



Collective student characteristics alter the effects of teaching practices on academic outcomes



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ABSTRACT

The goal of this study was to examine the influence of collective student characteristics (academic skills and task persistence at the beginning of first grade) and different teaching practices (child-centered, teacher-directed, and child-dominated) on the development of academic skills and task persistence during the first two years in school. We hypothesized that teaching practices would differentially impact the development of academic skills and task persistence depending on the collective needs of the classroom. Participants were 523 students (273 boys) from 32 classrooms across Estonia. By using multilevel modeling, we found several interactions indicating that both contextual influences are important in determining subsequent academic functioning and task persistence but that some teaching practices are more beneficial depending on the collective starting point of students. These findings highlight the importance of studying different contextual influences hand in hand when trying to understand what enhances young children's academic development.

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Success during the first years of school has implications for subsequent adaptive development (e.g., Jimerson, Egeland, & Teo, 1999). Thus, identifying factors that support (or undermine) academic development and learning during the early school years is of great importance. Prior knowledge and skills clearly influence the development of children's *academic skills* (math, reading, spelling; Lerkkanen, Rasku-Puttonen, Aunola, & Nurmi, 2004; Passolunghi, Mammarella, & Altoè, 2008). In addition, children who show high *task persistence* achieve better academic outcomes (McClelland, Acock, Piccinin, Rhea, & Stallings, 2013; Onatsu-Arvilommi & Nurmi, 2000; Schaefer & McDermott, 1999). Yet, less attention has been devoted to understanding how different characteristics of the classroom context shape early academic development.

Classrooms provide both an academic as well as a social context for learning. Classrooms differ with regard to a variety of characteristics (abilities, beliefs, interests, and behaviors) that children collectively bring to the classroom. They also vary in the type of instruction, management and socio-emotional support teachers provide their students. In fact, other students in the classroom and teachers constitute the most proximal environmental context (outside of home) for young children's academic and social development (Bronfenbrenner

& Morris, 1998; Hamre & Pianta, 2010; Harris, 1995; Wentzel & Watkins, 2002).

Importantly, other classmates and teachers in the early elementary school years have the potential to have a greater impact on students than in later years because children remain with the same classmates throughout the day and one teacher is responsible for delivering all the lessons. Although teachers' influence has long been acknowledged, there is a lacuna of studies separating the effects of teachers from other classroom context effects (see Byrne et al., 2010). Moreover, rather than assuming independent main effects, teaching practices are likely to be more (or less) effective in promoting academic skills and task persistence depending on the degree to which they match the collective needs of the students (initial skills and task persistence of all the students in the classroom). Thus, guided by an ecological framework, this longitudinal study was designed to examine interactive effects among multiple contextual-level influences on academic skills (math, text comprehension, and spelling) and task persistence during the first two years of elementary school.

Development of academic skills and task persistence

There is substantial evidence showing that technical reading skills (e.g., word decoding and reading) in the beginning of school predict future reading comprehension (e.g., Bianco, Pellenq, & Lambert, 2012; Fuchs et al., 2012; Ortiz, Folsom, & Al Otaiba, 2012), spelling

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(Lerkkanen et al., 2004), and math (Lerkkanen, Rasku-Puttonen, Aunola, & Nurmi, 2005). Similarly, early mastery of calculation and word problems facilitates later success in math and reading comprehension (Lerkkanen et al., 2005).

Motivational and affective mechanisms are also important determinants of children's learning and acquisition of academic skills (DiPerna, Volpe, & Elliott, 2005; Pintrich & Schunk, 2002). Although different conceptualizations of motivation and related constructs exist, we focused on learning behavior (i.e., how children approach different learning tasks), and more specifically on *task persistence* (see Schaefer & McDermott, 1999; Yen, Konold, & McDermott, 2004). Whereas children high in task persistence are characterized by showing effort and not giving up easily in the face of challenges and difficult tasks, children low in task persistence tend to quit when faced with complicated tasks. There is evidence that young children's task persistence contributes to academic achievement over and beyond their cognitive abilities (Schaefer & McDermott, 1999; Yen et al., 2004). Children who do not give up easily in the face of obstacles have better reading (Dally, 2006; Onatsu-Arvilommi & Nurmi, 2000) and math skills later on (Aunola, Nurmi, Lerkkanen, & Rasku-Puttonen, 2003; Dally, 2006; Onatsu-Arvilommi & Nurmi, 2000). The reverse is also true—better academic skills increase the likelihood that children stay on task when faced with obstacles (Aunola et al., 2003; Dally, 2006; Onatsu-Arvilommi & Nurmi, 2000). Thus, when children can easily focus on tasks that are challenging, they are more likely to acquire new skills that further facilitate persistence in tackling, and mastery of challenging tasks. Also, children with greater initial abilities are less likely to get frustrated and are consequently less likely to give up when faced with challenging tasks which, in turn, increases the probability for further developing their academic skills.

