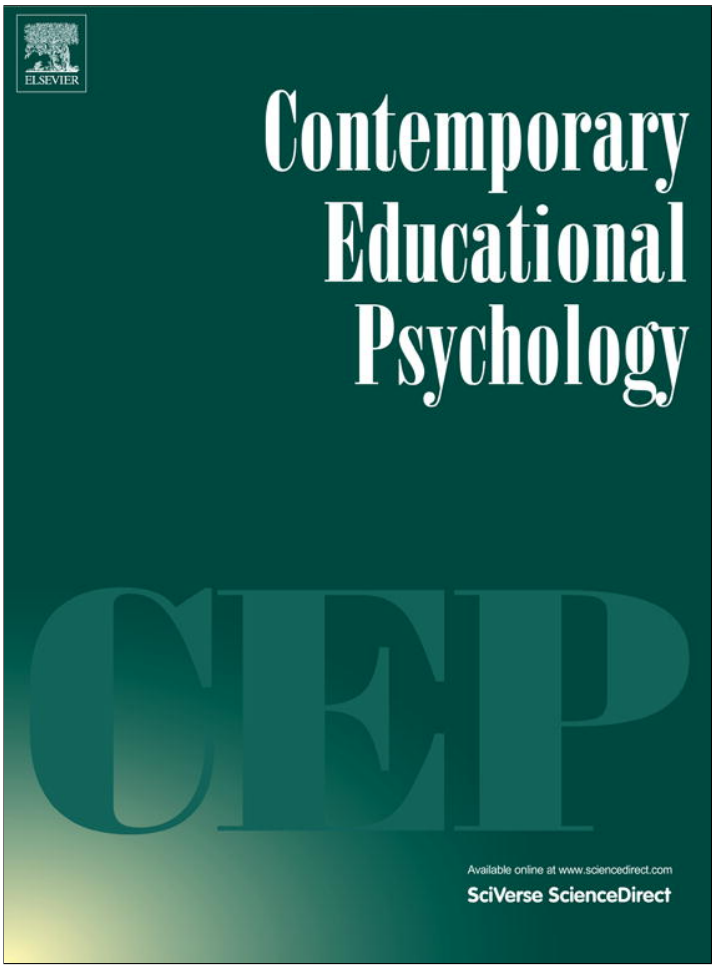

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The cross-lagged associations between classroom interactions and children's achievement behaviors

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ABSTRACT

This study examined the cross-lagged associations between the quality of classroom interactions and children's behaviors in achievement situations. The achievement behaviors in challenging test situations of 166 Finnish children from 70 classrooms were rated by trained testers in grades 1 and 2. The quality of classroom interactions in terms of emotional support, classroom organization, and instructional support were observed in 25 classrooms (out of 70) in grades 1 and 2. The results of multilevel modeling showed that classroom teachers' low emotional support predicted children's subsequent high passive avoidance, whereas high classroom organization and instructional support predicted children's high social dependence. Furthermore, the more children showed active task avoidance, the more emotional and instructional support and classroom organization teachers showed later on in the classroom. The findings emphasize the importance of warm and supportive classroom interactions for children's adaptive achievement behaviors. The results also suggest that teachers adapt their classroom interactions with respect to children's active task avoidance.

1. Introduction

Children differ regarding their affective and behavioral responses in the face of academic challenges. Whereas some children react to challenging and demanding achievement situations with enthusiasm and by focusing on the task at hand, others become anxious, passive, and helpless, or try to actively avoid challenging tasks (Pekrun, 2006; Ziegert, Kistner, Castro, & Robertson, 2001; for a review, Turner et al., 2002). Some children, in turn, lean on adults and seek help and social acceptance in achievement situations more than other children (Lepola, Salonen, & Vauras, 2000). As these kinds of achievement behaviors have been found to be strongly linked with academic outcomes, the role of teachers in evoking achievement-related emotions and promoting adaptive ways to cope with challenging learning situations becomes a central issue. Although previous studies have shown that teaching practices play an important role in students' emotions (Goetz, Lüdtke, Nett, Keller, & Lipnevich, 2013) and achievement behaviors (Anderman et al., 2001; Turner et al., 2002; Urdan, Midgley, & Anderman, 1998; for a review see, Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006), research in the field has at least three limitations. First, previous studies have mainly used questionnaire data on teaching practices and, thus, less is known about the role of observed classroom interactions in children's achievement behaviors. Second, because most of the previous research on achievement behaviors focused on older students, little is known about the classroom-related antecedents of achievement behaviors among children in early school years when maladaptive behaviors begin to emerge (Eccles, 1999). Third, because of the lack of cross-lagged research on children's achievement behaviors and teacher–child interactions, it is not known whether it is teacher–child interactions that impact children's behavior or rather vice versa. Consequently, the present study aimed to examine the cross-lagged associations between classroom interactions and children's achievement behaviors during grades 1 and 2.

1.1. Children's behaviors in achievement situations

Several theoretical frameworks have described the factors and mechanisms that influence students' achievement behaviors, such as the expectancy-value theory of achievement motivation (Wigfield & Eccles, 2000) and the control-value theory of

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achievement emotions (Pekrun, 2006). The expectancy-value theory (Eccles, 2005; Wigfield & Eccles, 2000) suggests that students' expectancies of success and reasons for engaging in tasks influence their achievement-related efforts, choices, and persistence in learning situations. The expectancies and values originate from previous learning experiences and related affects and beliefs (Wigfield & Eccles, 2000). The control-value theory of achievement emotions (Pekrun, 2006), in turn, emphasizes the role of emotions in the learning process by suggesting that achievement emotions originate from students' control and value appraisals in achievement situations (Pekrun, 2006). Those emotions then have consequences for students' achievement behaviors, motivation, and academic outcomes.

In the present study, the focus was on three forms of maladaptive achievement behavior, namely, children's active task avoidance, passive avoidance (or helpless behavior), and social dependence. Two kinds of avoidance patterns were introduced in previous literature. Passively avoidant students lack belief in their ability to control the outcomes of their learning behavior. Therefore they feel hopeless regarding their ability to succeed, which leads to passivity and withdrawal in learning situations (Abramson, Seligman, & Teasdale, 1978; Nolen-Hoeksema, Girgus, & Seligman, 1986; cf. Pekrun, 2006). In turn, active forms of avoidance, such as self-handicapping or a blunting type of coping, are fueled by anxiety and fear of failure, which then lead to a low level of effort and active attempts to avoid a challenge by doing something else (Aunola, Nurmi, Niemi, Lerkkanen, & Rasku-Puttonen, 2002). In the self-handicapping pattern, students engage in active task avoidance as they make an effort to create behavioral excuses for expected failure (Jones & Berglas, 1978). In blunting types of coping, individuals actively avoid a task as a coping effort to reduce their anxiety (Miller, 1989). Social dependence on adults has also been described as one form of maladaptive pattern in achievement situations, because it leads to low levels of self-directedness and academic readiness in the classroom (Lepola et al., 2000; Pianta, Steinberg, & Rollins, 1995). Although looking for the support of teachers is a natural part of the teacher–student relationship, excessive social dependence leads to learning behavior that lacks autonomy and self-directedness when facing challenging learning tasks. In the present study, we were interested in whether these three forms of maladaptive achievement behaviors (active avoidant, passive avoidant, and social dependent) would be differently related to classroom interactions, as they may partly originate from different teacher practices (Goetz et al., 2013), as well evoke different reactions from teachers (Nurmi, 2012).

The present study operationalized children's behavioral responses in achievement situations as observer-rated active avoidant, passive avoidant, and social dependent behaviors (see also Hirvonen, Aunola, Alatupa, Viljaranta, & Nurmi, 2013; Zhang, Nurmi, Kiuru, Lerkkanen, & Aunola, 2011). Although most of the previous research has used teacher–ratings of children's task-avoidant versus task-focused behaviors (e.g., Aunola et al., 2002; Georgiou, Manolitsis, Nurmi, & Parrila, 2010; Hirvonen, Georgiou, Lerkkanen, Aunola, & Nurmi, 2010; Stephenson, Parrila, Georgiou, & Kirby, 2008) or students' own ratings (e.g., Carr, Borkowski, & Maxwell, 1991; Mägi, Häidkind, & Kikas, 2010), observer ratings of children's achievement behaviors have been suggested in order to provide more objective information on the phenomena as the observers do not know the children in advance (e.g., Hirvonen et al., 2013; Mägi et al., 2010). The observer ratings provide information about children's actual behavioral responses in achievement situations that are not biased, for example, by teachers' expectations and beliefs concerning children. Children's own ratings, in turn, might reflect more the way in which they think teachers and parents would like them to behave.

