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Children's behavioral and emotional problems and peer relationships across elementary school: Associations with individual- and school-level parental education

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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

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needs of lower parental education schools and children growing up with lower-educated parents may be of primary importance.

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; Organization 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.

1. 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; McLaughlin et al., 2011; 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 (Bronfenbrenner, 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 high proportions of children whose parents' education extends no further than elementary school (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.

2. 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.

3. 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 symptoms) 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 Fig. 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.

4. Method

4.1. 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 1084 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 $ps < 0.05$). Effect sizes of these differences were small (all $\eta^2 \leq 0.02$; $\eta^2 < 0.09$ = 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 6 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-reported depression and anxiety. However, the effect sizes of these differences were small, $\eta^2 \leq 0.075$ (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.

4.2. 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-reported 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., 2009a).

4.3. Measures

4.3.1. 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.

4.3.2. 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 is defined as both parents having completed no more than elementary school. 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 (http://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% to 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.

4.3.3. 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 = 0.88–0.93). Oppositional defiant problems were assessed by 7 items (e.g., "Is disobedient", "Is rebellious"; Cronbach's α range = 0.86–0.91). Attention-deficit and hyperactivity problems were assessed by 8 items (e.g., "Is impulsive", "Easily distracted"; Cronbach's α range = 0.85–0.91). Anxiety symptoms were assessed by 5 items (e.g., "Is fearful", "Is anxious"; Cronbach's α range = 0.63–0.84). Depression symptoms were assessed by 7 items (e.g., "Cries or is sad at school", "Feels inferior"; Cronbach's α range = 0.76–0.84). 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 0.75 ($p < .01$) and were 0.55 for emotional problems ($p < .01$; Witvliet at al., 2009b).

4.3.4. 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 = 0.81–0.90). 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 = 0.87–0.92). 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 the Supplementary Materials (Supplementary Method, Results and sTables 1–22.)

4.3.5. *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 problems), and "Who cannot sit still in class?" (i.e., attention-deficit and hyperactivity problems). Within the *emotional domain*, descriptions included "Who is quickly scared?" (i.e., anxiety symptom) and "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.

4.3.6. *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 that 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

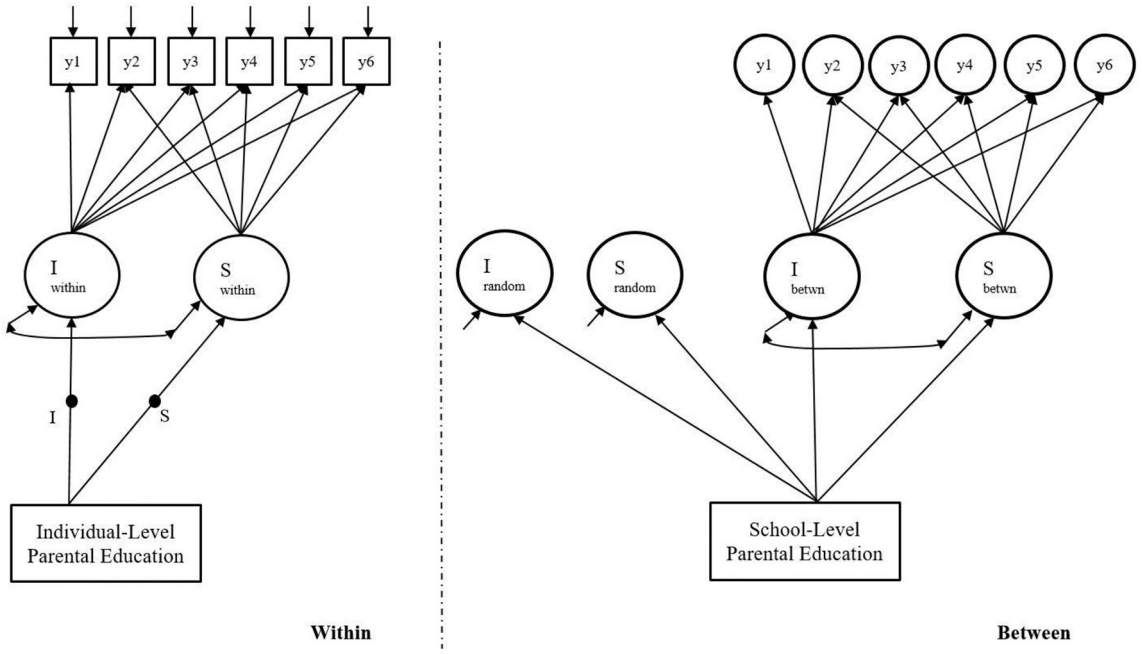

Fig. 1. The Graphical Representation of the Multi-level Latent Growth Model with Random Intercept and Random Slope to Test for Cross-level Interactions Between Individual- and School-level Parental Education.