Collective student characteristics

Upon school entry, interactions with peers increase dramatically (Rubin, Bukowski, Parker, & Bowker, 2008). Classmates provide one of the most important contexts for children's development and learning (Bronfenbrenner & Morris, 1998; Wentzel & Watkins, 2002; Wentzel & Wigfield, 1998). On a daily basis, children see how well their classmates can read or perform math assignments and how persistently they work on different learning tasks. Children also receive consistent feedback for their own skills and behaviors. Children engage in social comparison processes—they observe the persistence and performance of others with academic tasks to gauge their own capabilities in relation to the group (Guay, Boivin, & Hodges, 1999; Ruble, Feldman, & Boggiano, 1976). For instance, when children see their classmates performing well, they are likely to believe that they too can succeed. Such increases in self-efficacy are, in turn, related to increased persistence in tackling challenging tasks and greater achievement (e.g., Schunk, 2003). Thus, children are likely to alter their goals, beliefs, and task persistence to more closely align themselves with group accepted goals, beliefs, and behaviors (Kindermann, 2003; Mercer, McMillen, & DeRosier, 2009; see also Ryan, 2001). Moreover, this is more likely when children have a sense of belongingness and relatedness with other classmates (Wentzel & Watkins, 2002; Wentzel & Wigfield, 1998).

Classrooms that are characterized by students who are eager to learn and exhibit high academic skills are likely to create a very different socializing context for children compared to classrooms that include students who struggle with difficult tasks and have poorer academic skills. Several studies show that children's development is promoted in classrooms with higher levels of academic skills (e.g., Foorman, York, & Santi, 2008; Mashburn, Justice, Downer, & Pianta, 2009) and learning behavior (Barth, Dunlap, Dane, Lochman, & Wells, 2004; Bulotsky-Shearer, Bell, & Dominguez, 2012). The influence of collective student characteristics is not limited to the development of academic skills but also extends to children's motivation, attitudes toward school,

self-perceptions, and psychological well-being (Marsh, Martin, & Cheng, 2008; Rutter & Maughan, 2002; Ryan, 2001).

Teaching practices

Teachers provide another important context for children's learning (Bronfenbrenner & Morris, 1998; Wentzel & Wigfield, 1998). Teachers, and the practices they use, also differ between classrooms. We used the Early Childhood Classroom Observation Measure (ECCOM; Lerkkanen, Kikas, Pakarinen, Trossmann, et al., 2012; Stipek & Byler, 2005) that assesses three dimensions of *teaching practices*—child-centered, teacher-directed, and child-dominated (see Daniels & Shumow, 2003; Lerkkanen, Kikas, Pakarinen, Poikonen, et al., 2012; Lerkkanen, Kikas, Pakarinen, Trossmann, et al., 2012; Stipek & Byler, 2005). These approaches have their theoretical roots in constructivism, behaviorism, and maturationism, respectively (Daniels & Shumow, 2003). The three practices differ both in the amount and type of instruction, management practices, and the level of socio-emotional support teachers provide (Hamre & Pianta, 2010; Stipek & Byler, 2005). Child-centered and teacher-directed practices differ in the *type* of teacher activities, or in the degree to which teachers allow children to actively construct their knowledge (vs. teach basic skills), include children in various discipline-related decision processes (vs. set the rules), and engage in creating a positive social climate via individual support and encouragement of peer interactions. The primary difference between child-centered/teacher-directed and child-dominated practices lies in the *amount* of instruction, management, and socio-emotional support teachers provide. Whereas the first two practices presume active teacher participation, child-dominated practices are characterized by an overemphasis on students' "natural development", and teachers remain relatively passive observers (Lerkkanen, Kikas, Pakarinen, Poikonen, et al., 2012; Lerkkanen, Kikas, Pakarinen, Trossmann, et al., 2012; Woolfolk Hoy & Weinstein, 2011).

Teachers who engage in *child-centered practices* are supporters of children's academic and social development and view children as active contributors to their own learning (McCombs, 2010; Stipek & Byler, 2004; Woolfolk Hoy & Weinstein, 2011). In such classrooms, children's interests and personal experiences are valued (McCombs, 2010). Teachers give children opportunities to make their own choices, provide emotional support, personal feedback and encouragement, and promote mastery goal orientations that foster task-persistent behavior (Wentzel, 2010). In contrast, *teacher-directed* (or didactic) *practices* are characterized by teachers' dominance and control. Teachers who prefer such methods regard students as passive "receivers" and they view themselves as fully responsible for students' success (Gettinger & Kohler, 2011; Woolfolk Hoy & Weinstein, 2011). Instructional practices are based on the premise that more complicated learning tasks should not be introduced to students before they have mastered the basic academic skills. Teachers who use this approach focus on lecturing, demonstrations, and practice. Children are praised for giving a correct answer rather than for their effort. Teachers rarely adjust their teaching to the individual needs of children (Gettinger & Kohler, 2011; Stipek & Byler, 2004; Woolfolk Hoy & Weinstein, 2011). Teachers who employ *child-dominated practices* provide little guidance, control, or support. However, they are responsive to students' questions and demands (Lerkkanen, Kikas, Pakarinen, Poikonen, et al., 2012; Lerkkanen, Kikas, Pakarinen, Trossmann, et al., 2012; Woolfolk Hoy & Weinstein, 2011).

Moreover, teachers vary in whether they predominantly use one practice or implement a mix of approaches depending on what the situation calls for (Stipek & Byler, 2004). Whereas child-centered and teacher-directed practices have been found to be highly negatively correlated, associations of each with child-dominated practices are considerably weaker (Lerkkanen, Kikas, Pakarinen, Poikonen, et al., 2012; see also Hauser-Cram, Sirin, & Stipek, 2003), suggesting that teachers who use child-centered or teacher-directed methods can vary in the amount

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