disruptive children and give each team a set of cards. During the game, if a team member violates one of the preselected rules, teachers take a card from that team. Teams are rewarded at the end of the game period if at least one card remains. Teachers praise teams and children by complimenting appropriate behaviour and, aside from removing cards from teams that violate the rules, do not pay attention to disruptive behaviour. The GBG is implemented in three phases: introduction, expansion and generalization. In the introduction phase, the GBG is played three times a week. In the expansion and generalization phases, the duration (hours/days) is extended. More information regarding the intervention strategy, implementation and teacher trainings is described elsewhere (29).

## Measures

*Household-level parental education* was based on the highest education level per household, obtained by the (two) parent/caregiver(s). Parental education levels were ranked according to the Dutch Standard Education Classification (30), which corresponds to the International Standard Classification of Education (ISCED) (31). Following the ISCED classifications, parental education levels were coded using an 8-point scale, with education levels ranging from 0 = no education/early education, 1 = primary education, 2 = lower secondary education, 3 = upper secondary education, 4 = post-secondary non-tertiary education, 5 = short-cycle tertiary education, 6 = bachelor's degree or equivalent, to 7 = master's degree or equivalent. The household parental education levels were reverse coded so that higher scores indicated lower parental education levels.

*School-level parental education* levels were determined by the per-school percentage of children of low-educated parents. In the Netherlands, school-level socioeconomic inequalities are measured by children's parents' education levels. The Netherlands Inspectorate of Education calculates the percentage of low parental education levels of each school to identify schools that qualify for additional governmental resources (12). Low-education refers to either both parents completing no more than elementary school education or one parent completing no more than elementary education and the other parent completing no more than lower level secondary education (i.e., practical training or basic/middle-management pathway of preparatory vocational secondary education). Thus, in this study, school-level parental education was based on the percentage score of low parental education levels of the entire school population. The percentage scores can range

from 0%-100%, with higher percentage scores indicating schools with higher percentages of children of low-educated parents. This information is publicly available (www.duo.nl).

*Teacher ratings of individual children's behavioural and emotional problems* were assessed by the Problem Behaviour at School Interview (PBSI) (32). The PBSI is a validated questionnaire conducted via interview that uses a 5-point Likert scale ranging from 0 (never applicable) to 4 (often applicable) (33). Behavioural problem scores were assessed by conduct problems (12 items) and oppositional defiant problems (7 items), and calculated as the average of the mean scores of the two subscales. Emotional problem scores were assessed by depression (7 items) and anxiety (5 items) symptoms, and the same procedure was followed. Higher scores indicated higher levels of emotional and behavioural problems. See Appendix A for more information regarding the PBSI and the outcome variables.

*Intervention status* was dummy-coded (0 = control, 1 = GBG).

*Covariates* included gender (0 = girls, 1 = boys) and cluster size. Cluster size (i.e., number of participating children per school) was grand-mean centred and included to account for unequal cluster sizes ($M$ = 23, range = 8 - 88; mode = 14, median = 20). Baseline differences in kindergarten were controlled for because – despite randomization – children in the GBG arm had moderately higher levels of emotional ($M_{GBG}$ = 0.85, $SD$ = 0.57; $M_{control}$ = 0.67, $SD$ = 0.55, $t(647) = -3.85$, $p < .001$, Cohen's $d$ = 0.32) and slightly higher levels of behavioural problems ($M_{GBG}$ = 0.80, $SD$ = 0.67; $M_{control}$ = 0.69, $SD$ = 0.65, $t(650) = -2.08$, $p$ =.038, Cohen's $d$ = 0.17) than children in the control arm.



## Statistical analyses

A parallel latent growth curve (LGM) model with two-level time-nested-within-individual data structure (1 = variation across individual children, 2 = variation across schools), in which the development of emotional and behavioural problems was conceptualized by latent growth parameters (intercept and a linear slope), was used to test the main effects and potential moderation by household- and school-level parental education of the GBG in preventing the development of emotional and behavioural problems. The intercept represented the initial level in kindergarten (baseline) and the slope represented change over time (from kindergarten to second grade).

The analyses were conducted in three steps. All models were fitted in Mplus version 8.0 (34). We first computed design effects. Design effects larger than 2.0 indicate significant clustering of the data at the school level (Design Effects = 1+ ($n_c$ -1)ICC) (35). In the second step, we tested for main effects of the GBG intervention by regressing the outcome on the GBG intervention status, adjusting for the baseline differences in emotional and behavioural problems. In the third step, we tested moderation by household- and school-level parental education via a cross-level interaction and a between(school)-level

interaction, respectively. Before examining cross-level interactions between household-level parental education and the GBG, we checked whether such interactions could be performed. To do this, we modelled a random slope at the (within)household-level and estimated its variance at the (between)school-level. This random slope represented the effect of household-level parental education on the growth parameters of children's (individual-level) emotional or behavioural problems. Then, using Satorra Bentler Chi-Square Difference Tests, we checked whether adding a random slope improved the model fit of the main effect model in step two. If this was the case, the random slope parameter was regressed on the GBG at the between level (i.e., cross-level interaction) to test the interaction between household-level parental education and the GBG on the development of individual-level emotional and behavioural problems. To test for moderation by school-level parental education at the between level, an interaction term between school-level parental education and the GBG was added as a predictor of between-level emotional and behavioural problem development.

Model fit indices for multi-level latent growth models were used to determine model fit at both the household and school levels. For specifics, see Appendix B, sTable 1. MLR estimators were used to account for the possible non-normal distribution of data. Missing data was therefore handled using the default option in Mplus for MLR-estimation with missing at random data (i.e., Full Information Maximum Likelihood estimation; FIML). To ensure that the results were robust, two additional sensitivity tests were done: a) by imputing the missing data in MPLUS ($N$ = 25 imputed datasets) and b) by testing the models on a subsample ($N$ = 596) with complete household-level parental education data.

## Ethics

This study was approved by the Medical Ethics Committee of the Vrije Universiteit Amsterdam Medical Center and was registered with the 'Netherlands Trial Register' [Trial NL470 (NTR512)] (www.trialregister.nl). Signed parental informed consent was obtained from parents. Parents and children could revoke participation at any time.

## Results

### Descriptive statistics

Descriptive statistics of household-level and school-level parental education of the whole sample are presented in Table 1. The household-level parental education levels were slightly higher in the control arm than in the GBG arm, $t(1) = 2.75$, $p = .006$, Cohen's $d = 0.24$.

The per school percentage of children of low-educated parents was not significantly different between the schools in the control ($M$ = 18.61%, $SD$ = 23.97%) and intervention arms ($M$ = 15.35%, $SD$ = 17.02%), $t(29) = 0.44$, $p = .666$, Cohen's $d = 0.17$. The correlation

between household-level parental education and school-level parental education in our sample was positive and of moderate magnitude ($r$ = .42, $p$ < .001).

**Table 1**

*Descriptive statistics of household- and school-level parental education of the whole sample*

| **Household-level Parental Education (*N*=731)** | ***N* (%)** | **Low School-level Parental Education (*N*=31)** | **%** |
|---|---|---|---|
| No education/Early education | 11 (1.5%) | Range | 0.0% -76.5% |
| Primary education | 43 (5.9%) | Mean | 16.4% |
| Lower secondary education | 57 (7.8%) | Standard Deviation | 19.2% |
| Upper secondary education | 72 (9.8%) | Mode | 7.3% |
| Post-secondary non-tertiary education | 46 (6.3%) | Median | 8.1% |
| Short-cycle tertiary education | 149 (20.4%) | | |
| Bachelor's or equivalent degree | 124 (17.0%) | | |
| Master's or equivalent degree | 94 (12.9%) | | |
| Missing | 135 (18.5%) | | |



**Model building, unconditional latent growth models per condition and the GBG main effects**

Intra-class correlations, design effect values, model fit indices of the unconditional LGMs for the whole sample and model building testing results are presented in Appendix B, sTable 1. Design effects indicated the need to use a two-level structure to analyse the data. Model fit indices were acceptable for both outcomes. Adding the random slope improved the model fit of the main effect model of emotional problems only, which indicated that cross-level interaction testing can be performed for emotional but not for behavioural problems.

Results from the unconditional LGMs (Appendix B, sTable 2) showed that in the GBG arm emotional and behavioural problems stayed stable over time, as indicated by the non-significant slopes (emotional problems: $B$ = 0.065, $p$ = .115; behavioural problems: $B$ = -0.041, $p$ = .177). In the control arm, there was a significant yearly increase of emotional problems ($B$ = 0.271, $p$ < .001) and a borderline significant yearly increase of behavioural problems ($B$ = 0.100, $p$ = .057). This indicates that without the GBG, emotional (and to a lesser extent behavioural) problems tended to increase from kindergarten to second grade.

Results of main effects (Table 2) showed that the GBG was effective in preventing the increase in emotional problems that was found in the control group ($B$ = -0.208, 95% CI [-0.345, -0.070], $p$ = .003). In addition, the GBG was also effective in preventing behavioural problems from kindergarten to second grade ($B$ = -0.133, 95% CI [-0.256, -0.010], $p$ = .034)

**Moderation by household- and school-level parental education of the GBG impact**

*Household level*. Results showed no significant cross-level interaction between household-level parental education and the GBG-effect on individual-level emotional problem development, *B* = 0.010, 95% CI [-0.055, 0.074], *p* = .765 (see Table 2). The cross-level interaction for behavioural problems was not tested.

*School level.* Results showed a significant interaction between school-level parental education and the GBG-effect on children's emotional problems, *B* = 0.007, 95% CI [0.002, 0.013], *p* = .005 (see Table 2). That is, the GBG was more effective in preventing the development of emotional problems in higher parental education schools than in lower parental education schools. Figure 2A shows a visual representation of this interaction effect in which the effects were probed at 0.50 *SD* above (lower parental education schools; ~26% of the total sample; *B* = -0.140, *S.E* = 0.059, 95% CI [-0.255, -0.026], *p* = .016) and at 0.50 *SD* below the mean of school-level parental education (higher parental education schools; ~7% of the total sample; *B* = -0.281, *S.E* = 0.080, 95% CI [-0.438, -0.124], *p* < .001). For behavioural problems, no moderation between school-level parental education and the GBG was found, *B* = 0.002, 95% CI [-0.003, 0.007], *p* = .382 (see Figure 2B). The two sensitivity tests showed no changes in interpretation of the results. For specifics, see Appendix B, sTable 3 and sTable 4.

**Table 2**

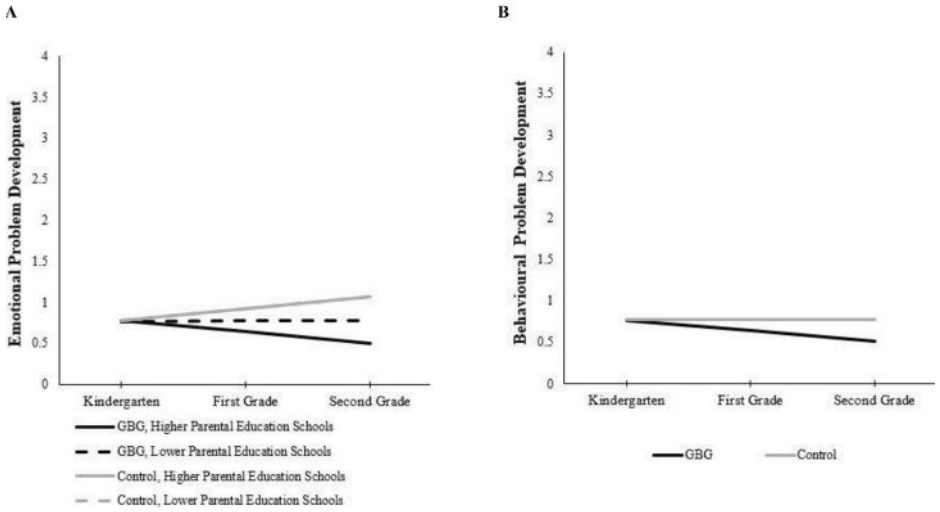
*Main effects of the GBG and moderation by household- and school-level parental education on children's emotional and behavioural problems*

| | Emotional Problems | | | | | | | | Behavioural Problems | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intercept | | | | Slope | | | | Intercept | | | | Slope | | | |
| **Main Effects Model** | ***B*** | ***S.E.*** | **CI (95%)** | **β** | ***B*** | ***S.E.*** | **CI (95%)** | **β** | ***B*** | ***S.E.*** | **CI (95%)** | **β** | ***B*** | ***S.E.*** | **CI (95%)** | **β** |
| ***Within Level*** | | | | | | | | | | | | | | | | |
| Gender | .054 | .033 | -.011,.120 | .189 | -.033 | .032 | -.095, .029 | -.242 | .361 | .041 | .281, .441*** | .746 | -.032 | .024 | -.080, .015 | -1.51 |
| Lower parental education | .013 | .011 | -.010, .035 | .086 | .008 | .009 | -.010, .026 | .113 | .057 | .017 | .024, .091*** | .228 | -.007 | .007 | -.021, .006 | -.657 |
| ***Between Level*** | | | | | | | | | | | | | | | | |
| Cluster size | .002 | .002 | -.002, .005 | .107 | -.004 | .002 | -.008, .000 | -.286 | .001 | .002 | -.002, .004 | .074 | -.002 | .001 | -.005, .000 | -.257 |
| School-level parental education | .002 | .002 | -.002, .006 | .187 | -.002 | .002 | -.007, .002 | -.215 | .005 | .002 | .001, .010* | .419 | .001 | .001 | -.002, .004 | .113 |
| GBG | .161 | .088 | -.010, .333 | .740 | -.208 | .070 | -.345, -.070** | -1.05 | .140 | .087 | -.031, .310 | .604 | -.133 | .063 | -.256, -.010* | -.964 |
| **Interaction Effect Model** | | | | | | | | | | | | | | | | |
| Cluster size | .002 | .002 | -.002, .005 | .107 | -.004 | .002 | -.007, .000* | -.270 | .001 | .002 | -.002, .004 | .074 | -.002 | .001 | -.004, .000* | -.252 |
| School-level parental education | .002 | .002 | -.002, .006 | .189 | -.006 | .002 | -.010,-.003*** | -.588 | .005 | .002 | .001, .010* | .420 | .000 | .002 | -.004, .003 | -.055 |
| GBG | .162 | .088 | -.011, .335 | .737 | -.211 | .066 | -.339, -.082*** | -1.06 | .140 | .087 | -.030, .310 | .604 | -.134 | .063 | -.257, -.012* | -.984 |
| Household-level parental education x GBG | - | - | - | - | .010 | .033 | -.055, .074 | n.a | - | - | - | - | - | - | - | - |
| School-level parental education x GBG | - | - | - | - | .007 | .003 | .002, .013** | .510 | - | - | - | - | .002 | .003 | -.003, .007 | .231 |

*Note.* $^{*}p < .05$, $^{**}p < .01$, $^{***}p \leq .001$; n.a. = estimate not available due to the use of Monte Carlo integration to estimate cross-level interaction. Note that the effect of school-level parental education is small because it represents the effect at 1% change in school-level parental education.

**Figure 2**

*School-level parental education effects on the development of emotional problems (A) and behavioural problems (B) in GBG versus control arms*




*Note*. In figure 2A, slopes of higher and lower parental education schools in the control arm (grey line) overlap. The scale of the y-axis represents the scale of the PBSI, with scores ranging from 0 (never applicable) to 4 (often applicable).

## Discussion

Overall, the GBG prevented the development of emotional and behavioural problems from kindergarten to second grade. Specifically, results showed that the effectiveness of the GBG in preventing emotional and behavioural problems did not differ between children of lower- and higher-educated parents. Nevertheless, the GBG was more effective in schools with a lower (compared to higher) percentage of children of lower-educated parents, albeit only for emotional problems.

To our knowledge, this study provides preliminary evidence that school-level parental education may impact the effectiveness of the GBG in reducing emotional problems. Previous studies mainly tested household/individual-level factors such as gender, initial risk status and behaviour type as moderators of universal school-based programs like the GBG (36, 37). This study suggests that more attention needs to be directed towards lower parental education schools and that in addition to individual-level moderators, school-level moderators should be studied to better understand the potential differential impact of universal school-based interventions.

The characteristics of lower and higher parental education schools may explain why the GBG was less effective in lower parental education schools for emotional problems. Lower parental education schools may have fewer resources, less effective school management, less teacher support and teachers who are insufficiently prepared to deal with such schools' diverse

populations (16, 38). Nevertheless, this study cannot explain why the school-level interaction effect was found for emotional but not for behavioural problems. It stands to reason that the GBG is more directed towards behavioural problems. Thus, it may be less affected by possible school-level factors that may attenuate its impact. However, we should be cautious in interpreting the results before replication studies with longer follow-up procedures are conducted.

The following limitations should be noted. First, and most importantly, we did not have implementation fidelity data. It is possible that there were no major differences in implementation fidelity based on school-level parental education since the interaction effect between school-level parental education and the GBG on behavioural and emotional problems differed. Our study should be considered as an effectiveness trial and an exploratory study meant to stimulate further investigation. It is important to study, for instance, whether the GBG's weaker effect on emotional problems in lower parental education schools is due to (i) specific school-level factors, (ii) possible problems with implementation or (iii) to lack of components more directly targeting emotional problems. Second, our sample was not randomly drawn from the Dutch population of elementary schools. Third, we used teacher-reports and teachers were not blinded to condition. Self-reports and observational data which could have provided additional insights were not available. Fourth, sample size at the between-level was relatively small with 31 schools. For example, we did not have enough power to test a three-way interaction of the GBG, household- and school-level parental education. Finally, we used parental education as an index of broader SES. Future replication studies are encouraged to use broader SES indices.



Despite these limitations, our results have implications for research and practice. Testing implementation fidelity and school-level moderators that relate to lower parental education schools would result in determining the specific factors to be addressed, such as teacher support and training or implementation infrastructure in schools. Further, if lower parental education schools need more support preventing emotional problems, more intensified or selective interventions that target high-risk populations could be implemented in these schools. Nevertheless, it is noteworthy that for general prevention efforts the GBG was equally effective in preventing behavioural and emotional problems irrespective of household-level parental education and in preventing behavioural problems irrespective of school-level parental education. Although results suggested that the GBG was less effective in lower parental education schools, it still was an effective tool for preventing the development of emotional problems in these schools. School-based universal interventions reduce the potential that children who may be at risk of developing mental health problems or who may be otherwise difficult to reach will be overlooked. For instance, despite the need for mental health services, it has been shown that the majority of low SES children do not receive treatment (39). At a time in which SES-related inequalities are on the rise (40), this study shows that the GBG is effective in preventing the development of behavioural and emotional problems of children in lower- and higher-educated households and schools but that more attention should be directed towards lower parental education schools.

# Appendix A

## Supplementary Method

### Sample Size Determination

With power of 0.80 and a conventional alpha of 0.05, at least 14 clusters were needed to detect differences considered relevant for clinical practice with an effect size of 0.50 (which is higher than the recommended minimum effect size of 0.41(41)) between the intervention and control arms and at least 28 clusters were needed to test for moderation effects when using a dichotomous moderator (e.g., gender). 31 schools that expressed a wish to participate in the research study were included.

### Problem Behaviour at School Interview (PBSI)

Teacher ratings of individual *children's behavioural and emotional problems* were assessed by the Problem Behaviour at School Interview (PBSI)(32). The PBSI was administered by trained research assistants. Via a structural interview, trained research assistants asked teachers to rate children's emotional and behavioural problems using a 5-point Likert scale ranging from 0 (never applicable) to 4 (often applicable). Higher scores indicated higher levels of behavioural and emotional problems.

Behavioural problem scores were calculated as the average of the mean scores of the subscales of conduct problems and oppositional defiant problems. *Conduct problems* were assessed by 12 items: "threatens other people," "starts fights," "pushes or endangers other children," "bullies or is mean to others," "physically attacks others," "destroys someone else's property," "tells lies," "swears or uses bad language," "truant or absent without a valid reason," "steals," "hangs out with deviant friends," "does not feel guilty if misbehaves." The Cronbach's alphas ranged from 0.885 to 0.918 from kindergarten to second grade. *Oppositional defiant problems* were assessed by 7 items: "rebellious," "stubborn," "does not adhere to school rules," "disobedient," "has tantrums or easily loses their temper," "talks back," "argues". The Cronbach's alphas ranged from 0.890 to 0.905 across the three years. The correlation between the two subscales of behavioural problems ranged from 0.83 - 0.84 across grades.

