

Classroom organization and teacher stress predict learning motivation in kindergarten children

Eija Pakarinen · Noona Kiuru ·
Marja-Kristiina Lerkkanen · Anna-Maija Poikkeus ·
Martti Siekkinen · Jari-Erik Nurmi

Received: 17 November 2008 / Revised: 20 May 2009 / Published online: 30 March 2010
© Instituto Superior de Psicologia Aplicada, Lisboa, Portugal and Springer Science+Business Media BV 2010

Abstract This study examined the extent to which observed teaching practices and self-reported teacher stress predict children's learning motivation and phonological awareness in kindergarten. The pre-reading skills of 1,268 children were measured at the beginning of their kindergarten year. Their learning motivation and phonological awareness were assessed in the following spring. Questionnaires measuring teacher stress were filled out by 137 kindergarten teachers. A pair of trained observers used the Classroom Assessment Scoring System (Pianta et al. 2008) to observe 49 kindergarten teachers from the whole sample on their emotional support, classroom organization, and instructional support. The results of multilevel modeling showed that low teacher stress and high classroom organization predicted high learning motivation in children and that the children's learning motivation contributed to their level of phonological awareness. Moreover, children's learning motivation mediated the association between teacher stress and children's phonological awareness. The results emphasize the importance of teachers' pedagogical well-being and classroom organizational quality for children's learning motivation.

Keywords Classroom organization · Kindergarten · Learning motivation · Pre-reading skills · Teacher stress

This study has been carried out in the Centre of Excellence in Learning and Motivation Research financed by the Academy of Finland (Nr. 213486 for 2006–2011) and other grants from the same funding agency (Nr. 213353 for 2005–2008 and Nr. 125811 for 2008–2009).

E. Pakarinen (✉) · N. Kiuru · J.-E. Nurmi
Department of Psychology, University of Jyväskylä, P.O. Box 35, 40014 Jyväskylän Yliopisto, Finland
e-mail: eija.k.pakarinen@jyu.fi

M.-K. Lerkkanen · A.-M. Poikkeus
Department of Teacher Education, University of Jyväskylä, P.O. Box 35, 40014 Jyväskylän Yliopisto, Finland

M. Siekkinen
Philosophical Faculty, School of Applied Educational Science and Teacher Education,
University of Eastern Finland, P.O. Box 111, 80101 Joensuu, Finland

The role of motivation in children's academic achievement is widely acknowledged (e.g., Wigfield et al. 2006). Still, relatively little is known about the antecedents of motivation, particularly among younger children. Some studies have indicated that teachers' instructional practices contribute to children's motivation (Anderman et al. 2001; Aunola et al. 2006). More specifically, teachers' support for students' autonomy (Guay et al. 2001; Guthrie et al. 2000) and consistent enforcement of rules in the classroom combined with teacher warmth (Ryan and Grolnick 1986) have been found to be associated with students' intrinsic motivation. Although the literature suggests that teachers play an important role in promoting primary school children's motivation, previous research involves at least two limitations. First, few studies have examined teaching practices using observational methods (as exceptions Stipek et al. 1998; Turner et al. 2002). Second, empirical studies which have analyzed the impact of teacher stress on children's learning motivation and academic outcomes are lacking. Consequently, the present study investigated the extent to which observed classroom quality and teacher stress would predict kindergarten children's learning motivation and their phonological awareness. Moreover, we investigated whether learning motivation would mediate the association between observed classroom quality factors, teacher stress, and children's phonological awareness.

Children's learning motivation

There is an increasing amount of literature concerning the role of motivation in children's academic achievement. One framework for conceptualization of motivation in the school context focuses on students' interest in various school subjects, tasks, or activities. This has been described through concepts such as task value (Eccles et al. 1983), task motivation (Aunola et al. 2006; Nurmi and Aunola 2005), intrinsic motivation (Deci et al. 1991; Gottfried 1990), and interest (Renninger 1992; Schiefele 1996). Interest in activities has been considered to be one of the central components of motivation and motivated behavior (Deci and Ryan 1985; Schiefele 1991). In the present study, we will use the concept of learning motivation to refer to children's interest and task value in particular learning activities that are typical in their kindergarten year, such as activities related to letters, rhyming, mathematics, listening to storybook reading, music, outdoor play, nature, and art and crafts. We chose to investigate learning motivation to wider range of activities, as in Finnish kindergartens, no systematic teaching of reading and mathematics is provided. In the literature review, learning motivation is also used to refer to task values, intrinsic motivation, and interest.

Previous research has shown that the development of learning motivation begins at the very beginning of the school career. Students' task motivation in reading and mathematics are relatively high at the beginning of the school career but decline during the elementary school years (Gottfried et al. 2001; Jacobs et al. 2002; Wigfield and Guthrie 1997). Individual differences in task motivation start to emerge early on in the school career (Eccles et al. 1993; Nurmi and Aunola 2005; Wigfield et al. 1997), after which is found increasing interindividual stability (Aunola et al. 2006; Gottfried et al. 2001). Students' motivation plays a role not only in overall academic achievement but also in the development of more specific skills, such as reading (Baker and Wigfield 1999). Previous research has shown that motivation in reading is related to good reading performance (e.g., Wigfield 1997) and that it predicts subsequent teacher-rated reading performance (Gottfried 1990) and improvement in reading skills (Ecalte et al. 2006).

The antecedents of children's learning motivation are not yet well known. Research suggests, however, that previous learning outcomes related to a particular school subject and related feedback provide a basis for the development of students' interest in a particular subject. For example, in primary school, students' good performance in reading (Gottfried 1990) and mathematics (Aunola et al. 2006; Gottfried 1990) has been reported to predict their subsequent task motivation in those particular subjects. Viljaranta et al. (2009) recently showed that kindergarten children's previous level of math-related skills predicted their subsequent interest in mathematics. Some researchers have also suggested that the characteristics of schools and classrooms, as well as teaching practices, may play an important role in the development of learning motivation (for a review, see Wigfield et al. 1996).

Teachers' role in children's learning motivation

A substantial body of research indicates that teachers' instruction and classroom practices, and classroom goals, contribute to children's learning and academic outcomes (for reviews, see Davis 2003; Perry and Weinstein 1998; Turner and Meyer 2000). However, only a few studies have been carried out on the role of teaching practices and classroom quality in children's learning motivation. For example, Anderman et al. (2001) found that students experienced decreases in task values for reading and math if their teachers used performance-oriented instructional practices. The more mastery-oriented instructional practices the teachers reported, the more positive academic-self concept the children showed and the higher value they placed on achievement (Anderman et al. 2001). Further, mastery-goal structure has been shown to be positively associated with preference for challenging tasks (Ames and Archer 1988), intrinsic task orientation, and strategy value beliefs (Nolen and Haladyna 1990). Consistent enforcement of rules in the classroom along with teacher warmth has been found to be positively related to children's self-worth, internal control, and mastery motivation (Ryan and Grolnick 1986). Perceived support and caring from teachers (Wentzel 1998) and more specifically, teachers' support for students' autonomy (Guay et al. 2001; Guthrie et al. 2000) have also been found to promote student motivation.

