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## Accepted Manuscript

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Externalizing Behavior Problems and Interest in Reading as Predictors of Later Reading  
Skills and Educational Aspirations

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## Abstract

This study examined the developments in children's externalizing problems and interest in reading during their first four years of school (Grades 1–4) and investigated whether this development predicted the children's Grade 6 reading skills and educational aspirations. Data comprised (1) teachers' ratings of externalizing problems and children's ( $N = 642$ ; 43% girls) self-ratings of their interest in reading, collected between Grades 1 and 4, and (2) measures of reading fluency and comprehension, and children's self-reports of educational aspirations, collected at Grade 6. First, latent growth modeling showed that a higher level of externalizing problems in Grade 1 was associated with a lower concurrent interest in reading. Second, a positive association between the initial level of interest in reading and a linear change in externalizing problems indicated that children with a lower interest in reading in Grade 1 were rated by teachers as exhibiting higher levels of externalizing problems, which nonetheless declined over the course of their first four years of school more than among other children. Third, a higher initial level of externalizing problems with a linear change in these problems across Grades 1–4 was a predictor of lower subsequent educational aspirations and poorer reading comprehension in Grade 6. Analysis of the indirect effects indicated that a higher level of externalizing problems was associated with a lower concurrent interest in reading, which, in turn, was related to poorer future reading fluency and lower educational aspirations. The findings imply that problem behaviors are interlinked with academic skill development and motivation across the first six years of school.

*Keywords:* Educational aspirations, Externalizing problems, Interest in reading, Latent growth modeling, Reading fluency, Reading comprehension

Externalizing Behavior Problems and Interest in Reading as Predictors of Later Reading  
Skills and Educational Aspirations

## 1 Introduction

Consistent evidence links children's externalizing problems to a variety of difficulties in school. These difficulties include deficits in the development of basic academic skills, such as reading (Adams, Snowling, Hennessy, & Kind, 1999; Gresham, Lane, MacMillan, & Bocian, 1999; Hinshaw, 1992; Nelson, Benner, Lane, & Smith, 2004; Willcutt & Pennington, 2000), and a gradual process of disconnecting from school that eventually increases the risk of having low educational aspirations and dropping out of education (Griffiths, Lilles, Furlong, & Sidhwa, 2012; McLeod & Fettes, 2007). Yet surprisingly little is known about the longitudinal processes, especially those affecting learning motivation, through which externalizing problems interfere with students' daily functioning in school and compromise their ability to benefit from learning opportunities and progress educationally.

The present study expands current understanding of the achievement outcomes and aspirations of children with externalizing problems by examining the link between externalizing problems and children's interest in and enjoyment of a key academic subject, reading (Eccles, Wigfield, Harold, & Blumenfeld, 1993). This interest lays the foundation for future academic achievement and engaged learning (Wang & Eccles, 2013), and it may help to explain why the educational progress of children at the upper end of the distribution in externalizing problems is often jeopardized. In the current study, we investigate how externalizing problems and interest in reading develop during the first four years of school and analyze whether this development predicts children's reading skills and educational aspirations at the end of elementary school in Grade 6. We focus on reading because it is a fundamental skill that is strongly associated with

overall academic success and forms the foundation for further learning and educational progress (Landerl & Wimmer, 2008; Williamson, Appelbaum, & Epanchin, 1991).

### **1.1 Developmental Trajectories of Externalizing Problems and Interest in Reading**

Externalizing problems is a broadband construct that includes a range of disruptive behaviors, such as aggressiveness, defiance, oppositional behavior, and attention deficit problems. Externalizing problems are often defined as comprising two primary externalizing domains: conduct problems and hyperactivity/inattention (Campbell, Shaw, & Gilliom, 2000; Hinshaw, 1992; McMahon, 1994). A clear understanding of how externalizing problems change over time requires an examination of the features of the learning environment and the developmental stage of the student entering that environment (Eccles & Midgley, 1989). As children make the transition to kindergarten and further to first grade, they face increasing demands for self-regulation, especially skills for self-regulated learning and engagement in goal-directed academic work. Children are expected, for instance, to follow instructions, to stay on task, to work independently, and to inhibit inappropriate behaviors. Previous evidence indicates that entering such an academically oriented environment is difficult for many children. According to Rimm-Kaufman, Pianta, and Cox (2000), teachers report that almost half of the children entering kindergarten display problems in adjusting to kindergarten, and a great proportion of these students have problems following directions and working independently. It is possible that school entry is especially challenging for children who have displayed externalizing behaviors before their transition to formal school. The increasing demands of academic and working skills may exacerbate or generate disruptive behaviors and difficulties in sustaining concentration while working in the classroom (Miles & Stipek, 2006). Using a sample of five to 10 year olds to examine the trajectories of externalizing problems, Zhou et al. (2007) identified a

group of children who were initially low in externalizing problems but displayed a large increase in these problems around the time of their transition to elementary school owing, at least in part, to the changes in their school and classroom environment.

Many children who initially manifest a high degree of externalizing problems make progress in emotional and behavioral regulation in consonance with neurocognitive maturation. These changes are discernible in the normative decreasing trend in externalizing problems as children progress through elementary school and beyond (Bongers, Koot, van der Ende, & Verhulst, 2003). For instance, Hughes and Ensor (2011) showed that growth in children's inhibitory control, working memory, and attentional flexibility (i.e., their executive functions) before the transition to elementary school predicted lower externalizing problems during first grade. Attending school may also foster children's self-regulatory skills by providing a structured environment and support from the teacher for regulation of emotions and behavior. Thus, one goal of the present study was to examine the developmental changes in externalizing problems after children enter formal schooling. We hypothesized that there is a significant variation in the level of externalizing problems in the first grade and that a sizable proportion of children who manifest elevated levels of problem behaviors initially show a decline in them over the following several school years.

Another factor impeding student learning is low motivation that is manifested, for instance, as children's low interest in various school subjects and a lack of enjoyment while doing tasks related to these subjects. The enjoyment gained from doing certain tasks is called interest value (Eccles et al., 1993), which, according to the expectancy-value model of motivation (Eccles et al., 1983; Wigfield & Eccles, 2000), is seen as a pivotal factor directly influencing students' choice of tasks and their persistence and performance on those tasks (Wigfield & Eccles, 2000).



Interest value comprises the immediate, inherent feelings of liking and enjoying the domain or the activity, which optimize the possibility for persistent engagement with the task (Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). Because interest value concerns doing a task for its own sake, this construct is related to the constructs of situational and individual interest as discussed by Hidi and Renninger (2006). In their four-phase model, interest is initially triggered by external stimuli that include elements that are personally relevant or novel and that elicit focused attention and immediate affective reactions, either positive or negative. If maintained, such situational interest may develop into a more enduring individual interest as the student begins to value the opportunity to reengage with particular tasks and chooses to pursue them. An emphasis on the development of interest and its cognitive components (e.g., focused attention and activation of stored knowledge; Hidi, 2006) distinguish this model from the expectancy-value model that focuses on the perceived value of the activity or a task and the effects related to and influencing it (Eccles et al., 1983; Wigfield & Eccles, 2000). These two models are used in the present study as the main theoretical frameworks to understand why students may or may not be motivated to approach reading tasks at school and at home.

The ability to distinguish between various school subjects in terms of their perceived value develops during the early years of elementary school (Wigfield & Eccles, 2000). For example, Nurmi and Aunola (2005) showed that children differed in the interest value they attached to math, writing, and reading. Although more than 40% of the children attached a high value to all three school subjects, a small group of children—approximately 16% in Grade 1—was identified as showing a low level of interest particularly in reading and writing. Low interest and a weak foundation in early reading skills may be especially debilitating because they hamper achievement in other subject areas and may lead to persistent difficulties in literacy learning

(Landerl & Wimmer, 2008). Children with a low interest in reading are likely to see little merit in recreational reading and read less than their more motivated peers (Baker & Wigfield, 1999; Wigfield & Guthrie, 1997). Conversely, children who consider reading an interesting activity invest more time and energy in reading tasks, strive to understand more challenging texts, and tend to read more frequently, all of which translate into better reading skills (Becker, McElvany, & Kortenbruck, 2010). At the beginning of their school careers, the majority of children typically report high interest in various academic subjects, including reading, but this interest tends to decline as children move through the school system (Spinath & Spinath, 2005; Wigfield et al., 1997, 2006). Following this line of thought, the present study investigated the development of children's interest in reading as a motivational factor that was expected to decrease across the first four years in elementary school.