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.

were on average 22 participating children per school ($SD = 17.66$, range = 6–101, mode = 15, $Mdn = 18$). 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.

4.4. 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 Fig. 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). 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 variable 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 levels using Chi-Square Test of Model Fit, as well as the Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) with critical values ≥0.90 (Bentler & Bonett, 1980), Root Mean Square Error of Approximation (RMSEA, critical value ≤0.08; Marsh et al., 2004), and Standardized Root Mean Residual (SRMR, critical value ≤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).

5. Results

5.1. 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 Netherlands, 2004) and equal to the current estimates (9.00%; Statistics Netherlands, 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 low 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%; http://www.duo.nl). The correlation between individual-level parental education and school-level parental education was positive and moderate in magnitude ($r = 0.41$, $p < .001$), indicating a tendency towards similar individual- and school-level parental education backgrounds.

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)	
		χ^2	df	RMSEA	CFI	TLI	SRMR	χ^2	df	RMSEA	CFI	TLI	SRMR	I	S	I	S
Behavioral Domain																	
Conduct problems (T)	0.10–0.23	24.29**	21	0.015	0.995	0.993	0.029	52.64**	19	0.051	0.952	0.924	0.170*	0.535**	0.002	0.161** / 0.042**	0.004* / 0.003*
Aggression (P)	0.01–0.13	89.64**	17	0.081	0.935	0.885	0.045	75.61**	18	0.070	0.948	0.914	0.181*	0.142**	0.001	0.036** / 0.001	0.001** / 0.000
OD problems (T)	0.10–0.26	32.45**	21	0.028	0.989	0.984	0.025	35.58**	18	0.038	0.983	0.971	0.179*	0.875**	0.023	0.310** / 0.063**	0.007** / 0.004*
OD problems[a] (P)	–	47.73**	16	0.055	0.965	0.967	0.064	–	–	–	–	–	–	0.135**	0.000	0.027**/ -	0.001** / -
ADH problems (T)	0.05–0.22	30.72**	21	0.026	0.992	0.989	0.025	90.31**	19	0.074	0.942	0.909	0.377*	1.025**	0.036	0.472** / 0.135*	0.009** / 0.012**
ADH problems (P)	0.01–0.06	40.65**	11	0.064	0.968	0.942	0.031	64.07**	15	0.071	0.947	0.929	0.422*	0.145**	0.008*	0.019** / 0.000	0.001** / 0.000
Emotional Domain																	
Anxiety (T)	0.10–0.32	26.56**	18	0.026	0.982	0.970	0.044	69.17**	18	0.064	0.889	0.814	0.275*	0.894**	0.040	0.164** / 0.095**	0.002/ 0.015**
Anxiety (P)	0.04–0.12	68.28**	17	0.068	0.924	0.866	0.052	56.23**	18	0.057	0.943	0.906	0.185*	0.081**	0.004*	0.002** / 0.001*	0.000** / 0.000
Depression sympt. (T)	0.12–0.31	25.80	16	0.030	0.978	0.959	0.040	63.69**	18	0.061	0.899	0.832	0.282*	0.728**	0.043*	0.125** / 0.105**	0.003** / 0.009**
Depression sympt.[a] (P)	–	66.34**	15	0.072	0.919	0.919	0.071	–	–	–	–	–	–	0.079**	0.003	0.006**/ -	0.001**/ -
Peer Relationship Domain																	
Physical vict. (T)	0.11–0.34	9.42	12	0.000	1.00	1.03	0.014	13.51	12	0.013	0.991	0.984	0.152	0.523**	−0.027	0.089** / 0.082**	0.008** / 0.008**
Physical vict. (P)	0.18–0.30	2.47	8	0.000	1.00	1.07	0.014	23.22*	11	0.046	0.941	0.892	0.250*	0.159**	−0.002	0.006** / 0.004**	0.001** / 0.000**
Relational vict. (T)	0.20–0.38	7.63	13	0.000	1.00	1.08	0.037	16.11	11	0.026	0.950	0.909	0.212*	0.588**	0.011	0.107** / 0.048	0.008/ 0.008*
Relational vict. (P)	0.17–0.30	51.08**	14	0.070	0.878	0.826	0.034	40.66**	11	0.071	0.903	0.823	0.166*	0.161**	0.005	0.001* / 0.002*	0.000** / 0.001**
Peer Dislike (P)	0.03–0.18	42.65**	14	0.055	0.961	0.944	0.026	48.11**	13	0.064	0.950	0.924	0.284*	0.168**	0.011**	0.015** / 0.000	0.001** / 0.000