Emotional problem scores were calculated as the average of the mean scores of the subscales of depression symptoms and anxiety symptoms. *Depression symptoms* were assessed by 7 items: "unhappy or depressed," "doesn't like or enjoy many things," "indifferent, listless or unmotivated," "cries or is sad at school," "burdened by feelings of guilt," "lack of energy," "feels inferior". The Cronbach's alphas ranged from 0.778 to 0.826 from kindergarten to second grade. *Anxiety symptoms* were assessed by 5 items: "worries about many things," "anxious," "nervous or tense," "too dependent on adults," "afraid of going to school." The Cronbach's alphas ranged from 0.813 to 0.836 across the three years. The correlation between the two subscales of emotional problems ranged from 0.66 - 0.69 across grades.

The convergent validity of the PBSI was tested in a sample that comes from the same research project as our study's sample by estimating the correlations between the behavioural and emotional scales of the PBSI and the Teacher's Report Form(33, 42). The correlations for behavioural problems were .75 ($p < .01$) and were 0.55 for emotional problems ($p < .01$)(4). Furthermore, measurement invariance of teacher ratings of emotional and behavioural problems between lower- and higher-educated households and schools has been established elsewhere (14).

The Kolmogorov-Smirnov and Shapiro-Wilk tests showed that emotional and behavioural problems were not normally distributed ($p < .001$). However, the values of skewness (emotional problems range: 0.535 – 0.663; behavioural problems range: 1.051 – 1.053) and kurtosis (emotional problems range: -0.153 – 0.315; behavioural problems range: 0.652 – 0.769) were within the critical bounds.

Our sample is considered a convenience sample drawn from the general population. Thus, since our participants come from non-clinical populations, we do not expect average higher scores in the PBSI. The scale of the PBSI range from 0 – 4, with higher scores indicating more problems. The mean scores of behavioral problems for the whole sample were 0.76 in kindergarten (*SD* = 0.67, *range* = 0 – 3.14), 0.74 (*SD* = 0.66, *range* = 0 – 3.17 ) in first grade and 0.70 (*SD* = 0.67, *range* = 0 – 3.36) in second grade. The mean scores of emotional problems for the whole sample were 0.78 (*SD* = 0.57, *range* = 0 – 3.21) in kindergarten, 0.88 (*SD* = 0.61, *range* = 0 – 3.05) in first grade and 0.97 (*SD* = 0.72, *range* = 0 – 3.38) in second grade. Thus, the mean scores of emotional and behavioral problems were in the lower range of the PBSI scale.



Furthermore, we calculated the means of behavioural and emotional problems across three years for children in lower-educated households and schools as well as for children in higher-educated households and schools. Lower and higher household- and school-level parental education were calculated by 0.50 SD above and below the mean score of household- and school-level parental education.

Compared to children in higher parental education schools ($\leq$ 7% of low educated parents per school), children in lower parental education schools ($\geq$ 26% of low educated parents per school) had significantly higher levels of behavioural problems across the three years and significantly higher levels of emotional problems in first grade. However, the mean scores were still in the lower range for both groups.

Compared to children of higher-educated parents ( > 5.5; short-cycle tertiary education and higher), children of lower-educated parents (< 3.60; upper secondary education and lower) had higher levels of behavioural problems across three years and higher levels of emotional problems in second grade. However, the mean scores were still in the lower range for both groups. Please see sTable 1 for specific means, standard deviations and ranges across the groups.

**sTable 1**

*Descriptive statistics of the outcome variables per household- and school-level parental education*

| | *N* | *M* | *SD* | *Range* | *N* | *M* | *SD* | *Range* | *t-test* |
|---|---|---|---|---|---|---|---|---|---|
| | **Higher parental education schools** | | | | **Lower parental education schools** | | | | |
| **Behavioural Problems** | | | | | | | | | |
| Kindergarten | 278 | 0.71 | 0.61 | 0.0 – 2.95 | 148 | 0.98 | 0.75 | 0.0 – 3.34 | <.001* |
| First Grade | 297 | 0.63 | 0.64 | 0.0 – 3.14 | 176 | 0.95 | 0.70 | 0.0 – 3.17 | <.001* |
| Second Grade | 275 | 0.43 | 0.54 | 0.0 – 3.36 | 140 | 0.90 | 0.65 | 0.0 – 2.70 | <.001* |
| **Emotional Problems** | | | | | | | | | |
| Kindergarten | 275 | 0.83 | 0.59 | 0.0 – 2.87 | 148 | 0.85 | 0.55 | 0.0 – 3.21 | .716 |
| First Grade | 297 | 0.93 | 0.65 | 0.0 – 3.05 | 176 | 0.78 | 0.54 | 0.0 – 2.43 | .015* |
| Second Grade | 275 | 0.87 | 0.70 | 0.0 – 3.00 | 140 | 0.93 | 0.66 | 0.0 – 3.25 | .377 |
| **Children of higher-educated parents** | | | | | **Children of lower-educated parents** | | | | |
| **Behavioural Problems** | | | | | | | | | |
| Kindergarten | 205 | 0.64 | 0.56 | 0.0 – 2.95 | 148 | 0.96 | 0.68 | 0.0 – 2.86 | .001* |
| First Grade | 218 | 0.66 | 0.60 | 0.0 – 2.55 | 183 | 0.82 | 0.66 | 0.0 – 2.90 | .010* |
| Second Grade | 206 | 0.59 | 0.53 | 0.0 – 2.52 | 158 | 0.86 | 0.72 | 0.0 – 2.98 | <.001* |
| **Emotional Problems** | | | | | | | | | |
| Kindergarten | 203 | 0.76 | 0.58 | 0.0 – 2.87 | 148 | 0.84 | 0.61 | 0.0 – 3.21 | .230 |
| First Grade | 218 | 0.91 | 0.62 | 0.0 – 2.89 | 183 | 0.80 | 0.57 | 0.0 – 2.30 | .076 |
| Second Grade | 206 | 0.76 | 0.64 | 0.0 – 2.63 | 158 | 1.08 | 0.70 | 0.0 – 3.38 | <.001* |

## Appendix B

**sTable 1**

*ICC, design effects, model fit indices and model building testing of multi-level modelling with random slope model versus fixed effects model*

| | ICC | Design Effects | Model Fit Indices Within | | | | | | Model Fit Indices Between | | | | | | Fixed Effect vs Random Slope | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $\chi^2$ | df | RMSEA | CFI | TLI | SRMR | $\chi^2$ | df | RMSEA | CFI | TLI | SRMR | $\chi^2$ | df |
| Behavioural problems | 125 - .255 | 4.22 | 2.49 | 2 | .018 | .999 | .996 | .013 | 8.86* | 3 | .052 | .983 | .966 | .142* | -.16 | 1 |
| Emotional problems | .158 - .336 | 5.81 | 2.18 | 3 | .000 | 1.00 | 1.06 | .012 | 9.98* | 2 | .074 | .920 | .760 | .214* | 18.6** | 1 |

*Note.* ICC = intraclass correlation coefficient. Within-level and between-level fit indices were derived by saturating the latter level (43). Chi-Square Test of Model Fit, Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) with critical values > .90 (44), Root Mean Square Error of Approximation (RMSEA, critical value ≤ .08) (45) and Standardized Root Mean Square Residuals (SRMR, critical value ≤ .08) (46) were used to determine model fit at both the within and between level. When cluster is small (<100), between-level SRMR values may be above the cut off value of 0.08. Therefore, Satorra Bentler Chi-Square Difference Tests were used to test the between level models to ensure that model fit at the between level was acceptable for each outcome (46). The ˚ next to the SRMR value at the between level suggests that the results from Satorra Bentler Chi-Square Difference Tests suggest the between level models are acceptable. The model building testing of fixed effects versus random slope models were also computed by Satorra Bentler Chi-Square Difference Tests using loglikelihood (47). Significant results of the model building test indicate a need for adding a random slope parameter. For behavioural problems, we got a negative chi-square value when using the regular and the strictly positive Satorra Bentler Chi-Square Difference Tests (48). We concluded that the addition of the random slope did not improve the model fit for behavioural problems. We based our conclusion on the variance of the random slope, which was smaller than .001. $^{*}p < .05$. $^{**}p < .01$.

**sTable 2**

*Means and variances of the growth parameters of the unconditional multi-level latent growth models of the full sample and per GBG and the control arms*

| | Emotional Problems | | | | | | Behavioural Problems | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | | Variance | | | | Mean | | Variance | | | |
| | I | S | $I_w$ | $S_w$ | $I_b$ | $S_b$ | I | S | $I_w$ | $S_w$ | $I_b$ | $S_b$ |
| Full sample | .780** | .135** | .088** | .022 | .049** | .041** | .760** | .009 | .248** | .003 | .053* | .021** |
| GBG arm | .836** | .065 | .080* | .025 | .041** | .028** | .810** | -.041 | .262** | .014 | .053 | .013** |
| Control arm | .676** | .271** | .099** | .014 | .048* | .039* | .666** | .100˚ | .235** | .000 | .035* | .023* |

*Note.* ˚$p = .057$, $^{*}p < .05$, $^{**}p < .01$. I = intercept. S = slope. w = within level. b = between level.

**sTable 3**

*Sensitivity analysis A: Moderation by imputed household-level parental education and school-level parental education on emotional and behavioural problems*

| | Emotional Problems | | | | | | Behavioural Problems | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intercept | | | Slope | | | Intercept | | | Slope | | |
| | *B* | *S.E.* | CI (95%) | *B* | *S.E.* | CI (95%) | *B* | *S.E.* | CI (95%) | *B* | *S.E.* | CI (95%) |
| **Within Level** | | | | | | | | | | | | |
| Gender | .047 | .033 | -.017,.112 | -.029 | .032 | -.093, .034 | .364 | .041 | .284, .444*** | -.035 | .025 | -.084, .015 |
| Lower parental education | .014 | .012 | -.010, .038 | - | - | - | .062 | .017 | .029, .096*** | -.008 | .007 | -.022, .006 |
| **Between Level** | | | | | | | | | | | | |
| Cluster Size | .001 | .002 | -.002, .005 | -.004 | .002 | -.007, .000* | .000 | .002 | -.003, .004 | -.002 | .001 | -.004, .000* |
| School-level parental education | .003 | .002 | -.002, .007 | -.006 | .002 | -.010, -.003** | .007 | .002 | .002, .011** | -.001 | .002 | -.004, .003 |
| GBG | .165 | .089 | -.010, .339 | -.209 | .066 | -.339, -.080** | .136 | .089 | -.038, .310 | -.132 | .063 | -.255, -.009* |
| Household-level parental education x GBG | - | - | - | .002 | .015 | -.027, .030 | - | - | - | - | - | - |
| School-level parental education x GBG | - | - | - | .008 | .002 | .003, .012** | - | - | - | .003 | .003 | -.002, .008 |

*Note.* $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. Note that the effect of school-level parental education is small because it represents the effect at 1% change in school-level parental education.

**sTable 4**

*Sensitivity analysis B: Moderation by complete data of household-level parental education and school-level parental education on emotional and behavioural problems*

| | Emotional Problems | | | | | | Behavioural Problems | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intercept | | | Slope | | | Intercept | | | Slope | | |
| | *B* | *S.E.* | CI (95%) | *B* | *S.E.* | CI (95%) | *B* | *S.E.* | CI (95%) | *B* | *S.E.* | CI (95%) |
| **Within Level** | | | | | | | | | | | | |
| Gender | .077 | .035 | .008,.146* | -.028 | .036 | -.097, .042 | .369 | .042 | .287, .451** | -.043 | .028 | -.098, .012 |
| Lower parental education | .015 | .012 | -.008, .037 | - | - | - | .057 | .015 | .028, .086*** | -.007 | .006 | -.019, .005 |
| **Between Level** | | | | | | | | | | | | |
| Cluster Size | .001 | .002 | -.003, .005 | -.004 | .002 | -.007, -.001* | .001 | .002 | -.003, .004 | -.002 | .001 | -.004, .000* |
| School-level parental education | .003 | .003 | -.003, .008 | -.006 | .002 | -.010, -.003** | .006 | .003 | .000, .012* | .000 | .002 | -.004, .003 |
| GBG | .198 | .095 | .011, .385* | -.209 | .068 | -.342, -.076** | .108 | .106 | -.099, .316 | -.101 | .061 | -.222, .019 |
| Individual-level parental education x GBG | - | - | - | .005 | .017 | -.028, .038 | - | - | - | - | - | - |
| School-level parental education x GBG | - | - | - | .009 | .002 | .004, .014*** | - | - | - | .003 | .003 | -.002, .008 |

*Note.* $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. Note that the effect of school-level parental education is small because it represents the effect at 1% change in school-level parental education.

## References


1. Patel V, Flisher AJ, Hetrick S, McGorry P. Mental health of young people: a global public-health challenge. The Lancet. 2007;369(9569):1302-13.
2. Obradović J, Burt KB, Masten AS. Testing a dual cascade model linking competence and symptoms over 20 years from childhood to adulthood. J Clin Child Adolesc Psychol. 2009;39(1):90-102.
3. Goodwin R, Sourander A, Duarte C, Niemelä S, Multimäki P, Nikolakaros G, et al. Do mental health problems in childhood predict chronic physical conditions among males in early adulthood? Evidence from a community-based prospective study. Psychol Medicine. 2009;39(2):301.
4. Vigo D, Thornicroft G, Atun R. Estimating the true global burden of mental illness. The Lancet Psychiatry. 2016;3(2):171-8.
5. Barrish HH, Saunders M, Wolf MM. Good Behavior Game: Effects of individual contingencies for group consequences on disruptive behavior in a classroom. J Appl Behav Anal. 1969;2(2):119-24.
6. Embry DD. The Good Behavior Game: A best practice candidate as a universal behavioral vaccine. Clini Child Fam Psychol Rev. 2002;5(4):273-97.
7. Flower A, McKenna JW, Bunuan RL, Muething CS, Vega Jr R. Effects of the Good Behavior Game on challenging behaviors in school settings. Rev Educ Res. 2014;84(4):546-71.
8. Vuijk P, van Lier PA, Crijnen AA, Huizink AC. Testing sex-specific pathways from peer victimization to anxiety and depression in early adolescents through a randomized intervention trial. J Affect Disord. 2007;100(1-3):221-6.
9. Nolan JD, Houlihan D, Wanzek M, Jenson WR. The Good Behavior Game: A classroom-behavior intervention effective across cultures. Sch Psychol Int. 2014;35(2):191-205.
10. Spilt JL, Koot JM, van Lier PA. For whom does it work? Subgroup differences in the effects of a school-based universal prevention program. Prev Sci. 2013;14(5):479-88.
11. Reiss F. Socioeconomic inequalities and mental health problems in children and adolescents: a systematic review. Soc Sci Med. 2013;90:24-31.
12. 2015 NIoE. Toelichting Gewichtenregeling basisonderwijs per 1 januari 2015.
13. Education NIo. Summary report: The state of education 2016/2017. 2018
14. Horoz N, Buil JM, Koot S, van Lenthe JF, Houweling AJT, Koot MH, et al. Children's Behavioral and Emotional Problems, and Peer Relationships Across Elementary School: Associations with Individual- and School-level Parental Education. J Sc Psychol. Manuscript tentatively accepted.
15. Lareau A. Unequal childhoods: Race, class, and family life. 2003.
16. OECD E. Equity and quality in education: Supporting disadvantaged students and schools. 2012. p. 1-165.
17. Sanchez AL, Cornacchio D, Poznanski B, Golik AM, Chou T, Comer JS. The effectiveness of school-based mental health services for elementary-aged children: A meta-analysis. Am Acad of Child Adolesc Psychiatry. 2018;57(3):153-65.
18. Wilson SJ, Lipsey MW. School-based interventions for aggressive and disruptive behavior: Update of a meta-analysis. Am J Prev Med. 2007;33(2):S130-S43.
19. Farahmand FK, Grant KE, Polo AJ, Duffy SN. School-based mental health and behavioral programs for low-income, urban youth: A systematic and meta-analytic review. Clin Psychol Sci Prac. 2011;18(4):372-90.

20. Mifsud C, Rapee RM. Early intervention for childhood anxiety in a school setting: Outcomes for an economically disadvantaged population. J Am Acad of Child Adolesc Psychiatry. 2005;44(10):996-1004.

21. Rooney R, Hassan S, Kane R, Roberts CM, Nesa M. Reducing depression in 9–10 year old children in low SES schools: A longitudinal universal randomized controlled trial. Behav Res Ther. 2013;51(12):845-54.

22. Webster-Stratton C, Jamila Reid M, Stoolmiller M. Preventing conduct problems and improving school readiness: evaluation of the incredible years teacher and child training programs in high-risk schools. J Child Psychol Psychiatry. 2008;49(5):471-88.

23. McGoey KE, Schneider DL, Rezzetano KM, Prodan T, Tankersley M. Classwide intervention to manage disruptive behavior in the kindergarten classroom. J App Sch Psychol. 2010;26(3):247-61.

24. Bierman KL, Coie JD, Dodge KA, Greenberg MT, Lochman JE, McMahon RJ, et al. The effects of a multiyear universal social-emotional learning program: The role of student and school characteristics. J Consult Clin Psychol. 2010;78(2):156.

25. Holsen I, Iversen AC, Smith BH. Universal social competence promotion programme in school: Does it work for children with low socio-economic background? Adv Sch Ment Health Promot. 2009;2(2):51-60.

26. Clinton AB, Edstrom L, Mildon HA, Davila L. Social emotional learning in a Guatemalan preschool sample: Does socioeconomic status moderate the effects of a school-based prevention program? Sch Psychol Int. 2015;36(1):18-35.

27. Raimundo R, Marques-Pinto A, Lima ML. The effects of a social emotional learning program on elementary school children: The role of pupils' characteristics. Psychol Sch. 2013;50(2):165-80.

28. Taylor RD, Oberle E, Durlak JA, Weissberg RP. Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. Child Dev. 2017;88(4):1156-71.

29. Witvliet M, van Lier PA, Cuijpers P, Koot HM. Testing links between childhood positive peer relations and externalizing outcomes through a randomized controlled intervention study. J Consult Clin Psychol. 2009;77(5):905.

30. Netherlands S. Dutch Standard Classification of Education, SOI 2006. Voorburg/Heerlen, The Netherlands; 2016.

31. ISCED U. International standard classification of education 2011. UNESCO Institute for Statistics Montreal, Canada. 2012.

32. Erasmus MC. Problem behavior at school interview. Rotterdam, the Netherlands: Department of Child and Adolescent Psychiatry, Erasmus MC. 2000.

33. Witvliet M, Van Lier PA, Cuijpers P, Koot HM. Change and stability in childhood clique membership, isolation from cliques, and associated child characteristics. J Clin Child Adolesc Psychol. 2009;39(1):12-24.

34. Muthén L, Muthén B. Mplus Editor (version 8.0)[Software]. Los Angeles, CA: Muthen & Muthen. 2017.

35. Peugh JL. A practical guide to multilevel modeling. J Sch Psychol. 2010;48(1):85-112.

36. Bowman-Perrott L, Burke MD, Zaini S, Zhang N, Vannest K. Promoting positive behavior using the Good Behavior Game: A meta-analysis of single-case research. J Posit Behav Interv. 2016;18(3):180-90.

37. Smith S, Barajas K, Ellis B, Moore C, McCauley S, Reichow B. A meta-analytic review of randomized controlled trials of the good behavior game. Behav Modif. 2019:0145445519878670.

38. Gaikhorst L, Beishuizen J, Roosenboom B, Volman M. The challenges of beginning teachers in urban primary schools. Eur J Teach Educ. 2017;40(1):46-61.

39. Santiago CD, Kaltman S, Miranda J. Poverty and mental health: How do low-income adults and children fare in psychotherapy? J Clin Psychol. 2013;69(2):115-26.

40. DESA U. World social report 2020: Inequality in a rapidly changing world. New York, NY: Department of Economic and Social Affairs, United Nations. 2020.

41. Ferguson CJ. An effect size primer: A guide for clinicians and researchers. In: Kazdin AE, editor. Methodological issues and strategies in clinical research. American Psychological Association; 2016. p. 301–102016.

42. Achenbach TM. Manual for Teacher's Report Form and 1991 Profile. Burlington: University of Vermont Department of Psychiatry1991.

43. Hsu H-Y, Lin JJ, Skidmore ST, Kim M. Evaluating fit indices in a multilevel latent growth curve model: A Monte Carlo study. Behav Res Methods. 2019;51(1):172-94.

44. Bentler PM, Bonett DG. Significance tests and goodness of fit in the analysis of covariance structures. Psychol Bull. 1980;88(3):588.