Surprisingly little research has linked externalizing problems to motivational factors such as the development of interest in reading across the elementary school years. Yet children manifesting higher levels of externalizing problems tend to have lower persistence in learning tasks (Metsäpelto et al., 2015) and difficulty in focusing their attention for longer periods of time (Arnold, 1997), which may indicate the children's low interest in these tasks. To our knowledge, this association has not been empirically investigated. Because externalizing problems often co-occur with difficulties in learning to read (Adams et al., 1999; Gresham et al., 1999; Hinshaw, 1992; Nelson et al., 2004; Willcutt & Pennington, 2000), it is possible that these adverse experiences result in a negative perceived value of reading-related tasks and materials, which deters students from developing an interest value in reading. Low interest in reading may co-occur with externalizing problems also because of peer influence such that students who are less motivated affiliate with peers who also have little interest in engaging in and enjoying school

subjects and tasks (Sage & Kindermann, 1999). Therefore, in this study, we anticipated that children displaying a higher level of externalizing problems would be less likely to develop an enduring interest in reading at the beginning of their school careers.

We anticipated that the link between the degree of externalizing problems in the first grade and the concurrent level of interest in reading and the interweaving developmental changes in these areas over the primary school years would form related processes. Previous research gave rise to a pair of hypotheses. First, a high degree of externalizing problems in the first grade may drive a decline in interest in reading over time. Previous researchers reported on processes leading to increasing academic difficulties as children with externalizing problems progress through school. For instance, students manifesting elevated levels of externalizing problems have been found to lag further behind their classmates in academic skills over the period from first grade to age 16 (Jimerson, Egeland, & Teo, 1999). Second, the initial level of interest in reading in the first grade could predict changes that occur in the degree of externalizing problems over time. Failure to develop skills and a liking of key academic subjects, such as reading-related tasks at the beginning of schooling, may generate feelings of frustration and anger. Such experiences make it difficult for students to stay on task and can contribute to disruptive and destructive behavior toward other people or things. These behaviors are likely to be discernible at school entry when a lack of fit between the demands of the learning environment and the skills of the student in relation to emotional and behavioral self-regulation is especially salient (Rimm-Kaufman et al., 2000; Zhou et al., 2007).

## **1.2 Reading Skills and Educational Aspirations as Developmental Outcomes**

Children, who initially exhibit a high degree of externalizing behavior problems may despite a gradual decline in these problems by age, continue to manifest signs of maladjustment

and have far-reaching developmental consequences for their development. Moilanen, Shaw, and Maxwell (2010) refer to the phenomenon as “adjustment erosion,” because externalizing problems tend to reduce later academic competence and increase vulnerability to difficulties in other domains. In the current study, we assessed whether the developmental trajectories of externalizing problems and interest in reading predict two salient but distinct aspects of academic success: reading skills (fluency and comprehension) and future educational aspirations.

Skilled reading constitutes a multifaceted competence in which the ability to extract and construct meaning through interaction with print depends on skills for fast, accurate, and automatic decoding and word recognition. According to a widely held view, known as the simple view of reading, reading comprehension is a function of language comprehension and word recognition or decoding (Braze et al., 2015; Gough & Tunmer, 1986; Kirby & Savage, 2008; Stuart, Stainthorp, & Snowling, 2008). In transparent languages (such as Finnish), the relation between decoding and reading comprehension is prominent in the early phases of reading development, but the contribution of linguistic comprehension to reading comprehension becomes more important in the later phases (Lerikkanen et al., 2004; Torppa, Georgiou, Lerikkanen, Niemi, Poikkeus, & Nurmi, 2016). Fluent reading entails automatic, effortless processing, which allows cognitive resources to be allocated to reading comprehension (Wolf & Katzir-Cohen, 2001); in oral reading, fluency is manifested in the ability to read with accuracy, speed, and proper expression (Kuhn & Stahl, 2003). Reading fluency contributes to growth in reading comprehension (Stanovich, West, Cunningham, Cipielewski, & Siddiqui, 1996), but the latter also requires skills, such as making connections between different parts of the text in order to fully understand the intended meanings (Cornoldi & Oakhill, 1996). As students move into higher grades, reading comprehension becomes increasingly important for progress in different

subject areas. Thus, reading comprehension is a fundamental skill for academic achievement and success.

Ample evidence links externalizing problems with difficulties in learning to read (Adams et al., 1999; Gresham et al., 1999; Heiervang, Lund, Stevenson, & Hugdahl, 2001; Hinshaw, 1992; Nelson et al., 2004; Willcutt & Pennington, 2000). Previous studies, however, typically used broad reading skill measures that combine several sub-skills of reading (Adams et al., 1999; Gresham et al., 1999; Nelson et al., 2004), thus failing to specify how externalizing problems are associated with specific sub-skills, such as reading fluency and comprehension. Seeking knowledge needed for a more thorough understanding of the critical deficits that characterize children with externalizing problems is one of the main goals of the present study.

Acquiring an adequate level of reading skills is an important prerequisite for academic attainment as are the ways in which students think and act in relation to their future lives, particularly in the domain of education. As children progress through school, they develop beliefs about the importance of schooling and ideas regarding their future education partly based on experiences in the educational setting through which they learn about their abilities and competencies (Lent, Brown, & Hackett, 2000). Students who have had predominantly positive learning experiences are more likely to value education and regard the process of educational attainment as important and gratifying (Garg, Kauppi, Lewko, & Urajnik, 2002). The concept of future educational aspirations refers to students' commitment to academic endeavors and their belief in the importance of further education for their prospective goals and career choices (Appleton et al., 2006). Although adolescence is a pivotal time for forming educational aspirations and goals, individuals start to think about their future education and careers during elementary school (Auger & Blackhurst, 2005), and early signs of disengagement with school

and learning can be observed from the beginning of schooling (Ladd & Dinella, 2009). Support for the link between problem behaviors and future orientation was established by Nurmi (1991) in a review showing empirical support for the notion that adolescent problem behaviors, such as delinquency and drug abuse, were related to a low level of investment in future planning.

High learning motivation—such as valuing school subjects and enjoying learning—is a key facilitator in educational aspirations (Eccles, 2005). Utilizing a sample of 16-year-old adolescents, Viljaranta, Nurmi, Aunola, and Salmela-Aro (2009) found that students who place a high value on school subjects (ranging from math and literacy to social science and the arts) have statistically significantly higher educational aspirations compared with students who place a low value on school subjects. Thus, the degree of interest, importance, and utility that students attach to various school subjects is likely to have consequences for the students' future aspirations. The present study aims to examine the future educational aspirations that students have at the end of elementary school (in Grade 6) before they transition to lower secondary school. By analyzing links between educational aspirations and the initial level and changes across time in externalizing problems, as well as interest in reading, we hope to gain more in-depth understanding of the factors that set the stage for the adverse developmental trajectories reported in the literature among students with higher levels of externalizing problems, such as lower engagement with schoolwork and a higher drop-out rate (McLeod & Fettes, 2007).

As low interest in reading may constitute a critical factor contributing to poor reading proficiency and low educational aspirations among children exhibiting a higher level of externalizing problems, there is evident need to model mediator effects, that is, to test whether externalizing problems are not directly related to poor reading skills and low educational aspirations and whether instead the association is at least partially mediated by interest in

reading. There is empirical evidence supporting predictive links from externalizing problems and interest in reading to the development of reading skills and educational aspirations. However, due to the lack of longitudinal research on the links between externalizing problems and interest in reading and subsequent effects on academic outcomes, the mediator hypothesis is as yet untested. In this study, we construed interest in reading as a critical component in a developmental mechanism that could potentially account for the relation among externalizing problems, future reading skills, and educational aspirations.

### 1.3 Aims and Hypotheses

In the present study, we used latent growth modeling to examine the development of externalizing problems and interest in reading by creating two latent factors for each construct, that is, the initial level and the rate of change from the first to the fourth grade. Subsequently, we used these growth components to predict academic outcomes (educational aspirations and reading fluency and comprehension) in the sixth grade. Specifically, this study addressed the following three issues.

First, how do externalizing problems and interest in reading change from Grade 1 to Grade 4, and are there individual differences in the initial level and in the rate of change? We hypothesized that, on average, externalizing problems and interest in reading decline during the early school years. However, within these average trends, we expected a significant variation between children (H1).

Second, to what extent are the initial level of externalizing problems and its rate of change related to the initial level of interest in reading and its rate of change? We expected that children with a higher initial level of externalizing problems exhibit lower concurrent interest in reading (indicated by a significant negative association between the intercepts; H2). In addition, we

tested two hypotheses concerning the associations between the intercepts and the slopes: (1) Children with a higher initial level of externalizing problems exhibit a more steeply waning interest in reading, indicating an accumulation of academic problems over time (signified by a negative association between the intercept of externalizing problems and the slope of interest in reading; H3). (2) Lower interest in reading in the first grade will coincide with a high concurrent level of externalizing problems followed by a decrease in problem behaviors over time, reflecting the normative developmental trajectory of externalizing problems (indicated by a positive association between the intercept of interest in reading and the slope of externalizing problems; H4).