Previous research in the field has, however, at least five limitations. First, little research has been carried out among kindergarten-age children (for exception, see Stipek et al. 1995, 1998). Second, the majority of previous studies have investigated teacher instruction and classroom goal structures either by using student reports (Nolen and Haladyna 1990; Ryan and Grolnick 1986) or teachers' self-reports (Anderman et al. 2001), while no studies to our knowledge have used classroom observations to investigate the role of teaching practices in children's learning motivation. Third, most previous studies have not taken into account children's preexisting differences in academic skills (Ames and Archer 1988; Nolen and Haladyna 1990; Ryan and Grolnick 1986), even though classroom differences in children's learning motivation may partly be due to student selection for placement in classes. Fourth, prior research on teacher stress has mainly concentrated on the antecedents of stress and coping with it, and there has been little empirical research on the consequences of teachers' pedagogical well-being and teacher stress for children's learning motivation and academic outcomes. Finally, few previous studies have utilized advanced statistical tools, by which we mean multilevel modeling for examining teaching practices in hierarchical classroom contexts (for exceptions, see Anderman et al. 2001; Perry et al. 2007). Consequently, the present study aimed to investigate the extent to which classroom quality, as observed in

kindergarten classes and teacher stress, contributes to children's learning motivation and their phonological awareness.

Observed classroom quality

Classroom observations measuring interaction in a classroom have been found to provide more powerful predictors of children's learning outcomes than information on structural features of the classroom (Howes et al. 2008; Mashburn et al. 2008). The most widely used instruments for the observational assessment of classroom interactions and teaching practices are the Early Childhood Environment Rating Scale (Harms et al. 1998), the Early Childhood Classroom Observation Measure (Stipek and Byler 2004), and the Classroom Assessment Scoring System (CLASS) (Pianta et al. 2008). In this study, CLASS was used to examine classroom quality in learning situations (see Pakarinen et al. 2010, for validation in Finnish kindergartens). This instrument assesses three domains of classroom interaction, namely, emotional support, classroom organization, and instructional support (Pianta et al. 2008).

In classrooms with *emotional support* of high-quality teachers are sensitive to children's needs and interests; they show responsiveness and are warm (Pianta et al. 2008). They also provide children with appropriate levels of autonomy and feelings of comfort (Pianta et al. 2008). In classrooms with high-quality *classroom organization*, teachers use proactive rather than reactive approaches to discipline, establish clear and stable routines, monitor students carefully to keep them involved in academic tasks, and provide activities that are interesting to children (Emmer and Stough 2001; Pianta et al. 2008). Teachers also help students to regulate their own behavior and to maintain interest in learning activities (Pianta et al. 2008). In classrooms with high-quality *instructional support*, teachers provide scaffolding and support (Yates and Yates 1990), create opportunities for conceptual development, and afford appropriate questioning and feedback (La Paro et al. 2004; Pianta et al. 2008). Teachers help students to solve problems, think creatively, and develop more complex language skills (Pianta et al. 2008).

High-quality emotional support, classroom organization, and instructional support contribute to children's emergent and subsequent academic performance (e.g., Mashburn et al. 2008; Pianta et al. 2008). Emotional support provided by the teacher has been found to promote children's social skills (Mashburn et al. 2008; NICHD ECCRN 2003) and academic achievement (Hamre and Pianta 2005; Perry et al. 2007). Effective classroom management has been shown to be associated with high achievement (Cameron et al. 2008; Wharton-McDonald et al. 1998) and greater engagement in learning (Rimm-Kaufman et al. 2009; Wharton-McDonald et al. 1998). Moreover, in classrooms with high-quality management, the students show higher on-task behavior and social and academic competence than in classrooms with low-quality management (e.g., Pianta et al. 2002; Rimm-Kaufman et al. 2005). Further, high instructional quality has been found to be associated with students' classroom engagement (Downer et al. 2007; Wharton-McDonald et al. 1998) and academic outcomes (Howes et al. 2008; Wharton-McDonald et al. 1998).

Although a considerable body of research has produced findings on the impact of observed classroom quality on children's academic, engagement, and social skills, its role in children's motivation has been less investigated. Thus, the present study aimed to add to previous research by examining the extent to which classroom quality, assessed using classroom observation, contributes to children's learning motivation; and determining

whether learning motivation would also mediate the association between observed classroom quality and children's phonological skills.

Teacher stress

Besides instructional practices, other characteristics or resources of teachers, such as their coping with stress, might influence children's learning and motivation and the overall quality of classroom interaction. Previous research has found that exhaustion and stress at work are common among teachers: 27% of Finnish teachers have been found to suffer from symptoms of exhaustion (Kalimo and Toppinen 1997). Previous studies in the field have mainly concentrated on the predictors of teacher stress and coping with stress, while there are only a few studies which have examined the consequences of teacher stress for students' learning and motivation (for an exception, see Kyriakou 1987).

Work-related exhaustion in teachers may be detrimental to their performance in their job (Grayson and Alvarez 2008), and teachers with burnout symptoms may also have reduced tolerance when it comes to meeting the needs of students with challenging behavior (Kokkinos et al. 2005). Moreover, emotional exhaustion may lead to avoidance of interaction with students and to lowered sensitivity. Teacher stress can have negative influences on their students' emotional well-being (e.g., Kyriakou 1987). Teachers with burnout symptoms are also likely to perform and achieve educational goals less effectively than their healthy and engaged colleagues (Guglielmi and Tatrow 1998; Rudow 1999). Not surprisingly, self-reported depression in teachers, which is closely linked to feelings of exhaustion and stress, has been shown to be negatively connected with observed classroom quality (Hamre and Pianta 2004; Pianta et al. 2005). These earlier findings support the assumption that teacher stress may lead to lower quality interaction in the classroom and also to lower learning motivation in children. No studies to our knowledge have examined the mediating effect of learning motivation between teacher stress and children's phonological awareness, which was one of our research questions.

Early reading skills

Research on the antecedents of early reading skills indicates that letter knowledge and phonological awareness have consistently been identified as the best proximal predictors of future reading skills (e.g., Leppänen et al. 2008; Pennington and Lefly 2001; Vellutino et al. 2004). Girls have been shown to perform better than boys in reading (Leppänen et al. 2008; Logan and Johnston 2009) and to have more motivation than boys in languages (Eccles et al. 1998, 2005).

Compared to many other languages, Finnish is relatively easy to learn to read, as it has a highly regular orthography and simple syllabic structure (Seymour et al. 2003). In Finnish, for example, the writing system consists of only 29 grapheme–phoneme combinations, and every word can be read through reliance on this highly bi-directionally consistent phonological strategy. This makes the acquisition of basic reading accuracy a fast and easy process for the majority of beginning readers (e.g., Seymour et al. 2003). At least 25% of Finnish children can read before they enter formal education at the age of 7 (Holopainen et al. 2000; Lerkkanen et al. 2004), and the great majority of them achieve an accurate and fluent word reading skill before the end of the first school year (Aunola et al. 2002; Seymour et al. 2003).

Kindergarten education in Finland

In Finland, compulsory education begins in the year in which the child turns 7 years of age and ends when he/she is 16. Kindergarten education is provided in the year preceding entrance into primary school, that is, at the age of 6. Organising kindergarten education is a statutory obligation for municipalities. For families, participation in kindergarten education in Finland is voluntary and free of charge. Almost the whole age cohort (98%) attends kindergarten either in daycare centers (78%) or schools (22%) (Rautanen 2007).

The core curriculum for kindergarten education is regulated by the Ministry of Education. The goals set for education are based on a holistic view of the child's growth, development, and lifelong learning. Kindergarten education is closely integrated with early childhood education in general and in particular with the first 2 years of primary school. The kindergarten curriculum includes various subject areas (Language and Interaction; Mathematics; Environmental Studies and Natural Science; Ethics; Health, Physical and Motor Development; and Art and Culture), but instruction is not divided into lessons on specific subjects. Instead, the activities are an integrated part of thematic learning throughout the day. Children's skill development is promoted through various play-related methods, together with child-initiated and small-group activities. The assumption is that children learn at their own speed, in accordance with their own capabilities and interests. Special attention is paid to social and cognitive development to minimize possible later risks for learning at school.