45. Marsh HW, Hau K-T, Wen Z. In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. Struct Equ Modeling. 2004;11(3):320-41.

46. Asparouhov T, Muthén B. SRMR in Mplus. Retrieved from Mplus Web Notes website: http://www statmodel com/download/SRMR2 pdf. 2018.

47. Satorra A, Bentler PM. A scaled difference chi-square test statistic for moment structure analysis. Psychometrika. 2001;66(4):507-14.

48. Asparouhov T, Muthén B. Computing the strictly positive Satorra-Bentler chi-square test in Mplus. Mplus Web Notes. 2010;12:1-12.

# CHAPTER 6

General Discussion

Socioeconomic inequalities exist and are increasing worldwide (Chancel et al., 2022; United Nations, 2023; van den Bossche & WECF, 2019; Vrooman et al., 2023). This much-discussed issue is one of the most pressing of our time. The unequal access to opportunities created by inequalities in socioeconomic distribution constitute barriers to children reaching their full potential. Indeed, socioeconomic status (SES) impacts numerous aspects of life course trajectories including but not limited to physical and mental health, occupation and educational success, life-style, negative life events experienced, and an overall well-being (Bornstein & Bradley, 2014; Caro & Lenkeit, 2012; Letourneau et al., 2013; Reiss, 2013; van Lenthe et al., 2004). Efforts to tackle socioeconomic inequalities have increased within local communities, countries, and across the globe (United Nations, 2015). Nevertheless, we are still far from a world where all children have access to equal opportunities to fulfill their full developmental potential. Yet, every child regardless of their social background, ought to be recognized as having the right to access equal opportunities, support, and care (United Nations, 1989). Thus, immediate action is necessary to address the determinants of socioeconomic inequalities in multiple contexts (e.g., household and school) that may lead to differences in developmental trajectories. A more refined understanding is the first step toward revealing and eventually dismantling the barriers that are faced by children growing up in less favorable conditions.

The overall objective of the present doctoral thesis was to provide a more comprehensive and holistic understanding of the effect of socioeconomic status (SES) on children's development throughout the elementary school period. To do this, I specifically focused on the role of parental education, which is arguably the most powerful indicator of SES (Davis-Kean et al., 2021; Mirowsky & Ross, 2005; Mirowsky & Ross, 2003), in child development. In addition, I focused on household and school contexts because the vast majority of elementary school-aged children's experiences are influenced by their immediate (and nested) environments within the microsystem (Bronfenbrenner, 1977, 1999). As such, I examined the contributions of parental education at both levels to children's development. Furthermore, as outcome variables, I focused on a wide range of developmental domains that extend beyond academic learning. Compared to studies that examined outcomes within academic achievement and learning, there is a small number of studies that examined outcomes within the domains of emotional, behavioral, social, and motivational development. Yet, each developmental domain relates to the others and is essential to overall well-being (e.g., Masten et al., 2005; van Lier & Koot, 2010; van Lier et al., 2012). Moreover, to date, most research on parental education (or other SES indices) was based on adolescent samples, or employed cross-sectional designs and/or single level models (i.e., only household or school context). These limitations have created a gap in our knowledge of whether and how parental education at both the household and school levels contributed to differences in childhood developmental trajectories throughout elementary school. Longitudinal research is therefore critical to identify the specific context(s) (e.g., household and/or school) and developmental domain(s) that

need to be addressed in order to promote the development of children growing up in less favorable conditions. Such research could also inform early intervention strategies and policies. Therefore, guided by the ecological systems theory (see Figure 1 in General Introduction) the present doctoral thesis aimed to close the abovementioned gap by adopting a multi-context and holistic approach to paint a picture of the development of children growing up in higher and lower parental education households and schools. The study chapters specifically focused on the microsystem, mesosystem, and chronosystem but the implications for the exosystem and macrosystem are also discussed. All studies employed longitudinal and multi-level (household and classroom/school) research designs, spanning from kindergarten to the end of elementary school.

Two overarching questions were examined:

1. What are the roles of household- and school-level parental education in the social, emotional, behavioral, and motivational development of children throughout the elementary school period? (Part 1: Chapters 2 and 3)

2. What is the role of the classroom context in the development of children growing up in higher- and lower-educated households and schools? (Part 2: Chapters 4 and 5)



The two overarching questions were addressed in two parts. Below, in Part 1 and Part 2, I summarize the main findings of the present thesis and discuss their scientific and practical implications. After discussing Parts 1 and 2, the overall implications, future directions, and limitations of the present thesis are also discussed.

## PART 1: HOUSEHOLD- AND SCHOOL-LEVEL PARENTAL EDUCATION AND CHILD DEVELOPMENT

Parental education is an important predictor of child development (Davis-Kean et al., 2021; Reiss, 2013), yet the roles of household- and school-level parental education in children's development throughout the elementary school period remained unknown. The primary goal of Part 1 was to address this knowledge gap. To achieve the aim of attaining a more holistic account, Chapter 2 examined outcomes within the domains of social, emotional, and behavioral development and Chapter 3 examined an outcome within the domain of motivational development.

Chapter 2 investigated a total of fifteen teacher- and peer-reported outcome variables. Outcomes within the emotional domain included depression and anxiety symptoms. Outcomes within the behavioral domain included conduct problems, aggression, attention-deficit hyperactivity problems, and oppositional defiant problems. Outcomes within the social domain included indicators of peer relationships such as being disliked by peers, relational victimization, and physical victimization. Specifically, Chapter 2 examined whether household- and school-level parental education were independently

associated with outcome variables within the domains of social, emotional, and behavioral development in first grade and over time from first to sixth grade. That is, Chapter 2 examined whether the severity of problems in first grade and the rate of change of problem levels (i.e., development) differed among children in lower- and higher-educated households and schools. Furthermore, we tested whether school-level parental education moderated the association between household-level parental education and the outcome variables of interest.

Chapter 3 studied a construct within the motivational development domain: academic self-concept (ASC). Academic self-concept refers to students' beliefs about their own abilities in academic domains (Marsh & Martin, 2011; Vu et al., 2022). Research suggests that children who view their academic abilities more positively generally show less emotional, behavioral and peer relationship problems and are more likely to have higher academic performance (Buhs, 2005; Taylor et al., 2007; Vu et al., 2022). Thus, understanding how this motivational construct may develop in relation to parental education would further contribute to the formulation of a holistic perspective. Using self-reported ASC, Chapter 3 examined the independent associations and cross-level interactions of household- and school-level parental education with child- and school-level ASC development from fourth to sixth grade. In addition, it examined whether child- and school-level academic achievement (AA) (partly) explained these associations.

The findings provided novel insights into the emotional, behavioral, social, and motivational development of children of lower- and higher-educated parents and children in lower and higher parental education schools throughout the elementary school period. Below, in separate subsections I begin by summarizing the findings at the household level, followed by school level, and then their interactions before synthesizing the results of Chapters 2 and 3.

**Household-Level Parental Education**

The household context is the most proximal and immediate environment within the microsystem that shapes children's development. Thus, I begin by presenting the results pertaining to household-level parental education from Chapters 2 and 3.

In Chapter 2, findings showed that in first grade, as compared to children of higher-educated parents, children of lower-educated parents had higher levels of problems within the emotional (peer-reported anxiety), behavioral (teacher-reported conduct problems, peer-reported oppositional defiant problems, and attention-deficit hyperactivity problems) and peer relationship (teacher-reported physical and relational victimization and peer dislike) domains. Moreover, there were growth pattern differences in the behavioral and emotional domains from first to sixth grade. That is, the growth rate of peer-reported anxiety was slower for children of lower-educated parents than that of children of higher-educated parents. Furthermore, children of lower-educated

parents showed a faster growth rate of teacher-reported conduct problems, oppositional defiant problems and attention-deficit and hyperactivity problems than children of higher-educated parents.

In Chapter 3, findings showed that the association between household-level parental education and child-level ASC became more pronounced from fourth to sixth grade. Importantly, child-level AA was found to be one underlying mechanism that partly explained the differences in ASC levels between children of higher- and lower-educated parents. Children of lower-educated parents generally had lower academic achievement scores and in turn reported less positive ASC compared to children of higher-educated parents. There were no differences in ASC growth patterns between children of higher- and lower-educated parents.

Chapters 2 and 3 extended our knowledge of the role of household-level parental education in domains of development that extend beyond academic learning. In addition to their exhibiting early academic and language difficulties (Davis-Kean, 2005; Davis-Kean et al., 2021; Houweling et al., 2022; Sirin, 2005), findings showed that children of lower-educated parents enter elementary school with more difficulties within the emotional, behavioral and social (i.e., peer relationship) domains. Beyond this unequal start to elementary school, the differences between problem levels either stayed stable or increased over time until the end of elementary school (Chapter 2). Furthermore, in the last years of elementary school – which are crucial in determining children's secondary education track options in the Netherlands – findings showed that children of lower-educated parents viewed their academic abilities less positively than children of higher-educated parents (Chapter 3) with one explanatory factor for this being their generally lower academic achievement scores. Overall, findings indicated that children of lower-educated parents experience an unequal beginning to elementary school and that the inequalities in their development do not diminish, but rather persist, throughout the six years. This suggests that there is a persistent inequality that extends all the way through elementary school, leading up to the start of secondary school.



Previous studies reported that the effect of parental education is the strongest in childhood and that compared to other indicators, parental education is a stronger predictor of the persistence and severity of mental health problems across the life course (McLaughlin et al., 2011; Reiss, 2013). As such, findings from Part 1 supported previous studies by showing associations between lower parental education and disparities in a wide range of childhood outcomes. These associations could be understood through the family investment model (FIM) and the family stress model (FSM) (Bradley & Corwyn, 2002; Conger & Donnellan, 2007; Masarik & Conger, 2017). On the one hand, owing to disproportionate access to opportunities and capital, parents differ in how they are able to invest in resources and experiences for their children's development (i.e., FIM). On the other hand, difficulties experienced due to socioeconomic position influence parental

mental health and parenting practices (i.e., FSM). Higher-educated parents' greater access to various forms of capital shapes not only their beliefs and parenting strategies but also makes it possible for them to offer their children the desired opportunities (Bourdieu & Passeron, 1990; Davis-Kean et al., 2021; Harding et al., 2015; Lareau, 2011). The inequalities thereby produced, may, in turn, condition the developmental disparities experienced by children of lower-educated parents. In sum, differences in access to opportunities and various forms of capital as well as corresponding parenting practices may explain the found differences between children of higher and lower-educated parents.

**School-Level Parental Education**

Elementary schools, although more distal than the household context, also fall within children's microsystem. The elementary school years provide unique learning opportunities for children to build foundational skills and competencies that lay the basis for their academic and social-emotional development. Therefore, in addition to the household context, this broader social and structured context holds an immense importance in children's lives. But do all schools have a similar (beneficial) effect on children's overall development? Chapters 2 and 3 aimed to answer this question by examining one characteristic of elementary schools, namely their parental education compositions. Below I present the results pertaining to school-level parental education.

In Chapter 2, results showed that in first grade, children in lower parental education schools had, on average, higher problems within the emotional (peer-reported anxiety) and behavioral (teacher-reported conduct problems and oppositional defiant problems, and peer-reported aggression) domains than children in higher parental education schools. No differences in growth rates were reported for outcomes within the behavioral and emotional domains. This suggested that the differences in severity of reported problems found in first grade between lower and higher parental education schools stayed stable over time. Within the peer relationship domain, the number of disliked children increased at a faster rate in lower parental education schools than in higher parental education schools from first to sixth grade. While findings showed that average problem levels were generally higher in lower parental education schools, they also indicated that attending higher parental education schools may mitigate behavioral and peer relationship problems and anxiety symptoms of all children.

In Chapter 3, results showed that school-level academic self-concept (ASC) was lower in higher parental education schools than in lower parental education schools from fourth to sixth grade. However, school-level academic achievement (AA) was higher in higher parental education schools. Furthermore, the association between school-level AA and school-level ASC was not significant, and therefore school-level AA was not considered to be an underlying mechanism. There were no differences in ASC growth rates between schools, suggesting that the differences between reported ASC levels stayed stable from fourth to sixth grade.

Findings of Chapters 2 and 3 provided novel insights into the role of school-level parental education, or broader SES, in developmental patterns in domains that extend beyond academic learning throughout the elementary school years. Interestingly, the findings of these two chapters, in a way, showed different patterns. On the one hand they suggested that attending lower parental education schools may impede positive behavioral, emotional, and peer relationship development. On the other hand attending these schools may boost academic self-concept. Characteristics associated with the socioeconomic compositions of schools may explain the results of both Chapters 2 and 3. It may be that the often cited less effective management strategies, reduced amount of resources and workplace meetings, as well as higher teacher stress and mental workload and peer contagion, may explain the higher emotional, behavioral, and peer relationship difficulties observed in lower parental education schools (OECD, 2012, 2016a; Virtanen et al., 2007), whereas lower rates of competition and lower performance pressure may explain higher ASC levels (Krogh, 2023; Salmela-Aro et al., 2008).

**The Interplay Between Household- and School-Level Parental Education**

While the household and the school are both situated within the microsystem, their interaction lays within the mesosystem. Chapters 2 and 3 also examined whether children of lower- and higher-educated parents' development depended upon school-level parental education. That is, did attending higher parental education schools equally benefit all children? Did it have the capacity to 'level the playing' field or compensate for the difficulties faced by children of lower-educated parents?



In Chapter 2, school-level parental education only moderated the association between household-level parental education and teacher-reported depression symptoms. The null findings of the interaction effects of the rest of the outcome variables suggested that attending higher parental education school did not mitigate or exacerbate the problem development of children of lower-educated parents specifically. However, findings related to teacher-reported depression showed that in higher parental education schools, children of lower-educated parents showed a faster growth rate of depression symptom levels than children of higher-educated parents from first to sixth grade. In lower parental education schools, there were no differences in depression symptom development over time.

Chapter 3 showed that in general children of lower-educated parents benefited more from attending lower parental education schools than higher parental education schools with respect to their ASC levels from fourth to sixth grade. That is, children of lower-educated parents seemed to view their academic abilities more positively in lower parental education schools.

In sum, findings showed that in most cases, school-level parental education did not affect the development of children of higher- and lower-educated parents differently (Chapter 2). However, when it did, findings suggested that attending higher parental education

schools did not necessarily benefit children of lower-educated parents to the same extent as it did children of higher-educated parents (Chapter 2 and 3). These results could be explained by the likely mismatch between children's household and school environments. Findings regarding children of lower-educated parents provide support for theories that focus on the mismatch between contexts such as the local inequalities model and the stage environment fit theory. Similarly, they also support social comparison theories such as person-group similarity model and the big-fish-little-pond effect (Fang et al., 2018; Li et al., 2021; Wright et al., 1986). For instance, the mismatch between the norms and practices of lower-educated households and higher parental education schools may be greater than that of higher-educated households and higher parental education schools. Findings also supported and extended the results of previous cross-sectional studies which showed that lower SES adolescents have more difficulties when attending higher SES schools (Crosnoe, 2009; Granvik Saminathen et al., 2019; Moore et al., 2017)

**PART 1: Interim Summary**

Taken together, the findings of Chapters 2 and 3 are alarming. They showed that, despite all our efforts, we are far from reaching equality and equity. They showed that inequalities are apparent at a young age and persists throughout childhood. In other words, the findings revealed that compared to children of higher-educated parents and children in higher parental education schools, children of lower-educated parents and children in lower parental education schools not only start elementary school with more difficulties but also finish with higher levels. In addition, findings showed that schools are not able to fully compensate for the found inequalities in development. That is, the unequal start to elementary school experienced by children growing up in lower-educated contexts is not leveled out, but instead persists and, in some cases, increases in the years leading up to the end of elementary school.

## PART 2: THE ROLE OF THE CLASSROOM CONTEXT IN INEQUALITIES IN CHILD DEVELOPMENT

The research in Part 2 examined whether the classroom context would compensate for or rather exacerbate developmental disparities. In it, I examined the role of the classroom environment, a context within the microsystem, in the development of children in lower- and higher-educated households and schools (i.e., mesosystem: interactions between contexts within the microsystem, see Figure 1 in the General Introduction). I did this by examining two ways in which classroom context might impact child development: classroom norms and preventive intervention. Below I present the results of Chapter 4 and 5.

Chapter 4 examined one of the most important characteristics of the classroom environment: peer norms. Specifically, it examined the moderating role of the development of classroom norm salience towards aggression in the association between household-level parental education and overt aggressive behavior development from third to sixth

grade. Findings from Chapter 4 revealed that only the development of the salient norm (i.e., rate of change from grade three to six) but not the norm in third grade was a moderator. Overall, in third grade children of lower-educated parents exhibited higher levels of overt aggressive behavior than children of higher-educated parents, irrespective of the norm. However, in classrooms where norm salience became more favorable towards aggression over time, children of higher-educated parents showed a faster growth rate of aggressive behavior levels than children of lower-educated parents from third to sixth grade. In classrooms where norm salience became less favorable towards aggression over time, aggressive behavior development did not differ between children. Although the effect sizes were small and replication studies are needed, our results provisionally suggested that context may matter in aggressive behavior development. That is, some environments may provoke faster growth rates of aggressive behavior development among children of higher-educated parents than among children of lower-educated parents.

The findings supported the social-ecological framework by showing how interactions within the mesosystem (household x classroom) interacted to explain aggressive behavior development (Bronfenbrenner, 1977, 1994; Espelage, 2014; Swearer & Hymel, 2015). As such, they highlighted the context dependent nature of aggressive behavior. Moreover, results may suggest that classrooms where norm salience became more favorable towards aggression over time could be regarded as risk environments, but more so for children of higher-educated parents. Alternatively, classrooms where norm salience became less favorable towards aggression could be regarded as protective environments. These findings may suggest that children of higher-educated parents are generally more able to perceive, respond and adapt to environmental cues. That is, they may be more capable of using their resources to capitalize on opportunities in order to gain social benefits, thereby contributing to a salient norm that is not positive or prosocial. Previous research revealed that more vulnerable children (i.e., children who were victimized) are less likely to adapt to classroom norm salience towards risk-taking than less vulnerable children, and in fact are more likely to engage in norm- defying behavior (Tieskens et al., 2019). Furthermore, children of higher-educated parents have been reported to have better skills in social information processing and executive functioning (e.g., Bookhout et al., 2021; Ursache et al., 2016). As such, if, on average, children of lower-educated parents indeed face more difficulty in reading the room, and in capitalizing on beneficial environments, these challenges may hinder their development and access to future opportunities.

Chapter 5 examined whether the effectiveness of a classroom-based preventive intervention, namely the Good Behavior Game (GBG), differed in preventing emotional and behavioral problems among children of higher- and lower-educated parents and in lower and higher parental education schools from kindergarten to second grade. Using a longitudinal multi-level randomized control trial design, results showed that the GBG was an effective intervention in preventing the development of emotional and behavioral problems. The effectiveness of the GBG did not differ between children of

higher- and lower-educated parents. Nevertheless, the GBG was found to be less effective in lower parental education schools than in higher parental education schools but only for emotional problems. To our knowledge, Chapter 5 was the first study to consider both the household and school levels of context when studying intervention effects with respect to parental education (or broader SES). Previous studies primarily investigated individual-child-level moderators when examining the effects of the GBG (see Bowman-Perrott et al., 2016; Smith et al., 2021). Therefore, the findings add to the literature by showing that, in addition to individual-level moderators, household- and school-level moderators should be considered in research designs to help us better understand (differential or similar) intervention effects.

In line with previous studies (e.g., Embry, 2002; Nolan et al., 2014), findings showed that the GBG was an effective intervention in preventing emotional and behavioral problems. This is important because despite their need for mental health services, research shows that lower SES children do not receive the treatment they need due to reduced amount of resources as well as logistical, attitudinal, and systematic barriers (Santiago et al., 2013). Therefore, effective school-based interventions like the GBG can play a critical role in targeting students who otherwise may not have been able to receive treatment. Nevertheless, it should be noted that the GBG was not as effective in addressing emotional problems in lower parental education schools as in higher parental education schools. This could be due to the differences in the distinct sources of emotional problems faced by children in lower parental education schools, such as more household financial stress and more stressful life situations (Oude Groeniger et al., 2023; Reiss et al., 2019). Taken together, the findings of Chapter 5 showed that, despite its effectiveness, the GBG was not able to reduce the inequalities in emotional and behavioral development between children in higher- and lower-educated contexts.