The cognitive, affective, and behavioral responses and reactions children display in the face of challenging achievement situations are important because they have been found to influence their academic skills and performance (Aunola et al., 2002; Kikas, Peets, Palu, & Afanasjev, 2009; Onatsu-Arvilommi, Nurmi, & Aunola, 2002). In general, adaptive motivational and behavioral patterns characterized by positive affect, high success expectations, task-focused behavior, and high effort and persistence in tasks (e.g., Cain & Dweck, 1995; Onatsu-Arvilommi & Nurmi, 2000) have been shown to predict positive learning outcomes (Aunola et al., 2002; Dweck & Leggett, 1988; Onatsu-Arvilommi et al., 2002). In turn, maladaptive patterns typified by anxiety, failure expectations, helplessness beliefs, lack of effort, and task avoidance when facing challenges (e.g., Carr et al., 1991; Onatsu-Arvilommi & Nurmi, 2000) have been related to poor learning outcomes, low school performance (Carr et al., 1991; Onatsu-Arvilommi & Nurmi, 2000; Onatsu-Arvilommi et al., 2002), and learning disabilities (Poskiparta, Niemi, Lepola, Ahtola, & Laine, 2003). Similarly, high levels of social dependence on adults have been related to low levels of academic readiness and self-directedness in the classroom (Pianta et al., 1995), as well as to low pre-reading skills measured in kindergarten (Lepola et al., 2000).

When studying the development of children's achievement-related behavioral patterns, the first school years, in particular, might be assumed to be an important period. First, during the transition to formal schooling, children confront various new challenges and rapid changes not only in their cognitive abilities but also in their self-concepts (Entwisle & Alexander, 1998; Entwisle, Alexander, Pallas, & Cadigan, 1988), changes which might be assumed to be reflected also in the development of children's achievement-related motivational and behavioral patterns. In addition, classroom environments set multiple demands on children's behavior. For example, they are expected to be able to control their attention and behavior, follow multiple task instructions, switch between tasks, and direct their focus to tasks while ignoring external distractions. Second, because achievement-related behaviors and performance start to form cumulative cycles already from the very beginning of schooling (Onatsu-Arvilommi & Nurmi, 2000; Onatsu-Arvilommi et al., 2002; Ziegert et al., 2001), it is important to focus on the factors contributing to this development already during the first school years. In addition, teacher instruction is strongly focused on enhancing children's working habits and motivation for learning during the first school years.

1.2. Classroom interactions and children's achievement behaviors

It has been suggested that teacher–child interactions play a key role in the development and maintenance of interpersonal, self-regulatory, and task-oriented competencies that support adjustment in classrooms (Pianta, Nimetz, & Bennett, 1997; see also, Archambault, Pagani, & Fitzpatrick, 2013). For example, teachers may either encourage children's engagement and enthusiasm in learning activities or, alternatively, discourage their efforts and inadvertently augment their anxiety and task-avoidant behavior. Teaching also plays a central role in evoking achievement emotions in the classrooms (Goetz et al., 2013; Pekrun, 2006), and, thus, influences students' achievement behaviors. Moreover, self-determination theory (STD; Deci & Ryan, 2000) posits that students feel motivated to learn and confident in their abilities when their needs for autonomy, competence, and relatedness are supported in the classroom. In addition, achievement goal orientation literature suggests that students show adaptive achievement behaviors in classrooms where the atmosphere and teacher practices are focused on understanding, knowledge, and skills needed to master tasks instead of comparison and competition between classmates (Urdan et al., 1998). Hence, there is evidence to suggest that

teachers' classroom interactions with students affect students' achievement-related emotions, beliefs, and behaviors in the classroom.

Pianta and colleagues have suggested that the quality of classroom interactions can be conceptualized in terms of three domains: emotional support, classroom organization, and instructional support (Pianta & Hamre, 2009; Pianta, La Paro, & Hamre, 2008). *Emotional support* refers to the ways in which teachers help children to develop warm and supportive relationships with others, and to experience enjoyment and excitement about learning (Pianta & Hamre, 2009; Pianta et al., 2008). In classrooms with high emotional support, teachers are sensitive to children's needs and interests, and show responsiveness and warmth (Pianta et al., 2008). Emotionally supportive teachers also provide children with appropriate levels of autonomy or independence and help children to feel comfortable in the classroom (Pianta et al., 2008). *Classroom organization* is defined in terms of managing time, attention, and activities in the classroom (Pianta et al., 2008). It refers to the ways in which teachers help children to develop self-regulation skills, get the most learning out of activities, and maintain interest in learning activities (Pianta et al., 2008). In classrooms with effective classroom organization, teachers actively monitor children's schoolwork (Bru, Stephens, & Torsheim, 2002), and are proactive rather than reactive with regard to disruptive behavior (Yates & Yates, 1990). *Instructional support,* in turn, refers to the ways in which teachers implement instructional discussions and activities to effectively support children's cognitive development and language growth (Pianta & Hamre, 2009; Pianta et al., 2008). In classrooms with high-quality instructional support, teachers provide scaffolding (Yates & Yates, 1990), create opportunities for concept development, use questioning and feedback in supportive ways (Pianta et al., 2008), and promote students' problem-solving, creative thinking, and complex language skills (Pianta et al., 2008).

The self-determination theory (Deci & Ryan, 2000) provides a basis for postulating hypotheses concerning the links between achievement behaviors and classroom interactions. For example, emotional support from teacher can be assumed to promote children's autonomy and connectedness with teachers and school, thereby fulfilling their needs for autonomy and relatedness (Furrer & Skinner, 2003). Teacher emotional support may also reduce stress in demanding situations and, in this way, increase children's focus on and interest in learning tasks (Wang & Eccles, 2012). In turn, by setting clear expectations for behavior, clear rules, and well-established routines, i.e., high-quality classroom organization, teachers specify guidelines that students can follow in order to support their feelings of competence (Grolnick & Fargas, 2002; see also Grolnick & Ryan, 1987). High-quality classroom organization may also promote children's self-regulatory skills, such as ability to focus on the task at hand and to persist at a task (e.g., Hamre et al., 2013). Well-grounded feedback and high-quality instruction that promotes understanding and active participation may also enhance children's ability and willingness to persist at tasks and activities.

Previous literature has found associations between classroom interactions and achievement behaviors, also referred to as on-task behavior, academic/learning behavior, and behavioral engagement. Emotional support by teachers, for example, is related to children's behavioral adjustment in preschool (Mashburn et al., 2008) and strong engagement in schoolwork in first grade (NICHD Early Child Care Research Network, 2003). Similarly, classroom organization has been associated with children's high behavioral engagement in kindergarten (Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009) and in first grade (Ponitz, Rimm-Kaufman, Brock, & Nathanson, 2009), with on-task behavior in kindergarten (Pianta, La Paro, Payne, Cox, & Bradley, 2002; Pianta et al., 2008; Rimm-Kaufman, La Paro, Downer, & Pianta, 2005; Rimm-Kaufman et al., 2009), and with positive change in children's adaptive learning behavior during preschool (Domínguez, Vitiello, Maier, & Greenfield, 2010). Instructional support, in turn, has been linked with children's high engagement and attention in academic activities in primary school (Downer, Rimm-Kaufman, & Pianta, 2007; Pianta et al., 2008; Wharton-McDonald, Pressley, & Mistretta-Hampston, 1998) and kindergarteners' low rates of task-avoidant behavior (Pakarinen et al., 2011a).

It has also been suggested that, rather than being a one-directional relationship, the associations between classroom interactions and children's achievement behaviors might also be transactional (Nurmi, 2012; Sameroff & Fiese, 1990; Skinner, Furrer, Marchand, & Kindermann, 2008). On the one hand, children who perceive their teachers as supportive and providing well-organized activities might be better engaged and responsive to academic demands. On the other hand, there is some evidence to suggest that children and their characteristics influence teachers and their instructional practices (Nurmi, Viljaranta, Tolvanen, & Aunola, 2012; Pakarinen, Lerkkanen, Poikkeus, Siekkinen, & Nurmi, 2011b). For example, teachers have been found to report more socioemotional support and more behavioral regulation for children with whom they have conflictual or dependent relationships in kindergarten (Thijs, Koomen, & van der Leij, 2008). Annevelink, Bosker, and Doolaard (2004) showed that children with disruptive behavior in grade 1 had more interactions with their teachers than other children. In other words, teachers also react to children's achievement behaviors by tailoring their classroom practices (see Nurmi, 2012). Maladaptive achievement behaviors may evoke increased instructional responses, i.e., teachers spending more time redirecting children's behavior or attention to tasks, thereby decreasing time spent in instruction (Valiente, Lemery-Chalfant, & Castro, 2007). Children's adaptive achievement behaviors, such as persistence and task focus, might, in turn, be related to positive affect of teachers and classroom interactions (Roorda, Koomen, Spilt, & Oort, 2011; Sutton & Wheatley, 2003).