Aims and hypotheses

The present study examined the following research questions:

1. Do kindergarten classes differ in terms of children's learning motivation and phonological awareness? We expected, as reported previously in elementary school classes (Anderman et al. 2001), that children in different kindergarten classes would differ in terms of their learning motivation and phonological awareness (Hypothesis 1).
2. Do observed emotional support, classroom organization, and instructional support predict differences in children's learning motivation, after controlling for classroom differences in mothers' education, gender, and previous pre-reading skills? As teachers' mastery-oriented instructional practices (Anderman et al. 2001), perceived support and caring (Wentzel 1998), and enforcement of rules in the classroom combined with teacher warmth (Ryan and Grolnick 1986) have been connected to higher intrinsic motivation in children, we assumed (Hypothesis 2) that high emotional support, classroom organization, and instructional support would predict high learning motivation in children.
3. Does teacher stress rated by kindergarten teachers predict classroom differences in children's learning motivation, after controlling for classroom differences in mothers' education, gender, and previous skills in reading? As teachers' self-reported depression (Hamre and Pianta 2004; Pianta et al. 2005) has been shown to be connected with lower observed classroom quality, and teacher stress has been found to have negative influences on their students' emotional well-being (e.g., Kyriakou 1987), we expected that high teacher stress would predict low learning motivation in children (Hypothesis 3).
4. Do observed emotional support, classroom organization, instructional support, teacher stress, and classroom differences in learning motivation predict classroom differences in children's phonological awareness after controlling for classroom differences in pre-reading skills? As classroom quality has previously been associated with children's

- language skills (Pianta et al. 2002; Mashburn et al. 2008), it was hypothesized (Hypothesis 4a) that high classroom quality would predict high phonological awareness. In line with findings indicating that teachers' self-reported depression (Hamre and Pianta 2004; Pianta et al. 2005) has been shown to be connected with lower observed classroom quality, we assumed (Hypothesis 4b) that a high level of teacher stress would contribute to low phonological awareness in children.
5. Does learning motivation mediate the association between teacher stress, observed classroom quality factors, and children's phonological skills? We assumed (Hypothesis 5) that children's high learning motivation would mediate the association between observed classroom quality, teacher stress, and high level of phonological awareness.

Method

Participants and procedure

The present study is a part of the ongoing First Steps Study (Lerkkänen et al. 2006, unpublished data). The present analyses concern data on 1,268 (613 girls, 655 boys) kindergarteners ($M=73.58$ months old, $SD=3.40$ months) and 137 kindergarten teachers (130 females, seven males). The children participating in the present study represent a whole age cohort from three municipalities, two of them located in Central Finland and one in Eastern Finland. Some kindergartens were in semirural and some in urban areas. Of the total of 121 kindergartens, 87 were situated in daycare centers and 34 in elementary schools. Kindergarten class size ranged from 3 to 24 ($M=13.70$; $SD=5.51$). All the groups were Finnish-speaking. Although most of the groups were composed of kindergarten-age children (6-year-olds) exclusively, the age composition was wider in some of the groups: some groups that were taught in daycare centers also enrolled younger children (most often 5-year-olds), and some groups that were taught in elementary schools also enrolled 1st and/or 2nd graders. Class size in the classrooms observed ranged from three to 24 children ($M=13.85$; $SD=5.92$). On average, 10.89 ($SD=3.35$) children were present during the observation. Of the classrooms observed, 36 (73.5%) were in daycare centers and 13 (26.5%) in elementary schools.

Before the study was begun, parents were contacted for a written consent for their children's participation. Children participated in two assessments during their kindergarten year. Their pre-reading skills were measured in October (Time 1) and their phonological awareness in April (Time 2). The tests were carried out by trained investigators. Children were also interviewed about their learning motivation in April (Time 2).

Mothers were asked to fill in a background questionnaire in March. The representativeness of the children's family backgrounds with respect to the general Finnish population was good. The vast majority of the children, 78.5%, came from nuclear families, 11.3% were from single-parent families, 8.2% from blended families, and 2% from families where the parents were divorced and the child had two homes. A total of 26% of the children's mothers had a Master's degree or higher, 35.2% had a BA or vocational college degree, 31.8% had a vocational school degree, and 7% had no education beyond comprehensive.

Kindergarten teachers were asked for their written consent to participate in March. They were asked to complete questionnaires on their teaching-related stress and teaching experience. Questionnaires were sent to the teachers, and they were returned by mail. The kindergarten teachers' working experience in daycare ranged from less than a year to more than 15 years (*Mode* = more than 15 years). All teachers had at least a Bachelor's degree.

Three kindergarten teachers did not fill out the questionnaire reporting their education or working experience. The teachers participating in the classroom observations were selected on a voluntary basis from the total of 137 kindergarten teachers participating in the First Steps Study. When the 49 kindergarten teachers who participated in the classroom observations were compared to those who chose not to participate, no statistically significant differences were found concerning teachers' work experience, number of 6-year-olds in the class, teacher stress, and teacher efficacy. By using the missing data procedure (see details below in the description of the analysis strategy used), we were able to use data for all teachers ($N=137$) in the analyses.

Measures

Children's measures

Pre-reading skills in the fall Children's pre-reading skills were used as a control variable. They were assessed by using two subtests. *Initial phoneme identification* was tested by the use of the ARMI test material (Lerikkanen et al. 2006). The child was shown 10 sets of four pictures, one at a time. The four pictures were named. The initial phoneme had to be recognized from among four words given. The children were instructed as follows: "Here are pictures of omena, sukka, reppu and lintu [apple, sock, bag, bird]. Listen carefully: which word starts with the sound /o/: omena, sukka, reppu, lintu?" The test was administered individually to each child by a trained tester at Time 1. The total score corresponded to the number of correct items (maximum value of 10).

Children's *Letter knowledge* was assessed using a test that employed all 29 letters in the Finnish language. The experimenter showed 29 uppercase letters divided into three rows in random order from the ARMI test material (Lerikkanen et al. 2006). The children were asked to name the letters, one row at a time, while the other rows were covered. The test was administered individually to each child by the trained tester at Time 1. The total score corresponded to the number of correct items (maximum value of 29).

The scores for Initial phoneme identification and Letter knowledge were firstly standardized. Then, a variable measuring pre-reading skills was calculated as the mean of these two scores. The Cronbach alpha for pre-reading skills was .95.

Phonological awareness in the spring Phonological awareness on leaving kindergarten tested at Time 2 was among the outcomes that were predicted. It was assessed using the same initial phoneme identification test (Lerikkanen et al. 2006) and procedure as in the fall (see above). The total score was based on the number of correct items (maximum value of 10). The Cronbach alpha for phonological awareness was .77.