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 0.08. 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 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				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	0.14(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	0.02(1)	–	–	–	–	6721	6839	6757	0.53(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	0.49(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**	#	#	#	#	–	–	–	–	#	#	#	#
Peer Dislike (P)	2.85	**−3118**	**−3124**	**−3191**	−3216	−3317	−3187	0.18(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 outcome variables 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. $^{*}p < .05$. $^{**}p < .01$.

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	*SE*	95% CI	R^2	*B*	*SE*	95% CI	R^2	*B*	*SE*	95% CI	R^2	*B*	*SE*	95% CI	R^2
Behavioral Domain																
Conduct problems(T)	0.038	0.016	0.007, 0.069*	0.030	0.006	0.002	0.001, 0.011*	0.026	0.093	0.039	0.017, 0.169*	0.208	0.009	0.008	−0.008, 0.025	0.037
Aggression (P)	0.009	0.005	−0.001, 0.019	0.009	0.002	0.001	−0.001, 0.004	0.009	0.024	0.012	0.001, 0.047*	0.729	−0.003	0.004	−0.011, 0.005	0.050
OD problems (T)	0.023	0.024	−0.025, 0.071	0.005	0.011	0.004	0.003, 0.018**	0.055	0.120	0.052	0.019, 0.222*	0.250	0.013	0.011	−0.009, 0.034	0.046
OD problems [a] (P)	0.016	0.003	0.009, 0.023**	0.032	0.002	0.001	0.000, 0.004	0.010	–	–	–	–	–	–	–	–
ADH problems (T)	0.031	0.023	−0.014, 0.076	0.007	0.010	0.004	0.001, 0.019*	0.035	0.042	0.081	−0.117, 0.202	0.009	0.007	0.022	−0.036, 0.049	0.004
ADH problems (P)	0.011	0.004	0.003, 0.018**	0.012	0.000	0.001	−0.002, 0.003	0.000	0.009	0.008	−0.006, 0.024	0.627	0.005	0.004	−0.003, 0.012	0.232
Emotional Domain																
Anxiety (T)	−0.009	0.015	−0.039, 0.021	0.002	0.002	0.004	−0.007, 0.010	0.004	−0.018	0.056	−0.128, 0.092	0.006	0.014	0.020	−0.026, 0.053	0.025
Anxiety (P)	0.005	0.002	0.001, 0.008**	0.035	−0.003	0.001	−0.004,-0.001**	0.062	0.013	0.005	0.003, 0.024*	0.373	0.000	0.002	−0.003, 0.003	0.000
Depression sympt.[a](P)	0.004	0.002	0.000, 0.008	0.009	−0.001	0.001	−0.003, 0.000	0.008	–	–	–	–	–	–	–	–
Peer Relationship Domain																
Physical vict. (T).	0.035	0.010	0.015, 0.054**	0.048	−0.002	0.003	−0.008, 0.003	0.005	−0.003	0.050	−0.101, 0.095	0.001	0.018	0.014	−0.010, 0.045	0.050
Physical vict. (P)	0.003	0.002	0.000, 0.007	0.012	0.000	0.001	−0.002, 0.002	0.001	0.015	0.009	−0.003, 0.034	0.113	−0.004	0.004	−0.013, 0.004	0.061
Relational vict. (T)	0.028	0.013	0.003, 0.054*	0.027	0.001	0.005	−0.008, 0.010	0.000	0.108	0.073	−0.034, 0.250	0.289	−0.003	0.023	−0.048, 0.043	0.000
Relational vict.(P)	0.000	0.002	−0.004, 0.004	0.003	0.000	0.001	−0.002, 0.002	0.002	0.005	0.007	−0.009, 0.019	0.043	0.005	0.005	−0.004, 0.014	0.068
Peer Dislike (P)	0.011	0.003	0.005, 0.018**	0.026	−0.001	0.001	−0.004, 0.001	0.006	0.003	0.006	−0.009, 0.016	0.042	0.009	0.003	0.003, 0.016**	0.656