Previous research on the associations between classroom interactions and children's achievement-related behaviors, however, has some limitations. First, most previous studies have not been longitudinal. Consequently, little is known about the extent to which teachers' teaching practices and classroom interactions influence children's achievement behaviors or whether it is rather children's behavior that evokes certain teaching practices (as exceptions, see Nurmi, 2012; Nurmi et al., 2012). Second, the role of classroom interactions in children's learning motivation and related achievement behaviors has been studied to a lesser extent than its role in academic performance (as exceptions, see Cadima, Leal, & Burchinal, 2010; Pakarinen et al., 2011a; Rimm-Kaufman et al., 2009). Third, no previous studies have examined the relations between classroom interactions and different forms of maladaptive achievement behaviors, although it is likely that active and passive task avoidance and social dependence have different origins in classroom interactions, as well as different consequences for classroom interactions. Fourth, despite the growing body of research, classroom interaction and its influences on child outcomes have been studied mainly in the U.S. (as exceptions, see Cadima et al., 2010; Pakarinen et al., 2011a). However, there is a need for studies in different educational contexts to support the notion that mechanisms that promote learning and adjustment in a classroom are universal (Van de Grift, 2007). Finally, most of the studies regarding classroom interactions have focused on preschool-aged children and less is known about the associations between classroom interactions and achievement behaviors at the beginning of schooling. Given that formal schooling places multiple demands on child behavior, the first school years are an important period for forming and supporting adaptive achievement behaviors (Eccles, 1999). Therefore, the present study

examined the cross-lagged relations between observed classroom interactions and different kinds of maladaptive achievement-related behaviors among Finnish children during the first two school years.

As previous studies have indicated that achievement behaviors develop partly as a result of pre-existing academic skills and related feedback (Aunola, Nurmi, Lerkkanen, & Rasku-Puttonen, 2003; Hirvonen, Tolvanen, Aunola, & Nurmi, 2012; Hirvonen et al., 2010), children's academic skills were controlled for in the present study. As boys (Domínguez et al., 2010; Onatsu-Arvilommi & Nurmi, 2000; Urdan et al., 1998) and younger children (Domínguez et al., 2010; Vitiello et al., 2012) have been found to display more dysfunctional behavioral patterns than girls and older children do, children's gender and age were also controlled for in the present study.

1.3. Research questions

The present study investigated the following research questions:

(1) Does the quality of classroom interactions (i.e., emotional support, classroom organization, and instructional support) predict children's achievement behaviors (i.e., active task avoidance, passive task avoidance, and social dependence), when controlling for gender, age, mother's education, and academic skills from a previous time point? In line with the control-value theory of achievement, emotions, and self-determination theory, we expected that low levels of emotional support would predict high levels of active and passive avoidance (Hypothesis 1a; Deci & Ryan, 2000; Goetz et al., 2013; Pekrun, 2006), and low levels of classroom organization and instructional support would predict children's high levels of active and passive avoidance (Hypothesis 1b; Pakarinen et al., 2011a; Rimm-Kaufman et al., 2009). No hypotheses were formulated regarding the associations with social dependence.

(2) Do achievement behaviors predict the subsequent quality of classroom interactions, when controlling for age, gender, mother's education, and academic skills from a previous time point? In line with the postulates of transactional theory (Sameroff & Fiese, 1990), we expected that children's active avoidance would contribute to the high quality of subsequent classroom interactions, i.e., emotional support, classroom organization, and instructional support (Hypothesis 2; Annevelink et al., 2004; Nurmi, 2012; Thijs et al., 2008).

2. Method

2.1. Participants

2.1.1. Children

The present study is a part of the First Steps Study (Lerkkanen et al. 2006) in which 1880 children were followed from kindergarten to grade 4. The original sample was recruited from four municipalities in Finland: two in Central, one in Western, and one in Eastern Finland (classroom observations were conducted only in three municipalities). The children comprised the whole age cohort from three municipalities and about half of the age cohort from one municipality. Parental written consent was received from all participating children. The representativeness of the children's family backgrounds (e.g., parents' educational level) with respect to the general Finnish population was good (Statistics Finland, 2007). To obtain the subsample, we first selected 251 children in the 1st grade by randomly sampling a small number of children from each classroom from the three municipalities in which classroom observations were conducted. These children were randomly selected from a larger sample of children (1880) with the aim of taking three children from each class. However, due to particularly small or particularly large classes, the actual number of children from different classes ranged between one and four, with a median of three ($M = 2.37$, $SD = .75$). The reason for creating the subsample was to reduce the teachers' workload. Only children whose classroom teacher remained the same during the 1st (T1) and 2nd (T2) grades were included in the study. We also excluded children who were enrolled in special education classrooms and ended up with a subsample of 166 children (90 boys; age at school entry: $M_{age} = 86.10$ months, $SD = 3.38$ months). Children's achievement behaviors and academic skills were measured on two time points: end of the first grade (T1) and end of the second grade (T2).

2.1.2. Teachers and classrooms

All of the 70 teachers in our sample provided their written consent before the study. All of the participating classrooms belonged to mainstream schools from two medium-sized towns and one municipality located in Central and in Eastern Finland, with Finnish as the principal language used in the schools. The mean class size was 18.47 children ($SD = 5.13$; range 5–27 children) and 19.59 children ($SD = 4.49$; range 7–28 children) in grades 1 and 2, respectively. Out of a total of 70 teachers, a subsample of 25 teachers (2 male) participated in classroom observations on a voluntary basis. Nearly all (87.9%) of the 70 teachers had at least a master's degree in education, and the teachers' teaching experience ranged from less than a year to more than 15 years (*Mode* = - more than 15 years). Classroom interactions were observed on two time points: at the end of grade 1 (T1) and at the end of grade 2 (T2) about four weeks before the children's measurements.

Classroom observations were available only for a subsample of 25 out of 70 teachers,while other data were available for all 70 teachers. Inquiries concerning voluntary participation in the observations were made to all teachers in the three towns, with about a third consenting to participate. Because classroom observations are time- and resource-consuming it would not have been feasible to conduct observations in all classrooms. To use all the data in such a case, the missingness should be random (Muthén & Muthén, 1998–2010). Consequently, the assumption of missingness-at-random was tested in two ways. First, we compared the 25 teachers who participated in observations to those who did not participate with regard to a broad set of background variables. The results showed no statistically significant differences between the compared groups in their age, educational background, professional experience, number of children in the classrooms, mean age of the children, and number of available personnel. In addition, we compared the variances in children's achievement behaviors and academic skills in the observed classrooms to those classrooms that were not observed. No statistically significant differences were found. Thus, the observed teachers and classrooms did not differ from the rest of the sample with regard to the research variables. Second, we tested the missing-at-random assumption with regard to the variables in this study. To accomplish this, we conducted Little's Missing-Completely-At-Random tests (MCAR tests; Little, 1988) separately for the class-level variables and the individual-level variables. The results of the MCAR tests showed that the missingness was random both at the individual level: $\chi^2(22) = 19.11$, $p > .05$ and at the class level: $\chi^2(172) = 203.02$, $p > .05$. Because the missing data proved to be missing-at-random, statistical analyses were carried out using the full-information maximum likelihood estimation (FIML), which allows all the information available to be used without imputing data (Muthén & Muthén, 1998–2010). Consequently, we were able to use the data for all children ($N = 166$) in further analyses, although teacher–child

interaction information was gathered from only 25 classes. This kind of approach has been used previously in some studies (e.g., Lerkkanen et al., submitted for publication; Pakarinen et al., 2011a, 2011b). To make sure that the results would be similar in the smaller sample, we also carried out some additional analyses using only the subsample of 25 observed teachers. The pattern of the results using this subsample was very similar to those including the whole sample, although the ability to detect significant results decreased somewhat with the decrease in sample size.

2.1.3. Education in Finland

The present study was conducted in Finland, where compulsory formal education consists of nine years of comprehensive school (six years of elementary school and three years of secondary school). Elementary school begins at age seven, which is later than in many other countries. However, all six-year-olds are entitled to a kindergarten education at day care centers or schools for one year before starting basic education. Kindergartens and schools set up their own curricula on the basis of the national core curriculum (National Board of Education, 2004). The national curriculum of the first grade includes 6 h of literacy teaching per week. In these hours, students focus on learning to decode syllables and words, and practice fluency and comprehension with alphabet books. Since word-level decoding reaches a high level of accuracy for most first graders after only a few months of school, students' long-term commitment to and motivation for silent reading to improve their fluency and comprehension is supported weekly from grades 1 and 2 onwards, soon after they have acquired the decoding skill (Lerkkanen, 2007). Student gains in reading are encouraged by the availability of high-interest texts at multiple levels and by giving students the freedom to choose reading material and providing then time to read what they want without evaluative measures. Besides achieving specific skills, such as learning to read and mathematics, teachers put a lot of effort into enhancing children's motivation and working habits during the first school years (National Board of Education, 2004).