Learning motivation Children's learning motivation was assessed in an interview using the Content Interest Rating Scale for Children (Lerikkanen and Poikkeus 2006, unpublished test material) at Time 2. The children were first shown a picture of a task or activity that was related to a kindergarten curriculum area (eight pictures altogether). Then, they were read a question concerning how much they liked this particular task or activity ("How much do you like doing letter tasks in your kindergarten?"). The eight tasks or activities were: letter tasks and reading, mathematics, play, listening to storybook reading, music, outdoor play, nature and environment, and art and crafts. Children were shown a set of five pictures of faces depicting a scale from very positive to very negative and asked to indicate the face (i.e., the point on the scale) which best described their liking for a particular task

or activity (picture of the most unhappy face 1 = *I do not like it at all/I dislike doing those tasks*; picture of the happiest face 5 = *I like it very much/I really enjoy doing those tasks*). As the preliminary factor analysis indicated that one factor solution fitted the data best, a summary score was calculated on the basis of seven items (outdoor playing not included based on factor analysis). The Cronbach alpha reliability for the *Learning motivation* was .63.

Teachers' measures

Classroom observations The kindergarten classrooms were observed using the CLASS (La Paro et al. 2004; Pianta et al. 2008), which consists of ten items measuring three components of classroom quality: (1) Emotional Support (four items), (2) Classroom Organization (three items), and (3) Instructional Support (three items). In this study, we used nine items from CLASS based on their validation in Finnish kindergartens (Pakarinen et al. 2010). Each item was rated on a seven-point scale: low (1, 2), moderate (3–5), and high (6, 7). The manual (Pianta et al. 2008) provides detailed indicators of each item and examples of teacher behaviors and classroom interaction for these ratings, as well as reliability and validity information (see also Pakarinen et al. 2010).

The kindergarten classrooms were observed in spring 2007 by 17 trained observers, all of whom were female university students. The observers were carefully trained in advance (Pakarinen et al. 2010). Each kindergarten class was observed on two different days by a pair of observers. Observation began in the morning when instructional activity started (at 9 A.M.) and lasted approximately 3 h (until naptime in full-time programs and until the time children left in half-time programs). The two observers assigned their CLASS codings independently of each other. The inter-rater reliabilities between the pairs of observers varied between .80 and .94. For the final analyses, a mean score for each item was calculated from the ratings of the two observers.

Correlations between the CLASS ratings for the two separate observation days ranged from .44 (Productivity) to .80 (Teacher sensitivity). For further analyses, the ratings from these two observation days were collapsed. Next, summary scores were calculated taking the mean of the items belonging to each specific factor, namely, *Emotional support* (three items; e.g., *Teacher sensitivity*), *Classroom organization* (three items; e.g., *Behavior management*), and *Instructional support* (three items; e.g., *Quality of feedback*). The Cronbach alpha reliabilities for the scales were as follows: Emotional support .93; Classroom organization .88; Instructional support .90.

Teacher stress was assessed using a modified version of Gerris' Parental Stress Inventory (Gerris et al. 1993). The modification involved changing the context from home to kindergarten. The three items tapped feelings of stress in kindergarten teaching and powerlessness in handling teacher–child situations (e.g., “I have a lot more problems in guiding the children than I expected”). Cronbach alpha reliability for Teacher stress was .60.

Parents' measures

Mothers' level of education All (N = 1,233) mothers were asked to report their vocational education. The results showed that 5.5% of mothers had no vocational education, 25.2% had a vocational school degree, 18.7% had a vocational college degree, 9.8% had a polytechnic degree or Bachelor's degree, and 21.4% had a university degree. Two hundred and forty-six (19.4%) mothers' did not report their vocational education.

Analysis strategy

The aim of the present study was to examine the extent to which kindergarten classrooms differ from each other with respect to children's learning motivation and phonological awareness and the extent to which observed emotional support, classroom organization, instructional support, and teacher stress would predict these classroom differences. The Multilevel Modeling technique (Duncan et al. 1997) is an excellent tool for answering these research questions. First, it enables the variance in the variables observed to be divided into two components: (1) variation due to the differences between different kindergarten classes (*between-kindergarten class variation*) and (2) variation due to individual differences, after taking into account kindergarten class membership (*within-kindergarten class variation*). Second, the Multilevel Modeling technique enables one to enter various predictors both at the kindergarten class level (*between-level*) and at the level of the individual children (*within-level*).

The analyses were carried out in the following sequence. First, to examine kindergarten class differences in learning motivation and phonological awareness, intraclass correlations and the variance estimates at the between- and within-levels were calculated by using the kindergarten class as a clustering variable. One-tailed testing of significance was used (H_0 : between-class variance is zero; H_1 : between-class variance is larger than zero). Next, the correlations between the variables observed were calculated at the kindergarten class level (*between-level*) and at the individual level (*within-level*). Variables measuring observed classroom quality and teacher stress were treated as the kindergarten group level variables, whereas variables with an insignificant kindergarten group level variance were treated as individual level variables. Other variables were analyzed at both levels. As a next step, multilevel models were carried out for learning motivation and phonological awareness. The learning motivation typical of a kindergarten class was predicted by emotional support, classroom organization, instructional support, and teacher stress, while controlling for mother's education, child's gender, and pre-reading skills at the beginning of kindergarten (T1). Children's phonological awareness (T2) typical of the kindergarten class, in turn, was predicted by learning motivation, emotional support, classroom organization, instructional support, teacher stress, and pre-reading skills, while controlling for mother's education and child's gender. Moreover, we also examined the indirect effects of emotional support, classroom organization, instructional support, and teacher stress on children's phonological awareness via learning motivation.

All the analyses were performed using the Mplus statistical package (Version 5; Muthén and Muthén 1998–2007) with the missing data method, that is, the standard *missing at random* approach to missingness (Muthén and Muthén 1998–2007). This missing-data method uses all the data that are available to estimate the model without imputing data. Because the variables were skewed, the parameters of the models were estimated using maximum likelihood estimation with non-normality robust standard errors (Muthén and Muthén 1998–2007). 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).

Results

Intraclass correlations

First, to determine kindergarten class differences in learning motivation and phonological awareness, intraclass correlations and variance estimates at the between- and within-levels

were calculated by using the kindergarten class as a clustering variable. The results (Table 1) showed that the between-class variation both in learning motivation (T2) and phonological awareness (T2) was statistically significant: 4% of the total variation in learning motivation was due to kindergarten class membership, whereas 5% of the total variation in phonological awareness was due to the similarity among the children from the same kindergarten class. The results for the background variables (see Table 1) showed further that a significant kindergarten level variation existed in pre-reading skills (T1; 3% of the total variance) and in mothers' education (T2; 10% of the total variance). However, the intra-class correlation for gender (1% of the total variance) was nonsignificant. Consequently, gender was treated as an individual (within-level) variable in further analyses. The learning motivation, phonological awareness, and other background variables were analyzed at both levels.

Predictive relationships between classroom quality, teacher stress, children's learning motivation, and phonological awareness

The within-level (below the diagonal) and between-level (above the diagonal) correlations and the means and variances for the observed variables are presented in Table 2. The between-level correlations ranged from $-.56$ to $.86$. In particular, teacher stress correlated negatively, and classroom organization correlated positively with children's learning motivation: the more classroom organization was observed and the less teacher stress the kindergarten teacher reported, the higher was children's learning motivation typical of the kindergarten group. Teacher stress also correlated negatively with children's level of phonological awareness. Thus, teacher stress correlated negatively both with learning motivation and phonological awareness. Classroom organization, in turn, correlated only with learning motivation. Learning motivation correlated positively with phonological awareness. In addition, mothers' education typical of the kindergarten group correlated positively with pre-reading skills typical of the kindergarten group: the more typical it was for the mothers to be highly educated, the better were the children's pre-reading skills typical of the kindergarten group. The correlations between children's learning motivation and phonological awareness and observed emotional support and instructional support were nonsignificant at the between-level. In addition, the CLASS domains (i.e., emotional support, classroom organization, and instructional support) correlated highly positively with each other (r varied between $.79$ and $.86$).