**PART 2: Interim Summary**

The findings of Chapters 4 and 5 suggested that the classroom context does play an important role in child development and has the capacity to buffer or exacerbate the development of emotional and behavioral problems. The findings of Chapter 4 showed that the rate of change of classroom norm salience towards aggression plays a different role in the behavioral change of children of higher- compared to lower-educated parents. That is, depending on whether norm salience becomes more or less favorable towards aggression, it could serve as a risk or protective factor for children from varying parental education backgrounds. Furthermore, the findings of Chapter 5 suggested that classroom management interventions, like the GBG, serve as a protective measure that prevents problem development. However, such interventions may not be sufficient to reduce the observed inequalities. The findings from Part 2 accentuate the critical role that the classroom environment may play in the development of children who grow up in higher- and lower-educated contexts. Thus, findings reveal the necessity to consider factors at the classroom level to better understand how the household, classroom and school

environments within children's microsystem interact to explain their development in elementary school.

**OVERALL DISCUSSION: Towards a More Holistic Understanding of and Prevention of Inequalities in Social, Emotional, Behavioral, and Motivational Development**

The findings of the present doctoral thesis contributed to the current state of the art by offering a more comprehensive and holistic picture of the role of household- and school-level parental education in children's development throughout the elementary school period. Findings from all study chapters showed that, apart from the previously reported inequalities in academic achievement outcomes (Davis-Kean, 2005; Davis-Kean et al., 2021; Houweling et al., 2022; Passaretta et al., 2022; Skopek & Passaretta, 2021), inequalities in social, emotional, behavioral, and motivational domains of development exist between children in lower- and higher-educated households and schools at the entrance, during and at the completion of elementary school. These findings are incredibly concerning and should not be overlooked. Findings also showed that the classroom context can play a buffering or exacerbating role in children's development. Overall, findings indicate the years spent in elementary school were not able to level the playing field between children growing up in lower-educated and higher-educated contexts.



Taken together, findings revealed that it is necessary to study outcomes within domains of development that extend beyond academic learning in order to gain a more refined understanding of child development. Moreover, the results showed that children's most immediate environments within the microsystem contribute to their development individually but also simultaneously within the mesosystem. Thus, the present doctoral thesis uniquely contributes to advancing our understanding of the processes within the microsystem, the mesosystem and changes over time within the chronosystem (See Figure 1 in the General Introduction). In addition, the findings suggest that, as of right now, it is difficult to imagine a world where all children have access to equal opportunities to reach their full developmental potentials. Therefore, the findings from the present doctoral thesis constitutes a clear call to action.

## IMPLICATIONS FOR PRACTICE, POLICY, AND RESEARCH

In an ideal world, equal opportunities that are provided within schools could have the potential to 'level the playing field' for children who grow up in diverse conditions. However, the unfortunate reality is that a) not all children benefit equally from the equal opportunities provided within their own school and b) not all children have access to schools of equal opportunity and quality. This is because children enter elementary school with different levels of accumulated skills and because elementary schools differ in their characteristics and resources they offer, including the physical environment, school management, the material resources, curriculum, and teacher characteristics.

These diverse conditions and unequal distribution of resources within households and schools hinder the capacity to diminish inequalities.

In what follows, I set out some implications for practice, policy, and research. In presenting these ideas, I also would like to commend the tremendous effort within the local, national, and international communities to promote healthy development and equal opportunities for all children. Below I present implications for inequalities at the beginning, during, and at the end of elementary school.

**Inequalities at Elementary School Entry**

Early intervention and prevention efforts that precede elementary school may be crucial in reducing the found inequalities at elementary school entry. Some prior research showed that early child education and care (ECEC) programs can have the potential to promote healthy development and decrease early inequalities between children (Burger, 2010; Cebolla-Boado et al., 2017; Ghirardi et al., 2023; Janssen et al., 2023; Leseman et al., 2017). In the Netherlands, as well as in other countries, children from lower SES households and schools are less likely to participate in these programs (OECD, 2016b). On average, attending early ECEC is considered better than not attending it, because without attendance inequalities are observed to widen between children from varying social backgrounds. Thus, ECEC policies implemented within the macrosystem (e.g., greater national funding and involvement of governments) may foster a more positive development compared to privatization of ECEC (Janssen et al., 2023; OECD, 2006, 2016b; van Lancker & Ghysels, 2016). It should, however, be noted that the Netherlands offers targeted programs for children from more disadvantaged backgrounds (Leseman & Slot, 2020). Policy makers are encouraged to continue to advocate for research that investigates how various programs considered within ECEC can further 'close the gap' between children from varying social backgrounds (for examples see Leseman et al., 2017; Leseman & Veen, 2016). Moreover, because most studies, including the aforementioned ones, examined the effects of these programs on language or cognitive development, examining the effects of ECEC programs on social-emotional learning outcomes can furnish a more holistic picture of early development. In sum, research that identifies effective early intervention strategies and helps to guide policy making may contribute to reducing the differences observed at elementary school entry and beyond.

**Inequalities During Elementary School**

*Implications for Promoting Equal Childhood Opportunities*

The findings from all chapters highlight the importance of closely monitoring children of lower-educated parents throughout the elementary school years. It is vital for teachers and school counselors to be adept at recognizing early signs of distress and difficulties among these children. Thus, fostering effective communication and collaboration between teachers and school counselors may be crucial in order to provide these children with the support they need. Furthermore, teachers often hold negative stereotypes about

the abilities of children from lower SES households which in turn could both influence the stereotypes that peers have about these children and self-views that children have of themselves (Brummelman & Sedikides, 2023; Schoneveld & Brummelman, 2023). It is therefore important that teacher training programs are implemented to foster warm and positive teacher-child relationships (see Jennings & Greenberg, 2009). We need to be mindful however that some well-intentioned teacher practices, such as inflated praise, to support children may not always yield to positive results for them (see Brummelman et al., 2014; Schoneveld & Brummelman, 2023).

While monitoring and providing additional support to children of lower-educated parents at the practical level may be crucial, researchers and policy makers could advocate for studies that investigate the preventive factors and underlying mechanisms that combat developmental inequalities. In light of the findings of the present thesis, classroom/school-level factors ought also to be considered in research designs. Researchers are encouraged to study factors at the child (e.g., social information processing skills, executive functioning, personality, extracurricular activities, belongingness to school) and household (e.g., parental practices, parental mental health, material resources, parental social and cultural capital, parent-child relationship, household wealth) but also at the classroom/school levels (e.g., positive peer norms, classroom climate, teacher-child relationship, teacher bias, teacher support). For instance, the results of Chapter 4 showed that parental education and the development of classroom norm salience towards aggression interacted to explain aggressive behavior development. They suggested that classroom norms affect behavioral change of children from various social backgrounds differently and that interventions that target classroom norms might promote positive development (also see Tolmatcheff et al., 2022). As such, when considering the development of individual children, the factors within the classroom/school context should also be included in order to identify those strategies (targeted and/or universal) that foster children's well-being.



*Implications at the School Level*

It is also of the utmost importance that time and resources be invested in lower parental education schools. While there are already strategies in place for assisting lower parental education schools, our results showed that these efforts do not (yet) adequately decrease the observed inequalities. For example, in the Netherlands qualifying lower parental education schools receive additional funding (Ministry of Education, Culture and Science, 2013). Schools decide how they allocate their funds, and this is not monitored. It is necessary that the allocation of resources effectively addresses the particular challenges faced by each lower parental education school. This might be achieved in two complementary ways: in research and in practice. Policy makers are encouraged to advocate for and researchers are encouraged to design studies that aim to pinpoint the exact underlying mechanisms leading to differences in developmental outcomes between lower and higher parental education schools. These studies could investigate

factors at different levels of schools, such as the level of management (e.g., staff support, promotion of professional development), of the teachers (e.g., teacher motivation, teacher shortages), of the parents (e.g., parent involvement in school), and of classroom-peers (e.g., peer contagion, peer dynamics). Interventions could address the factors operating at the respective levels using the insights gained from such studies.

With regard to practice, the promotion of a warm and positive school climate and learning environment should be prioritized within all schools. This includes peer-peer relationships, teacher-student relationships (as mentioned above) and also parent-school relationships. That is, establishing relationships between schools, parents and communities that facilitate communication and involvement may strengthen the feeling of belongingness among students (OECD, 2012). Furthermore, in each school open communication with teachers about their needs and the ways to support them should be a priority if it is not already. Teachers in Dutch elementary schools report that they are not adequately prepared to deal with a diverse student body and feel strain caused by the challenges faced by their students (Gaikhorst et al., 2017). On average, teachers in lower SES schools experience more emotional exhaustion and burnout symptoms and have lower retention rates than teachers in higher SES schools (van Eycken et al., 2024; Vercambre et al., 2009). Hence, additional strategies to retain and support teachers, especially those in lower parental education schools, should be prioritized. These strategies may include extra support as well as mentoring and professional development programs that align with schools' and teachers' needs (OECD, 2012). Teachers play an irreplaceable role in elementary school children's learning and lives; it is therefore important that they enjoy their jobs for their own and their students' sakes.

*Implications for Interventions in Elementary School*

Interventions centered around elementary school are great candidates for the early prevention of problem development. This is primarily because elementary school is compulsory in most of the countries around the world, including the Netherlands (from age 5). School-based universal interventions can reach diverse groups of children who might otherwise be difficult to reach, thereby reducing the chance of overlooking those children who may require the most support. Chapter 5 did indeed shed light on to the effectiveness of a universal classroom management intervention, the Good Behavior Game (GBG), and showed that while the GBG was an effective intervention from kindergarten to second grade, it was not able to compensate for the effects of growing up in lower-educated households or schools. While it is unknown whether a longer intervention period could have led to different results, it is evident that prioritizing further research into the underlying causes of this inadequacy is imperative. It could be that components that target broader school climate, intrapersonal skills and more directly emotional competencies could lead to more successful results (Cipriano et al., 2023). Therefore, further research could investigate whether this inadequacy pertains to the components of the GBG, to the implementation practices, or to specific child- and school-

level factors. Importantly, the results of each chapter of this study highlight the necessity of considering interventions that more directly target social emotional learning (SEL).

Thus far, despite the importance of social emotional learning in human development, SEL has not often been considered to be the primary aim of educational policies and has not been viewed as being as important as academic learning competencies (Duraiappah et al., 2021; Ergas et al., 2022). Yet, children benefit from SEL programs not only with respect to social, emotional and behavioral development but also with respect to their self-beliefs and academic achievement (Cipriano et al., 2023; Corcoran et al., 2018; Durlak et al., 2011). In addition, SEL programs promote positive teacher-child relationships, school climate and safety (Cipriano et al., 2023). SEL programs have been proven effective across many studies, cultures and backgrounds (Cipriano et al., 2023; Clinton et al., 2015; Durlak et al., 2022; Durlak et al., 2011; Lee et al., 2023; Mondi & Reynolds, 2021; Taylor et al., 2017). These kinds of programs may be necessary because they have the capacity to prevent the cascade effects of maladaptive development since they nurture not only academic but also social emotional learning. SEL interventions (in combination with academic learning) within educational institutions may thus promote a more holistic development and well-being. It is noteworthy that in the Netherlands schools have an obligation to promote citizenship and monitor social safety (Ministry of Education, Culture and Science, 2015; Ministry of Education, Culture and Science, 2021). Furthermore, they are encouraged to include SEL programs within their curriculum (Ministry of Education, Culture, and Science, 2023). SEL programs often entail a lesson module built into the curriculum and do not offer specific training for teachers to teach SEL to children through teacher-child relationships. Thus, implementing evidence-based SEL programs could further foster child development. For example, SEL programs that aim to train teachers and stimulate positive teacher-child relationships may create a more effective social emotional learning environment (Jennings & Greenberg, 2009). While we acknowledge the positive role of SEL programs, research is still needed to identify whether such programs will be able to decrease the found inequalities between children in higher and lower-educated contexts (but see for single-level designs and mixed results; Bierman et al., 2010; Holsen et al., 2009; Raimundo et al., 2013; Taylor et al., 2007).



**Inequalities at the End of Elementary School**

Findings revealed that inequalities exist at the entrance, during, and at the end of elementary school. These difficulties may lead to adverse consequences in future life course stages. For instance, findings may indicate that children who grow up in lower-educated contexts may be less adequately prepared for secondary school and thereby may be at risk of falling further behind. That is, the reported differences in the social, emotional, behavioral, motivational, and academic outcomes in elementary school could lead to future adverse consequences such as severe mental health problems, engagement with delinquent peers, substance abuse, school-drop out, lower educational attainment, and unemployment (e.g., Kim et al., 2011; Kokko & Pulkkinen, 2000; Lynne-

Landsman et al., 2010; Obradović et al., 2009; Woodward & Fergusson, 2000). In addition, in tracked education systems like that of the Netherlands lower SES children are more likely to attend and receive recommendations for lower secondary school tracks (Batruch et al., 2023; Scheerens et al., 2019; van Leest et al., 2021). To sum up, the abovementioned childhood disparities in various domains may lead to intergenerational transmission of inequalities, including persistent educational and achievement inequality as well to mental health problems across generations. Therefore, the findings of this doctoral thesis highlight the importance of formulating a more holistic understanding of inequalities in childhood in order to nurture positive development and to break the cycle of intergenerational transmission of socioeconomic inequalities. In order to achieve this, collaboration between researchers, schools, and policy makers is required.

## LIMITATIONS AND FUTURE DIRECTIONS

While the present thesis furnished us with a more refined understanding of the role played by household- and school-level parental education in child development, it is not without limitations. These limitations should be considered when interpreting the findings and considering future directions for research.

First, convenience samples were used in each study chapter. Samples were not randomly drawn from the general Dutch population. The first schools that agreed to participate were included in the two research projects. In addition, because the main aim of the larger research projects was to examine the normative development of children, the samples were not drawn to represent the Dutch parental education distribution at the household or school levels. While the two research projects differed in parental education distribution, neither were fully representative of the Dutch population. Future replication studies with a wider range of parental education backgrounds at both levels are encouraged to test the generalizability of our findings within the Netherlands and between countries.

Second, parental education was studied as one indicator of socioeconomic inequalities in development. Although parental education is arguably the most powerful indicator of SES and even precedes other SES indices (Davis-Kean et al., 2021; Mirowsky & Ross, 2005), it would still be interesting to test the longitudinal effects of other SES indices such as income, poverty, occupation status, or family affluence on child development. It has been argued that SES indicators should be tested separately to better understand the unique role of each indicator in child development (Duncan & Magnuson, 2003). Nevertheless, future research can also consider using a composite measure of SES, where multiple indicators are combined to reflect the overall socioeconomic position of the household (or the school).

Third, studies in the present thesis were limited in their investigation of the strengths that children growing up in lower-educated contexts may have developed. It has been argued that studying only the “deficits” can overlook the skills developed by children growing

up in more adverse and unpredictable conditions (Ellis et al., 2017). Identifying and subsequently addressing these strengths can help children to achieve their full potential in development (Ellis et al., 2017; Masten & Cicchetti, 2016). For instance, the hidden talents approach examines social and cognitive abilities that are developed and strengthened by growing up in adverse conditions (Ellis et al., 2022; Frankenhuis et al., 2020). While this is a new approach with limited and mixed support (Frankenhuis et al., 2020), future research is encouraged to identify the various hidden talents and strengths of children growing up in low SES households and schools. Furthermore, research could investigate how these talents may form in the elementary school context and be leveraged to produce a more balanced learning environment. Importantly, majority of the interventions that aim to prevent problem development do not provide the opportunity for children growing up in more adverse conditions to capitalize on their the unique abilities and skills (Ellis et al., 2017). In sum, future studies adopting a more strength and resilience-based approach may not only contribute to a more holistic understanding but may also foster intervention efforts to promote the well-being of children from varying backgrounds.

Fourth, while the present thesis utilized the ecological systems theory as its main theoretical framework, the study chapters examined social structures (i.e., household, classroom, and school) within the microsystem, and their interactions within the mesosystem. The study chapters also encompassed the chronosystem by studying the influence of time on the developing child. However, the thesis did not specifically study the structures within the exosystem (e.g., neighborhood characteristics) and macrosystem (e.g., national educational system). Consequently, future research could investigate how structures at broader levels of the ecological system contribute to child development. For example, previous research showed that lower neighborhood SES has been associated with greater behavioral problems and lower educational achievement (Kalff et al., 2001; Nieuwenhuis & Hooimeijer, 2016; Schneiders et al., 2003). Yet our understanding of how neighborhood SES interacts with both household and school SES to explain social-emotional outcomes is limited (but see Owens, 2010). Within the macrosystem, it could be further investigated how education systems with different policies between nations affect children from various social backgrounds during elementary school. For instance, education systems with early tracking, on average, increase educational inequality and social segregation between schools (Hanushek & Wößmann, 2006; Strello et al., 2022; van de Werfhorst, 2019). However, education inequality is likely to decrease more strongly when tracked education systems transition to comprehensive systems (van de Werfhorst, 2018). Thus, future research could also investigate the effects of such systems on the social, emotional, behavioral, and motivational outcomes of elementary school children from various social backgrounds embedded within different educational systems.

Fifth, it should be noted that data from all studies within this doctoral thesis were collected before the COVID-19 pandemic. The pandemic increased the mental health and educational inequalities between of children higher- and lower-educated parents (Agostinelli et al., 2022; Ravens-Sieberer et al., 2022). For instance, in the Netherlands

children of lower-educated parents showed a steeper decline in their learning during the pandemic (Haelermans et al., 2022) and that during school closures parents from less advantaged families did not feel that they could sufficiently support their children (Bol et al., 2020). Thus, it is possible that the strength of the associations between lower parental education and outcome variables in this thesis could have been stronger if these studies were conducted during or after the COVID-19 pandemic.

Finally, although all studies in this thesis employed longitudinal designs, results do not imply causality. Similarly, results do not indicate that parental education at both levels play a causal role in children's development. Parental education correlates with factors at the household (e.g., household wealth, financial stress, social and cultural capital, exposure to children's learning opportunities at home) and school levels (e.g., school average income, school management, staff support and development, school material resources) that may have accounted for the associations found in this thesis. Due to data unavailability, we were not able to control for these factors. Future research is encouraged to consider the factors that may play a role in the found associations within this thesis.

## CONCLUSION

The findings of the present doctoral thesis are alarming and show an urgent need to take action to promote equal opportunities for all children regardless of their social backgrounds. To sum up, findings suggested that inequalities in development exist between children growing up in higher- and lower-educated households and children attending higher and lower parental education schools at the beginning, during, and at the end of elementary school. Results showed that schools are not able to fully compensate for disparities in development between children growing up in higher- and lower-educated contexts. While attending higher parental education schools may have some benefits for children of lower-educated parents, they do not always benefit children of lower-educated parents to the same extent as children of higher-educated parents. Furthermore, findings showed that the classroom context may play a buffering or exacerbating role in preventing the problem development of children growing up in higher- and lower-educated households and schools. The present doctoral thesis concludes that it is critical to provide more support to children growing up in lower-educated households and attending lower parental education schools. Importantly, findings indicate that the current efforts are not sufficient to 'level the playing field' between children growing up in higher- and lower-educated contexts. As of right now, it is hard to imagine a world where all children have access to equal opportunities to reach their full potential in development. Nevertheless, the present doctoral thesis suggests that a multi-context and holistic approach may be necessary to more adequately address the challenges faced by children of lower-educated parents and lower parental education schools. I hope the holistic picture that my doctoral thesis drew can function as a small step along the road towards equality and equity.

## References


Agostinelli, F., Doepke, M., Sorrenti, G., & Zilibotti, F. (2022). When the great equalizer shuts down: Schools, peers, and parents in pandemic times. *Journal of Public Economics*, *206*, 104574. https://doi.org/10.1016/j.jpubeco.2021.104574

Batruch, A., Geven, S., Kessenich, E., & van de Werfhorst, H. G. (2023). Are tracking recommendations biased? A review of teachers' role in the creation of inequalities in tracking decisions. *Teaching and Teacher Education*, *123*, 103985. https://doi.org/10.1016/j.tate.2022.103985

Bierman, K. L., Coie, J. D., Dodge, K. A., Greenberg, M. T., Lochman, J. E., McMahon, R. J., & Pinderhughes, E. (2010). The effects of a multiyear universal social–emotional learning program: The role of student and school characteristics. *Journal of Consulting and Clinical Psychology*, *78*(2), 156. https://doi.org/10.1037/a0018607

Bol, T., Belfi, B., & Borghans, L. (2020). Thuisonderwijs tijdens de corona-crisis.