2.2. Measures

2.2.1. Achievement behaviors

Children's achievement behaviors in individual test situations were rated twice (T1 and T2) by trained research assistants, who administered all the reading and math tests. Immediately after the testing session, the assistants rated the child's behavior in a given situation using the Observer-rating Scale of Achievement Strategies (OSAS; Nurmi & Aunola, 1998; for more information on validity of scales in Finnish samples, see Aunola et al., 2003; Zhang et al., 2011). *Active Avoidance* (2 items: *If there are problems with the task, the child starts doing something else; if the child cannot cope with the task, s/he becomes interested in other things in the room*) measures to what extent the child diverts his or her attention from the task as task difficulty increases. *Passive Avoidance* (4 items: *Although the task becomes difficult for the child, s/he tries hard to finish it (reversed); the child tries persistently to do the task (reversed); if there are problems with the task, the child stops doing it and waits passively; the child gives up easily or say that s/he cannot do the task even before trying it*) measures to what extent the child gives up easily and stays passive rather than makes an active effort as task difficulty increases. *Social Dependence* (2 items: *If there are problems with the task, the child turns to the tester; the child seeks the tester's support when doing the task*) measures to what extent the child constantly looks for signals of approval or support for his or her task performance from the investigator. After testing each child on an individual basis, the testers were asked to consider the child's behavior as the task became more difficult, and then to rate his or her behavior on a 7-point scale (1 = *not at all*; 7 = *always or almost all the time this kind of behavior*). Composite scores for children's Active Avoidance, Social Dependence, and Passive Avoidance were created by computing the mean scores of the particular items. The Cronbach alpha coefficients for the first (T1) and second (T2) grades were 0.89 and 0.88 respectively for the Active Avoidance scale, 0.82 and 0.74 respectively for the Passive Avoidance scale, and 0.91 and 0.87 respectively for the Social Dependence scale. Active Avoidance in both grades correlated significantly with teacher ratings of task avoidance ($r = 0.19$ T1; $r = 0.23$ T2) and hyperactivity ($r = 0.19$ T1; $r = 0.30$ T2). In previous studies, tester-rated active task avoidance has been found to be related to teacher ratings of task avoidance (Aunola et al., 2003; see also Zhang et al., 2011).

2.2.2. Reading skills

In grade 1 (T1), a group-administered subtest of the nationally standardized reading test battery developed for children from grade 1 to grade 6 (ALLU; Lindeman, 1998) was used as a measure of reading skills. In the task assessing *the accuracy and fluency of decoding*, a maximum of 80 items could be attempted within a 2-min time limit. For each item, there was a picture with four words next to it, and the child was asked to read the four phonologically similar words and to draw a line to semantically match the picture to the word. The score was derived by calculating the number of correct answers (maximum score 80). In a highly transparent language, such as Finnish, only a fluency measure can differentiate between children's decoding skills across their primary school years (see Lerkkanen, Rasku-Puttonen, Aunola, & Nurmi, 2004). The mean for the test was 20.01 ($SD = 9.20$). According to the test manual (Lindeman, 1998), the Kuder–Richardson reliability coefficient was 0.97 in grade 1.

2.2.3. Math skills

Children's arithmetic skills at the end of grade 1 (T1) were assessed by the group test of the Basic Arithmetic Test (Aunola & Räsänen, 2007; see also Räsänen, Salminen, Wilson, Aunio, & Dehaene, 2009). In this speed test, there were a maximum of 28 items, consisting of 14 items for addition (e.g., 2 + 1 =; 3 + 4 + 6 =) and 14 for subtraction (e.g., 4 − 1 =; 20 − 2 − 4 =) to be completed within a 3-min time limit. The task difficulty increases gradually across the test, and it provides a combined measure of the speed and accuracy of the arithmetic procedures (Zhang et al., in press). The final score is the total number of correct answers (the maximum value was 28). The mean for the test was 11.30 ($SD = 4.15$). The Kuder–Richardson reliability was .84 in grade 1.

2.2.4. The quality of classroom interactions

The classrooms were observed using the Classroom Assessment Scoring System (CLASS K–3; Pianta et al., 2008). The CLASS consists of ten dimensions measuring three domains of classroom quality: (1) Emotional Support (4 dimensions: Positive Climate, Negative Climate, Teacher Sensitivity, Regard for Student Perspectives), (2) Classroom Organization (3 dimensions: Behavior Management, Productivity, Instructional Learning Formats), and (3) Instructional Support (3 dimensions: Concept Development, Language Modeling, Quality of Feedback). Each dimension was rated on a 7-point scale: low (1, 2), moderate (3–5), and high (6, 7). The manual (Pianta et al., 2008) provides detailed indicators of each dimension and examples of teacher behaviors and classroom interactions for these ratings. Ratings provide scores on the overall quality of teacher–child interactions in a classroom, the main focus being on the teacher.

The classrooms ($n = 25$) were observed four times, twice in the 1st (T1) and twice in the 2nd (T2) grade. There were always two observers present making independent ratings. The observers

(master or doctoral students of education or psychology) were carefully prepared with 10 h of training and 3 h of live observation practice within a two-week period. At the end of the training, the observers' pairwise inter-rater reliability was 0.81 (T1) and 0.79 (T2). Each observation session lasted three lessons (3 h) and began when the school day started. The inter-rater reliabilities between the observers were calculated using intra-class correlation coefficients (*ICCs*). The inter-rater reliabilities for the 1st grade were between 0.72 and 0.96 (day 1) and 0.66 and 0.96 (day 2), and for the 2nd grade between 0.73 and 0.88 (day 1) and 0.84 and 0.93 (day 2), respectively. For further analyses, a mean score for each dimension was calculated from the ratings of the two observers.

Test–retest reliability was determined by calculating correlations between two separate days of observation. Correlations between the CLASS ratings for the two separate observation days ranged from 0.49 (Productivity) to 0.87 (Positive Climate) in grade 1 and from 0.60 (Productivity) to 0.86 (Teacher Sensitivity) in grade 2. For further analyses, CLASS scores were aggregated across two days. The Cronbach alpha reliabilities for the 1st and 2nd grades were for Emotional Support 0.97 and 0.98, Classroom Organization 0.87 and 0.97, and Instructional Support 0.93 and 0.97, respectively. The means in grades 1 and 2 were for Emotional Support 5.13 (SD = 0.79) and 5.03 (SD = 0.73), Classroom Organization 5.20 (SD = 0.47) and 5.24 (SD = 0.48), and Instructional Support 4.00 (SD = 0.80) and 4.19 (SD = 0.76), respectively.

2.2.5. Maternal education

Mothers were asked to report their education by mail-in background questionnaires (T1) on a 5-point scale (1 = basic education, nine years of formal education; 5 = master's degree or higher university degree). A total of 6.1% (general population 6%) of the mothers in the sample had a basic education (grades 1–9), 25.5% (general population 30%) had a secondary education (high school or vocational school degree, grades 10–12), 37% (general population 35%) had a vocational college degree, 23% had a polytechnic degree or a bachelor's degree (three-year education at a college or university), and 35% (general population 29%) had a master's degree (five-year education at university) or higher university degree (i.e., licentiate or doctoral degree). The sample was fairly representative of the Finnish population, although the mothers showed a somewhat higher level of education than the general population (Statistics Finland, 2007).

2.3. Analysis strategy

The present study aimed to examine the extent to which the observed quality of classroom interactions would predict children's achievement behaviors, on the one hand, and the extent to which children's achievement behaviors would predict the observed quality of teacher–child interactions, on the other. As cross-lagged analyses control for the level of the constructs at previous time points, they enable one to determine the direction of prediction. Moreover, multilevel modeling (Heck & Thomas, 2009) is an excellent tool for answering research questions. First, it enables the variance in the observed variables to be divided into two components: (1) variation due to differences between different classrooms (*between-classroom variation*) and (2) variation due to individual differences after taking into account class membership (*within-classroom variation*). Second, it enables one to enter various predictors both at the classroom level (*between-level*) and at the level of the individual children (*within-level*). In the theoretical model, children's achievement behaviors, measured at the individual level, are allowed to randomly vary between classrooms (in Fig. 1, see small filled ovals in achievement behavior variables at the individual level, below the dashed line). These random intercepts of children's achievement behaviors are indicated by large ovals at the classroom level (in Fig. 1, see between-level, above the dashed line) as these intercepts are continuous latent variables that vary across classrooms. Because the distributions of achievement behavior variables were skewed, all the analyses of the study were conducted using logarithmically transformed variables.

The analyses were carried out as follows. First, intraclass correlation coefficients (*ICCs*; Table 1) were calculated in order to determine what proportion of the variance in children's active and passive avoidant behaviors and social dependence is due to classroom differences. Only those individual-level variables in which classroom differences were statistically significant were included at the classroom-level in the further multilevel analyses. Next, the correlations (see Table 2) between the observed variables were calculated both at the classroom level (*between-level*) and at the level of individual children (*within-level*). As a next step, cross-lagged multilevel path models were conducted for each achievement behavior separately (see theoretical model in Fig. 1). In the tested model (see Fig. 1), achievement behaviors at the between-level (i.e., classroom level) (T2) were predicted by classroom interactions, after controlling for the previous level of achievement behavior (T1), and academic skills measured at the end of grade 1 (T1) and class size. The quality of classroom interactions at the end of grade 2 (T2), in turn, was predicted by achievement behaviors, after controlling for the previous level of classroom interaction measured at the end of grade 1 (T1), and academic skills (T1) and class size. At the within-level (i.e., level of individual children), achievement behaviors at the end of grade 2 (T2) were predicted by the previous level of achievement behavior (T1), gender, child's age, mother's education, and academic skills.