Table 1 Intraclass correlations and kindergarten group (between) and individual level (within) variances teacher ID at time 2 as a clustering variable

Variable	ICC	Between-variance (Standard error)	Within-variance (Standard error)
Learning motivation, Time 2	0.04*	0.02 (0.01)*	0.52 (0.02)***
Phonological awareness, Time 2	0.05*	0.16 (0.07)*	2.98 (0.24)***
Control variables			
Mothers' education, Time 2	0.10***	0.18 (0.05)***	1.55 (0.06)***
Pre-reading skills, Time 1	0.03*	0.02 (0.01)*	0.76 (0.03)***

Standard errors in parentheses

*** $p < .001$; ** $p < .01$; * $p < .05$

Table 2 Within-level (below the diagonal) and between-level correlations (above the diagonal), and means and variances of observed variables

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	Mean	Var _{between}
Learning motivation T2 ^a	1.00	.33	.03	–	.37	.50 ^c	.20	–.47**	–.14	3.82	0.02
Phonological awareness T2 ^a	.09**	1.00	.49****	–	.13	.05	.23	–.42**	.43***	8.83	0.16
Pre-reading skills T1 ^a	.07***	.63*	1.00	–	–.15	–.39****	–.13	–.26	.82*	0.01	0.02
Gender ^b	–.30*	–.20*	–.15*	1.00	–	–	–	–	–	1.52	–
Emotional support T2 ^c	–	–	–	–	1.00	.86*	.80*	–.19	–.16	5.12	0.52
Classroom organization T2 ^c	–	–	–	–	–	1.00	.79*	–.14	–.20	5.34	0.38
Instructional support T2 ^c	–	–	–	–	–	–	1.00	–.14	–.14	3.96	0.72
Teacher stress T2 ^c	–	–	–	–	–	–	–	1.00	–.20****	2.04	0.43
Mothers' education T2 ^a	–.03	.15*	.19*	.02	–	–	–	–	1.00	3.19	0.18
Var _{within}	0.52	2.98	0.76	0.25	–	–	–	–	1.55	–	–

– not estimated

* $p < .001$; ** $p < .01$; *** $p < .05$; **** $p < .10$ ^a Variable both at between-level and within-level^b Within-level variable^c Between-level variable

Correlations at the within-level ranged from $-.30$ to $.63$ with the largest positive correlations between pre-reading skills and phonological awareness ($r=.63$): the better a child performed in tests measuring pre-reading skills at the beginning of the kindergarten year, the better she or he also performed in the test measuring phonological awareness at the end of the kindergarten year. Gender correlated negatively with learning motivation ($r=-.30$), girls showing higher learning motivation than boys.

The role of classroom organization and teacher stress in children’s learning motivation and phonological awareness

Since the correlations between children’s learning motivation and phonological awareness and observed emotional support and instructional support were nonsignificant at the between-level, only classroom organization was used in further analyses. We ran multilevel model to determine whether observed classroom organization and teacher stress would predict kindergarten class differences in children’s learning motivation and phonological awareness, while controlling for mothers’ education, child’s gender, and pre-reading skills. We also examined whether class differences in learning motivation would predict those in phonological awareness. The predictor variables were allowed to correlate with each other. Because we had hypotheses on the directions of the associations, one-tailed testing of significance was used.

The final model (Fig. 1) included statistically significant paths and associations only ($\chi^2(15 \ N_{within}=1,268, \ N_{between}=137)=12.25, \ p=0.66; \ CFI=1.00, \ TLI=1.01; \ RMSEA=0.00; \ SRMR_{between}=0.11, \ SRMR_{within}=0.01$). This model is presented in Fig. 1 [kindergarten class level (between-level) results above the dashed line and individual level

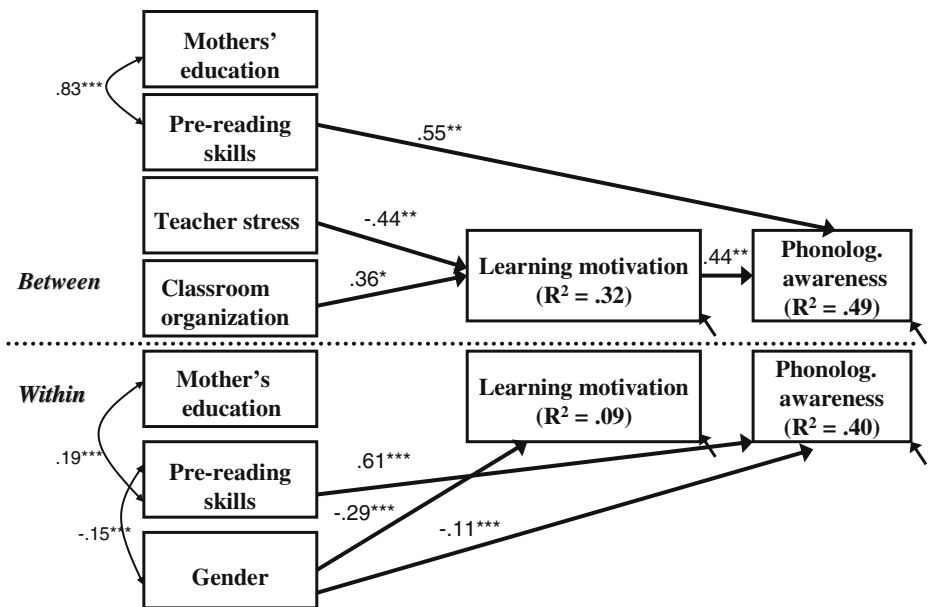


Fig. 1 Multilevel model for kindergarten children’s learning motivation and phonological awareness. The paths and associations between variables are presented as standardized estimates. $*p<.05$; $**p<.01$; $***p<.001$; gender 1 = girl, 2 = boy

(within-level) results below the dashed line]. The results showed that at the kindergarten class level, teacher stress predicted negatively and observed classroom organization predicted positively children's learning motivation: the less teaching-related stress a teacher reported and the higher the classroom organization observed in a particular classroom, the higher the children's learning motivation shared among the kindergarten class members. Teacher stress and observed classroom organization had no direct impact on children's phonological awareness (T2) at the kindergarten class level. Learning motivation and pre-reading skills, however, further predicted phonological awareness: the higher the learning motivation children showed and the higher their pre-reading skills were, the higher the phonological awareness shared among the kindergarten class members. Moreover, learning motivation was found to mediate the association between teacher stress and phonological awareness (Estimate of indirect effect = -0.13 ; $SE=0.07$; $p=0.04$), whereas it did not mediate the association between classroom organization and phonological awareness. The mothers' education and pre-reading skills typical of the kindergarten class correlated positively with each other: the higher the mothers' education typical of the class, the better the pre-reading skills. However, the mothers' education and pre-reading skills typical of the class had no impact on learning motivation typical of the kindergarten group. The results at kindergarten class level remained the same when controlling also for class size.

The results (Fig. 1) at the individual level showed further that gender predicted negatively the level of children's learning motivation: boys showed lower learning motivation in kindergarten than girls. In addition, pre-reading skills as well as gender predicted phonological awareness later on: the better the child's pre-reading skills the better was his or her phonological awareness later on. Girls also showed better phonological awareness than boys.