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. *$p < .05$. **$p < .01$.

5.2. 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-reported depression (1.61) and oppositional defiant 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 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 intercepts 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.

5.3. 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.

5.3.1. 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 of peer-reported dislike over time than children in higher parental education schools. No other main effect associations of concurrent individual- and school-level parental education were found.

5.3.2. 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 defiant 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.

5.3.3. 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, in first grade children in lower parental education schools had higher initial levels of peer-reported aggression than children in higher parental education schools. No other main effect associations of school-level parental education were found.

5.4. 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

Table 4
Cross-level interactions between individual- and school-level parental education.

Outcome	Within (lower individual-level parental education)						Between (lower school-level parental education)											
	Intercept			Slope			Intercept			Slope			Random intercept (cross-level interaction)			Random slope (cross-level interaction)		
	B	*SE*	95% CI	*B*	*SE*	95% CI	*B*	*SE*	95% CI	*B*	*SE*	95% CI	*B*	*SE*	95% CI	*B*	*SE*	95% CI
Behavioral D.																		
CD (T)	–	–	–	0.006	0.002	0.001,0.011*	0.117	0.036	0.047, 0.186**	0.014	0.009	−0.002,0.031	−0.008	0.011	−0.030, 0.014	–	–	–
OD (T)	–	–	–	–	–	–	0.137	0.050	0.038, 0.235**	0.021	0.011	−0.001, 0.042	−0.011	0.019	−0.048,0.026	0.002	0.003	−0.005,0.009
ADH (T)	–	–	–	–	–	–	0.063	0.079	−0.092, 0.217	0.014	0.023	−0.031,0.059	−0.013	0.019	−0.051,0.024	0.005	0.003	−0.001,0.012
ADH (P)	–	–	–	0.001	0.001	−0.001,0.004	0.017	0.008	0.001, 0.033*	0.005	0.004	−0.002, 0.012	−0.001	0.004	−0.008, 0.006	–	–	–
Emotional D.																		
Anxiety (P)	–	–	–	–	–	–	0.016	0.006	0.005, 0.027**	−0.002	0.002	−0.005, 0.001	−0.003	0.001	−0.006,0.000	−0.001	0.001	−0.003, 0.000
Dep. (T)	0.023	0.013	−0.003,0.049	–	–	–	0.041	0.041	−0.038, 0.121	0.013	0.012	−0.011, 0.037	–	–	–	−0.007	0.003	−0.012,−0.002**
Peer Rela. D.																		
Dislike (P)	0.012	0.004	0.005, 0.019**	–	–	–	0.011	0.007	-0.002, 0.025	0.008	0.003	0.003, 0.013**	–	–	–	0.000	0.001	−0.003, 0.002

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. *$p < .05$. **$p < .01$.

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 ($B = -0.007$, $p = .007$, 95% CI [−0.012, −0.002]).