Because the CLASS domains (i.e., emotional, organization, and instructional support) correlated highly with each other (r ranged from .52 to .71 and from .75 to .80 in the 1st and 2nd grades respectively), they were analyzed in separate models. Only statistically significant paths were included in the final models so that only significant predictors contributed to the proportion of the explained variance. The predictor variables were allowed to correlate. One-tailed significance testing was used for hypothesized cross-lagged associations.

All the analyses were performed using the Mplus statistical package (Version 6.12; Muthén & Muthén, 1998–2010). The parameters of the models were estimated using full-information maximum likelihood estimation with non-normality robust standard errors (Muthén & Muthén, 1998–2010). The goodness-of-fit of the estimated models was evaluated by four indicators: χ^2-test, Comparative Fit Index (*CFI*), Tucker Lewis Index (*TLI*), Root Mean Square Error of Approximation (*RMSEA*), and Standardized Root Mean Square Residual (*SRMR*).

3. Results

3.1. Intraclass correlations and descriptive statistics

The intraclass correlations (*ICCs*) (see Table 1 for *ICCs* and variance estimates at the between- and within-classroom levels) showed that the differences *between* classrooms were statistically significant at both measurement points in active avoidance, passive avoidance, and in social dependence, and at the first measurement point in reading skills. In turn, the differences between classrooms were not statistically significant in child's gender, age, maternal education, and mathematical skills. Thus, these variables were included only in the within-level (level of individual children). The correlations between the observed variables

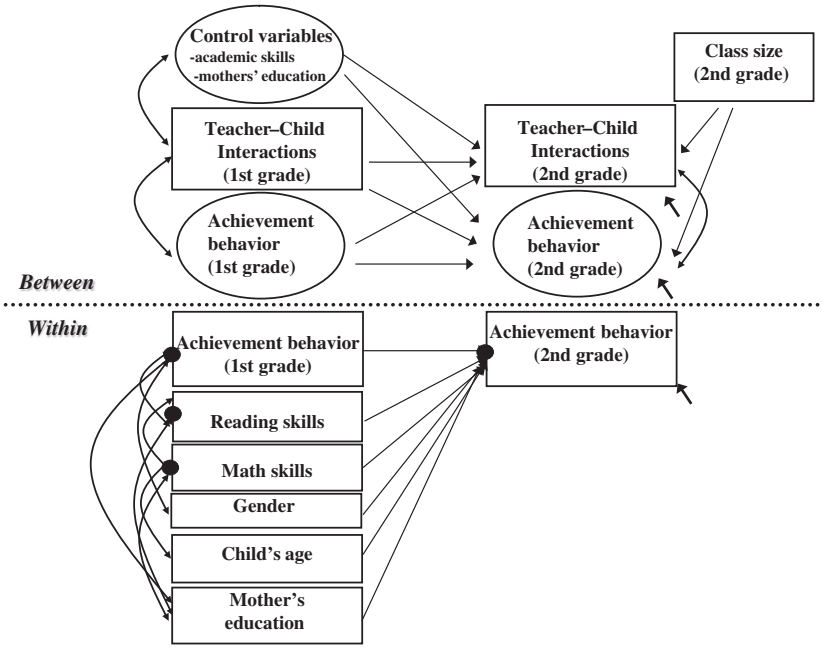

Fig. 1. Theoretical multilevel model.

Table 1
Descriptive statistics and intraclass correlations (*ICCs*) using teacher Id at grade 2 as a clustering variable (N_{within} = 166, $N_{between}$ = 70).

Variable	*ICC*	Between-variance (S.E.)	Within-variance (S.E.)	Mean	Min.	Max.
Achievement behaviors						
Active avoidance T1	0.24**	0.27 (0.10)**	0.84 (0.19)***	0.38	0	1.87
Passive avoidance T1	0.36***	0.33 (0.08)***	0.58 (0.10)***	0.61	0	1.70
Social dependence T1	0.48***	0.48 (0.19)*	0.53 (0.10)***	0.47	0	1.70
Active avoidance T2	0.29*	0.25 (0.14)+	0.61 (0.13)***	0.30	0	1.70
Passive avoidance T2	0.28*	0.21 (0.09)*	0.55 (0.10)***	0.49	0	1.61
Social dependence T2	0.37***	0.31 (0.22)**	0.52 (0.10)***	0.44	0	1.61
Maternal education	0.19	0.31 (0.23)	1.33 (0.23)***	3.21	1	5
Gender	0.004	0.001 (0.03)	0.25 (0.02)***	1.55	1	2
Reading skills T1	0.19*	16.17 (8.59)+	67.84 (9.89)***	20.08	4	49
Math skills T1	0.07	1.13 (1.60)	15.93 (3.02)***	11.30	4	28

Note: Two-tailed testing of significance.
+ $p < .10$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

(within-level correlations below the diagonal and between-level correlations above the diagonal) and descriptive statistics are presented in Table 2.

3.2. The cross-lagged associations between achievement behaviors and classroom interactions

The cross-lagged associations are presented separately for each CLASS domain (i.e., emotional support, classroom organization, and instructional support) and each achievement behavior (i.e., active task avoidance, passive task avoidance, and social dependence). All the models, including only statistically significant paths, fitted the data well (Model 1: $\chi^2(25, N_{within} = 166, N_{between} = 70) = 17.035$, $p = 0.908$; *CFI* = 1.00; *TLI* = 1.00; *RMSEA* = 0.00; $SRMR_{between} = 0.080$, $SRMR_{within} = 0.035$; Model 2: $\chi^2(25, N_{within} = 166, N_{between} = 70) = 23.28$, $p = 0.76$; *CFI* = 1.00; *TLI* = 1.00; *RMSEA* = 0.00; $SRMR_{between} = 0.12$, $SRMR_{within} = 0.05$; and Model 3: $\chi^2(25, N_{within} = 166, N_{between} = 70) = 16.861$, $p = 0.887$; *CFI* = 1.00; *TLI* = 1.00; *RMSEA* = 0.00; $SRMR_{between} = 0.099$, $SRMR_{within} = 0.039$; see Figs. 2–4). In the analyses, children's skills in reading and math, mothers' education, children's gender and age, and class size were used as control variables. The results concerning these control variables are presented at the end of the results section.

3.3. The role of classroom interactions in children's achievement behaviors

The first research question was to what extent classroom interactions predict children's achievement behaviors. The results showed, first, that the lower the quality of emotional support in the 1st grade (T1), the more passive avoidance children in the classroom typically showed in the 2nd grade (T2), after controlling for the previous level of passive avoidance (see Fig. 2). Second, the higher the quality of the classroom organization (see Fig. 3) and instructional support in the 1st grade (T1), the more social dependence children in the classroom showed in the 2nd grade (T2). Children's active avoidance was not predicted by classroom interactions. The results showed further that, at the classroom level,

Table 2
Correlations among study variables (within-level correlations below the diagonal and between-level correlations above the diagonal).