Discussion

The role of teachers and their instructional practices in children's learning motivation has gained increasing attention in recent years. However, few studies have focused on children's learning motivation in kindergarten and used classroom observations. Furthermore, there has been, to our knowledge, no previous research on the impact of teacher stress on children's learning motivation. The results of the present study showed that children in the same kindergarten class resembled each other in terms of their learning motivation and phonological awareness. Low teacher stress and high classroom organization predicted high learning motivation as typical of the kindergarten class, and this, in turn, predicted a high level of phonological awareness in the children. Moreover, learning motivation mediated the association between teacher stress and phonological awareness.

As was hypothesized (Hypothesis 1), the results showed that children in the same kindergarten class resembled each other in terms of their learning motivation and phonological awareness. The results also partly supported Hypothesis 2 by showing that classroom organization predicted children's learning motivation: the higher the classroom organization observed in a classroom, the higher the learning motivation children showed in that particular classroom. This result suggests that teachers' setting of clear rules and providing of inherently interesting tasks in the classroom contributes to children's motivation and engagement in learning activities. This result is in accordance with a previous study by Ryan and Grolnick (1986) showing that warmth and consistent rules in the classroom are related to children's self-worth, internal control, and mastery motivation.

This result is also in line with a previous finding of Guay et al. (2001) indicating that teacher provision of both autonomy support and optimal structure predict children's motivation. The present result adds to our understanding of the development of children's motivation by showing that teachers' classroom practices make a difference already in kindergarten: in the classes in which teachers predominantly employed high-quality classroom organization, children tended to show more learning motivation than in classes with lower classroom organization. Our result broadens the previous research also by showing that besides being connected to teacher reports or student reports of teaching practices, children's motivation is also associated with classroom organization actually observed. It is important to note that the entry level of children's pre-reading skills was controlled for in the analyses to ensure that the results were not due to the selection of differently skilled children into different kindergarten classes.

Emotional support and instructional support correlated also with children's learning motivation albeit not statistically significantly. On the one hand, this result may be due to the small sample size. Moreover, according to the CLASS system, classroom organization focuses on the ways in which the teacher maximizes students' interest, engagement, and ability to learn from lessons and activities and how well teacher manages instructional time and routines and provides activities for students so that they have opportunity to be involved in learning activities (Pianta et al. 2008). In Rimm-Kaufman et al. (2009), study classroom organization was also the only significant predictor for children's engagement in learning.

We also investigated whether teacher stress would predict classroom differences in children's learning motivation in kindergarten. The results showed that high levels of teacher's self-reported teaching stress predicted negatively children's learning motivation. This result is in line with Hypothesis 3 and may reflect the fact that teachers who experience stress may have low effort or ability to support their pupils' engagement and interest in learning. Teachers exhibiting greater amounts of enthusiasm seem to be effective in promoting interest, excitement, and curiosity among pupils (Patrick et al. 2000), while emotional exhaustion may lead to avoidance of interaction with students and to lowered sensitivity. This result broadens prior research by suggesting that in addition to teachers' instructional practices (Anderman et al. 2001; Aunola et al. 2006), their pedagogical well-being is also important in promoting children's motivation. In terms of practical implications, it is important to pay attention to teachers' well-being since teachers' well-being seems to promote children's enthusiasm and engagement in learning. In other words, emotional exhaustion and stress in teachers might hamper their students' motivation in learning.

Our next aim was to examine whether observed classroom organization, teacher stress, and class differences in learning motivation would predict class differences in children's phonological awareness. The results showed that high learning motivation in children predicted high levels of phonological awareness. This result suggests that learning motivation has an important role in promoting kindergarteners' pre-reading skills. This finding is in line with previous studies which have found that motivation contributes to children's reading performance (e.g., Baker and Wigfield 1999; Wigfield 1997). In line with Hypothesis 5, the results showed further that teacher stress had an indirect effect on phonological awareness via children's learning motivation: high teacher stress predicted low learning motivation in children, which further contributed to a low level of phonological awareness. Overall, this result suggests that children's learning motivation is an important mediator of the impact of teacher-related variables on children's school-related skills. In other words, kindergarten teachers' well-being may affect children's academic skills by promoting children's enthusiasm and engagement in learning. It is important to note that we also asked kindergarten teachers to report the amount of time spent in activities

that promote literacy skills. There were no statistically significant differences between kindergarten teachers in their self-reported instructional activities, and the amount of time spent in activities did not predict gains in phonological awareness.

We also examined whether kindergarten classes differ in terms of children's pre-reading skills and mothers' education, which might suggest the effects of selection on kindergarten classes. The results showed that children in different classes resembled each other both in terms of their pre-reading skills and their mothers' education. This result is likely to be due to the selection of children for different kindergarten classes suggesting that similar children in terms of background variables go to same kindergarten groups. However, the pre-reading skills and mothers' education typical of the kindergarten class had no impact on children's learning motivation. The pre-reading skills typical of the kindergarten class, however, predicted the subsequent phonological awareness typical of the kindergarteners in the same class (see also Lepola et al. 2005).

Our findings at the level of individual children (within level) showed that after controlling for classroom differences in learning motivation and phonological awareness, girls showed a higher level of learning motivation than boys. This result is in line with previous studies showing that girls are typically more motivated in languages than boys (Eccles et al. 1998, 2005). Girls also had better phonological awareness skills than boys. In addition to gender, pre-reading skills (a composite of letter naming and phonological awareness) also predicted later phonological awareness (see also Lepola et al. 2005).

Limitations

This study has some limitations that need to be considered in any attempt to generalize the findings. First, although we interpreted the findings as showing that classroom organization and teacher stress contribute to children's learning motivation, our study did not have a cross-lagged longitudinal design, as classroom quality indicators and children's learning motivation were measured only once. Consequently, it is also possible that children's learning motivation had an impact on their teachers' classroom practices and ways of perceiving themselves as teachers (see Nurmi, submitted for publication). Moreover, children's learning motivation and end of kindergarten year phonological awareness were measured at the same time. Hence, caution is warranted in making causal inferences. Second, internal consistency indices concerning teacher stress and children's learning motivation were somewhat low. Third, we used overall interest in kindergarten activities as a measure of children's learning motivation. This is not a traditional approach to task-specific motivation (i.e., task value in math and reading), but it fits well the context and curriculum of Finnish kindergarten education in that Finnish kindergarten instruction is not divided into subject lessons, but different activities are integrated in thematic learning throughout the day. Given that it is difficult to measure young children's motivation, this kind of interest in activities works well in describing children's interest and motivation. Fourth, our measure of pre-reading skills at Time 2 was phonological awareness. A measure of word reading or a composite measure of letter knowledge and phonological awareness might have been better at Time 2. Fifth, the number of kindergarten teachers observed in our study was relatively small, which decreased the power of statistical testing. Consequently, there is an evident need to replicate the findings with a larger sample. Finally, the results were found in a particular cultural and educational setting, that is, in Finnish kindergartens. As there is a substantial amount of variation in how kindergartens

are organized, and in the kind of instruction provided, there is clearly a need to replicate these findings in other cultures and educational settings.

Conclusion

The results of the present study contribute to our understanding of the impact of classroom quality indicators, that is, observed teacher practices and teacher stress, on children's learning motivation and phonological awareness. We found children's learning motivation to be sensitive to teacher's pedagogical well-being, as well as to observed quality of classroom organization. Children's learning motivation was also found to mediate the association between teacher stress and phonological skills suggesting that motivation is an important mediator of the impact of teacher-related variables on children's school-related skills.