Third, how do the initial level and rate of change in externalizing problems and interest in reading during the first four years of school predict educational aspirations and reading skills (fluency and comprehension) in Grade 6? We expected that a higher initial level of externalizing problems and a lower initial interest in reading predict poor reading fluency, poor reading comprehension, and lower educational aspirations in Grade 6 (H5). In addition, we expected to find support for the mediator model, suggesting that the associations between externalizing problems in Grade 1 and reading skills and educational aspirations in Grade 6 partially run via students' interest in reading (H6).

## 2 Method

### 2.1 Participants

Participants in the present study were part of an extensive follow-up (AUTHORS, 2006) from kindergarten to the end of Grade 6, comprising a total of 1,880 Finnish-speaking children from four municipalities (two in central Finland, one in western Finland, and one in eastern Finland). The children's average age was 85.82 months ( $SD = 3.45$  months) at school entry. At



the beginning of the study, the children's parents and teachers were asked for their written consent for their child's or their own participation in the study.

The participants in the present study represented a subsample of the original sample and comprised 642 children (43% girls; 57% boys) who were followed more intensively than the others. This subsample consisted of children identified as being at risk for reading difficulties ( $n = 321$ ) and randomly selected children from the same classrooms who were not at risk ( $n = 321$ ). The majority of children at risk for reading difficulty (RD) were identified at the end of kindergarten based on prereading skills ( $n = 287$ ), and a small subgroup of children ( $n = 34$ ) participating in the follow-up was added to this group based on their poor early decoding skills at the end of Grade 1. Children were identified as being at risk for RD at the end of kindergarten (AUTHORS, 2011) if they scored at or below the 15th percentile of the total sample in at least two of the measured prereading skills (i.e., letter knowledge, phonemic awareness, and rapid automatized naming) or if they scored at or below the 15th percentile in one of the skill areas and the parental questionnaire indicated a mild or severe family risk (i.e., mother or father self-reported "mild" or "severe" problems with reading at school age).

The random selection of the nonrisk sample ( $n = 321$ ) was carried out in a stratified fashion from the classrooms participating in the follow-up. Due to variations in class size, the number of nonrisk children from different classrooms ranged between one and six, with a median of three children. Target sampling of children for the individual follow-up was necessary to ensure that the demands of data collection for the teachers were not too heavy. To control for the effect of RD, risk for RD was set as a covariate in the latent growth models (LGMs).

The family educational background of the study sample (defined as the highest level of education attained in the family) exhibited the following range of parental education: no

vocational education (4%), a short vocational course (3%), a vocational school qualification (31%), a vocational college qualification (22%), a polytechnic degree or a bachelor's degree (14%), a master's degree (21%), or a licentiate or doctoral degree (5%). Parental education was set as a covariate in the latent growth models.

Data on the students' externalizing problems (teacher ratings) and interest in reading (students' self-ratings) were collected in Grade 1 (April 2008), Grade 2 (April 2009), Grade 3 (April 2010), and Grade 4 (April 2011). The students were tested on their reading skills at school entry in Grade 1 (September 2007) and in Grade 6 (April 2013). In Grade 6 (April 2013), students also reported on their educational aspirations.

## 2.2 Measurements

**2.2.1 Externalizing problems.** Externalizing problems were assessed with teacher ratings in Grades 1–4 using a Finnish version of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), which has been shown to be a highly valid screening instrument (Goodman, Ford, Simmons, Gatward, & Meltzer, 2000) and to have good psychometric properties among Finnish children and adolescents (Koskelainen, Sourander, & Kaljonen, 2000). The SDQ consists of 25 items rated on a 3-point scale (i.e., *not true*; *somewhat true*; *certainly true*), producing scales for hyperactivity/inattention, conduct problems, emotional symptoms, peer problems, and prosociality. To measure externalizing problems, we used the scales for hyperactivity/inattention (five items, e.g., restless, cannot stay still for long) and conduct problems (five items, e.g., often fights with other children or bullies them). The composite score for externalizing problems for each grade was formed as the mean score of the hyperactivity/inattention and conduct problems scales (based on 10 items). The Cronbach alpha

reliabilities for the externalizing problems composite scores were .89, .90, .89, and .88 in Grade 1, Grade 2, Grade 3, and Grade 4, respectively.

The SDQ has normative banding categories that can be used to identify children who exhibit symptoms commonly associated with psychiatric disorders in emotional, social, and behavioral domains. We used sum scores ( $R = 1 \square 10$ ) of the hyperactivity/inattention and conduct problem scales to determine the severity of externalizing problems in the current sample. The bandings were based on normative teacher-rating data collected in the United Kingdom for children from 4 to 17 years of age (www.sdqinfo.com; see also Kovess-Masfety et al., 2016). The bandings were defined as follows: SDQ scores 0–5 for hyperactivity/inattention and 0–2 for conduct problems were classified as low and within normal range (0–80th percentile), scores 6–7 and 3 as slightly raised (81st–90th percentile), and scores of 8–10 and 4–10 as high or very high (91st–100th percentile), respectively. Although SDQ banding allows efficient identification of children at risk for child psychiatric disorders (Bourdon, Goodman, Rae, Simpson, & Koretz, 2005; Capron, Théron, & Duyme, 2007), SDQ bands alone cannot be used to diagnose a disorder. In this study, the SDQ bands were used for descriptive purposes to characterize the degree of externalizing symptoms in the current sample.

**2.2.2 Interest in reading.** Interest in reading in Grades 1–4 was assessed by using the Task Value Scale for Children (TVS-C; Aunola & Nurmi, 1999), which is based on concepts developed by Eccles (1983) concerning the interest children show in particular school subjects. The use of this scale in a number of previous studies provided evidence for the scale's internal consistency and association with other relevant constructs, such as the student's academic achievement and self-concept of ability, and with teaching practices (Aunola, Viljaranta, Lehtinen, & Nurmi, 2013; Lerkkanen et al., 2012; Natale, Viljaranta, Lerkkanen, Poikkeus, &

Nurmi, 2009; Nurmi & Aunola, 2005; Viljaranta, Tolvanen, Aunola, & Nurmi, 2014). The scale consists of three items that measure students' self-rated interest in or affinity for reading tasks (i.e., "How much do you like reading tasks at school?"; "How much do you like doing reading-related tasks at school?"; "How much do you like doing reading-related tasks at home?"). The children were asked to indicate their degree of interest by pointing to (or, in Grade 4, circling) one of five faces (ranging from a face with a frown to a smiley face) that best portrayed their interest in reading tasks (1 = *I do not like it at all/I dislike doing those tasks*; 5 = *I like it very much/I really enjoy doing those tasks*). A composite score for interest in reading was created by calculating the mean score of the three items related to reading tasks. The Cronbach alpha reliabilities for the composite scores for interest in reading were .77, .80, .88, and .87 in Grade 1, Grade 2, Grade 3, and Grade 4, respectively.

**2.2.3 Reading skills.** Reading skills were measured in Grade 1 (at school entry) with a reading fluency test and at the end of Grade 6 with tests of reading fluency and reading comprehension. In both grades, reading fluency was assessed using a group-administered subtest of the nationally normed reading test battery (ALLU; Lindeman, 1998). Each of the 80 items consisted of a picture with four phonologically similar words attached to it. The children were asked to silently read the four words and then draw a line connecting the picture with the word that matched it semantically. The score was the number of correct answers within a 2 minute time limit. Because of the nature of this timed test, the score reflected the children's fluency in reading the stimulus words and accuracy in making the correct choice from among the alternatives. The two parallel versions of the test, A and B, were used in alternate years. Version B was used in Grade 1 and version A in Grade 6. The alternate-form reliability between forms A and B was .84.

The reading comprehension test assessed the children's skills in gleaned factual knowledge, concepts, and inferences from the text. The children were asked to answer 12 multiple-choice questions based on a silently read text. The children received one point for each correct answer (the maximum score was 12). They completed the task at their own pace, but the maximum time allotted was 45 minutes. This normed test included different texts and multiple-choice questions for Grade 1 through Grade 6 so that the task difficulty was optimal for each age. No ceiling effect was evident in Grade 6. The Kuder-Richardson reliability coefficient for the reading comprehension task in Grade 6 was .66.

**2.2.4 Educational aspirations.** Educational aspirations in Grade 6 were measured using a shortened version of the Student Engagement Instrument, which comprises five scales measuring cognitive and affective engagement (SEI; Appleton et al., 2006). There is evidence for the internal consistency and validity of the SEI in U.S. samples (Betts, Appleton, Reschly, Christenson, & Huebner, 2010) and across other cultural contexts (Moreira, Vaz, Dias, & Petracchi, 2009), including Finland (Virtanen, Kiuru, Lerkkanen, Poikkeus, & Kuorelahti, 2016). Our analyses involved the sub-scale for Future Aspirations and Goals, which indexes students' educational aspirations and includes three items rated on a 4-point scale (1 = *Strongly disagree*, 4 = *Strongly agree*; "I plan to continue my education following high school"; "Going to school after high school is important"; "School is important to achieve my future goals"). A composite score for educational aspirations was formed as the mean score of these three items. The Cronbach alpha for the scale was .83.