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Active avoidance T1[1]	1.00	.67[a]	.85[a]	−.14	−.09	.02	−.12	.01	.04	.35[d]	.32	.25	.20	–	–	–	–	.20
2. Passive avoidance T1[1]	.22[c]	1.00	.51[a]	−.22	−.15	−.29	.18	−.15	.00	.06	.08	.18	.34	–	–	–	–	.17
3. Social dependence T1[1]	.30[b]	.22[c]	1.00	.01	−.03	−.21	−.15	.00	.11	.05	.04	.15	−.07	–	–	–	–	.03
4. Active avoidance T2[1]	.28[c]	.04	.15[d]	1.00	.41[d]	.70[a]	.30[d]	.14	.33	.37[c]	.52[b]	.46[c]	−.57[d]	–	–	–	–	.34[c]
5. Passive avoidance T2[1]	.10	.01	.12	.30[b]	1.00	.39[d]	−.53[c]	−.32	−.32	.27	.14	.03	−.88[b]	–	–	–	–	.38[c]
6. Social dependence T2[1]	.08	.06	.19[d]	.11	.22[c]	1.00	.54[c]	.56[c]	.52[c]	.51[b]	.50[b]	.38[d]	−.05	–	–	–	–	.04
7. Emotional support T1[3]	–	–	–	–	–	–	1.00	.43[c]	.71[a]	.25	.30	.51[a]	.40	–	–	–	–	−.24
8. Classroom organization T1[3]	–	–	–	–	–	–	–	1.00	.58[a]	.26	.44[b]	.40[c]	.33	–	–	–	–	−.31
9. Instructional support T1[3]	–	–	–	–	–	–	–	–	1.00	.23	.15	.55[b]	−.21	–	–	–	–	−.05
10. Emotional support T2[3]	–	–	–	–	–	–	–	–	–	1.00	.78[a]	.77[a]	−.45	–	–	–	–	.07
11. Classroom organizationT2[3]	–	–	–	–	–	–	–	–	–	–	1.00	.72[a]	−.36	–	–	–	–	.02
12. Instructional support T2[3]	–	–	–	–	–	–	–	–	–	–	–	1.00	−.63[c]	–	–	–	–	−.03
13. Reading skills T1[1]	−.24[b]	−.36[a]	−.25[c]	−.03	−.01	−.07	–	–	–	–	–	–	1.00	–	–	–	–	−.16
14. Math skills T1[2]	−.08	−.27[a]	.02	.04	−.07	−.07	–	–	–	–	–	–	.46[a]	1.00	–	–	–	–
15. Child's gender[2]	.19[c]	−.05	−.06	.12	−.12	−.23[b]	–	–	–	–	–	–	.06	.18[c]	1.00	–	–	–
16. Child's age T1[2]	−.06	−.10	.00	−.08	−.22[c]	.09	–	–	–	–	–	–	.30[a]	.14[d]	.08	1.00	–	–
17. Mothers' education[2]	−.00	−.04	.14	−.12	.12	−.12	–	–	–	–	–	–	.10	.01	.03	.01	1.00	–
18. Class size T2[3]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.00

[a] $p < .001$.
[b] $p < .01$.
[c] $p < .05$.
[d] $p < .10$.
[1] Variable both at between-level and within-level.
[2] Within-level variable.
[3] Between-level variable, – not estimated.

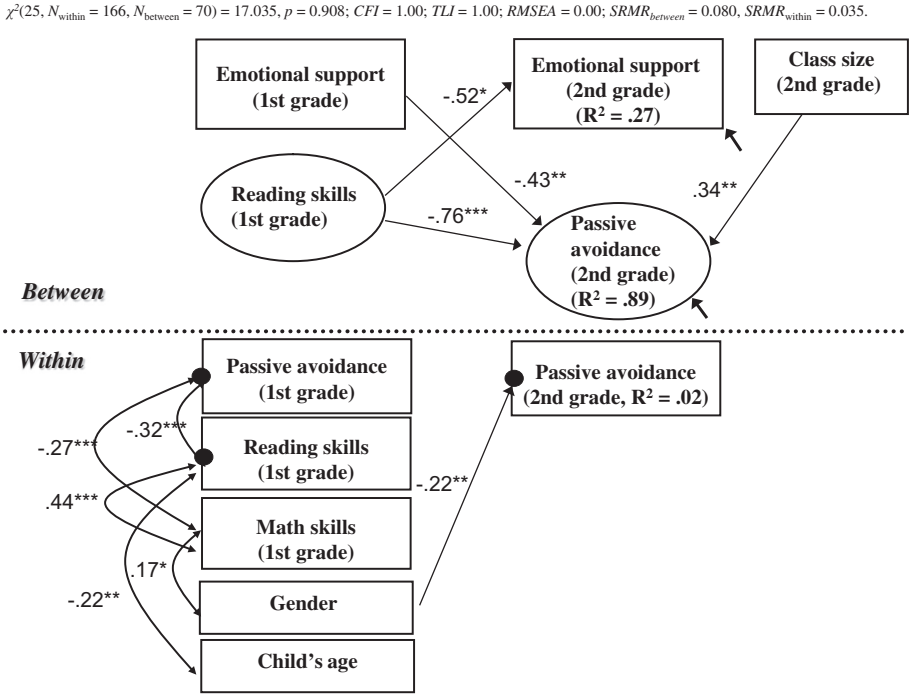

Fig. 2. Emotional support and passive avoidance. *Notes.* Paths are presented as standardized estimates. Gender 1 = *girl*, 2 = *boy*; $^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$.

children's achievement behaviors showed no stability during the study period.

3.4. The role of children's achievement behaviors in the quality of classroom interactions

The second research question was to what extent achievement behaviors predict subsequent classroom interactions. The results showed that children's passive avoidance or social dependence did not predict classroom interactions, but their active avoidance did (see Fig. 4): the more active avoidance children in the classroom showed at the end of the 1st grade (T1), the higher the quality of the emotional support that teachers in classrooms showed one year later (T2), after controlling for the previous level of emotional support. Moreover, the more active avoidance children in the classroom showed, the more classroom organization and instructional support teachers showed later on. The results showed further that classroom organization and

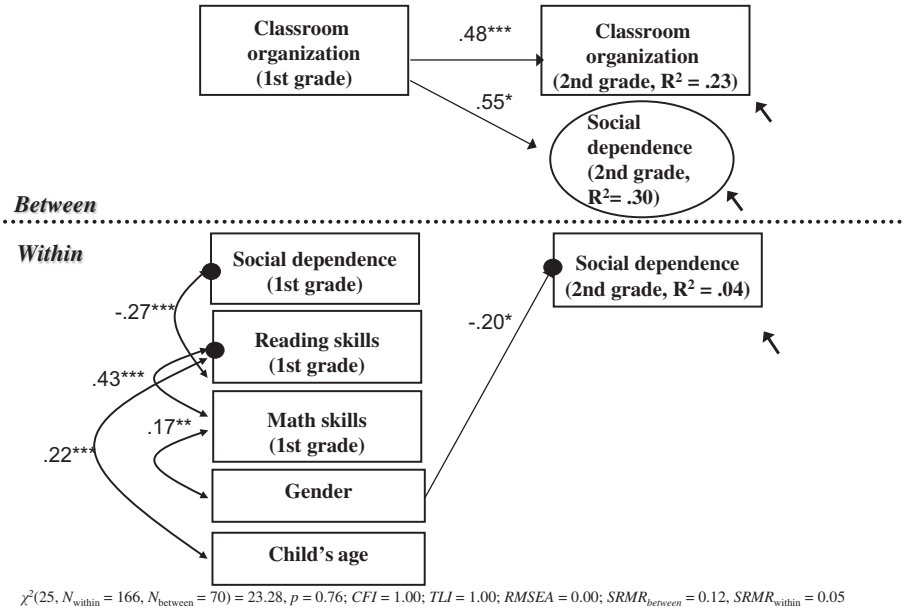

Fig. 3. Classroom organization and social dependence. *Notes.* Paths are presented as standardized estimates. Gender 1 = *girl*, 2 = *boy*; $^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$.

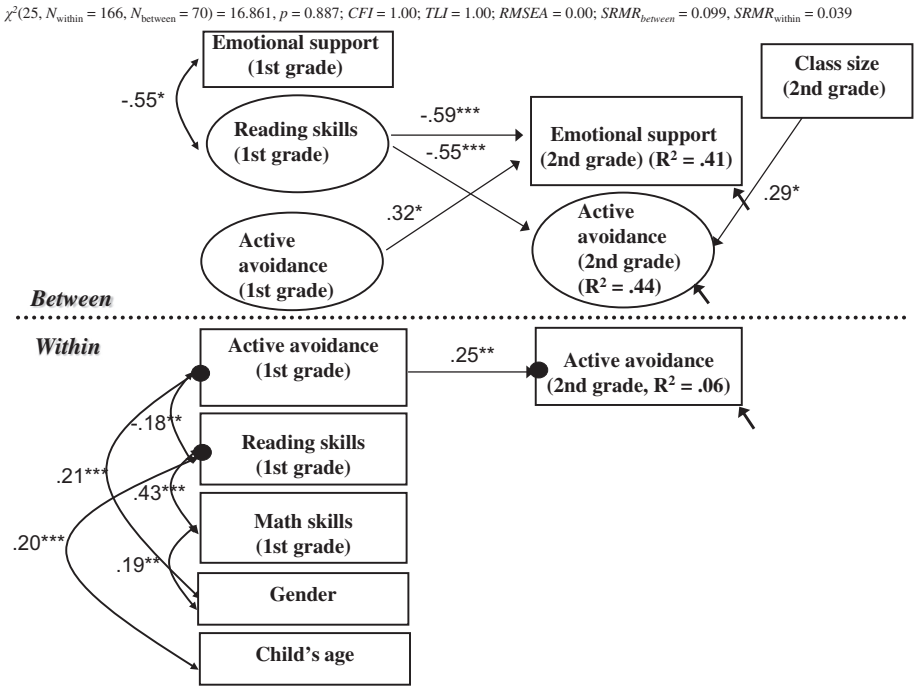

Fig. 4. Emotional support and active avoidance. *Notes.* Paths are presented as standardized estimates. Gender 1 = *girl*, 2 = *boy*; $^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$.

instructional support indicated inter-class stability whereas emotional support did not ($\beta = .24$, $p = .16$).