References

- Ames, C., & Archer, J. (1988). Achievement goals in the classroom: students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*, 260–267.
- Anderman, E. M., Eccles, J. S., Yoon, K. S., Roeser, R., Wigfield, A., & Blumenfeld, P. (2001). Learning to value mathematics and reading: relations to mastery and performance-oriented instructional practices. *Contemporary Educational Psychology, 26*, 76–95.
- Aunola, K., Nurmi, J.-E., Niemi, P., Lerkkanen, M.-K., & Rasku-Puttonen, H. (2002). Developmental dynamics of achievement strategies, reading performance, and parental beliefs. *Reading Research Quarterly, 37*, 310–327.
- Aunola, K., Leskinen, E., & Nurmi, J.-E. (2006). Developmental dynamics between mathematical performance, task-motivation, and teachers' goals during the transition to primary school. *British Journal of Educational Psychology, 76*, 21–40.
- Baker, L., & Wigfield, A. (1999). Dimensions of children's motivation for reading and their relations to reading activity and reading achievement. *Reading Research Quarterly, 34*, 452–477.
- Cameron, C. E., Connor, C. M., Morrison, F. J., & Jewkes, A. M. (2008). Effects of classroom organization on letter—word reading in first grade. *Journal of School Psychology, 46*(1), 173–192.
- Davis, H. A. (2003). Conceptualizing the role and influence of student-teacher relationships on children's social and cognitive development. *Educational Psychologist, 38*, 207–234.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: the self-determination perspective. *Educational Psychologist, 26*, 325–346.
- Downer, J. T., Rimm-Kaufman, S. E., & Pianta, R. C. (2007). How do classroom conditions and children's risk for school problems contribute to children's behavioral engagement in learning? *School Psychology Review, 36*(3), 413–432.
- Duncan, T. E., Duncan, S. C., Alpert, A., Hops, H., Stoolmiller, M., & Muthén, B. (1997). Latent variable modeling of longitudinal and multilevel substance use data. *Multivariate Behavioral Research, 32*, 275–318.
- Eccles, J., Magnan, A., & Gibert, F. (2006). Class size effects on literacy skills and literacy interest in first grade: a large-scale investigation. *Journal of School Psychology, 44*, 191–209.
- Eccles, J. S., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. L., et al. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motives* (pp. 75–146). San Francisco: Freeman.
- Eccles, J. S., Wigfield, A., Harold, R. D., & Blumenfeld, P. (1993). Age and gender differences in children's self- and task perceptions during elementary school. *Child Development, 64*, 830–847.
- Eccles, J. S., Barber, B., & Jozefowicz, D. (1998). Linking gender to educational, occupational, and recreational choices: Applying the Eccles, et al. model to achievement-related choices. In W. B. Swann, J. H. Langlois, & L. A. Gilbert (Eds.), *Sexism and stereotypes in modern society: The gender science of Janet Taylor Spence* (pp. 153–192). Washington: American Psychological Association.

- Eccles, J. S., O'Neill, S. A., & Wigfield, A. (2005). Ability self-perceptions and subjective task values in adolescents and children. In K. Anderson Moore & L. H. Lippman (Eds.), *What do children need to flourish? Conceptualizing and measuring indicators of positive development* (pp. 237–249). New York: Springer.
- Emmer, E. T., & Stough, L. (2001). Classroom management: a critical part of educational psychology, with implications for teacher education. *Educational Psychologist*, *36*(2), 103–112.
- Gerris, J. M., Vermulst, A., van Boxtel, D., Janssens, J., van Zutphen, R., & Felling, A. (1993). *Parenting in Dutch families*. Nijmegen: University of Nijmegen Institute of Family Studies.
- Gottfried, A. E. (1990). Academic intrinsic motivation in young elementary school children. *Journal of Educational Psychology*, *82*, 525–538.
- Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: a longitudinal study. *Journal of Educational Psychology*, *93*, 3–13.
- Grayson, J. L., & Alvarez, H. K. (2008). School climate factors relating to teacher burnout: a mediator model. *Teaching and Teacher Education*, *24*, 1349–1363.
- Guay, F., Boggiano, A. K., & Vallerand, R. J. (2001). Autonomy support, intrinsic motivation, and perceived competence: conceptual and empirical linkages. *Personality and Social Psychology Bulletin*, *27*, 643–650.
- Guglielmi, R. S., & Tatrow, K. (1998). Occupational stress, burnout, and health in teachers: a methodological and theoretical analysis. *Review of Educational Research*, *68*(1), 61–99.
- Guthrie, J. T., Wigfield, A., & von Secker, C. (2000). Effects of integrated instruction on motivation and strategy use in reading. *Journal of Educational Psychology*, *92*, 331–341.
- Hamre, B. K., & Pianta, R. C. (2004). Self-reported depression in nonfamilial caregivers: prevalence and associations with caregiver behavior in child-care settings. *Early Childhood Research Quarterly*, *19*, 297–318.
- Hamre, B. K., & Pianta, R. C. (2005). Can instructional and emotional support in the first grade classroom make a difference for children at risk of school failure? *Child Development*, *76*(5), 949–967.
- Harms, T., Clifford, R. M., & Cryer, D. (1998). *The early childhood environment rating scale* (Revth ed.). New York: Teachers College Press.
- Holopainen, L., Ahonen, T., Tolvanen, A., & Lyytinen, H. (2000). Two alternative ways to model the relation between reading accuracy and phonological awareness at preschool age. *Scientific Studies of Reading*, *4*, 77–100.
- Howes, C., Burchinal, M., Pianta, R. C., Bryant, D., Early, D., Clifford, R., et al. (2008). Ready to learn? Children's pre-academic achievement in pre-Kindergarten programs. *Early Childhood Research Quarterly*, *23*(1), 27–50.
- Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J. S., & Wigfield, A. (2002). Changes in children's self-competence and values: gender and domain differences across grades one through twelve. *Child Development*, *73*, 509–527.
- Kalimo, R., & Toppinen, S. (1997). *Työuupumus Suomen työikäisellä väestöllä. [Burnout in the Finnish labour force]*. Helsinki: Finnish Institute of Occupational Health.
- Kokkinos, C. M., Panayiotou, G., & Davazoglou, A. M. (2005). Correlates of teacher appraisals of student behaviors. *Psychology in Schools*, *42*(1), 79–89.
- Kyriakou, C. (1987). Teacher stress and burnout: an international review. *Educational Research*, *29*, 146–152.
- La Paro, K. M., Pianta, R. C., & Stuhlman, M. (2004). The classroom assessment scoring system: findings from the prekindergarten year. *The Elementary School Journal*, *104*(5), 409–426.
- Lepola, J., Poskiparta, E., Laakkonen, E., & Niemi, P. (2005). Development of and relationship between phonological and motivational processes and naming speed in predicting word recognition in Grade 1. *Scientific Studies of Reading*, *9*(4), 367–399.
- Leppänen, U., Aunola, K., Niemi, P., & Nurmi, J.-E. (2008). Letter knowledge predicts Grade 4 reading fluency and reading comprehension. *Learning and Instruction*, *18*(6), 548–564.
- Lerkanen, M.-K., Rasku-Puttonen, H., Aunola, K., & Nurmi, J.-E. (2004). Predicting reading performance during the first and the second year of primary school. *British Educational Research Journal*, *30*, 67–92.
- Lerkanen, M.-K., Poikkeus, A.-M., & Ketonen, R. (2006). *ARMI—Luku- ja kirjoitustaidon arviointimateriaali 1 luokalle [ARMI—A tool for assessing reading and writing skills in Grade 1]*. Helsinki: WSOY.
- Logan, S., & Johnston, R. (2009). Gender differences in reading ability and attitudes: examining where these differences lie. *Journal of Research in Reading*, *32*(2), 199–214.
- Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O. A., Bryant, D., et al. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child Development*, *79*, 732–749.
- Muthén, L., & Muthén, B. O. (1998–2007). *Mplus Version 5*. <http://www.statmodel.com/index2.html>
- NICHD Early Child Care Research Network. (2003). Social functioning in first grade: associations with earlier home and child care predictors and with current classroom experiences. *Child Development*, *74*, 1639–1662.