### 3 Analysis Strategy

LGMs were first estimated separately for externalizing problems and interest in reading. These two models included an intercept (representing the initial level) and a linear slope

(representing the rate of linear change). We began by examining the general developmental trend in externalizing problems and interest in reading. The preliminary visual inspection of the plots suggested that individual growth in externalizing problems and interest in reading could be described with a linear function. To model linear growth, the values for the slopes were fixed at 0, 1, 2, and 3. We then examined the variability in intercepts and slopes to determine whether the children differed in terms of their initial levels of externalizing problems and of interest in reading and in their rates of change over time. For externalizing problems and interest in reading, we allowed the intercepts and the slopes to correlate in order to examine how the initial level was associated with the rate of change.

Second, we combined the two models into a parallel-process LGM and entered the outcome variables (reading fluency, reading comprehension, and educational aspirations in Grade 6) and covariates (student gender, risk for reading difficulties, parental education, and early reading fluency). We allowed the intercepts to correlate in order to examine the extent to which the levels of externalizing problems and interest in reading were associated in Grade 1. Likewise, we allowed the slopes to correlate in order to determine whether the rate of change in externalizing problems was related to the rate of change in interest in reading. We also examined whether the intercepts of externalizing problems and of interest in reading predicted the rate of change in the other construct.

Third, we examined whether reading fluency, reading comprehension, and educational aspirations in Grade 6 were predicted by the intercepts and slopes of externalizing problems and interest in reading, controlling for the effect of covariates (student gender, risk for reading difficulties, parental education, and early reading fluency). Because reading skills were included as a covariate and as an outcome variable, we also specified two autoregressive paths: from early

reading fluency at school entry to reading fluency in Grade 6 and from early reading fluency to reading comprehension in Grade 6. We also tested the statistical significance of the hypothesized indirect effects by testing the paths from the initial level of externalizing problems to reading fluency, comprehension, and educational aspirations via interest in reading (intercept and slope).

The LGM was conducted within a structural equation modeling framework using the Mplus software package (version 7.3; Muthén & Muthén, 1998–2012). The percentage of missing data ranged from 7.8% to 32.6% for externalizing problems and interest in literacy across four time points ( $M = 18.0\%$ ,  $SD = 8.9\%$ ) and from 0% to 39.6% across all study variables, including child's gender, risk for reading difficulties, parental education, and early literacy skills ( $M = 18.8\%$ ,  $SD = 14.4\%$ ). Data were not missing completely at random: Little's missing completely at random (MCAR) test for externalizing problems and interest in reading was  $\chi^2(212) = 296.657$ ,  $p = .000$ , and for all study variables  $\chi^2(1009) = 1190.954$ ,  $p = .000$ . Thus, we used the standard missing at random approach for missing data (Little & Rubin, 1987; Muthén & Muthén, 1998–2012). Because the distributions of the variables were skewed, the model parameters were estimated using the maximum likelihood with the robust standard errors estimator (Muthén & Muthén, 1998–2012). For all the models, goodness of fit was evaluated using five indicators: the chi-square test, Bentler's comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). According to Hu and Bentler (1999), TLI and CFI values above .95, RMSEA values below .06, and SRMR values close to .08 indicate a good model fit to the data.

Because data were hierarchical (i.e., each teacher assessed more than one student), we calculated intraclass correlations (ICCs) for the externalizing problems and interest in reading.

The ICCs for these variables ranged from .014 (not statistically significant) to .275 ( $p < .001$ ). The design effects were obtained according to the ICCs, and they ranged from 1.038 to 1.756. Hox and Maas (2002) suggested that analyzing multilevel data as single-level data can yield acceptable (not overly biased) parameter estimates and inferential tests, if the design effects are smaller than 2.0. However, in the subsequent analyses and inferential tests, we used the Type = COMPLEX approach (Muthén & Muthén, 1998–2012). This command estimates the model at the whole-sample level but corrects for distortions in standard errors in the estimation caused by the clustering of observations (i.e., classroom differences). In our analyses, grouping was based on the teachers' identification code in Grade 1, which resulted in a total of 165 clusters with an average cluster size of 3.752.

## 4 Results

### 4.1 Descriptives and Correlations

The descriptive statistics for the study variables are shown in Table 1. The means for externalizing problems and interest in reading indicated decreasing trends from Grade 1 to Grade 4. In the study sample, 72% of the first graders exhibited low and 12% slightly raised levels of hyperactivity/inattention while 16% manifested high or very high level of such problems. The corresponding percentages for conduct problems in Grade 1 were 78%, 6%, and 16%, respectively. By Grade 4, the prevalence of problem behaviors had decreased: 80% of children manifested low and 9% slightly raised levels of hyperactivity/inattention, and 11% displayed the highest level of such problems. The percentages for conduct problems in Grade 4 were 82%, 7%, and 11%, respectively. Thus, when normative SDQ bands were applied, the current sample exhibited a slightly elevated proportion of children displaying high or very high hyperactivity/inattention and conduct problems in Grade 1 (16% in the current sample vs. 10% in



the British sample the norms of which were used as the cutoff criteria for the SDQ bands; see Kovess-Masfety et al., 2016).

Correlations between the study variables are presented in Table 2. Inter-correlations for externalizing problems from Grades 1 to 4 indicated high inter-individual stability (the inter-correlations ranged from .67 to .82). The inter-correlations over time for interest in reading ranged from .20 to .61. Externalizing problems in Grades 1 to 4 exhibited weak negative correlations to interest in reading (correlations ranging from  $-.09$  to  $-.27$ ), to Grade 6 educational aspirations ( $-.12$  to  $-.22$ ), and to Grade 6 reading fluency and comprehension ( $-.17$  to  $-.28$ ). The associations of interest in reading with Grade 6 educational aspirations and with Grade 6 reading fluency and comprehension ranged from .17 to .22 and from .01 to .22, respectively.

#### **4.2 Latent Growth Model for Externalizing Problems and Interest in Reading and Predictive Associations with Reading Skills and Educational Aspirations**

We constructed two separate LGMs with an intercept and a linear slope to investigate the development of externalizing problems and interest in reading. A good model fit was obtained for externalizing problems ( $\chi^2(5, n = 578) = 25.656, p < .001$ ; TLI = .970; CFI = .965; RMSEA = .085; SRMR = .047) and for interest in reading ( $\chi^2(5, n = 617) = 15.911, p = .007$ ; TLI = .964; CFI = .970; RMSEA = .059; SRMR = .042). The parameter estimate for the intercept of externalizing problems was 1.547 (standard error [S.E.] = 0.022,  $p < .001$ ) and that for interest in reading was 3.717 (S.E. = 0.044,  $p < .001$ ). A decline in both constructs from Grades 1 to 4 was indicated by negative linear growth in externalizing problems (slope =  $-.032$ , S.E. = 0.007,  $p < .001$ ) and interest in reading (slope =  $-.093$ , S.E. = 0.021,  $p < .001$ ).

There was a statistically significant individual variation in the intercepts and the slopes of externalizing problems (intercept = .209, S.E. = 0.015,  $p < .001$ ; slope = .009, S.E. = 0.002,  $p <$

.001) and interest in reading (intercept = .476, S.E. = 0.068,  $p < .001$ ; slope = .111, S.E. = 0.016,  $p < .001$ ), suggesting that the children differed in Grade 1 levels of externalizing problems and interest in reading and in rates of change over time. The correlation between the intercept and the slope for externalizing problems was  $-.50$  ( $p < .001$ ) while that for interest in reading was  $-.40$  ( $p < .001$ ), indicating that students with higher intercepts had more negative slopes and students with lower intercepts had less negative slopes. In other words, the higher a child's initial levels of externalizing problems or interest in reading, the greater his or her slope, that is, the steeper the decline over time.

We then combined the separate LGMs into a parallel-process LGM and entered the academic outcome variables and the covariates (educational aspirations, reading fluency, and reading comprehension) into the model. A good model fit was obtained ( $\chi^2(53, n = 619) = 106.716, p < .001$ ; TLI = .957; CFI = .973; RMSEA = .040; SRMR = .038). In the final model, the estimated means of the intercepts and the slopes of the final LGM resembled the estimates of the separate models, as reported above.

The final model, shown in Fig. 1, indicated that the intercepts of externalizing problems and interest in reading were negatively associated. The more externalizing problems the students had in Grade 1, the lower their concurrent interest in reading. The linear slopes were not correlated, indicating that changes in externalizing problems were not associated with changes in interest in reading. The predictive relation of the externalizing problems intercept with the slope for interest in reading was not statistically significant, indicating that a high initial level of externalizing problems did not predict a change in interest in reading.