3.5. The results concerning the control variables

The results for the control variables showed that older children displayed less passive avoidance than their younger peers, and girls were rated as showing more social dependence than boys. Moreover, reading skills were related to passive avoidance and social dependence in the 1st grade (T1), and math skills with passive avoidance: a child showed more passive avoidance when his/her academic skills were low and more social dependence when her/his reading skills were low.

At the classroom level, bigger class size was associated with higher levels of passive and active avoidance typical of the classroom. In addition, the level of reading skills typical of the classroom (T1) predicted both passive avoidance (T2) and emotional support in grade 2 (T2): lower reading skills in the classroom were associated with higher levels of passive avoidance and higher levels of emotional support.

4. Discussion

The present study investigated the cross-lagged associations between the quality of classroom interactions and different kinds of maladaptive achievement-related behaviors among children.

The results showed, first, that the less emotional support the teachers provided in classroom situations, the more passive avoidance the children in those classrooms typically evidenced later on. Higher-quality instructional support and classroom organization, in turn, predicted higher levels of social dependence among children. In addition, the results showed that higher levels of active avoidance among children in the classroom predicted subsequent higher-quality emotional and instructional support and classroom organization in the classroom.

4.1. The role of quality of classroom interactions in children's achievement behaviors

The results of the present study suggest that different forms of maladaptive achievement behaviors are differently related to the quality of classroom interactions. The findings are important because they suggest that researchers should take into account that students show different patterns of maladaptive behavior, and the antecedents of these behaviors in the classroom context are different. The findings indicate, first, that the lower the quality of emotional support in a particular classroom in the first grade, the more passive avoidance children in that classroom showed in academically challenging situations in the second grade. This result supports Hypothesis 1a and is in line with the postulates of self-determination and attachment theories that children with emotionally secure relationships are able to explore their social environment and willing to take risks and make an active effort in learning situations (e.g., Bowlby, 1982; Connell & Wellborn, 1991). A warm and supportive teacher provides children with an essential emotional bond and comfort, as well as evoking positive achievement emotions, which are then related to active effort and engagement. When teachers are responsive and sensitive to children's needs, and help children to form secure relationships with their peers, children typically show more active effort and persistence in achievement situations, even when faced with obstacles. It could be that emotional support from the teacher prevents passive avoidance (i.e., learned helplessness) in children by giving them a feeling that they are active agents in a classroom and have autonomy regarding their learning, for example, possibilities to choose and influence things. In previous studies as well, emotional support given by the teacher has been linked with children's engagement and behavioral adjustment in preschool (Mashburn et al., 2008) and in first grade (NICHD ECCRN, 2003). The findings of the present study are also in accordance with the control-value theory of achievement emotions in that quality of teaching evokes achievement emotions (Goetz et al., 2013; Pekrun, 2006) which are manifested in motivation and behaviors in achievement situations. The results suggest that teachers should pay particular attention to the quality of their emotionally supportive interactions in classroom situations to promote an active task focus and effort in learning situations. By being sensitive and responsive to children's needs, teachers could provide children with a secure environment for active participation and engagement. In addition, teachers should actively monitor and try to identify those children who are struggling with their sense of self-esteem and dysfunctional achievement beliefs and behaviors, which are probably manifested in feelings of helplessness and low effort and lack of task focus behavior (cf., Domínguez et al., 2010). It is possible that by reducing children's passive avoidance in achievement situations, emotional support from teachers could also increase children's satisfaction with schooling and school engagement. This, however, needs to be tested empirically.

Contrary to our Hypothesis 1b, the lower quality of classroom interactions was not predictive of active task avoidance. This result seems to suggest that quality of emotional support is particularly important for those children who show a helpless type of task avoidance. It may be that students who show a more active type of avoidance may benefit from more structured instruction that is more efficient in decreasing the amount of active forms of task avoidance, such as restlessness and off-task activities.

In addition, high levels of classroom organization and instructional support predicted a high degree of subsequent social dependence. There are at least two possible explanations for these unexpected results. First, it is possible that in classrooms characterized by a high level of classroom organization, teachers put a lower emphasis on supporting children's autonomy and self-directed learning. Highly organized instruction may, thus, increase children's dependence on teacher approval and seeking cues and help from the teacher when facing challenging learning tasks. Second, the results of the present study may also reflect the fact that the social dependence scale used in the study reflects children's natural reaction in the presence of an external observer, i.e., leaning on an adult's help. It should also be noted that student–teacher relationship scale (STRS; Pianta, 2001) measures social dependence on the teacher whereas in the present study we measured social dependence in test situations.

4.2. The role of achievement behaviors in classroom interactions

The results showed further that the more active avoidance children in a particular classroom typically showed in the 1st grade, the higher-quality was the emotional support, classroom organization, and instructional support that teachers provided one year later. Because classroom interactions did not impact on children's active task avoidance, it seems that in terms of active avoidance it is the children's achievement-related behavior that contributes to subsequent teacher–child interactions rather than vice versa. The results of the present study are in accordance with the postulates of transactional theory (Sameroff & Fiese, 1990) and suggest that active task avoidance is the kind of behavior that teachers react to by actively increasing the management of time, attention, and routines in classroom situations. Teachers also increased their responsiveness and sensitivity as a reaction to children's active task avoidance and made an extra effort to increase children's feelings of closeness and comfort in the classroom. Teachers seem, thus, to tailor their organizational practices and classroom interactions as a response to children's active task avoidance and lack of effort. In line with the results of the present study, Annevelink et al. (2004) have shown that pupils with disruptive behavior had more organizational or personal interactions with their teachers than other pupils. Similarly, kindergarten teachers have been found to report more socioemotional support and behavioral regulation for children with whom they have conflictual or dependent relationships (Thijs et al., 2008). The results of the present study contribute to previous findings by showing that, besides individual student's behaviors, the typical achievement behavior of the class (average level) influences teacher's interactions and practices in a classroom.

The present findings support Hypothesis 2 and are partly in line with previous ones showing that teachers actively adapt their instructional practices (Nurmi et al., 2012) and quality of classroom interactions (Pakarinen et al., 2011a, 2011b) in accordance with children's academic skills and behaviors in academically challenging situations. In terms of adaptive teaching, it seems quite reasonable that active task avoidance catches the attention of teachers and pushes them to tailor their instruction and classroom interactions. Active, non-persistent, and distractible children are probably well recognized in classrooms because their activity, lack of persistence, and off-task behavior is disturbing for the rest of the class. Overall, the present results provide evidence of the bidirectional, transactional nature of teacher–child interactions (Downer, Sabol, & Hamre, 2010). The transactional theory of child

development suggests that adult and child characteristics interact in producing child outcomes (Combs-Ronto, Olson, Lunkenheimer, & Sameroff, 2009; Sameroff & Fiese, 1990; Skinner et al., 2008).

4.3. The role of control variables

The results showed further that academic skills and achievement behaviors were associated with each other. At the level of individual children, passive avoidance was associated with low math and reading skills measured at the same time point and active avoidance with low reading skills. These results suggest that achievement behaviors develop partly as a result of academic skills and related feedback. Hirvonen et al. (2012), for example, have shown that task avoidance and academic skills develop in tandem (see also Aunola et al., 2003; Hirvonen et al., 2010; Urdan et al., 1998). If children are struggling with their academic skills, they probably need more support and encouragement in order to invest effort and focus on tasks in learning situations than their peers with better academic skills. The results of the present study are in line with those of Onatsu-Arvilommi and Nurmi (2000), who found that poor academic skills predicted first graders' subsequent task-avoidant behavior, evidenced by a high level of task-irrelevant and helplessness behaviors as well as a lack of persistence. Hence, it could be the case that children with low skills have learned to expect failure and do not see the value of investing effort. It could also be that passive avoidance, i.e., withdrawal and disengagement when faced with challenges, is a kind of coping strategy for those children who are struggling with learning. In addition, poor reading skills and social dependence can also go hand in hand, as Lepola et al. (2000) have previously shown. Overall, these results suggest that teachers should pay particular attention to achievement beliefs and behaviors of children with low academic skills. By giving individualized instruction and feedback, teachers can promote the development of adaptive beliefs and behaviors.

Academic skills also seem to influence the quality of classroom interactions. The reading skills typical of a classroom in the first grade also predicted the quality of emotional support, classroom organization, and instructional support later on: teachers provided higher-quality teacher–child interactions in classrooms with children having lower reading skills. These results suggest, again, that teachers actively adapt their interactions in terms of emotional support, quality of feedback, and instructional activities when children are struggling with their reading skills (see Pakarinen et al., 2011b). Nurmi and colleagues have also shown that teachers provide more active instruction for children with low reading skills (Nurmi et al., 2012).