Bookhout, M. K., Hubbard, J. A., Zajac, L., Mlawer, F. R., & Moore, C. C. (2021). Validation of the Social Information Processing Application (SIP-AP) across genders, socioeconomic levels, and forms of aggression. *Psychological Assessment*, *33*(8), 716. https://doi.org/10.1111/j.1467-8624.2004.00755.x

Bornstein, M. H., & Bradley, R. H. (2014). *Socioeconomic status, parenting, and child development*. Routledge. https://doi.org/10.4324/9781410607027

Bourdieu, P., & Passeron, J.-C. (1990). *Reproduction in education, society and culture* (Vol. 4). Sage.

Bowman-Perrott, L., Burke, M. D., Zaini, S., Zhang, N., & Vannest, K. (2016). Promoting positive behavior using the Good Behavior Game: A meta-analysis of single-case research. *Journal of Positive Behavior Interventions*, *18*(3), 180-190. https://doi.org/10.1177/1098300715592355

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, *53*(1), 371-399. https://doi.org/10.1146/annurev.psych.53.100901.135233

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, *32*(7), 513. https://doi.org/10.1037/0003-066X.32.7.513

Bronfenbrenner, U. (1994). Ecological models of human development. *International Encyclopedia of Education*, *3*(2), 37-43. https://doi.org/10.4135/9781412952484.n105

Bronfenbrenner, U. (1999). Environments in developmental perspective: Theoretical and operational models. https://doi.org/10.1037/10317-001

Brummelman, E., & Sedikides, C. (2023). Unequal selves in the classroom: Nature, origins, and consequences of socioeconomic disparities in children's self-views. *Developmental Psychology*. https://doi.org/10.1037/dev0001599

Brummelman, E., Thomaes, S., Orobio de Castro, B., Overbeek, G., & Bushman, B. J. (2014). "That's not just beautiful—that's incredibly beautiful!" The adverse impact of inflated praise on children with low self-esteem. *Psychological Science*, *25*(3), 728-735. https://doi.org/10.1177/0956797613514251

Buhs, E. S. (2005). Peer rejection, negative peer treatment, and school adjustment: Self-concept and classroom engagement as mediating processes. *Journal of School Psychology*, *43*(5), 407-424. https://doi.org/10.1016/j.jsp.2005.09.001

Burger, K. (2010). How does early childhood care and education affect cognitive development? An international review of the effects of early interventions for children from different social backgrounds. *Early Childhood Research Quarterly*, *25*(2), 140-165. https://doi.org/10.1016/j.ecresq.2009.11.001

Caro, D. H., & Lenkeit, J. (2012). An analytical approach to study educational inequalities: 10 hypothesis tests in PIRLS 2006. *International Journal of Research & Method in Education*, *35*(1), 3-30. https://doi.org/10.1080/1743727X.2012.666718

Cebolla-Boado, H., Radl, J., & Salazar, L. (2017). Preschool education as the great equalizer? A cross-country study into the sources of inequality in reading competence. *Acta Sociologica*, *60*(1), 41-60. https://doi.org/10.1177/0001699316654529

Chancel, L., Piketty, T., Saez, E., & Zucman, G. (2022). *World inequality report 2022* (0674273567).

Cipriano, C., Strambler, M. J., Naples, L. H., Ha, C., Kirk, M., Wood, M., Sehgal, K., Zieher, A. K., Eveleigh, A., & McCarthy, M. (2023). The state of evidence for social and emotional learning: A contemporary meta-analysis of universal school-based SEL interventions. *Child Development*, *94*(5), 1181-1204. https://doi.org/10.1111/cdev.13968

Clinton, A. B., Edstrom, L., Mildon, H. A., & Davila, L. (2015). Social emotional learning in a Guatemalan preschool sample: Does socioeconomic status moderate the effects of a school-based prevention program? *School Psychology International*, *36*(1), 18-35. https://doi.org/10.1177/0143034314559868

Conger, R. D., & Donnellan, M. B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology*, *58*, 175-199. https://doi.org/10.1146/annurev.psych.58.110405.085551

Corcoran, R. P., Cheung, A. C., Kim, E., & Xie, C. (2018). Effective universal school-based social and emotional learning programs for improving academic achievement: A systematic review and meta-analysis of 50 years of research. *Educational Research Review*, *25*, 56-72. https://doi.org/10.1016/j.edurev.2017.12.001

Crosnoe, R. (2009). Low-income students and the socioeconomic composition of public high schools. *American Sociological Review*, *74*(5), 709-730. https://doi.org/10.1177/000312240907400502

Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: the indirect role of parental expectations and the home environment. *Journal of Family Psychology*, *19*(2), 294. https://doi.org/10.1037/0893-3200.19.2.294

Davis-Kean, P. E., Tighe, L. A., & Waters, N. E. (2021). The role of parent educational attainment in parenting and children's development. *Current Directions in Psychological Science*, *30*(2), 186-192. https://doi.org/10.1177/0963721421993116

Duncan, G. J., & Magnuson, K. A. (2003). Off with Hollingshead: Socioeconomic resources, parenting, and child development. *Socioeconomic status, parenting, and child development*, *287*, 83-106. https://doi.org/10.4324/9781410607027

Duraiappah, K., Atteveldt, N., Buil, J. M., Singh, K., & Wu, R. (2021). *Summary for Decision Makers, Reimagining Education: The International Science and Evidence based Education Assessment*. N. D. U. MGIEP.

Durlak, J. A., Mahoney, J. L., & Boyle, A. E. (2022). What we know, and what we need to find out about universal, school-based social and emotional learning programs for children and adolescents: A review of meta-analyses and directions for future research. *Psychological Bulletin*, *148*(11-12), 765. https://doi.org/10.1037/bul0000383

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, *82*(1), 405-432. https://doi.org/10.1111/j.1467-8624.2010.01564.x

Ellis, B. J., Abrams, L. S., Masten, A. S., Sternberg, R. J., Tottenham, N., & Frankenhuis, W. E. (2022). Hidden talents in harsh environments. *Development and Psychopathology, 34*(1), 95-113. https://doi.org/10.1017/s0954579420000887

Ellis, B. J., Bianchi, J., Griskevicius, V., & Frankenhuis, W. E. (2017). Beyond risk and protective factors: An adaptation-based approach to resilience. *Perspectives on Psychological Science*, *12*(4), 561-587. https://doi.org/10.1177/1745691617693054

Embry, D. D. (2002). The Good Behavior Game: A best practice candidate as a universal behavioral vaccine. *Clinical Child and Family Psychology Review*, *5*, 273-297. https://doi.org/10.1023/a:1020977107086

Ergas, O., Gilead, T., & Singh, N. C. (2022). 'Introduction to ISEE Assessment Working Group 1 – education in and for flourishing' in Duraiappah, A.K., van Atteveldt, N.M., Borst, G., Bugden, S., Ergas, O., Gilead, T., Gupta, L., Mercier, J., Pugh, K., Singh, N.C. and Vickers, E.A. (eds.). In *Reimagining Education: The International Science and Evidence based Assessment*. https://unesdoc.unesco.org/ark:/48223/pf0000381872

Espelage, D. L. (2014). Ecological theory: Preventing youth bullying, aggression, and victimization. *Theory into Practice*, *53*(4), 257-264. https://doi.org/10.1080/00405841.2014.947216

Fang, J., Huang, X., Zhang, M., Huang, F., Li, Z., & Yuan, Q. (2018). The big-fish-little-pond effect on academic self-concept: A meta-analysis. *Frontiers in Psychology*, *9*, 1569. https://doi.org/10.3389/fpsyg.2018.01569

Frankenhuis, W. E., Young, E. S., & Ellis, B. J. (2020). The hidden talents approach: Theoretical and methodological challenges. *Trends in Cognitive Sciences*, *24*(7), 569-581. https://doi.org/10.1016/j.tics.2020.03.007

Gaikhorst, L., Beishuizen, J., Roosenboom, B., & Volman, M. (2017). The challenges of beginning teachers in urban primary schools. *European Journal of Teacher Education*, *40*(1), 46-61. https://doi.org/10.1080/02619768.2016.1251900

Ghirardi, G., Baier, T., Kleinert, C., & Triventi, M. (2023). Is early formal childcare an equalizer? How attending childcare and education centres affects children's cognitive and socio-emotional skills in Germany. *European Sociological Review*, *39*(5), 692-707. https://doi.org/10.1093/esr/jcac048

Granvik Saminathen, M., Låftman, S. B., & Modin, B. (2019). School choice at a cost? Academic achievement, school satisfaction and psychological complaints among students in disadvantaged areas of Stockholm. *International journal of environmental research and public health*, *16*(11), 1912. https://doi.org/0.3390/ijerph16111912

Haelermans, C., Korthals, R., Jacobs, M., de Leeuw, S., Vermeulen, S., van Vugt, L., Aarts, B., Prokic-Breuer, T., Van der Velden, R., & van Wetten, S. (2022). Sharp increase in inequality in education in times of the COVID-19-pandemic. *PloS One*, *17*(2), e0261114. https://doi.org/10.1371/journal.pone.0261114

Hanushek, E. A., & Wößmann, L. (2006). Does educational tracking affect performance and inequality? Differences-in-differences evidence across countries. *The Economic Journal*, *116*(510), C63-C76. https://doi.org/10.1111/j.1468-0297.2006.01076.x

Harding, J. F., Morris, P. A., & Hughes, D. (2015). The relationship between maternal education and children's academic outcomes: A theoretical framework. *Journal of Marriage and Family*, *77*(1), 60-76. https://doi.org/10.1111/jomf.12156

Holsen, I., Iversen, A. C., & Smith, B. H. (2009). Universal social competence promotion programme in school: Does it work for children with low socio-economic background? *Advances in School Mental Health Promotion*, *2*(2), 51-60. https://doi.org/10.1080/1754730x.2009.9715704

Houweling, T. A., Oude Groeniger, J., Jansen, P. W., van Lier, P., Horoz, N., Buil, M., & van Lenthe, F. J. (2022). Trajectories of socioeconomic inequality in early child development: a cohort analysis. *International Journal for Equity in Health*, *21*(1), 1-10. https://doi.org/10.1186/s12939-022-01675-8

Janssen, L., Zwier, D., & van de Werfhorst, H. (2023). Privatization of preschool education: The implications for educational inequalities in cross-national perspective. *Acta Sociologica*, 00016993231205201. https://doi.org/10.1177/00016993231205201

Jennings, P. A., & Greenberg, M. T. (2009). The prosocial classroom: Teacher social and emotional competence in relation to student and classroom outcomes. *Review of Educational Research*, *79*(1), 491-525. https://doi.org/10.3102/0034654308325693

Kalff, A., Kroes, M., Vles, J., Hendriksen, J., Feron, F. J., Steyaert, J., Van Zeben, T., Jolles, J., & van Os, J. (2001). Neighbourhood level and individual level SES effects on child problem behaviour: a multilevel analysis. *Journal of Epidemiology & Community Health*, *55*(4), 246-250. https://doi.org/10.1136/jech.55.4.246

Kim, M. J., Catalano, R. F., Haggerty, K. P., & Abbott, R. D. (2011). Bullying at elementary school and problem behaviour in young adulthood: A study of bullying, violence and substance use from age 11 to age 21. *Criminal Behaviour and Mental Health*, *21*(2), 136-144. https://doi.org/10.1002/cbm.804

Kokko, K., & Pulkkinen, L. (2000). Aggression in childhood and long-term unemployment in adulthood: a cycle of maladaptation and some protective factors. *Developmental Psychology*, *36*(4), 463–472. https://doi.org/10.1037//1522-3736.3.1.332a

Krogh, S. C. (2023). "It's just performance all the time": early adolescents' accounts of school-related performance demands and well-being. *Scandinavian Journal of Educational Research*, *67*(3), 463-476. https://doi.org/10.1007/s11121-023-01552-y

Lareau, A. (2011). University of California Press. https://doi.org/10.1525/9780520949904

Lee, J., Shapiro, V. B., & Kim, B.-K. E. (2023). Universal school-based social and emotional learning (SEL) for diverse student subgroups: Implications for enhancing equity through SEL. *Prevention Science*, *24*(5), 1011-1022. https://doi.org/10.1007/s11121-023-01552-y

Leseman, P., Mulder, H., Verhagen, J., Broekhuizen, M., van Schaik, S., & Slot, P. (2017). Effectiveness of Dutch targeted preschool education policy for disadvantaged children: Evidence from the pre-COOL study. In *Childcare, early education and social inequality* (pp. 173-193). Edward Elgar Publishing. https://doi.org/10.4337/9781786432094.00019

Leseman, P. P., & Slot, P. L. (2020). Universal versus targeted approaches to prevent early education gaps. The Netherlands as case in point. *Zeitschrift für Erziehungswissenschaft*, *23*(3), 485-507. https://doi.org/doi.org/10.1007/s11618-020-00948-8

Letourneau, N. L., Duffett-Leger, L., Levac, L., Watson, B., & Young-Morris, C. (2013). Socioeconomic status and child development: A meta-analysis. *Journal of Emotional and Behavioral Disorders*, *21*(3), 211-224. https://doi.org/10.1177/1063426611421007

Li, W., Zeng, X., Wang, Y., Curtis, R., & Sparks, E. (2021). Does school matter for students' self-esteem? Associations of family SES, peer SES, and school resources with Chinese students' self-esteem. *Research in Social Stratification and Mobility*, *71*, 100565. https://doi.org/10.1016/j.rssm.2020.100565

Lynne-Landsman, S. D., Bradshaw, C. P., & Ialongo, N. S. (2010). Testing a developmental cascade model of adolescent substance use trajectories and young adult adjustment. *Development and Psychopathology*, *22*(4), 933-948. https://doi.org/10.1348/000709910x503501

Marsh, H. W., & Martin, A. J. (2011). Academic self-concept and academic achievement: Relations and causal ordering. *British Journal of Educational Psychology*, *81*(1), 59-77. https://doi.org/10.1348/000709910x503501

Masarik, A. S., & Conger, R. D. (2017). Stress and child development: A review of the Family Stress Model. *Current Opinion in Psychology*, *13*, 85-90.

Masten, A. S., & Cicchetti, D. (2016). Resilience in development: Progress and transformation. *Developmental Psychopathology*, *4*(3), 271-333. https://doi.org/10.1002/9781119125556.devpsy406

Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradović, J., Riley, J. R., Boelcke-Stennes, K., & Tellegen, A. (2005). Developmental cascades: linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology*, *41*(5), 733. https://doi.org/10.1037/0012-1649.41.5.733

McLaughlin, K. A., Breslau, J., Green, J. G., Lakoma, M. D., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2011). Childhood socio-economic status and the onset, persistence, and severity of DSM-IV mental disorders in a US national sample. *Social Science & Medicine*, *73*(7), 1088-1096. https://doi.org/10.1016/j.socscimed.2011.06.011

Ministry of Education, Culture and Science (2013). Key figures 2009–2013: Education, culture, science. https://www.government.nl/documents/reports/2014/08/12/key-figures2009-2013ministry-of-education-culture-and-science

Ministry of Education, Culture and Science (2015). *Zorgplicht voor sociale veiligheid op scholen.* https://www.onderwijsinspectie.nl/onderwerpen/sociale-veiligheid/toezicht-op-naleving-zorgplicht-sociale-veiligheid-op-school

Ministry of Education, Culture and Science (2021) . *Wettelijke opdracht burgerschap*. Inspectorate of Education.

https://www.onderwijsinspectie.nl/onderwerpen/burgerschap/wettelijke-opdracht

Ministry of Education, Culture and Science. (2023). *Petitie sociale en emotionele vaardigheden in het curriculum* .

Mirowsky, J. & Ross, C. E. (2003) *Education, social status, and health* (New York, Aldine de Gruyter).

Mirowsky, J., & Ross, C. E. (2005). Education, learned effectiveness and health. *London Review of Education, 3*(3). https://doi.org/10.1080/14748460500372366

Mondi, C. F., & Reynolds, A. J. (2021). Socio-emotional learning among low-income prekindergarteners: The roles of individual factors and early intervention. *Early Education and Development*, *32*(3), 360-384. https://doi.org/10.1080/10409289.2020.1778989

Moore, G. F., Littlecott, H. J., Evans, R., Murphy, S., Hewitt, G., & Fletcher, A. (2017). School composition, school culture and socioeconomic inequalities in young people's health: Multi-level analysis of the Health Behaviour in School-aged Children (HBSC) survey in Wales. *British Educational Research Journal*, *43*(2), 310-329. https://doi.org/10.1002/berj.3265

Nieuwenhuis, J., & Hooimeijer, P. (2016). The association between neighbourhoods and educational achievement, a systematic review and meta-analysis. *Journal of Housing and the Built Environment*, *31*, 321-347.

Nolan, J. D., Houlihan, D., Wanzek, M., & Jenson, W. R. (2014). The Good Behavior Game: A classroom-behavior intervention effective across cultures. *School Psychology International*, *35*(2), 191-205. https://doi.org/10.1177/0143034312471473

Obradović, J., Burt, K. B., & Masten, A. S. (2009). Testing a dual cascade model linking competence and symptoms over 20 years from childhood to adulthood. *Journal of clinical child & adolescent psychology*, *39*(1), 90-102. https://doi.org/10.1080/15374410903401120

OECD. (2006). *Starting Strong II: Early childhood education and care* (Paris: Organization for Economic Co-operation and Development, Issue.

OECD. (2012). *Equity and quality in education: Supporting disadvantaged students and schools*. https://www.oecd-ilibrary.org/education/equity-and-quality-in-education_9789264130852-en

OECD. (2016a). *Low-Performing Students*. https://doi.org/doi:https://doi.org/10.1787/9789264250246-en

OECD. (2016b). Starting strong IV. Early childhood education and care. Data Country Note: Netherlands. *Organization for Economic Co-operation and Development*, 1-18. https://doi.org/https://www.oecd.org/publications/starting-strong-iv-9789264233515-en.htm

Oude Groeniger, J., Houweling, T. A., Jansen, P. W., Horoz, N., Buil, J. M., van Lier, P. A., & van Lenthe, F. J. (2023). Social inequalities in child development: the role of differential exposure and susceptibility to stressful family conditions. *Journal of Epidemiology & Community Health*, *77*(2), 74-80. https://doi.org/10.1136/jech-2022-219548

Owens, A. (2010). Neighborhoods and schools as competing and reinforcing contexts for educational attainment. *Sociology of Education*, *83*(4), 287-311. https://doi.org/10.1177/0038040710383519

Passaretta, G., Skopek, J., & van Huizen, T. (2022). Is social inequality in school-age achievement generated before or during schooling? A European perspective. *European Sociological Review*, *38*(6), 849-865. https://doi.org/10.1093/esr/jcac005

Raimundo, R., Marques-Pinto, A., & Lima, M. L. (2013). The effects of a social-emotional learning program on elementary school children: The role of pupils' characteristics *Psychology in the Schools*, *50*(2), 165-180. https://doi.org/doi.org/10.1002/pits.21667

Ravens-Sieberer, U., Erhart, M., Devine, J., Gilbert, M., Reiss, F., Barkmann, C., Siegel, N. A., Simon, A. M., Hurrelmann, K., & Schlack, R. (2022). Child and adolescent mental health during the COVID-19 pandemic: results of the three-wave longitudinal COPSY study. *Journal of Adolescent Health*, *71*(5), 570-578. https://doi.org/10.1016/j.jadohealth.2022.06.022

Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: a systematic review. *Social science & medicine*, *90*, 24-31. https://doi.org/10.1016/j.socscimed.2013.04.026

Reiss, F., Meyrose, A.-K., Otto, C., Lampert, T., Klasen, F., & Ravens-Sieberer, U. (2019). Socioeconomic status, stressful life situations and mental health problems in children and adolescents: Results of the German BELLA cohort-study. *PloS One*, *14*(3), e0213700. https://doi.org/10.1371/journal.pone.0213700

Salmela-Aro, K., Kiuru, N., & Nurmi, J. E. (2008). The role of educational track in adolescents' school burnout: A longitudinal study. *British Journal of Educational Psychology*, *78*(4), 663-689. https://doi.org/10.1348/000709908x281628

Santiago, C. D., Kaltman, S., & Miranda, J. (2013). Poverty and mental health: how do low-income adults and children fare in psychotherapy? *Journal of clinical psychology*, *69*(2), 115-126. https://doi.org/doi.org/10.1002/jclp.21951

Scheerens, J., Timmermans, A., van der Werf, G. (2019). Socioeconomic Inequality and Student Outcomes in the Netherlands. In: Volante, L., Schnepf, S., Jerrim, J., Klinger, D. (eds) Socioeconomic Inequality and Student Outcomes. Education Policy & Social Inequality, vol 4. Springer, Singapore. https://doi.org/10.1007/978-981-13-9863-6_7

Schneiders, J., Drukker, M., van der Ende, J., Verhulst, F., van Os, J., & Nicolson, N. (2003). Neighbourhood socioeconomic disadvantage and behavioural problems from late childhood into early adolescence. *Journal of Epidemiology & Community Health*, *57*(9), 699-703. https://doi.org/10.1136/jech.57.9.699

Schoneveld, E., & Brummelman, E. (2023). "You did incredibly well!": teachers' inflated praise can make children from low-SES backgrounds seem less smart (but more hard-working). *npj Science of Learning*, *8*(1), 31. https://doi.org/10.1038/s41539-023-00183-w

Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of educational research*, *75*(3), 417-453. https://doi.org/10.3102/00346543075003417

Skopek, J., & Passaretta, G. (2021). Socioeconomic inequality in children's achievement from infancy to adolescence: The case of Germany. *Social Forces*, *100*(1), 86-112. https://doi.org/10.1093/sf/soaa093

Smith, S., Barajas, K., Ellis, B., Moore, C., McCauley, S., & Reichow, B. (2021). A meta-analytic review of randomized controlled trials of the good behavior game. *Behavior Modification*, *45*(4), 641-666. https://doi.org/10.1177/0145445519878670

Strello, A., Strietholt, R., & Steinmann, I. (2022). Does tracking increase segregation? International evidence on the effects of between-school tracking on social segregation across schools. *Research in Social Stratification and Mobility*, *78*, 100689. https://doi.org/10.1016/j.rssm.2022.100689

Swearer, S. M., & Hymel, S. (2015). Understanding the psychology of bullying: Moving toward a social-ecological diathesis–stress model. *American psychologist*, *70*(4), 344. https://doi.org/10.1037/a0038929

Taylor, L. D., Davis-Kean, P., & Malanchuk, O. (2007). Self-esteem, academic self-concept, and aggression at school. *Aggressive Behavior: Official Journal of the International Society for Research on Aggression*, *33*(2), 130-136. https://doi.org/10.1002/ab.20174

Taylor, R. D., Oberle, E., Durlak, J. A., & Weissberg, R. P. (2017). Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. *Child Development*, *88*(4), 1156-1171. https://doi.org/10.1111/cdev.12864

Tieskens, J. M., Buil, J. M., Koot, S., & van Lier, P. A. (2019). Relational victimization and elementary schoolchildren's risk-taking behavior: Impact of the classroom norm toward risk-taking. *International Journal of Behavioral Development*, 0165025419880617.