However, the intercept of interest in reading positively predicted variation in the slope of externalizing problems: A steeper decline in externalizing problems was predicted by a lower

interest in reading. As this association may seem counterintuitive, we split interest in reading in Grade 1 into three groups with cutoffs at 1 *SD* and 1 *SD*, representing “low” ( $n = 115$ ), “average” ( $n = 377$ ), and “high” ( $n = 94$ ) interest in reading. Fig. 2, based on the estimated marginal means of the repeated-measures analysis of variance (ANOVA), illustrates the shape of change in externalizing problems in the three groups of interest in reading (low, average, and high) in Grade 1. The students with the lowest initial interest in reading were those who also had, initially, the highest level of externalizing problems. These students then showed a greater decline in problem behaviors between Grades 1 and 4 in comparison with the two other groups who had lower baseline levels of externalizing problems.

SDQ banding categories allowed us to determine the severity of initial externalizing problems in the three reading interest groups. The chi-square test indicated that reading interest classification was associated with SDQ bands of hyperactivity/inattention ( $\chi^2(4) = 10.48, p < .05$ ) and conduct problems ( $\chi^2(4) = 14.05, p < .01$ ). In the group with the lowest interest in reading in Grade 1, 26% manifested a high or very high level of hyperactivity/inattention and 27% a corresponding level of conduct problems. In this group, children displaying a high level of hyperactivity/inattention were statistically significantly overrepresented (adjusted residual of 3.1), and those manifesting a low level of such problems were underrepresented (adjusted residual of -2.6). The corresponding adjusted residuals for conduct problems were 3.3 and -3.7. Thus, low reading interest co-occurred with elevated levels of externalizing problems: In approximately one fourth of the children, the problems were clinically significant in Grade 1. In Grade 4, the SDQ bands in hyperactivity/inattention and conduct problems were not associated with the degree of reading interest ( $\chi^2(4) = 5.89, p = .208$ ;  $\chi^2(4) = 2.21, p = .697$ ).

The LGM further showed that educational aspirations and reading comprehension in Grade 6 were negatively predicted by the intercept and the slope of externalizing problems. A higher level of externalizing problems in Grade 1 predicted poorer reading comprehension and lower educational aspirations in Grade 6. Moreover, a higher rate of change (i.e., a greater decrease) in externalizing problems was associated with lower educational aspirations and poorer reading comprehension. These associations are illustrated in Fig. 3 and Fig. 4. The variable for educational aspirations in Grade 6 was split into three groups with cutoffs at  $-1 SD$  and  $1 SD$ , representing “low” ( $n = 44$ ), “average” ( $n = 202$ ), and “high” ( $n = 142$ ) educational aspirations. The corresponding groups for the reading comprehension variable were “low” ( $n = 70$ ), “average” ( $n = 246$ ), and “high” ( $n = 76$ ). Fig. 3 and Fig. 4 show that the students with the lowest educational aspirations and the poorest skills in reading comprehension were those who had a higher level of externalizing problems in their first years at school. Although the externalizing problems declined by Grade 4, the slope predicted academic difficulties in Grade 6. Additionally, the intercept of interest in reading positively predicted educational aspirations and reading fluency in Grade 6 but not reading comprehension.

The SDQ bands showed that within the group of students with the lowest educational aspirations in Grade 6, 28% exhibited a high or very high level of hyperactivity/inattention and 24% an equal level of conduct problems in Grade 1. The corresponding percentages for students with the lowest skills in reading comprehension were 28% and 14%, respectively. The association between the three reading comprehension groups and hyperactivity/inattention was statistically significant ( $\chi^2(4) = 9.54, p = .049$ ): Among students with the lowest reading comprehension skills, those with a high or very high level of hyperactivity/inattention were

overrepresented (adjusted residual 2.6). Other associations between groupings and SDQ bands in hyperactivity/inattention and conduct problems failed to reach statistical significance.

Finally, we examined the mediator effect by testing the significance of the indirect paths from initial externalizing problems to low educational aspirations and poor reading skills (fluency and comprehension) via interest in reading. The estimates and standard errors regarding the indirect effects are presented in Table 3. The results supported two mediator effects running via the intercept of the interest in reading. A higher degree of externalizing problems in Grade 1 was linked with lower educational aspirations and poorer reading fluency in Grade 6 via a low interest in reading in Grade 1.

## 5 Discussion

The current study represents one of the first longitudinal studies on the development of externalizing problems and interest in reading in the elementary school years and the predictive links with later reading skills and educational aspirations. The sample consisted of elementary school-age children the majority of whom were found to manifest low or slightly raised levels of difficulties in externalizing domains and a small group of children who manifested a high or very high level of externalizing problems suggesting a risk for child psychiatric disorders (Bourdon et al., 2005; Capron et al., 2007). Latent growth modeling indicated, first, that a higher initial level of externalizing problems was associated with a lower concurrent interest in reading and second, that a lower initial level of interest in reading was associated with a greater decline in externalizing problems over the early school years. Third, we found that a higher initial level and then a decrease in externalizing problems across Grades 1–4 predicted lower educational aspirations and poor reading comprehension in Grade 6. An analysis of the mediator effects indicated that a higher level of externalizing problems was associated with a lower concurrent

interest in reading, which, in turn, was related to poorer future reading fluency and lower educational aspirations. These results, thus, indicated that for children who were at the upper end of the distribution in externalizing problems early behavior problems, even when they dissipate, can have pervasive developmental consequences (Moilanen et al., 2010). Finally, higher initial interest in reading predicted a higher level of reading fluency and educational aspirations in Grade 6, while interest in reading did not independently predict reading comprehension.

### **5.1 General Discussion**

The results of this study revealed that, overall, the levels of children's externalizing problems and their interest in reading declined over the course of their first four years of school. These findings are in line with our first hypothesis (H1) and with the conclusions of large-scale longitudinal studies that suggest that the average levels of externalizing behavior problems tend to decrease from preschool age to young adulthood (Bongers et al., 2003; Campbell, Spieker, Burchinal, Poe, & The NICHD Early Child Care Research Network, 2006). The present findings also agree well with previous findings showing that children's interest in various academic subjects tends to decrease with exposure to school experiences (Spinath & Spinath, 2005; Wigfield et al., 1997). As hypothesized, however, we found significant variation in the declining trajectories for externalizing problems and interest in reading, suggesting differences among children in terms of their rates of change over time. The negative association between the intercept and the slope suggests that students with a higher initial level of externalizing problems (or of interest in reading) tend to exhibit faster decreases in problem behaviors than other students across the first four years of school. Neurocognitive maturation, for instance, in executive functions (Hughes & Ensor, 2011; Wiggs, Elmore, Nigg, & Nikolas, 2016) together with structure and support from a teacher in elementary school may explain why children

exhibiting a higher level of problem behaviors in the first grade displayed a greater decrease across time, whereas children with a lower initial level of externalizing problems exhibited less change.

As hypothesized (H2), a higher level of externalizing problems was associated with a lower interest in reading in first grade, indicating that children who exhibit problem behaviors also tend to lack interest in reading. Apparently, the various reading-related tasks and materials that children were engaged with over their first year of school triggered less enjoyment and liking among those children exhibiting higher externalizing problems than among their peers. The emergence of this association by the end of first grade is alarming because a low interest and a poor foundation in early reading skills may hinder achievement in other subject areas and lead to persistent difficulties in literacy learning (Landerl & Wimmer, 2008). The finding may also help to understand achievement-related behaviors among children with higher levels of externalizing problems. The difficulties these children experience in staying focused and on task (Arnold, 1997; Metsäpelto et al., 2015) may stem from slower maturation of inhibitory control and other executive functions (Hughes & Ensor, 2011), but according to the present study, the difficulties also stem from a lack of interest in academic subjects, such as reading. Such a low interest may originate in adverse experiences in learning to read during kindergarten and first grade, which failed to promote the situational enjoyment and positive affect that would have had the potential to lead to the development of a more enduring individual interest (Hidi & Renninger, 2006). Interest value may be an especially important determinant of a choice to approach reading tasks in the early elementary school years because young children's choices are primarily related to their enjoyment and liking of the activity (Wigfield & Eccles, 1992). In

addition, affiliation with deviant peers may lead to resistance and opposition to school that undermines enjoyment and interest in learning.