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 ($B = 0.012$, $p = .007$, 95% CI [0.003, 0.020]). 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 ($B = 0.005$, $p = .187$, 95% CI [−0.002, 0.012]). This suggests that in lower parental education schools the growth rate of depression symptom levels between children of

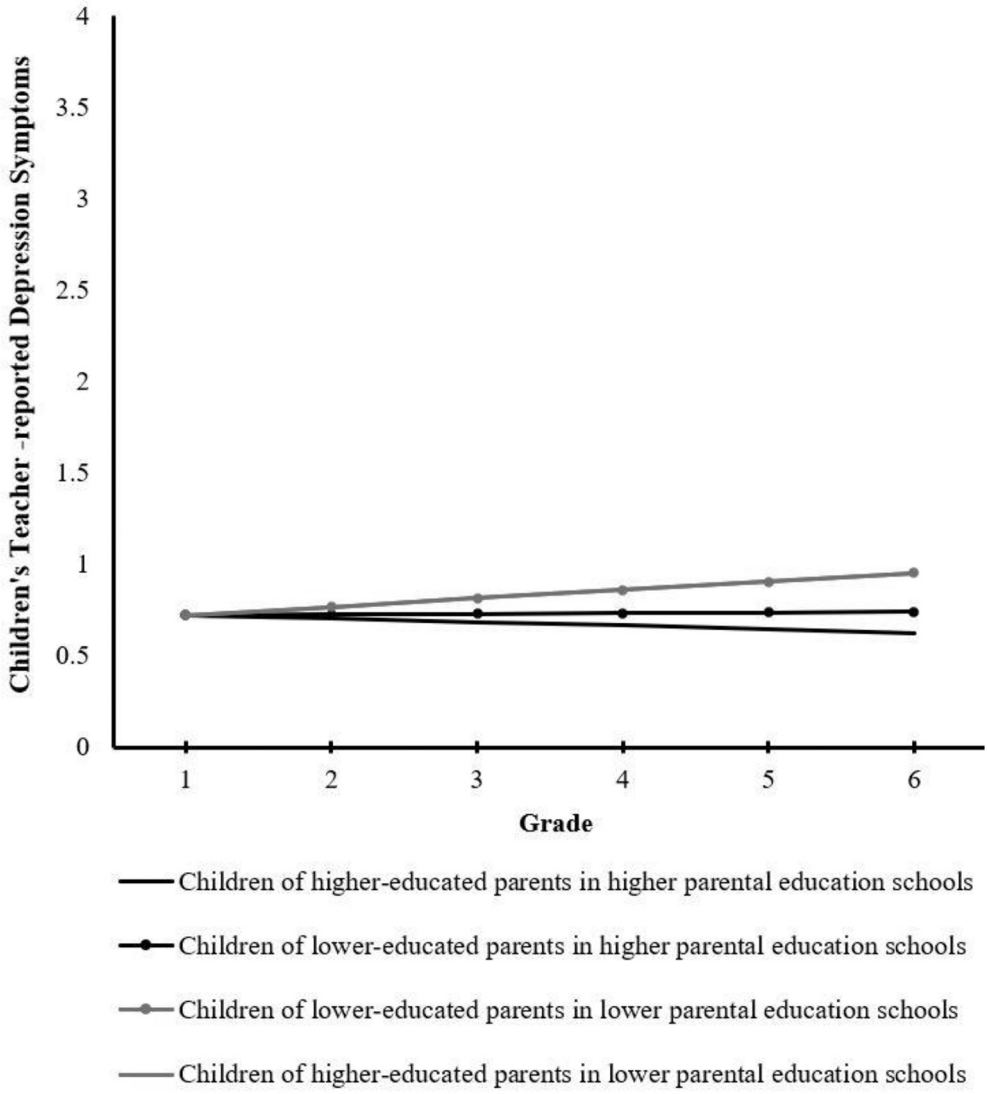

Fig. 2. The Cross-level Interaction Between Individual-Level Parental Education and School-Level Parental Education on the Development of Children's Teacher-reported Depression Symptoms.

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.

lower- and higher-educated parents did not differ over time. A visual representation of the cross-level interaction effect can be seen in Fig. 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.

6. 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 Fig. 1).

6.1. 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 as 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 years) 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, except for one association (i.e., individual-level peer-reported anxiety), showed that 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 including 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, 2019; 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 but 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 symptoms.

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 are enrolled 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 growth rate of depression symptom levels as compared to children of higher-educated parents. Collectively, our results may suggest that investing in and addressing the needs of lower parental education schools and children growing up with lower-educated parents 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).

6.2. *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 crucial. 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 towards school-wide social-emotional competence

training (Durlak et al., 2011) should be implemented from preschool onwards.