Tolmatcheff, C., Galand, B., Roskam, I., & Veenstra, R. (2022). The effectiveness of moral disengagement and social norms as anti-bullying components: A randomized controlled trial. *Child Development*, *93*(6), 1873-1888. https://doi.org/10.1111/cdev.13828

United Nations. (1989). Convention on the Rights of the Child. *General Assembly resolution 44/25*.

United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. *General Assembly*. https://sdgs.un-.org/2030agenda

United Nations. (2023). *The Sustainable Development Goals Report 2023: Special Edition*. https://doi.org/https://unstats.un.org/sdgs/report/2023/

Ursache, A., Noble, K. G., Pediatric Imaging, N., & Study, G. (2016). Socioeconomic status, white matter, and executive function in children. *Brain and Behavior*, *6*(10), e00531. https://doi.org/10.1002/brb3.531

Van de Werfhorst, H. G. (2018). Early tracking and socioeconomic inequality in academic achievement: studying reforms in nine countries. *Research in Social Stratification and Mobility*, *58*, 22-32. https://doi.org/10.1016/j.rssm.2018.09.002

Van de Werfhorst, H. G. (2019). Early tracking and social inequality in educational attainment: Educational reforms in 21 European countries. *American Journal of Education*, *126*(1), 65-99. https://doi.org/10.1086/705500

van den Bossche, C., & WECF. (2019). *Inequalities in the Netherlands* (Make Europe Sustainable for All, Issue. https://www.sdgwatcheurope.org/wp-content/uploads/2019/06/10.3.a-report-NL.pdf

Van Eycken, L., Amitai, A., & Van Houtte, M. (2024). Be true to your school? Teachers' turnover intentions: The role of socioeconomic composition, teachability perceptions, emotional exhaustion and teacher efficacy. *Research Papers in Education*, *39*(1), 24-49. https://doi.org/10.1080/02671522.2022.2089208

van Lancker, W., & Ghysels, J. (2016). Explaining patterns of inequality in childcare service use across 31 developed economies: A welfare state perspective. *International Journal of Comparative Sociology*, *57*(5), 310-337. https://doi.org/10.1177/0020715216674252

Van Leest, A., Hornstra, L., van Tartwijk, J., & van de Pol, J. (2021). Test-or judgement-based school track recommendations: Equal opportunities for students with different socio-economic backgrounds?. *British Journal of Educational Psychology*, *91*(1), 193-216. https://doi.org/10.1111/bjep.12356

van Lenthe, F. J., Schrijvers, C. T., Droomers, M., Joung, I. M., Louwman, M. J., & Mackenbach, J. P. (2004). Investigating explanations of socio-economic inequalities in health: the Dutch GLOBE study. *The European Journal of Public Health*, *14*(1), 63-70. https://doi.org/10.1093/eurpub/14.1.63

van Lier, P. A., & Koot, H. M. (2010). Developmental cascades of peer relations and symptoms of externalizing and internalizing problems from kindergarten to fourth grade elementary school. *Development and Psychopathology*, *22*(3), 569-582. https://doi.org/10.1017/S0954579410000283

van Lier, P. A., Vitaro, F., Barker, E. D., Brendgen, M., Tremblay, R. E., & Boivin, M. (2012). Peer victimization, poor academic achievement, and the link between childhood externalizing and internalizing problems. *Child Development*, *83*(5), 1775-1788. https://doi.org/10.1111/j.1467-8624.2012.01802.x

Vercambre, M.-N., Brosselin, P., Gilbert, F., Nerrière, E., & Kovess-Masféty, V. (2009). Individual and contextual covariates of burnout: a cross-sectional nationwide study of French teachers. *BMC Public Health*, *9*(1), 1-12. https://doi.org/10.1186/1471-2458-9-333

Virtanen, M., Kivimäki, M., Elovainio, M., Linna, A., Pentti, J., & Vahtera, J. (2007). Neighbourhood socioeconomic status, health and working conditions of school teachers. *Journal of Epidemiology and Community Health*, *61*(4), 326. https://doi.org/10.1136/jech.2006.052878

Vrooman, C., Boelhouwer, J., Iedema, J., & Van der Torre, A. (2023). *Eigentijdse ongelijkheid. De postindustriële klassenstructuur op basis van vier typen kapitaal* (Sociaal en Cultureel Planbureau, Issue.

Vu, T., Magis-Weinberg, L., Jansen, B. R., van Atteveldt, N., Janssen, T. W., Lee, N. C., van der Maas, H. L., Raijmakers, M. E., Sachisthal, M. S., & Meeter, M. (2022). Motivation-achievement cycles in learning: A literature review and research agenda. *Educational Psychology Review*, *34*(1), 39-71. https://doi.org/10.1007/s10648-021-09616-7

Woodward, L. J., & Fergusson, D. M. (2000). Childhood peer relationship problems and later risks of educational under-achievement and unemployment. *Journal of child Psychology and Psychiatry*, *41*(2), 191-201. https://doi.org/10.1111/1469-7610.00600

Wright, J. C., Giammarino, M., & Parad, H. W. (1986). Social status in small groups: Individual–group similarity and the social" misfit.". *Journal of Personality and Social Psychology*, *50*(3), 523. https://doi.org/10.1037/0022-3514.50.3.523

# APPENDICES

## SUMMARY

*Imagine that every child — regardless of their social background — were to have equal opportunities to reach their full potential in development.* Coupled with biological influences, the conditions under which children grow up shape their development. More favorable conditions can nurture positive development while less favorable conditions can undermine it. This may result in disparities in children's developmental trajectories. Yet, despite diverse conditions and experiences in their walks of life, every child has the right to access equal opportunities to develop skills and competencies that enable them to fulfill their potential and to foster an overall well-being (United Nations, 1989).

One important factor that contributes to disparities in developmental trajectories is socioeconomic status (SES) (e.g., Bornstein & Bradley, 2014; Caro & Lenkeit, 2012; Reiss, 2013). Regardless of the country or society, SES hierarchies and inequalities exist and are increasing worldwide (Chancel et al., 2022; United Nations, 2023; van den Bossche & WECF, 2019; Vrooman et al., 2023). Inequalities in socioeconomic distribution not only condition unequal access to opportunities but also create barriers that hinder children to reach their full developmental potential. Therefore, it is critical to identify and address socioeconomic inequalities in multiple contexts that may lead to differences in developmental trajectories. The household and the school contexts are the most immediate and influential environments in children's development. Thus, socioeconomic distribution within these two contexts may influence children's development.

Decades of research have explored associations between SES and a wide range of outcomes including but not limited to mental and physical health, occupational success, academic and educational attainment across the life course (e.g., Bornstein & Bradley, 2014; McLaughlin, et al., 2011; Caro & Lenkeit, 2012; Letourneau et al., 2013; Reiss, 2013; van Lenthe et al., 2004). However, our understanding of the longitudinal contributions of SES at both the household and school levels to child development throughout the elementary school period remains incomplete. Therefore, using a multi-context approach, the present doctoral thesis aimed to provide a more holistic understanding of how household- and school-level socioeconomic status (SES) contributed to elementary school children's development. To achieve this goal, the present thesis focused on the role of parental education, arguably the most powerful indicator of SES, (Davis-Kean et al., 2021; Mirowsky & Ross, 2005; Mirowsky & Ross, 2003) by examining the contributions of parental education at both the household and school levels of context to children's development. Moreover, it examined domains of development that extend beyond academic learning, namely, social, emotional, behavioral, and motivational development. Compared to studies that examined outcomes within the academic learning domain, only a small number of studies examined outcomes within the social, emotional, behavioral and motivational domains. Yet, each domain of development relates to the others and acquiring skills in these specific domains promotes positive child development. In

addition, to date, most research on parental education (or other SES indices) was based on adolescent samples or used cross-sectional designs and/or single level models (i.e., only household or school context). The present doctoral thesis therefore employed a longitudinal and a multi-context approach to parental education and child development spanning from kindergarten to the end of elementary school. In this way, it attempted to paint a more holistic and comprehensive picture of the development of children growing up in higher and lower parental education households and schools throughout the elementary school years. Household-level parental education refers to children's parents' education level (i.e., higher- or lower-educated parents). School-level parental education refers to per school percentage of children of lower-educated parents (i.e., lower parental education schools: schools with a higher percentage of children of lower-educated parents; higher parental education schools: schools with a lower percentage of children of lower-educated parents)

**Chapter 2** examined the main effect associations of household-level parental education and school-level parental education on children's development within emotional, behavioral, and peer relationship domains from first to sixth grade of elementary school. In addition, it examined whether school-level parental education moderated the association between household-level parental education and outcome variables within these three domains. Children ($N$ = 698, $M_{age}$ = 7.08 in first grade) from 31 mainstream elementary schools were annually followed from first grade to sixth grade. Outcome variables within the behavioral domain included conduct problems, oppositional defiant problems, attention-deficit and hyperactivity problems, and aggression. Outcome variables within the emotional domain included depression and anxiety symptoms. Outcome variables within the peer relationship domain included physical victimization, relational victimization, and peer dislike. Results from multi-level latent growth models showed that, when compared to children of higher-educated parents, children of lower-educated parents generally showed higher levels of problems within emotional, behavioral, and peer relationship domains in first grade and exhibited a faster growth rate of behavioral problems from first to sixth grade. Furthermore, when compared to children attending higher parental education schools, children attending lower parental education schools showed higher levels of problems within the behavioral and emotional domains in first grade and showed a faster growth rate of peer dislike over time. Cross-level interactions showed significant associations for only one outcome variable. That is, children of lower-educated parents showed a faster growth rate of depression symptom levels than children of higher-educated parents in higher parental education schools. However, the growth rate of depression symptom levels were similar for all children in lower parental education schools. Findings underscore the importance of addressing the needs of lower parental education schools and children growing up with lower-educated parents.

**Chapter 3** examined the main effect associations and cross-level interactions of household- and school-level parental education on academic self-concept (ASC)

development from fourth to sixth grade of elementary school. In addition, the mediating roles of child- and school-level academic achievement in these associations were investigated. ASC is a motivational construct defined by children's perceptions of their own abilities in academic domains. Children (*N* = 679, ages 10-12) from 18 elementary schools were annually followed from fourth to sixth grade. ASC levels were relatively high and stable from fourth to sixth grade. Overall, results from multi-level latent growth models showed that household-level parental education was indirectly associated with child-level ASC through child-level academic achievement. That is, children of higher-educated parents showed higher academic achievement levels and in turn reported more positive ASC development compared to children of lower-educated parents. Furthermore, school-level ASC was higher in lower parental education schools than in higher parental education schools. This association was not mediated by school-level academic achievement. While the average academic achievement scores were higher in higher parental education schools than in lower parental education schools, school-level academic achievement was not significantly associated with school-level ASC. Cross-level interactions showed that children of lower-educated parents generally benefited more from attending lower parental education schools than attending higher parental education schools regarding their ASC. Findings indicate a need for interventions to nurture ASC of children of lower-educated parents and children attending higher parental education schools.

**Chapter 4** investigated the moderating role of the development of classroom norm salience towards aggression in the association between household-level parental education and children's overt aggressive behavior development from third to sixth grade of elementary school. Children (*N* = 1,205; 51% girls) from 46 Dutch elementary schools were annually followed from third to sixth grade. Norm salience was operationalized by within classroom correlations between individual-children's peer-nominated social preference and aggression scores. Results from multi-level latent growth models showed that norm salience in third grade was not a significant moderator. However, the association between household-level parental education and overt aggressive behavior development depended upon norm salience development from third to sixth grade. Overall, results suggested that in third grade, children of lower-educated parents showed higher levels of overt aggressive behavior than children of higher-educated parents, irrespective of the norm. However, in classrooms where norm salience became more favorable towards aggression over time (i.e., classrooms where more aggressively behaving children became more socially preferred), children of lower-educated parents showed a slower growth rate of overt aggressive behavior than children of higher-educated parents from third to sixth grade. In classrooms where norm salience became less favorable towards aggression over time (i.e., in classrooms where more aggressively behaving children became less socially preferred), the development of overt aggressive behavior was similar for all children. Findings suggest that aggressive behavior may be context dependent

and that children of higher-educated parents may be more able to adapt their behavior towards the classroom norm.

**Chapter 5** examined whether household- and school-level parental education moderated the effectiveness of a universal school-based preventive intervention, the Good Behaviour Game (GBG), in preventing emotional and behavioral problems from kindergarten to second grade of elementary school. Children ($N$ = 731, $M_{age}$ = 6.02 in kindergarten) from 31 schools were annually followed for three years. The GBG was implemented in first and second grades (intervention arm: 21 schools, 484 children; control arm: 10 schools, 247 children). A longitudinal multi-level randomized controlled trial design was utilized. Overall, results showed that the GBG prevented the development of emotional and behavioral problems. Household-level parental education was not a significant moderator, suggesting that the GBG effect did not differ between children of higher- and lower-educated parents. School-level parental education was found to be a significant moderator but only for emotional problems. That is, GBG was slightly more effective in preventing emotional problems in higher parental education schools than in lower parental education schools. However, the GBG was equally effective in preventing behavioral problems across all schools. Findings suggested that more attention should be directed towards factors that may influence universal prevention effectiveness, particularly in lower parental education schools. In addition, findings indicate that while the GBG was an effective intervention, it was not able to decrease the disparities between children growing up in higher- and lower-educated contexts.

To conclude, the present doctoral thesis showed that disparities in development between children growing up in higher- and lower-educated households and children attending higher and lower parental education schools exist at the beginning, during, and at the end of elementary school. The findings suggested that schools are not able to fully compensate for the inequalities in development. Moreover, the findings indicated that classroom context has the potential to mitigate (e.g., through a classroom-based intervention like the GBG) or exacerbate (e.g., classrooms in which norm salience becomes favorable towards aggression) problem development experienced by children growing up in higher- and lower-educated households and schools. In sum, the findings of this doctoral thesis suggest that we are far from a world where all children have access to equal opportunities to develop their full potential. The present doctoral thesis advocates for a holistic and a multi-context approach to more adequately address the challenges faced by children of lower-educated parents and lower parental education schools.

## SAMENVATTING

*Stel je voor dat elk kind - ongeacht hun sociale achtergrond - gelijke kansen zou krijgen om hun volledige ontwikkelingspotentieel te bereiken.* De omstandigheden waarin kinderen opgroeien zijn - in combinatie met biologische invloeden - bepalend voor hun ontwikkeling. Gunstigere omstandigheden kunnen een positieve ontwikkeling bevorderen, terwijl minder gunstige omstandigheden de ontwikkeling kunnen ondermijnen. Dit kan resulteren in verschillen in het ontwikkelingstraject van kinderen. Ondanks de uiteenlopende omstandigheden en ervaringen in hun leven, heeft elk kind recht op gelijke kansen om vaardigheden en competenties te ontwikkelen zodat zij hun optimale ontwikkelingspotentieel kunnen bereiken, wat het algehele welzijn bevordert (Verenigde Naties, 1989).

Een belangrijke factor die verantwoordelijk is voor verschillen in ontwikkelingstrajecten is de sociaaleconomische status (SES) (bijv. Bornstein & Bradley, 2014; Caro & Lenkeit, 2012; Reiss, 2013). In nagenoeg elk land bestaan er SES-hiërarchieën en -ongelijkheden en deze nemen toe (Chancel et al., 2022; Verenigde Naties, 2023; van den Bossche & WECF, 2019; Vrooman et al., 2023). Sociaaleconomische ongelijkheid zorgt niet alleen voor een ongelijke toegang tot kansen (kansenongelijkheid), maar werpt ook barrières op die het voor kinderen veel moeilijker maken om hun volledige ontwikkelingspotentieel te bereiken. Daarom is het van cruciaal belang om sociaaleconomische ongelijkheden in meerdere contexten te identificeren en aan te pakken. Het gezin en de school vormen de meest invloedrijke omgevingen binnen het leven van een kind. Om die reden is het waarschijnlijk dat de SES van deze twee contexten – het gezin en de school - invloed heeft op de ontwikkeling van het kind.

Tientallen jaren onderzoek hebben de relatie tussen SES en een breed scala aan ontwikkelingsuitkomsten bestudeerd. Deze uitkomsten omvatten onder andere mentale en lichamelijke gezondheid, succes in het werkleven, academische en educatieve prestaties gedurende de levensloop (bijv. Bornstein & Bradley, 2014; McLaughlin, et al., 2011; Caro & Lenkeit, 2012; Letourneau et al., 2013; Reiss, 2013; van Lenthe et al., 2004). Desondanks blijft ons begrip onvolledig van hoe SES op zowel gezins- als schoolniveau bijdraagt aan de ontwikkeling van kinderen gedurende de basisschoolperiode. Om die reden was het doel van dit proefschrift om met behulp van een multi-contextbenadering een meer holistisch begrip te krijgen van hoe de SES op gezins- en schoolniveau bijdraagt aan de ontwikkeling van kinderen in deze periode. Om dit doel te bereiken richtte ik me op de rol van het opleidingsniveau van ouders, aangezien dit als meest sterke indicator van SES wordt gezien (Davis-Kean et al., 2021; Mirowsky & Ross, 2005; Mirowsky & Ross, 2003). Specifiek onderzocht ik de rol van ouderlijk opleidingsniveau op zowel gezins- als schoolniveau en de ontwikkeling van kinderen.

Hierbij bestudeerde ik niet alleen academische prestaties van het kind, maar ook minder vaak onderzochte ontwikkelingsuitkomsten in relatie tot ouderlijk opleidingsniveau, zoals sociale, emotionele, en gedragsmatige ontwikkeling en het academisch zelfconcept.