We did not find support for our hypothesis (H3) that a higher initial level of externalizing problems predicts a steeper decline in interest in reading across time. In fact, children with a higher initial level of externalizing problems were characterized by a lower initial interest in reading and were unlikely to exhibit a further decrease. Along similar lines, Nurmi and Aunola (2005) discovered that some children had a low interest in reading and writing in the first grade. However, as hypothesized (H4), we found that interest in reading in Grade 1 was associated with changes in externalizing problems during the first four years of school: A lower initial interest in reading was associated with a steeper decline in behavior problems than a higher initial interest in reading. This result implies that the relative difference in externalizing problems between children with lower versus higher interest in reading decreased over time, reflecting the normative trajectory of externalizing problems, which entails a decrease in problem behaviors over time (Bongers et al., 2003). Despite this encouraging trend, the distinctive shape of the curve for externalizing problems from Grades 1 to 4 in the group of students reporting a low interest in reading in their first year signifies a build-up of difficulties in the behavioral and motivational domains from the beginning of schooling. Approximately one fourth of these students were within a clinically significant range in hyperactivity/inattention and conduct problems (Kovess-Masfety et al., 2016), but the proportion of these students diminished by the fourth grade. These results corroborate the findings of Rimm-Kauffman et al. (2000) suggesting that the transition to elementary school often induces problems in adjusting to an academically oriented environment that may level off as children over time gain better self-regulatory skills.



Although children initially exhibiting a higher degree of externalizing problems showed improvements in their externalizing problems over time, the early problem behaviors left a negative imprint on the children's later academic skills and valuing of school. Unlike previous studies, our analysis divided reading skills into reading fluency and comprehension skills. In line with our hypothesis (H5) and extending previous research, the results indicated that—even after accounting for the level of previous reading skills and other covariates—the intercept and the slope of externalizing problems made unique negative contributions to the children's Grade 6 reading comprehension. Poorer reading comprehension was related to a history of higher (although descending) externalizing problems over the period from the first to the fourth grade. Moreover, in the group that had the lowest reading comprehension skills, students with a clinically significant level of hyperactivity/inattention were overrepresented. A suggested explanation is that reading comprehension requires complex skills, such as phonological and morphological awareness, grammatical and syntactical knowledge, and cognitive and deductive abilities (see Leppänen, Aunola, Niemi, & Nurmi, 2008; Taboada, Tonks, Wigfield, & Guthrie, 2009). The demand for skills in reading comprehension increases as students move through the grade levels, and reading tasks in many school subjects require longer periods of sustained effort. Thus, motivational factors, such as the ability to stay focused, come increasingly into play (Hirvonen, Georgious, Lerkkanen, Aunola, & Nurmi, 2010). Lack of persistence when performing challenging tasks has been shown to characterize children with a high degree of externalizing problems (Metsäpelto et al., 2015).

The current study found no direct statistically significant association between externalizing problems and reading fluency. This result may be partly due to the nature of the Finnish language. Finnish is a highly transparent language, and the process of reading acquisition is

faster and easier than in less transparent orthographies (e.g., English; Seymour et al., 2003). In the context of a transparent language, high reading fluency is typically achieved in the early elementary school years. It appeared that, by the end of Grade 6, variation in fluency with respect to the status of children's externalizing problems was small. However, we found evidence of an indirect association between externalizing problems and reading fluency via interest in reading (H6). Specifically, students who manifested a higher degree of problem behaviors were characterized by a low affinity for reading tasks in Grade 1, and consequently, the students fared poorly later on a standardized test of reading fluency in Grade 6. These findings corroborate previous findings concerning the importance of interest in academic achievement (Smith et al., 2012; Wigfield & Guthrie, 1997). Children who are interested in reading and enjoy it are more likely to develop good reading skills (Taboada et al., 2009; Wang & Guthrie, 2004). Ecalle, Magnan, and Gibert (2006), for instance, showed that first graders with a high interest in literacy made more progress in reading and spelling during their first year of school than children with a low interest. Conversely, cross-sectional studies have suggested that poor readers tend to have a lower intrinsic motivation to read (Lau & Chan, 2003). The current study extended previous research by showing that a low interest in reading represents a mechanism through which externalizing problems translate into difficulties in making advances in reading fluency.

In keeping with our expectations (H5), we found that students who had lower educational aspirations in Grade 6 had manifested higher (albeit diminishing) levels of externalizing problems in the period from the first to the fourth grade. Children manifesting a higher degree of externalizing problems were less determined to continue their education and found school less important than their peers by the end of elementary school and before the transition to lower

secondary school. Such a devaluing of schooling likely reflects the findings of previous studies showing that a long-term consequence of externalizing problems is a gradual process of disconnecting from school and ultimately dropping out of education (Griffiths et al., 2012; McLeod & Fettes, 2007). In the group of children with the lowest educational aspirations, approximately one fourth manifested a clinically significant degree of hyperactivity/inattention and conduct problems in Grade 1. Although these findings should be interpreted with some caution because the association between SDQ bands and grouping was not statistically significant for either of the externalizing domains, the findings corroborate the LGM results indicating that a higher degree of externalizing symptoms in the first four years of school had negative consequences for future educational aspirations. The results further showed that part of the impact of externalizing problems in Grade 1 on educational aspirations in Grade 6 was mediated by the child's interest in reading, supporting the hypothesis of mediator effects (H6). Thus, externalizing problems were detrimental to future educational aspirations also because of the association of these problems with a lower interest in reading. These findings are important because they imply that although students displaying externalizing problems may suffer from poor self-regulation skills in their first year of school, these students may benefit from instruction that triggers situational enthusiasm and positive affect and helps them to develop a more enduring interest in major school subjects, which, in turn, may promote positive beliefs about the importance and value of schooling.

## **5.2 Limitations and practical implications**

This study has limitations that should be acknowledged. First, children with an early risk for reading problems were overrepresented in the sample. This limitation was controlled for by setting the risk for developing reading difficulties as a covariate in the model. Second, the

measure for interest in reading comprised three items only. Thus, although the current three-item scale has been used in several previous publications demonstrating acceptable psychometric properties (i.e., internal consistency and predictive validity; see Aunola et al., 2013; Natale et al., 2009; Nurmi & Aunola, 2005; Viljaranta et al., 2014), this limitation should be taken into account in any attempt to generalize the findings of the present study. Third, in the mediational analysis, externalizing behaviors and interest in reading were modeled using Grade 1 measurements. Consequently, there is an evident need for future studies in which mediator effects are examined with the use of cross-lagged longitudinal models. Fourth, the association between externalizing problems and reading skills should be interpreted in view of the high degree of transparency of Finnish, which makes the development of reading fluency a faster process for the majority of children beginning to read (Holopainen, Ahonen, & Lyytinen, 2001; Lerkkanen et al., 2004) than do languages (e.g., English) with a less regular grapheme-to-phoneme correspondence (Georgiou, Hirvonen, Liao, Manolitsis, Parrila, & Nurmi, 2011). In languages with a lower degree of orthographic consistency, the level of externalizing problems may be directly associated with reading fluency, a hypothesis that future studies should investigate. Finally, even when using latent growth modeling, questions concerning evidence of causality should be addressed with caution.

From a practical perspective, our findings demonstrate that children with a higher level of externalizing problems at the beginning of their school careers are less likely than children without such problems to find reading tasks interesting or enjoyable. Clearly, more effort should be directed to fostering interest in reading among these children in order to prevent the building up of difficulties over time. Research has documented that the kinds of experiences that children have in classrooms and particularly the instructional support provided by teachers strongly affect

the students' intrinsic motivation for reading (Hidi, 2006; Wigfield, Guthrie, Tonks, & Perencevich, 2004). Instructional strategies for promoting students' situational interest may include stimulating reading tasks and topics that contain novel, personally relevant elements (Ainley, Hidi, & Berndorff, 2002; Hidi & Harackiewicz, 2000) and hands-on activities to spark intrinsic interest and curiosity in a topic followed by an immediate connection to engaging books and texts matched to the student's skill level (Guthrie et al., 2006; Wigfield et al., 2004). According to Hidi and Renninger's (2006) four-phase model, the frequent occurrence of learning experiences triggering situational interest is likely to foster the development of more enduring intrinsic interest in reading over time. Hidi and Harackiewicz (2000) emphasized the need to consider extrinsic rewards and externally triggered situational interest to reach those students who have no initial interest in reading. Interest in reading can also be fostered by adapting learning activities to individual needs and by supporting student autonomy and choice over texts and activities (Wigfield et al., 2004). In classrooms where teachers emphasize child-centered teaching practices by providing active reinforcement for learning efforts and tailoring teaching practices according to students' interests, children have been shown to manifest a higher level of interest in reading than students in other classrooms (Lerikkanen et al., 2012).