Gender was associated with active task avoidance: boys were rated as showing more avoidant behavioral patterns than girls. This result is in line with previous studies indicating that boys may be more vulnerable to developing dysfunctional motivational and behavioral patterns than girls (e.g., Onatsu-Arvilommi & Nurmi, 2000). However, this link has not been found in all studies (see Vitiello et al., 2012). In addition, girls were rated as showing more socially dependent behavior in the 2nd grade than boys. The child's age at school entry, in turn, was associated with passive avoidance in the 2nd grade: children who were younger at school entry showed more passive avoidance later on than their older peers. As this result suggests that boys and younger children at school entry seem to be prone to less active effort and persistence, teachers should put effort into fostering the adaptive achievement beliefs and behaviors of boys and children who are less mature at their school entry.

In addition, class size was associated both with passive and active avoidant behavior typical of the classroom. This result suggests that large class sizes may be harmful for children's adaptive achievement behaviors in terms of an active task focus and investment of effort. In small classes, children typically showed more focus on tasks and active effort. It has been suggested that in small classes teachers have more time for individualized teaching than in classes with more students (Blatchford, Bassett, Goldstein, & Martin, 2003). Small class sizes enable teachers to organize and implement high-quality classroom practices (Graue, Rauscher, & Sherfinski, 2009), which is likely to promote an active task focus and engagement in learning among children.

4.4. Practical implications

This study also has some practical implications. First, for teachers and teacher educators, the findings highlight the importance of emotionally supportive classroom interactions for children's adaptive achievement behaviors. This is particularly true for helpless type of passive avoidance among children. Teachers should aspire to create a classroom environment in which every child has a feeling of relatedness and comfort. In classrooms with high emotional support, a teacher is in tune with the needs of students and readily responsive to them (Rudasill, Reio, Stipanovic, & Taylor, 2010). When children experience secure relationships with teachers and a supportive classroom climate, they may be more willing to invest effort and focus on tasks, which is likely to further contribute to their academic success. Thus, teacher education programs should increase student teachers' awareness of supportive classroom interactions and provide them with tools to enhance the interactional quality of classrooms. In addition, interventions that promote supportive interactions in the classroom may enable both student and in-service teachers to provide a better learning environment, especially for children with helplessness and less adaptive achievement beliefs and behaviors.

Second, the findings highlight the fact that teachers actively adapt their classroom interactions according to children's behavioral responses in challenging achievement situations. When children typically show active task-avoidant behaviors in learning situations, their teachers increase the quality of emotional support, classroom organization, and instructional support in classroom situations. Thus, for teachers and teacher educators these findings highlight the fact that teaching is a bidirectional, transactional process in which children are also active agents. Teachers should increase their awareness of the influence of children and their different characteristics on their beliefs and everyday practices.

Third, teachers need more tools for identifying children with passively avoidant behavioral orientation, as passively avoidant children and their behavioral responses in achievement situations can easily be misunderstood. Because the behavioral responses of these children do not disturb the whole class in the same way as the behavior of their actively avoidant peers, these children might not get the encouragement and support they would need in order to feel comfortable so as to invest effort and be persistent in challenging achievement situations.

Fourth, for policymakers the results emphasize the associations between class size and active and passive avoidance. Namely, in large classes, children typically evidenced more active and passive avoidant behaviors. Thus, budgetary cuts in personnel and growing class sizes can be harmful for children's development of adaptive classroom behaviors. When there are a lot of children in a class, teachers are probably not able to give enough time and attention to individual children's needs. This can cause increased active or passive avoidant behaviors among children. Blatchford et al. (2003) have demonstrated that in small classes teachers engage in more individual interaction with students and take more time for individual tutoring, providing encouragement and supporting students' learning. Class size reduction has been shown to provide opportunities that can be activated by organizing and implementing high-quality classroom practices (Graue et al., 2009).

Finally, in terms of achievement-related beliefs and behaviors, the present results showed that the two forms of task-avoidant behavior (i.e., active and passive avoidance) were differently related to classroom interactions. Although those two forms are described by the lack of effort and negative emotions, it seems reasonable to investigate them separately as they seem to evoke different reactions from teachers: teachers reacted to active forms of task avoidance by increasing their quality of interactions, whereas teachers' warmth, sensitivity, and responsiveness in the classroom were especially essential for reducing students' passive avoidance and helplessness. One reason why teachers react to active forms of task avoidance may be that it partly reflects a child's temperamental characteristics, such as distractibility and activity (Hirvonen et al., 2013), towards which teachers have been shown to increase their control actions (Viljaranta, Virkkala, Hirvonen, Pakarinen, & Aunola, submitted for publication). Passive avoidance (helplessness), in turn, has been shown to be connected with low activity (Hirvonen et al., 2013). Interestingly, the quality of classroom interactions seems to be more influential in the case of passive avoidance than in the case of active task avoidance. Moreover, the results suggest that achievement emotions and related behaviors should be investigated within academic settings, including teacher–student interaction and teaching characteristics.

In general, the results suggest that children with different achievement behaviors may have various needs in the classroom. Teacher preparation programs should, therefore, focus more on teacher flexibility and identification of children's needs as well as the influence of children's characteristics on teacher emotions, beliefs, and practices. By becoming aware of the evocative impact that not only a particular child and his/her characteristics, but also the characteristics of the students as a group, have on the affective and instructional responses of teachers, they might be able to change their own behavior in order to better support the children's adjustment and academic performance. Some of our findings related to achievement behaviors may also generalize to other students' attitudes, such as school adjustment, prosocial behavior, and school engagement. However, this needs to be empirically tested.

4.5. Limitations and future directions

The present study has some limitations that need to be taken into account in any attempts to generalize the findings. First, this study was conducted in Finland, which represents a somewhat different educational system when compared to many other countries. For example, children start their formal schooling later than in many other countries and the same teachers teach children typically for several years. Thus, the extent to which the results generalize across samples and educational settings is an issue. Moreover, it is unclear to what extent cultural differences might affect the results. These results can be assumed to hold in other cultural and educational systems as well because classroom processes have some universal characteristics regardless of the cultural context (e.g., Hamre et al., 2013; Van de Grift, 2007). Moreover, the instruments used in the present study to estimate children's achievement behaviors have also been used in other cultural and educational contexts, such as Canada, Greece, and China (Georgiou et al., 2010, 2011). Second, the small sample size of the observed teachers, which is likely to have diminished the power of statistical testing, is a major limitation. It is likely, for example, that with a bigger sample, teachers' low emotional support would also be associated with children's active task avoidance. A related point is that some kind of selectivity can be responsible for our results, although we showed that teachers who chose to participate in classroom observations did not differ statistically from those who chose not to participate. Third, the trained investigators observed children in an evaluative situation only once at both grades. It should be noted that children often exhibit different behaviors in differing contexts, where they are observed by different people. Therefore, future studies might benefit from also using teacher ratings of children's achievement behaviors. Fourth, only a few children (1–4) were evaluated per classroom. Thus, caution is warranted when trying to generalize the findings, although this random sample was shown to be well representative of the whole sample according to children's reading fluency, reading comprehension, arithmetic skills, gender, and parental education. The results showed that there were no differences between randomly selected students and other students in the classroom ($ps > 10$). Fifth, there was actually no stability in tester ratings of children's passive avoidance. One possible reason for this is that the behavior of passively avoidant children was interpreted differently by different observers. In other words, some testers might have interpreted, for example, shyness as passive avoidance and vice versa, while others may have interpreted helpless behavior as passive avoidance. Alternatively, passive avoidance may be difficult to observe in a situation in which children are individually given tasks (tests) to be solved. Whatever the reason was for low stability in passive avoidance, there is an evident need to replicate the findings of the present study by using other instruments, such as observations and teacher ratings. Sixth, when interpreting the findings, we also need to take into account the fact that most of the teachers in our study were female. For example, Spilt, Koomen, and Jak (2012) showed that children in general had a somewhat different relationship with female teachers when compared to male teachers. In addition, female teachers reported having a less close relationship with boys than with girls. Although it is very typical for Finnish schools to have female teachers in Grades 1–2 and male teachers in higher grades, future studies might take into account the gender of both teachers and children and investigate the influence of gender on the relationship between classroom interactions and achievement behaviors. Finally, it should also be noted that classroom observations and achievement behaviors were conducted at separate time points. Curby et al. (2011) have shown that children's experiences in classrooms vary according to time of day, activity, and social setting. Thus, future studies should investigate achievement behaviors and classroom interactions at the same time points using multiple methods. Another important notion is that CLASS is an overall measure of classroom interactions and does not take into account the individual experiences of children and individualized instruction.

4.6. Conclusion

Overall, the findings of the present study add to previous literature by suggesting that especially the emotional support provided by the classroom teacher has a developmental relevance for children's adaptive achievement behaviors at the beginning of their schooling. Another important finding was that this was only the case for passive avoidance, suggesting that differentiating between different kinds of maladaptive achievement behavior is important in future studies. The results also provide evidence that teachers actively adapt their classroom interactions in accordance with children's affective and behavioral responses in the face of academic challenges. In addition, high classroom organization and instructional support predict children's social dependence.

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