Deze ontwikkelingsuitkomsten hangen elk met elkaar samen en dragen bij aan een goede ontwikkeling van het kind. Voorgaand onderzoek richtte zich voornamelijk op het opleidingsniveau van de ouder (of andere indicatoren van sociaal economische status) en de uitkomsten van adolescenten. Daarnaast werd er meestal gebruik gemaakt van een cross-sectioneel design en werd er alleen gekeken naar het opleidingsniveau binnen één context (bijvoorbeeld alleen het gezin, of alleen de school context). Dit proefschrift maakte daarom gebruik van een longitudinale en multi-context benadering van het ouderlijke opleidingsniveau in relatie tot de ontwikkeling van kinderen in de basisschoolleeftijd. Op deze manier werd getracht een meer holistisch en uitgebreid beeld te schetsen van de ontwikkeling van kinderen die opgroeien in gezinnen en scholen met een hoger en lager ouderlijk opleidingsniveau gedurende de basisschooljaren. Ouderlijk opleidingsniveau op gezinsniveau verwijst naar het opleidingsniveau van de ouders. Ouderlijk opleidingsniveau op schoolniveau verwijst naar het percentage kinderen van lager opgeleide ouders per school.

In **Hoofdstuk 2** werd de relatie tussen de opleiding van ouders, zowel op gezinsniveau als op schoolniveau, en drie ontwikkelingsuitkomsten bij kinderen uit groep 3 tot en met groep 8 onderzocht: de emotionele ontwikkeling, gedragsmatige ontwikkeling en de relaties met leeftijdsgenoten. Daarnaast werd onderzocht of het opleidingsniveau van ouders op schoolniveau een moderator vormde in de relatie tussen het opleidingsniveau van ouders op gezinsniveau en de ontwikkelingsuitkomsten van kinderen. Kinderen (N = 698, Gemiddelde leeftijd = 7.08 jaar in groep 3) van 31 reguliere basisscholen zijn jaarlijks gevolgd van groep 3 tot en met groep 8. Uitkomstvariabelen binnen het emotionele domein waren onder andere depressie en angstsymptomen. Uitkomstvariabelen binnen het gedragsdomein waren onder andere gedragsproblemen, oppositionele opstandigheidsproblemen, aandachtstekort, hyperactiviteitsproblemen en agressie. Uitkomstvariabelen binnen het domein van de relaties met leeftijdsgenoten waren onder andere slachtoffer zijn van fysiek en relationeel pestgedrag en afwijzing door leeftijdsgenoten. Resultaten van multi-level latente groeimodellen toonden aan dat, in vergelijking met kinderen van hoger opgeleide ouders, kinderen van lager opgeleide ouders over het algemeen hogere niveaus van problemen vertoonden binnen emotionele, gedrags- en peerrelatiedomeinen in groep 3 en een snellere groei vertoonden van gedragsproblemen van groep 3 tot en met groep 8. Daarnaast, in vergelijking met kinderen die op een school zaten met vooral kinderen van hoger opgeleide ouders, vertoonden kinderen op scholen met meer kinderen van lager opgeleide ouders meer emotionele en gedragsmatige problemen in groep 3. Daarnaast hadden deze kinderen een snellere toename van afwijzing door leeftijdsgenoten in de loop der tijd. Cross-level interacties lieten significante relaties zien voor slechts één uitkomstvariabele: Op scholen met meer kinderen van hoger opgeleide ouders, vertoonden kinderen van lager opgeleide ouders een snellere toename van depressieve symptomen dan kinderen van hoger opgeleide ouders. Op scholen met meer kinderen van lager opgeleide ouders was de verandering van depressieve symptomen tussen groep 3 en groep 8 echter voor alle kinderen

vergelijkbaar. De bevindingen onderstrepen het belang van het tegemoetkomen aan de behoeften van scholen met meer kinderen van lager opgeleide ouders en van kinderen die opgroeien bij lager opgeleide ouders.

In **Hoofdstuk 3** werden de relaties en interacties van het opleidingsniveau van de ouders, zowel op gezinsniveau als op schoolniveau, op de ontwikkeling van het academisch zelfconcept (AZC) onderzocht, bij kinderen van groep 6 tot en met groep 8. Daarnaast werd de mediërende rol van academische prestaties op kind- en schoolniveau in deze associaties onderzocht. Kinderen (N = 679, leeftijd 10-12 jaar) van 18 basisscholen waren jaarlijks gevolgd van groep 6 tot en met groep 8. AZC-niveaus waren relatief hoog en stabiel van groep 6 tot en met groep 8. De resultaten van multi-level latente groeimodellen toonden aan dat het opleidingsniveau van de ouders op gezinsniveau indirect geassocieerd was met AZC op kindniveau via de schoolprestaties op kindniveau. Kinderen van hoger opgeleide ouders vertoonden hogere academische prestatieniveaus en rapporteerden vervolgens een positievere AZC-ontwikkeling in vergelijking met kinderen van lager opgeleide ouders. Bovendien was AZC op schoolniveau hoger in scholen met meer kinderen van lager opgeleide ouders dan in scholen met meer kinderen van hoger opgeleide ouders. Deze relatie werd niet gemedieerd door academische prestaties op schoolniveau. Hoewel de gemiddelde academische prestatiescores hoger waren in scholen met meer kinderen van hoger opgeleide ouders dan in scholen met meer kinderen van lager opgeleide ouders, was de academische prestatie op schoolniveau niet significant geassocieerd met AZC op schoolniveau. Cross-level interacties toonden aan dat kinderen van lager opgeleide ouders meer voordeel leken te hebben bij scholen met meer kinderen van lager opgeleide ouders dan scholen met meer kinderen met hoger opgeleide ouders. De bevindingen duiden op een behoefte aan interventies om het AZC van kinderen van lager opgeleide ouders en kinderen die naar scholen met meer kinderen van hoger opgeleide ouders, te ondersteunen.

In **Hoofdstuk 4** werd onderzocht of de ontwikkeling van norm saillantie in de klas ten aanzien van agressie een modererende rol had in de relatie tussen de opleiding van ouders en de ontwikkeling van openlijk agressief gedrag van kinderen in groep 5 tot en met groep 8. Kinderen (*N* = 1.205; 51% meisjes) van 46 Nederlandse basisscholen zijn jaarlijks gevolgd van groep 5 tot en met groep 8. Norm saillantie werd geoperationaliseerd aan de hand van correlaties tussen de sociale voorkeur voor individuele kinderen en hun mate van agressief gedrag, binnen één klas. Resultaten van multi-level latente groeimodellen toonden aan dat norm saillantie in groep 5 geen significante moderator was. De ontwikkeling van norm saillantie van groep 5 tot en met groep 8 was echter wel een moderator binnen de relatie tussen ouderlijk opleidingsniveau en de ontwikkeling van openlijk agressief gedrag. Over het algemeen suggereerden de resultaten dat kinderen van lager opgeleide ouders in groep 5 hogere niveaus van openlijk agressief gedrag vertoonden dan kinderen van hoger opgeleide ouders, ongeacht de norm saillantie. Echter, in klassen waar de norm saillantie na verloop van tijd positiever werd ten aanzien

van agressie, vertoonden kinderen van lager opgeleide ouders een langzamere groei van openlijk agressief gedrag dan kinderen van hoger opgeleide ouders van groep 5 tot en met groep 8. In klassen waar de norm in de loop van de tijd minder gunstig werd ten aanzien van agressie, was de ontwikkeling van openlijk agressief gedrag voor alle kinderen vergelijkbaar. De bevindingen suggereren dat agressief gedrag mogelijk contextafhankelijk is en dat kinderen van hoger opgeleide ouders mogelijk beter in staat zijn om hun gedrag aan te passen aan de norm in de klas.

In **Hoofdstuk 5** werd onderzocht of het opleidingsniveau van ouders op gezins- en schoolniveau een modereerde rol speelde bij de effectiviteit van een universele preventieve schoolinterventie: de Good Behavior Game (GBG) (Nederlands: TaakSpel). Deze interventie had als doel het voorkomen van emotionele problemen en gedragsproblemen van kinderen, vanaf de kleuterschool tot en met groep 4 van de basisschool. Kinderen ($N$ = 731, gemiddelde leeftijd = 6.02 jaar in de kleuterklas) van 31 scholen werden jaarlijks gevolgd. De GBG werd geïmplementeerd in groep 3 en groep 4 (interventie-arm: 21 scholen, 484 kinderen; controle-arm: 10 scholen, 247 kinderen). Er werd gebruik gemaakt van een longitudinaal multi-level gerandomiseerd onderzoek met controlegroep. De resultaten toonden aan dat de GBG effectief was in het voorkomen van de ontwikkeling van emotionele en gedragsproblemen. De opleiding van de ouders was geen significante moderator, wat aangeeft dat de GBG niet effectiever was voor kinderen uit hoger- of lager opgeleide ouders. Het opleidingsniveau op schoolniveau vormde echter wel een significante moderator, maar alleen voor emotionele problemen: in scholen met meer kinderen van hoger opgeleide ouders was de GBG iets effectiever in het voorkomen van emotionele problemen dan in scholen met meer lager opgeleide ouders. De GBG was even effectief in het voorkomen van gedragsmatige uitkomsten tussen alle scholen. De bevindingen geven aan dat er meer aandacht moet worden besteed aan factoren die de effectiviteit van universele preventie kunnen beïnvloeden, met name op scholen met meer kinderen van lager opgeleide ouders.

Concluderend toonde dit proefschrift aan dat er verschillen in ontwikkeling bestaan tussen kinderen die opgroeien in hoger en lager opgeleide gezinnen en kinderen die naar scholen gaan met meer kinderen van hoger en lager opgeleide ouders opleiding aan het begin, tijdens, en aan het einde van de basisschool. De bevindingen suggereren dat scholen niet in staat zijn om de ongelijkheden in ontwikkeling volledig te compenseren. Bovendien gaven de bevindingen aan dat de context binnen een klas kan zorgen voor het verbeteren van ontwikkelingsuitkomsten (zoals door de GBG) of juist verslechteren van ontwikkelingsuitkomsten (zoals bij een positieve norm saillantie ten aanzien van agressie). Samengevat suggereren de bevindingen van dit proefschrift dat we nog ver verwijderd zijn van een wereld waarin alle kinderen toegang hebben tot gelijke kansen om hun volledige potentieel te ontwikkelen. Belangrijker nog is dat dit proefschrift suggereert dat een holistische en multi-context benadering nodig kan zijn om de uitdagingen waarmee kinderen van lager opgeleide ouders en scholen met meer kinderen van lager opgeleide ouders geconfronteerd worden, adequaat aan te pakken.

# ÖZET

Sosyal geçmişleri ne olursa olsun her çocuğun gelişim potansiyeline tam olarak ulaşması için eşit fırsatlara sahip olduğunu hayal edin. Biyolojik etkilerin yanısıra çocukların yetiştiği koşullar onların gelişimlerini şekillendirir. Olumlu koşullar çocukların gelişim potansiyelinin gerçekleşmesini desteklerken, olumsuz koşullar gelişim potansiyelinin gerçekleşmesinin önüne engeller koyabilir. Çocukların içinde bulundukları farklı çevre koşulları onların gelişimsel yörüngelerinde eşitsizliklere yol açabilir. Fakat, yaşamlarındaki farklı koşullara ve deneyimlere rağmen, her çocuk onu potansiyeline ve refaha ulaştırabilecek becerilere ve donanıma ulaşmak, ve bunu da eşit fırsatlardan yararlanarak elde etme hakkına sahiptir (Birleşmiş Milletler, 1989).

Çocukların gelişimsel yörüngelerindeki farklılıklara katkıda bulunan önemli etkenlerden birisi sosyoekonomik durumdur (Bornstein & Bradley, 2014; Caro & Lenkeit, 2012; Reiss, 2013). Her toplumda sosyoekonomik hiyerarşiler ve eşitsizlikler mevcuttur ve giderek artmaktadır (Chancel vd., 2022; Birleşmiş Milletler, 2023; van den Bossche & WECF, 2019; Vrooman vd., 2023). Sosyoekonomik dağılımdaki eşitsizlikler, hem fırsat eşitliğinin yaratılmasının hem de çocukların gelişim potansiyellerine en iyi şekilde erişebilmelerinin önüne engeller koyabilir. Bu nedenle, gelişim yörüngelerinde farklılıklara yol açabilecek sosyoekonomik eşitsizliklerin belirleyicilerini farklı bağlamlarda tespit etmek ve buna göre müdahale etmek önem taşımaktadır. İlkokul çağındaki çocukların gelişiminde aile ve okul bağlamları büyük önem taşır. Bu nedenle, aile ve okul bağlamlarındaki sosyoekonomik düzeyinin çocuk gelişimi üzerinde önemli bir etkisi olabilir.

Sosyoekonomik durumun gelişim üzerindeki etkisine dair pek çok araştırma yapılmıştır. Örneğin sosyoekonomik durumun ruhsal ve fiziksel sağlık veya mesleki başarı ile olan ilişkisi pek çok araştırmada ortaya konulmuştur. Buna rağmen, hem aile hem de okul düzeyindeki sosyoekonomik durumun ilkokul sürecindeki çocukların gelişimine dair daha çok araştırmaya ihtiyaç duyulmaktadır. Bu nedenle, bu doktora tezinde, aile ve okul düzeyindeki sosyoekonomik durumun ilkokul dönemindeki çocukların gelişimine nasıl katkıda bulunduğunu daha bütüncül bir anlayışla ve bu konuyu farklı bağlamlardan ele alarak ortaya koymak hedeflenmiştir. Bu amaca ulaşmak için bu tez sosyoekonomik durumun en güçlü göstergesi olan ebeveyn eğitiminin çocuk gelişimi üzerindeki etkisine odaklanmıştır (Davis-Kean vd., 2021; Mirowsky ve Ross, 2005; Mirowsky ve Ross, 2003). Bu tezde, özellikle, hem aile hem de okul düzeyindeki ebeveyn eğitiminin çocuk gelişimine olan etkileri incelenmiştir. Bu kapsamda, 'akademik öğrenim'in yanısıra, ek olarak çocukların 'sosyal', 'duygusal', 'davranışsal' ve 'motivasyonel' gelişimleri bağımlı değişkenler olarak incelenmiştir. Literatürde, bu ek değişkenleri inceleyen araştırma sayısı oldukça azdır. Fakat bu ek alanlardaki becerilerinin de desteklenmesi çocukların olumlu gelişimleri için büyük önem taşır. Bunun yanı sıra, bugüne kadar ebeveyn eğitimi (veya diğer SES göstergeleri) üzerine yapılan araştırmaların çoğunda kesitsel çalışma veya tek düzeyli modeller kullanılarak (yalnızca aile veya okul bağlamlı), ergenler üzerinde

yürütülmüştür. Dolayısıyla bu doktora tezi, ebeveyn eğitimi ve çocuk gelişimine daha bütüncül, boylamsal ve çok bağlamlı bir yaklaşım getirmiştir. Bu tez içerisinde çocuklarda yapılan incelemeler ilkokul yılları sürecini kapsamaktadır, ve analizlerde iki farklı eğitim göstergesi kullanılmıştır. Bir gösterge, çocukların kendi ebeveynlerinin sahip olduğu eğitim seviyesidir (düşük veya yüksek). Özetin geri kalanındaki okunabilirliği arttırmak için daha düşük eğitimli ebeveynlerin çocuklarına '*düşük-ebeveyn-eğitimli çocuklar*' ve daha yüksek eğitimli ebeveynlerin çocuklarına '*yüksek-ebeveyn-eğitimli çocuklar*' diye hitap edilecektir. Bir diğer gösterge de çocukların eğitim gördüğü okullardaki tüm ebeveynlerin eğitim seviyesidir (yine düşük veya yüksek). Yine özetin geri kalanında okunabilirliği arttırmak için düşük eğitimli ebeveynlerin çocuklarının çoğunlukta olduğu okullara '*düşük eğitimli okullar*' ve düşük eğitimli ebeveynlerin çocuklarının daha az sayıda olduğu okullara '*yüksek eğitimli okullar*' diye hitap edilecektir.

**Bölüm 2**, çocukların ailelerindeki ve okullarındaki ebeveyn eğitim seviyesinin, duygusal, davranışsal, ve akran ilişkilerinde olan gelişimini nasıl etkilediğini incelemiştir. Bu çerçevede, çocukların birinci sınıftan altıncı sınıfa kadar olan gelişimleri incelenmiştir. Bunun yanısıra, okul düzeyindeki ebeveyn eğitiminin, aile düzeyindeki ebeveyn eğitimi ile davranışsal, duygusal ve akran ilişkileri arasındaki ilişkileri etkileyip etkilemediği (düzenleyici değişken; moderator) incelenmiştir. Çalışmamızda bilgi toplamak adına Hollanda`da 31 farklı ilkokula giden 698 çocuk hakkında öğretmenlerinden ve akranlarından birinci sınıftan altıncı sınıfa kadar veri toplanmıştır. Davranışsal gelişim alanındaki bağımlı değişkenler, şu sorun belirtileri olmuştur: tavır/davranış bozukluğu, karşı gelme bozukluğu, dikkat eksikliği ve hiperaktivite bozukluğu, ve agresif davranış bozukluğu. Duygusal gelişim alanındaki bağımlı değişkenler depresyon ve anksiyete belirtilerini içermiştir. Akran ilişkileri alanındaki bağımlı değişkenler fiziksel mağduriyet, ilişkisel mağduriyet, ve akran hoşnutsuzluğu olmuştur. Çok düzeyli örtük gelişme modellerinden elde edilen sonuçlar, aile düzeyindeki ebeveyn eğitim seviyesinin çocuk gelişimi üzerinde etkisi olduğunu göstermiştir. Sonuçlar, yüksek-ebeveyn-eğitimli çocuklara göre, düşük-ebeveyn-eğitimli çocukların genellikle birinci sınıfta duygusal, davranışsal ve akran ilişkileri alanlarında daha yüksek düzeyde sorun belirtileri gösterdiklerini saptamıştır. Bunun yanısıra, aynı çocuklar için, birinci sınıftan altıncı sınıfa kadar davranışsal sorun belirtilerinin artış oranının da daha hızlı olduğu tespit edilmiştir. Ayrıca, sonuçlar okul düzeyindeki ebeveyn eğitim seviyesinin de çocuk gelişiminde etkisi olduğunu bulmuştur. Düşük eğitimli okullarda birinci sınıfta davranışsal ve duygusal alanlarda sorun belirtilerinin daha yüksek düzeyde olduğu gözlemlenmiştir. Bu okullarda birinci sınıftan altıncı sınıfa kadar akran hoşnutsuzluğu artış oranının da yüksek eğitimli okullara göre daha hızlı olduğu saptanmıştır. Bu sonuçların yanısıra, okul düzeyindeki ebeveyn eğitiminin düzenleyici etkisi sadece bir bağımlı değişken üzerinde görülmüştür. Yüksek eğitimli okullarda, düşük-ebeveyn-eğitimli çocukların depresyon belirtilerinin artış oranının, yüksek-ebeveyn-eğitimli çocuklara göre daha hızlı olduğu tespit edilmiştir. Fakat, düşük eğitimli okullarda çocukların depresyon belirtilerinin artış oranları arasında bir fark gözlemlenmemiştir. Bulgular, düşük eğitimli ebeveynlerin çocukları ve düşük

eğitimli okullarda eğitim gören çocukların ihtiyaçlarının desteklenmesinin önemini vurgulamaktadır.

**Bölüm 3,** üç farklı araştırma sorusuna değinmiştir. İlk olarak, aile ve okul düzeyindeki ebeveyn eğitiminin çocukların akademik benlik kavramı gelişimi üzerindeki etkileri incelenmiştir. İkinci olarak, okul düzeyindeki ebeveyn eğitiminin, aile düzeyindeki ebeveyn eğitiminin akademik benlik kavramı ile olan ilişkisini etkileyip etkilemediği incelenmiştir (düzenleyici değişken; moderator). Son olarak, bu ilişkilerde hem çocukların kendilerinin akademik başarılarının ve hem de çocukların eğitim gördüğü okullardaki ortalama akademik başarının aracılık rolü (aracılık değişkeni; mediator) alıp almadığı araştırılmıştır. Hollanda`da 18 farklı ilkokulda eğitim gören 679 çocuktan dördüncü sınıftan altıncı sınıfa kadar akademik benlik kavramları hakkında veri toplanmıştır. Sonuçlar, çocukların akademik benlik düzeylerinin genel olarak yüksek olup dördüncü sınıftan altıncı sınıfa kadar stabil bir durum izlediğini göstermiştir. Çok düzeyli örtük gelişme modellerinden elde edilen sonuçlar, düşük-ebeveyn-eğitimli çocuklara göre yüksek-ebeveyn-eğitimli çocukların akademik acıdan daha başarılı olduklarını ve dolayısı ile akademik benlik kavramlarının daha olumlu bir şekilde geliştiğini göstermiştir. Bu sonuçların yanı sıra, okul düzeyindeki ebeveyn eğitiminin akademik benlik kavramının gelişimi üzerinde etkisi olduğu bulunmuştur. Yüksek eğitimli okullara göre, düşük eğitimli okullarda ortalama akademik benlik düzeyinin daha olumlu olduğu görülmüştür. Bu ilişkiye okul düzeyindeki akademik başarı aracılık (mediator) etmemiştir. Bulgular, yüksek eğitimli okulların akademik açıdan daha başarılı olmasına rağmen, okul düzeyindeki akademik başarı ile okul düzeyindeki akademik benlik kavramı arasında bir ilişki olmadığını göstermiştir. Bu sonuçların yanısıra, düzenleyici değişken analizi sonuçları, düşük eğitimli okulların düşük-ebeveyn-eğitimli çocukların akademik benlik kavramlarına daha faydalı olduğunu göstermiştir. Bulgular, düşük-ebeveyn-eğitimli çocukların ve yüksek eğitimli okullarda eğitim gören çocukların akademik benlik kavramlarının desteklenmesi için müdahaleye ihtiyaçları olduğunu göstermektedir.