### **5.3 Conclusion**

The results of the present study provide new knowledge concerning the developmental paths and consequences of externalizing problems, that is, how problem behaviors are interlinked with interest in reading, and how in tandem they contribute to the development of reading skills and educational aspirations. One of the unique strengths of the study was the use of latent growth modeling techniques that have not previously been used to illustrate the conjoint changes in children's externalizing behaviors and interest in reading over time. Moreover, we used measures

derived from different raters: The degree of externalizing problems was rated by teachers, interest in reading was reported by the students themselves, and reading skills were based on standardized test batteries. This makes it unlikely that the interrelationships between constructs were attributable to a shared method variance. The findings significantly improve our understanding of why the educational progress of children with a higher level of externalizing problems may be compromised. This knowledge can be utilized to provide more effective support for engagement with learning among these children.

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## Figure captions

*Figure 1.* Latent growth model including growth parameters for externalizing problems and interest in reading, their interrelationships, and their associations with developmental outcomes. Paths are presented as standardized estimates. \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ . The following significant paths from covariates to the other variables of the model were omitted from the figure: from early reading fluency to reading fluency (.37\*\*\*) and to reading comprehension (.29\*\*\*) in Grade 6; from parental education (-.13\*\*) and student's gender (.38\*\*\*) to the intercept of externalizing problems; and from the student's gender to the intercept (-.16\*\*) and to the slope (-.19\*\*) of interest in reading. The following significant correlations among covariates and outcomes were also omitted from the figure: from parental education to risk for reading difficulty (RD) (-.21\*\*\*) and to early reading fluency (.21\*\*\*); from gender to RD (.21\*\*\*) and to early reading fluency (-.19\*\*\*); from RD to early reading fluency (-.49\*\*\*); and from educational aspirations to reading comprehension (.19\*\*).

*Figure 2.* Association between the intercept of reading interest and the slope of externalizing problems.

*Figure 3.* Association between the rate of change in externalizing problems and educational aspirations.

*Figure 4.* Association between the rate of change in externalizing problems and reading comprehension.

Table 1  
*Psychometric Properties of the Study Variables*

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	Range	
				Potential	Actual
<u>Key variables</u>					
Externalizing problems (Grade 1)	483	1.52	.46	1–3	1–2.90
Externalizing problems (Grade 2)	498	1.51	.48	1–3	1–2.90
Externalizing problems (Grade 3)	474	1.51	.48	1–3	1–2.90
Externalizing problems (Grade 4)	433	1.43	.41	1–3	1–3.00
Interest in reading (Grade 1)	586	3.73	1.05	1–5	1–5.00
Interest in reading (Grade 2)	578	3.64	.98	1–5	1–5.00
Interest in reading (Grade 3)	592	3.41	1.12	1–5	1–5.00
Interest in reading (Grade 4)	565	3.46	1.04	1–5	1–5.00
<u>Academic outcomes</u>					
Educational aspirations (Grade 6)	388	3.43	.56	1–4	1–4
Reading fluency (Grade 6)	392	46.45	10.31	0–80	11–80
Reading comprehension (Grade 6)	392	7.01	2.64	0–12	0–12
<u>Covariates</u>					
Child gender (1=girl; 2=boy)	642	1.57	.50	1–2	1–2
Risk for reading difficulties (0=no risk; 1=at-risk)	642	.50	.50	0–1	0–1
Parental education	587	4.24	1.46	1–7	1–7
Reading skills (Grade 1, at school entry)	611	6.76	6.24	0–80	0–35

Table 2

*Correlations between Study Variables*

Study variables	1	2	3	4	5	6	7	8	9	10	11
<u>Key variables (Grades 1- 4)</u>											
1 Externalizing problems (G1)	--										
2 Externalizing problems (G2)	.82***	--									
3 Externalizing problems (G3)	.74***	.79***	--								
4 Externalizing problems (G4)	.67***	.72***	.78***	--							
5 Interest in reading (G1)	-.18***	-.13**	-.14**	-.09	--						
6 Interest in reading (G2)	-.24***	-.22***	-.22***	-.23***	.37***	--					
7 Interest in reading (G3)	-.20***	-.22***	-.23***	-.25***	.25***	.40***	--				
8 Interest in reading (G4)	-.20***	-.26***	-.26***	-.27***	.20***	.40***	.61***	--			
<u>Academic outcomes (Grade 6)</u>											
9 Educational aspirations	-.12*	-.16**	-.16**	-.22***	.22***	.15**	.17**	.17**	--		
10 Reading fluency	-.17**	-.16**	-.19**	-.18**	.14**	.12*	.18***	.21***	.09		
11 Reading comprehension	-.22***	-.26***	-.26***	-.28***	.01	.05	.16**	.19***	.25***	.22***	--

Note. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ . G = grade.

Table 3

*Standardized Estimates of Indirect Effects: Interest in Reading as a Mediator*

Indirect effect	Estimate (S.E)
<u>From externalizing problems (intercept) via interest in reading (intercept) to academic outcomes</u>	
Externalizing problems (Grade 1) – Interest in reading (Grade 1) – Educational aspirations (Grade 6)	–0.091 (0.034)**
Externalizing problems (Grade 1) – Interest in reading (Grade 1) – Reading Fluency (Grade 6)	–0.046 (0.022)*
Externalizing problems (Grade 1) – Interest in reading (Grade 1) – Reading Comprehension (Grade 6)	0.008 (0.025)
<u>From externalizing problems (intercept) via interest in reading (slope) to academic outcomes</u>	
Externalizing problems (Grade 1) – Interest in reading (Grades 1–4) – Educational aspirations (Grade 6)	0.001 (0.006)
Externalizing problems (Grade 1) – Interest in reading (Grades 1–4) – Reading Fluency (Grade 6)	0.007 (0.010)
Externalizing problems (Grade 1) – Interest in reading (Grades 1–4) – Reading Comprehension (Grade 6)	0.005 (0.009)

\*  $p < .05$ ; \*\*  $p < .01$  (two-tailed testing of significance)



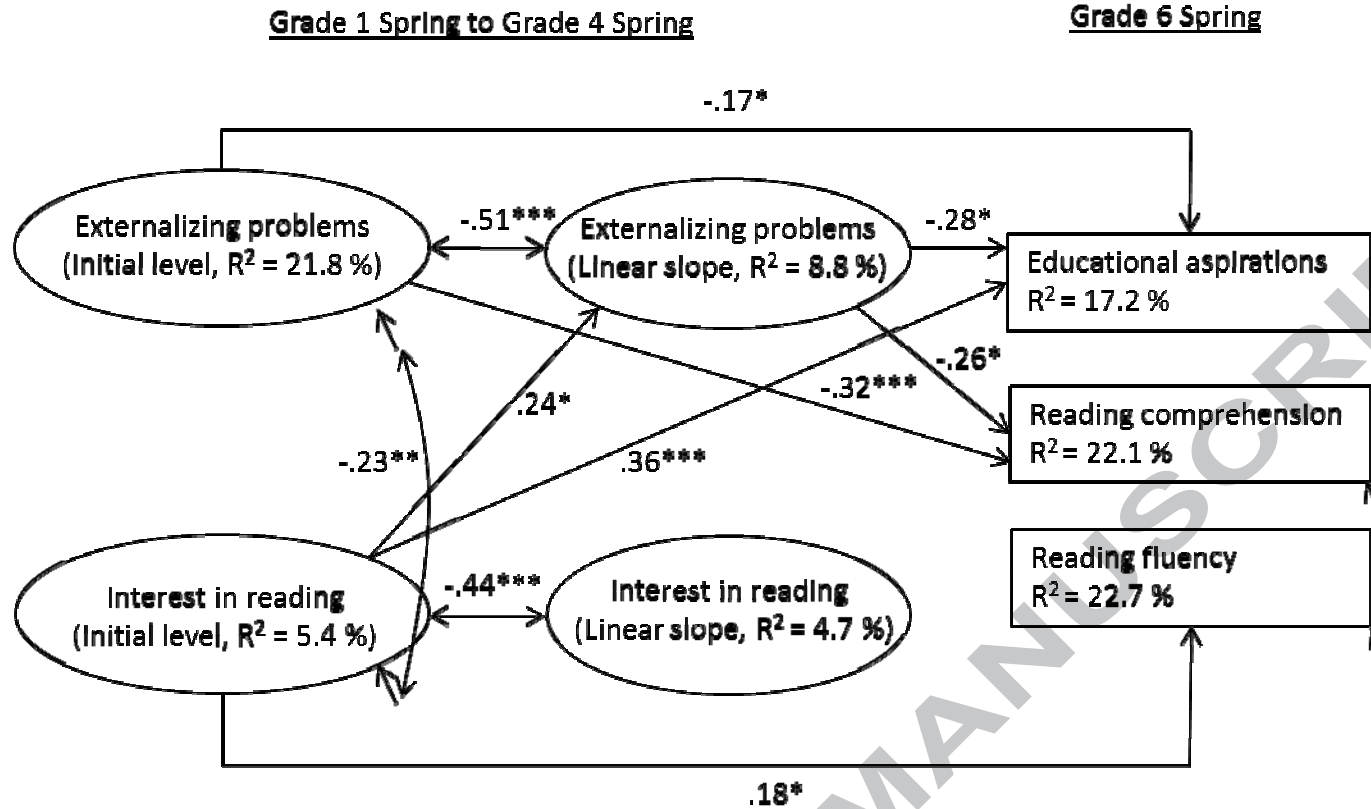


Figure 1.