- Nolen, S., & Haladyna, T. M. (1990). Personal and environmental influences on students' beliefs about effective study strategies. *Contemporary Educational Psychology, 15*, 116–130.
- Nurmi, J.-E., & Aunola, K. (2005). Task-motivation during the first school years: a person-oriented approach to longitudinal data. *Learning and Instruction, 15*, 103–122.
- Pakarinen, E., Lerkkanen, M.-K., Poikkeus, A.-M., Kiuru, N., Siekkinen, M., Rasku-Puttonen, H., et al. (2010). A validation of the classroom assessment scoring system in Finnish kindergartens. *Early Education and Development, 21*, 95–124.
- Patrick, B. C., Hisley, J., Kempler, T., & College, G. (2000). 'What's everybody so excited about?' The effects of teacher enthusiasm on student intrinsic motivation and vitality. *Journal of Experimental Education, 68*(3), 217.
- Pennington, B. F., & Lefly, D. L. (2001). Early reading development in children at family risk for dyslexia. *Child Development, 72*, 816–833.
- Perry, K. E., & Weinstein, R. S. (1998). The social context of early schooling and children's school adjustment. *Educational Psychologist, 33*, 177–194.
- Perry, K. E., Donohue, K. M., & Weinstein, R. S. (2007). Teaching practices and the promotion of achievement and adjustment in first grade. *Journal of School Psychology, 45*, 269–292.
- Pianta, R. C., La Paro, K. M., Payne, C., Cox, M. J., & Bradley, R. (2002). The relation of kindergarten classroom environment to teacher, family and school characteristics and child outcomes. *Elementary School Journal, 102*(3), 225–238.
- Pianta, R. C., Howes, C., Buchinal, M., Bryant, D., Clifford, R., Early, D., et al. (2005). Features of pre-kindergarten programs, classrooms and teachers: do they predict observed classroom quality and child-teacher interactions? *Applied Developmental Science, 9*(3), 144–159.
- Pianta, R. C., La Paro, K. M., & Hamre, B. K. (2008). *The Classroom Assessment Scoring System. Manual, Pre-K*. Baltimore: Brookes.
- Rautanen, R. (2007). Lasten koulunkäynti [School attendance]. In *Suomalainen lapsi 2007 [The Finnish Child 2007]*. (pp. 187–205). Helsinki: Statistics Finland.
- Renninger, K. A. (1992). Individual interest and development. In A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 361–395). Hillsdale: Erlbaum.
- Rimm-Kaufman, S. E., La Paro, K. M., Downer, J. T., & Pianta, R. C. (2005). The contribution of classroom setting and quality of instruction to children's behavior in kindergarten classrooms. *The Elementary School Journal, 105*(4), 377–394.
- Rimm-Kaufman, S. E., Curby, T. W., Grimm, K. J., Nathanson, L., & Brock, L. L. (2009). The contribution of children's self-regulation and classroom quality to children's adaptive behaviors in the kindergarten classroom. *Developmental Psychology, 45*(4), 958–972.
- Rudow, B. (1999). Stress and burnout in teaching profession: European studies, issues, and research perspectives. In A. M. Huberman (Ed.), *Understanding and preventing teacher burnout: A sourcebook of international research and practice* (pp. 38–58). New York: Cambridge University Press.
- Ryan, R. M., & Grolnick, W. S. (1986). Origins and pawns in the classroom: self-report and projective assessments of individual differences in children's perceptions. *Journal of Personality and Social Psychology, 50*, 550–558.
- Schiefele, U. (1991). Interest, learning and motivation. *Educational Psychologist, 26*(3–4), 299–323.
- Schiefele, U. (1996). Topic interest, text representation, and quality of experience. *Contemporary Educational Psychology, 21*, 3–18.
- Seymour, P. H., Aro, M., & Erskine, J. M. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology, 94*, 143–174.
- Stipek, D., Feiler, R., Daniels, D., & Milburn, S. (1995). Effects of different instructional approaches on young children's achievement and motivation. *Child Development, 66*, 209–223.
- Stipek, D. J., & Byler, P. (2004). The early childhood classroom observation measure. *Early Childhood Research Quarterly, 19*, 375–397.
- Stipek, D. J., Feiler, R., Byler, P., Ryan, R., Milburn, S., & Salmon, J. M. (1998). Good beginnings: what difference does the program make in preparing young children for school? *Journal of Applied Developmental Psychology, 19*, 41–66.
- Turner, J. C., & Meyer, D. K. (2000). Studying and understanding the instructional contexts of classrooms: using our part to forge our future. *Educational Psychologist, 35*, 69–85.
- Turner, J. C., Midgley, C., Meyer, D. K., Gheen, M., Anderman, E. M., Yongjin, K., et al. (2002). The classroom environment and students' reports of avoidance strategies in mathematics: a multimethod study. *Journal of Educational Psychology, 94*(1), 88–106.
- Vellutino, F. R., Fletcher, J. M., Snowling, M. J., & Scanlon, D. M. (2004). Specific reading disability (dyslexia): what have we learned in the past four decades? *Journal of Child Psychology and Psychiatry, 45*, 2–40.

- Viljaranta, J., Lerkkanen, M.-K., Poikkeus, A.-M., Aunola, K., & Nurmi, J.-E. (2009). Cross-lagged relations between task motivation and performance in arithmetic and literacy in kindergarten. *Learning and Instruction, 19*(4), 335–344.
- Wentzel, K. R. (1998). Social relationships and motivation in middle school: the role of parents, teachers and peers. *Journal of Educational Psychology, 90*(2), 202–209.
- Wharton-McDonald, R., Pressley, M., & Mistretta-Hampston, J. (1998). Literacy instruction in nine first-grade classrooms: teacher characteristics and student achievement. *The Elementary School Journal, 99*(2), 101–128.
- Wigfield, A. (1997). Reading motivation: a domain-specific approach to motivation. *Educational Psychologist, 32*(2), 59–68.
- Wigfield, A., & Guthrie, J. T. (1997). Relations of children's motivation for reading to the amount and breadth of their reading. *Journal of Educational Psychology, 89*, 420–432.
- Wigfield, A., Eccles, J. S., & Pintrich, P. R. (1996). Development between the ages of 11 and 25. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 148–185). New York: Macmillan.
- Wigfield, A., Eccles, J. S., Yoon, K. S., Harold, R. D., Arbreton, A., Freedman-Doan, C., et al. (1997). Changes in children's competence beliefs and subjective task values across the elementary school years: a 3-year study. *Journal of Educational Psychology, 89*, 451–469.
- Wigfield, A., Eccles, J. S., Schiefele, U., Roeser, R. W., & Davis-Kean, P. (2006). Development of achievement motivation. In W. Damon, R. M. Lerner, & N. Eisenberg (Eds.), *Handbook of Child Psychology: Social, Emotional, and Personality Development* (6th ed., Vol. 3, pp. 933–1002). New York: Wiley.
- Yates, G. C., & Yates, S. M. (1990). Teacher effectiveness research: towards describing user-friendly classroom instruction. *Educational Psychology, 10*(3), 225–238.