**Bölüm 4,** üçüncü sınıftan altıncı sınıfa kadar olan zaman boyunca, ebeveyn eğitimi ile çocukların agresif davranış sorun belirtileri arasındaki boylamsal ilişkiyi incelemiştir. Bunun yanısıra, 'agresifliğe yönelik sınıf normunun' gelişiminin bu ilişkide düzenleyici degişken olup olmadığını araştırmıştır. Hollanda' da 46 farklı ilkokulda eğitim gören 1205 çocuk hakkında üçüncü sınıftan altıncı sınıfa kadar her yıl veri toplanmıştır. Agresifliğe yönelik sınıf normu, sınıflarda akranların agresif davranış belirtileri gösteren çocuklardan ne kadar hoşnut olduklarını göstermektedir. Çok düzeyli örtük gelişim modellerinden elde edilen sonuçlar, üçüncü sınıftaki normun düzenleyicilik etkisi olmadığını göstermiştir. Ancak, ebeveyn eğitimi ile agresif davranış gelişimi arasındaki ilişkinin üçüncü sınıftan altıncı sınıfa kadar olan normun gelişimine bağlı olduğu saptanmıştır. Sonuçlar, üçüncü sınıfta düşük eğitimli ebeveyni olan çocukların daha yüksek düzeyde agresif davranış belirtileri gösterdiklerini ortaya koymuştur. Fakat, üçüncü sınıftan altıncı sınıfa kadar olan zaman diliminde, agresifliğe yönelik sınıf normunun agresifliğe karşı giderek daha

olumlu olarak görüldüğü sınıflarda (diğer bir deyişle, akranların agresif davranış belirtileri gösteren çocuklardan giderek daha hoşnut oldukları sınıflarda), düşük-ebeveyn-eğitimli çocukların agresif davranış belirtilerinin artış oranının yüksek-ebeveyn-eğitimli çocuklara göre daha yavaş olduğu görülmüştür. Agresifliğe yönelik sınıf normunun giderek daha olumsuz olarak görüldüğü sınıflarda (diğer bir deyişle, akranların agresif davranış belirtileri gösteren çocuklardan giderek daha az hoşnut olduğu sınıflarda), çocukların agresif davranış belirtilerinin artış oranı arasında bir fark görülmemiştir. Bulgular, agresif davranışın sınıf bağlamına bağlı olabileceğini ve yüksek-ebeveyn-eğitimli çocukların davranışlarını sınıf normuna göre daha hızlı değiştirebildiklerini göstermektedir.

**Bölüm 5**, önleyici müdahale programı olan Good Behavior Game (GBG; Türkçe: İyi Davranış Oyunu) 'in duygusal ve davranışsal sorun belirtilerine dair olan önleyici etkisini incelemiştir. Özellikle, aile ve okul düzeyindeki ebeveyn eğitiminin GBG'nin önleyici etkililiğinde düzenleyici etkileri (moderator) olup olmadığını araştırmıştır. Hollanda'da 31 farklı okulda eğitim gören 731 çocuk hakkında anaokul son sınıftan ilkokul ikinci sınıfa kadar veri toplanmıştır. GBG programı birinci ve ikinci sınıfta sınıf öğretmenleri tarafından uygulanmıştır (müdahale grubu: 21 okul, 484 çocuk; kontrol grubu: 10 okul, 247 çocuk). Bu araştırmada boylamsal çok düzeyli randomize kontrollü çalışma tasarımı kullanılmıştır. Sonuçlar, GBG'nin duygusal ve davranışsal sorun belirtilerinin gelişimini önlediğini göstermiştir. GBG'nin etkililiği yüksek- ve düşük-ebeveyn-eğitimli çocuklar arasında bir farklılık göstermemiştir (aile düzeyinde ebeveyn eğitimi düzenleyici değişken olarak saptanmamıştır). Bunun yanısıra, okul düzeyindeki ebeveyn eğitiminin düzenleyici bir etkisi olduğu saptanmıştır ama bu etki sadece duygusal sorun belirtileri kapsamında bulunmuştur. Ayrıca, duygusal sorun belirtilerinin önlenmesinde GBG'nin yüksek eğitimli okullarda daha etkili olduğu bulunmuştur. Fakat, davranışsal sorun belirtileri kapsamında GBG'nin etkililiği düşük ve yüksek eğitimli okullar arasında farklılık göstermemiştir. Bulgular, GBG'nin etkili bir müdahale olmasına rağmen, yüksek ve düşük eğitimli ailelerden gelen ve yüksek ve düşük eğitimli okullarda eğitim gören çocukların gelişimlerindeki eşitsizlikleri azaltamadığını göstermiştir.

Sonuç olarak, bu doktora tezinin bulguları, aile ve okul düzeyindeki ebeveyn eğitim seviyesinin çocuk gelişimine olan boylamsal etkilerini ortaya koymaktadır. Düşük-ebeveyn-eğitimli çocukların ve düşük eğitimli okullarda eğitim gören çocukların ilkokul başlangıcında, sürecinde, ve bitişinde daha yüksek düzeyde davranışsal, duygusal, sosyal, akademik ve aile bağlamında motivasyonel sorun belirtileri gösterdikleri saptanmıştır. Bulgular, ilkokul sürecinin, çocukların gelişimlerindeki eşitsizlikleri telafi edemediğini göstermiştir. Ayrıca, bulgular, sınıf bağlamının, çocukların sorunlarını önleme (örn. GBG gibi bir önleyici müdahale programı) veya hızlandırma (örn. agresifliğe yönelik sınıf normunun olumlu görüldüğü sınıflar) potansiyeline sahip olduğunu göstermiştir. Özetle, bu doktora tezinin bulguları, tüm çocukların gelişim potansiyellerine ulaşmaları için eşit fırsatlara sahip olduğu bir dünyadan uzakta olduğumuzu göstermektedir. Bu doktora tezi, düşük-ebeveyn-eğitimli çocukların ve düşük eğitimli okullarda eğitim gören çocukların karşılaştığı zorluklara müdahale etmek için bütüncül ve çok bağlamlı bir yaklaşımın gerekli olduğunu öne sürmektedir.

## Authorship Contributions

| | |
|---|---|
| **Chapter 2:** | Horoz, N.: conceptualization, methodology, data preparation, formal analyses, writing original draft, reviewing and editing; Buil, J.M.: conceptualization, methodology, supervision, reviewing and editing; Koot, S.: reviewing and editing; Houweling, A. J.: reviewing and editing; van Lenthe, F.: reviewing and editing; Koot, H.: reviewing and editing; van Lier, P.A.C.: conceptualization, methodology, supervision, reviewing and editing. |
| **Chapter 3:** | Horoz, N.: conceptualization, methodology, data preparation, formal analyses, writing original draft, reviewing and editing; Vu, T. V.: reviewing and editing; Houweling, A. J.: reviewing and editing; van Lenthe, F.: reviewing and editing; Oude Groeniger, J.: reviewing and editing; Koot, H.: reviewing and editing; Buil, J. M.: conceptualization, methodology, supervision, reviewing and editing; van Atteveldt, N.: conceptualization, methodology, supervision, reviewing and editing. |
| **Chapter 4:** | Horoz, N.: conceptualization, methodology, data preparation, formal analyses, writing original draft, reviewing and editing; Buil, J.M.: conceptualization, methodology, supervision, reviewing and editing; Houweling, A.J.: reviewing and editing; van Lenthe: reviewing and editing; Oude Groeniger J.: reviewing and editing. Koot, H.: reviewing and editing; van Lier P.A.C.: conceptualization, methodology, supervision, reviewing and editing; van Atteveldt N.: reviewing and editing, supervision. |
| **Chapter 5:** | Horoz, N.: conceptualization, methodology, data preparation, formal analyses, writing original draft, editing; Buil, J.M.: conceptualization, methodology, supervision, reviewing and editing; Koot, S.: reviewing and editing; Houweling, A.J.: reviewing and editing; van Lenthe, F.: reviewing and editing; Oude Groeniger J.: reviewing and editing. Koot, H.: reviewing and editing; van Lier P.A.C.: conceptualization, methodology, supervision, reviewing and editing. |

## Acknowledgements

As I near the end of this unforgettable era, I find myself reflecting more deeply on my experiences over the past years.

My PhD research has been invaluable to me. It has influenced the way I view the world around me, my priorities, and my perspective. I enjoyed working on my research topic and engaging with my daily tasks. The opening sentence of my dissertation was the inspiration behind my decision to study psychology and ultimately pursue a PhD in this specific topic. I have always wished for a world in which every child - regardless of their social background - has equal opportunities to reach their full potential in development and I do wish that every child will have this chance moving forward. I hope that my dissertation could serve as a small step towards a meaningful understanding and a change to improve children's lives.

At the same time, my PhD trajectory was a very difficult period. It felt like an uphill climb filled with many bumps, unexpected changes and unpredictable challenges. Beyond the inherent difficulties of pursuing a PhD and difficulties that the covid-19 pandemic brought during this period, the additional challenges I faced were beyond everything I could have imagined before starting this journey. I view this period as a period filled with life lessons and immense growth and learning opportunities. I am deeply grateful for the people who have supported me during this climb, without whom I would not have been able to reach this milestone. I would now like to take a moment to express my gratitude to those who accompanied me on this journey.

I would like to start by thanking my current promoter, my copromoter and then my previous promoter.

Dear Nienke, I am grateful for you for "adopting" me and becoming my new promoter! Working with you has been an eye-opening experience. I feel lucky to have had the opportunity to get to know you, work with you and learn from you. Reaching the end of my PhD, metaphorically the end of this climb, would not have been possible without your presence and guidance. Your support, both on a personal and an academic level, meant a lot to me during the final stages of my trajectory. Thank you very much for everything. I look forward to continuing to work together!

Dear Marieke, I want to express my appreciation for when you stepped up for me when the circumstances of my PhD trajectory changed. Your support and belief in me allowed me to grow as a more independent researcher and to gain more confidence in myself. Thank you for offering me opportunities to excel as a researcher, for your feedback on drafts, and for the discussions about the statistical questions that arose while running the complex models. I learned so much from you and I am happy to officially enter the next chapter of this academic journey!

Dear Pol, I would like to thank you for giving me the opportunity to research such an important and relevant topic using such rich longitudinal data. I wish the circumstances were different and we could have continued to work together like the way we started; during that time I enjoyed working with you and learned a lot from you. I hope you will enjoy the end product of the thesis we started together. I wish you all the best and hope that we can catch up one day.

I would like to extend my gratitude to my co-authors, from whom I have been learning since the beginning of my PhD. Dear Frank, Tanja, and Joost, it was a pleasure and a great learning experience to collaborate with you. I am grateful for your time and thoughtful suggestions on the drafts. Dear Hans, thank you very much for your support, your valuable feedback and for always being very responsive. I am grateful for your presence throughout my trajectory. I wish you all the best and hope to collaborate again in the future!

To the members of my doctoral committee: Prof. Dr. Anja Huizink, Prof. Dr. Susan Branje, Prof. Dr. Roy Otten, Dr. Eddie Brummelman and Dr. Marjolein Camphuijsen. Thank you very much for your time and consideration of my thesis.

Next, I would like to acknowledge the teams that I have been a member of in the duration of my PhD. To the members of the VSP team: Susanne A., Jacintha, Pia, and Jin thank you for warmly welcoming me to the team and for your great support in the first years of my PhD. I enjoyed being your officemate and colleague during the short time we overlapped. Susanne K., thank you for reviewing two of my articles and for offering your insights. Miranda and Steffie, it was always very nice to see you, whether at the VU or at a conference! To all members of the VSP team, I wish you all the best and hope to see you soon! Next, dear SCCILLS team: Fanny, Marieke, Iris, and Sonja, it has been a pleasure working with you all in the past year and I am excited to continue our collaboration. Thank you for your support. Finally, dear LOL team members: Nienke, Tieme, Van, Smiddy, Ilona, Elise, Laura, Jule, Christel, Fanny, Iris, Sonja, Marieke, Sibel, May, and Sabrine: it has been a pleasure to be a part of such a positive, supportive, and lively team. I appreciated the opportunity to learn from all of you about 'learning' during our lab meetings. Thank you for all the nice moments we have shared together. I look forward to learning even more from each of you and creating more memories together.

Thank you to all colleagues at the KLOP section and the KNOP department with whom I have shared memories with. I want to specifically thank some of my current and previous colleagues for their support. Yağmur and Cansu, I am so thankful to have met you both at the VU and for your endless support. Thank you for always being there for me at times of crisis and for your helpful advice. Yağmur, I also very much appreciated your help and encouragement in the final stages of my trajectory. I am still looking forward to our rakı meze night. Hester, from when we shared an office to now, I knew that I could count on you. Thank you for your support over the past years and for the gezelligheid. Willeke, I am

so glad we met during our master's and then got to be colleagues at the VU. I am always so happy to see you and to spend time together. Miriam, I appreciate our chats and our moments of laughter. Thank you for your support and I am excited to see you more in the coming months! Smiddy, thank you for your help with the achievement data and for your encouraging emails! Clara, it was fun to arrange and conduct our master (surprise) plan together! It is always very nice to see you at the VU. Fanny, I am grateful for your support in the past year and for your reading of my general discussion! Van, thank you for the nice moments we shared together, for your support, for your review of the ASC paper, and for our collaboration. It has been a pleasure to be your colleague. Els, thank you for your role in supporting PhD candidates. Alex, thank you very much for your time and support in HCHA data management and coordination. Your help has been very valuable during my trajectory and I appreciate it very much. Denise, thank you for the nice environment in our office. Dear Tjeert, thank you very much for being my master thesis supervisor. During that time, I learned a lot from you and refined my research interests. You have always been very approachable and understanding. I look forward to seeing you and continuing to work on our paper together. Brooke, it was a pleasure to be a part of the JDAD team last year and I am excited for another year ahead! Dear Victor, thank you for helping me find the light at the end of the tunnel. I am very thankful for your understanding and support, especially on the most difficult days of my PhD journey. I would also like to express my gratitude to all of the participating schools, children, teachers, and parents for making this PhD thesis possible!

To the department head Prof. Dr. Lydia Krabbendam and section head Prof. Dr. Sander Begeer: thank you for all the hard work you put into supporting our section and the department. On a personal level, I thank you for being approachable and understanding and for the support you provided in my trajectory.

Now I would like to extend my appreciation to the people and experiences that influenced me before my time in the Netherlands. Dear Dr. Karen Kochel, you have had a great influence on me since the day I entered your Child Development class during my bachelor's degree at the University of Richmond, USA. Then, I was very fortunate to take part in your 'Peer Relationships' research lab and conduct my bachelor thesis research under your supervision. During those years, I found a love for research in child development. The experience I had with you remains as one of the best times in my academic career. Thank you so much for being very supportive and for being a great role model. I hope to see you soon! Dear Dr. Kristen Roorbach, thank you for having me in your 'Social Emotional Learning' research lab and instilling in me the importance of early intervention. To the faculty of the department of psychology at UR, thank you for creating such a warm and positive learning environment that inspired to me pursue a path in academia. To my colleagues at National Center for School Mental Health (NCSMH), Baltimore, USA: thank you for the opportunity to work as a clinical research assistant on projects about advancing school mental health. Particularly, Sharon, Nancy, Joanna,

Courtney, Meghan, Britney and Tierra thank you for the uplifting, fun, and encouraging work environment. Working at NCSMH truly inspired me and refined my research interests and my career path. I hope our paths cross in the future!

To all my friends in Amsterdam: thank you for your presence in my life! From when I moved here as a Research Master student to now, I have made many kind, caring, supportive, and fun friends without whom my experience in Amsterdam and during my PhD would not have been the same. I am grateful for all of you and consider myself very lucky to have made such connections. Thank you for your immense support throughout this journey. Most importantly, thank you for all the fun times we had together and for putting a smile on my face on the most difficult days of my PhD. I am finally done and now we can officially celebrate!

Dear Lisa, my paranymph, thank you for being my first Dutch friend, my gateway to the Dutch culture and for your endless support throughout my time in the Netherlands. I am grateful that we met during our master's and built a wonderful friendship together. Some of the best memories I have in the Netherlands have been in your company. Thank you for standing next to me on the day of my defense, it means a lot to me.

My dear family, canım ailem, thank you so much for your unconditional love and endless support. To my parents Gül and Beyhan: thank you for all the opportunities you have given me. I am deeply grateful for your wonderful presence and for everything you have done for me. I feel very fortunate to have you as my parents. To my brother Alp: canım kardeşim, we have been each other's companion through thick and thin. Thank you for always being there for me, for always offering an ear and for your helpful advice. I am thankful for you. To my grandmother, Faile, you have been my best friend and role model since childhood. You showed me the human capacity of strength, resilience, and will power. Thank you for your encouragement and your humor which helped me to get through some of the difficult times of my PhD. Canım ailem, iyi ki varsınız ve sizi çok seviyorum.

Dear Matt, you have seen it all: the uphill climb with endless bumps, the tears and despair, and when I very slowly started to see the light at the end of the tunnel...There are absolutely no words to express my gratitude to you. You have been my rock, my backbone, my biggest support through this difficult trajectory. Thank you for making me feel less alone in this PhD journey and for your support, encouragement and patience. Thank you for taking the time to discuss my project with me and for proof-reading all my papers and dissertation. Thank you for finding ways to make me feel better on the bumpy roads. Thank you for standing next to me every day and on the day of my defense. Without your support and love, it would have been much more difficult to reach the end of this climb. I am grateful for you. Seni çok seviyorum.

And finally, beste Nederland en Nederlandse mensen, dank jullie wel voor de mogelijkheid om in Nederland te studeren, werken, en wonen als een Non-EU burger. Bedankt dat jullie me hebben geaccepteerd in jullie land. Ik heb geluk om in Nederland te wonen en ik heb echt van het leven in Nederland genoten. Zo vind ik bijvoorbeeld de fietscultuur heel leuk. Ik denk dat fietsen grote vrijheid geeft. Ik heb heel veel geleerd door hier te wonen en van mijn interacties met jullie. Dank jullie wel!

## About the Author

Nil Horoz was born on February 1st, 1993 in Mersin, Türkiye. In 2011, Nil started University of Richmond in Virginia, USA, with a full tennis scholarship to study psychology and to compete as a student athlete in an NCAA Division 1 program. In addition to being a student athlete, Nil was also involved in two research labs (Peer Relationships Lab and Social Emotional Development Lab) and volunteered at two elementary schools as a classroom aid and a mentor throughout the four years she spent in Richmond, VA, USA. Her experiences in Richmond sparked Nil's interest in developmental psychology and in research. In 2015, Nil obtained a bachelor's degree in Psychology (cum laude) with honors. Upon completing her bachelor's degree, Nil worked as a Clinical Research Assistant at the National Center for School Mental Health (NCSMH) in Baltimore, Maryland, USA. At NCSMH she worked on various projects focusing on advancing youth and school mental health. After one year of working at NCSMH, Nil moved to Amsterdam, the Netherlands to start her Research Master's program. In 2018, she obtained a Research Master's degree (cum laude) in Clinical and Developmental Psychopathology from Vrije Universiteit Amsterdam. Upon completing her Master's degree, Nil started her PhD project focusing on socioeconomic inequality in child development at the Department of Clinical, Neuro- and Developmental Psychology at the Vrije Universiteit Amsterdam. Since October 2023, Nil has been working as a Postdoctoral Researcher at the same department and has been involved in research and teaching. Nil aims to continue her research in order to better understand and prevent socioeconomic inequality and inequality of opportunity in child development.