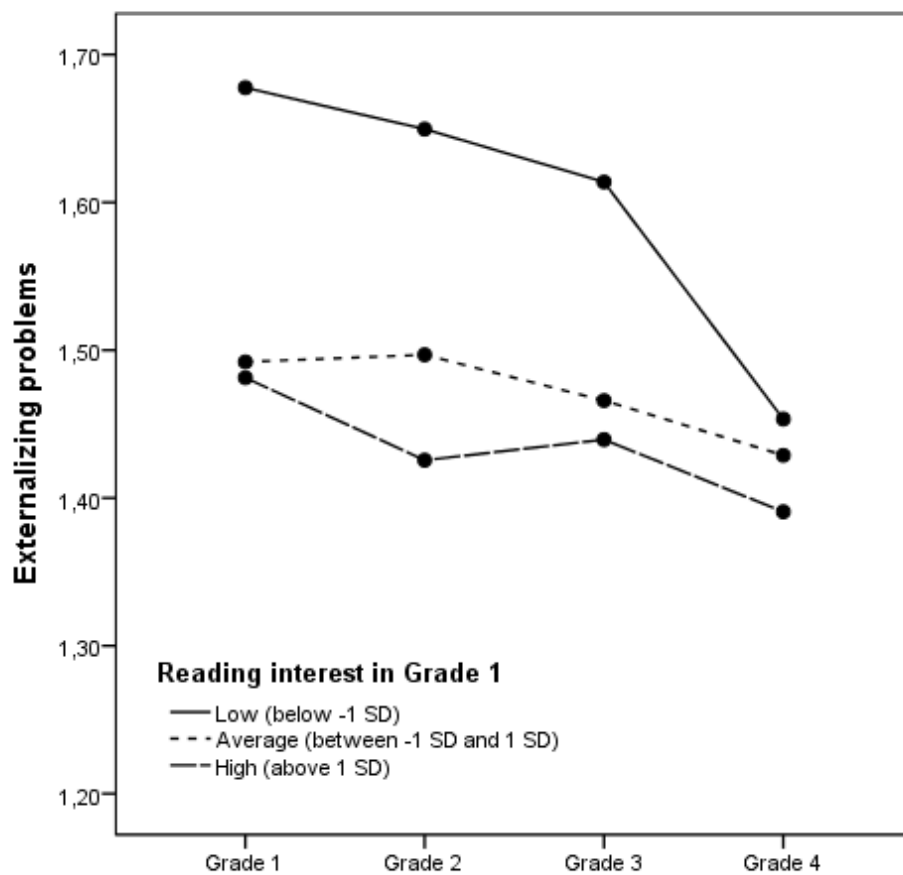


Figure 2.

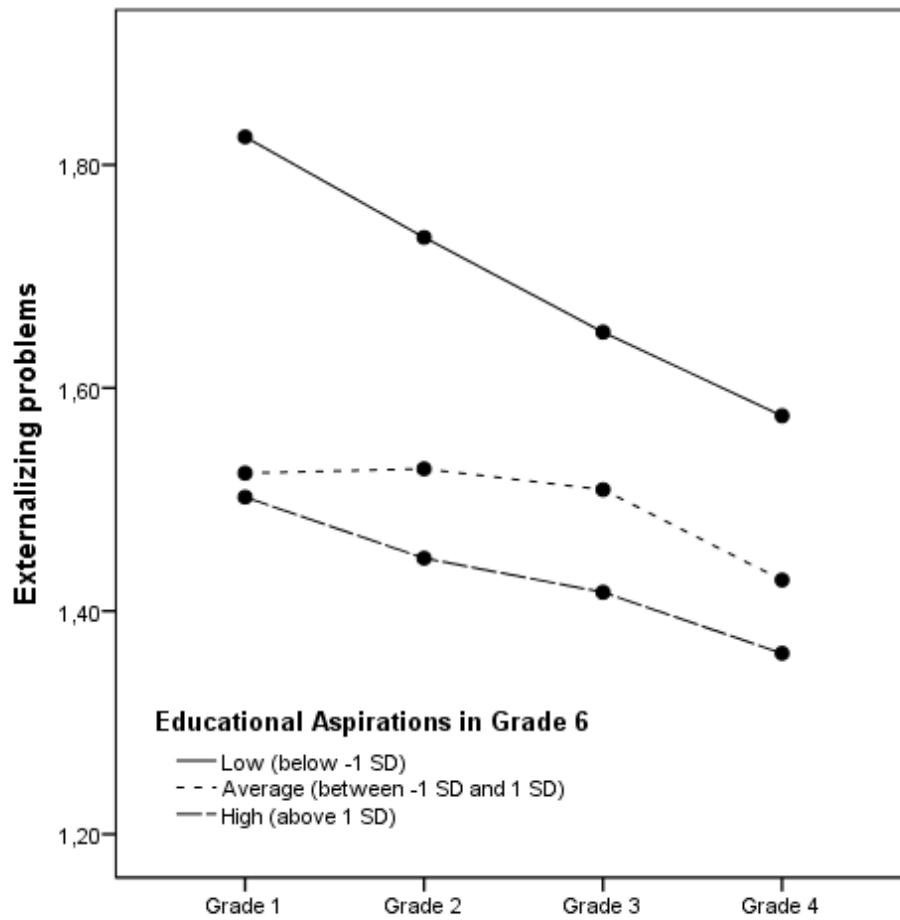


Figure 3.

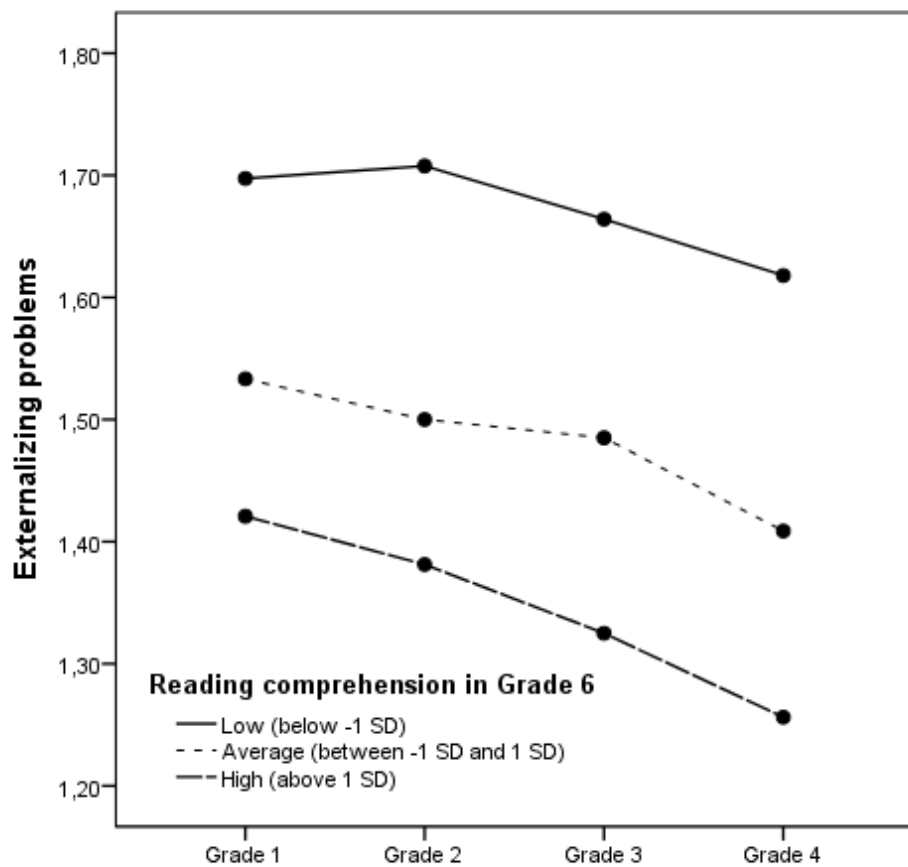


Figure 4.

Externalizing Problems and Reading Interest as Predictors of Later Reading Skills and  
Educational Aspirations

**Highlights**

- Higher level of externalizing problems was related to lower interest in reading in Grade 1
- Higher initial level and a decrease in externalizing problems across Grades 1–4 predicted poorer reading comprehension and lower educational aspirations in Grade 6
- Externalizing problems were associated with future academic outcomes via interest in reading
- Difficulties in behavioral, motivational, and academic domains were interlinked in elementary school years