6.3. 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.

7. 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 with faster growth rates 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.

Ethical information

This study was approved by the Medical Ethics Review Committee of Vrije Universiteit Amsterdam and Erasmus University Medical Center.

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Declaration of Competing Interest

Authors have no conflict of interest to declare.

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Appendix A

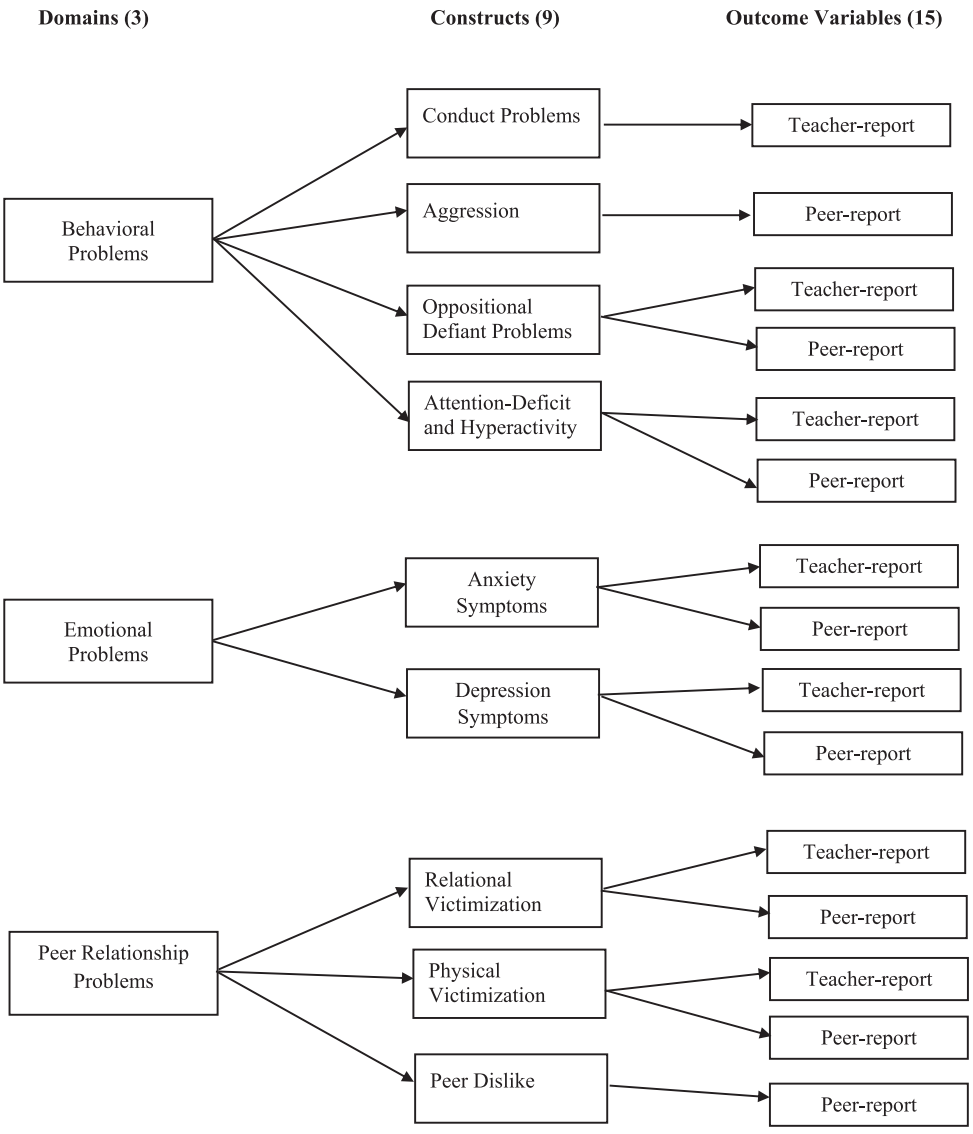

Fig. 1. Overview of the outcome variables within the behavioral, emotional, and peer relationship domains.

Appendix B. Supplementary Materials

Supplementary methods, results, and interpretations of measurement invariance testing can be found online at https://doi.org/10.1016/j.jsp.2022.06.005.

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