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Short- and long-term effects of assessment-based differentiated reading instruction in general education on reading fluency and reading comprehension

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ABSTRACT

Studies on Child x Instruction interactions show that learning growth depends on the fit of instruction to students' abilities. This study investigates short- and long-term effects of combining learning progress assessment (LPA) as a tool for teachers to constantly monitor their students' progress with differentiated reading instruction to address students' individual needs on reading fluency and reading comprehension. The study was conducted in German elementary school classrooms. Third grade classrooms (n = 28) were randomly assigned to either an LPA group with differentiated instruction or a control group (CG). Students in the treatment group showed higher growth in reading fluency than students in the CG (d = .30). The effect was stable over the two-year period of the study. Students with lower reading skills benefited more from the treatment. No effects were found on reading comprehension. Results are discussed with regard to teachers' use of data to differentiate instruction.

1. Introduction

Promoting students' reading achievement is one of the essential goals of schools, especially in elementary school. Studies on reading achievement, however, indicate large interindividual differences in reading achievement for students at any age (e.g., Mullis, Martin, Foy, & Drucker, 2012). As a consequence, teachers are faced with the challenging situation of large heterogeneity within their classrooms. According to recent findings of Child x Instruction interactions in first- to third graders (Connor, Morrison, & Petrella, 2004; Connor, Morrison, Fishman, Schatschneider, & Underwood, 2007; Connor et al., 2011, 2013), optimal reading instruction should be adapted to the individual skills of the student. To adapt instruction to individual needs, two essential requirements must be met. Teachers first need reliable and valid information about students' reading achievement and reading progress. Then a learning environment is needed in which students can work with differentiated methods and materials that match their abilities. The aim of this study was to investigate effects of a reading intervention for whole third- and fourth grade classrooms that addresses these two requirements by combining a) assessment-based information about student progress in reading and b) materials for differentiated reading instruction based on two established methods that address different levels of reading proficiency against a business-as-usual reading instruction.

In the following, we will present the theoretical and empirical research base of the two core concepts that are combined in the assessment-based differentiated reading intervention. First, we present information about learning progress assessment as the measurement approach providing teachers with information about their students reading progress and its effectiveness before we summarize research on differentiated instruction in the domain of reading and describe the developmental models of reading comprehension on which our reading intervention is based.

1.1. Learning progress assessment

Students not only have large interindividual differences with regard to their level of achievement but also show different growth trajectories over time (Salaschek, Zeuch, & Souvignier, 2014). Regressive or stagnating trajectories especially indicate students' need for individualized instruction. Thus, monitoring students' progress is a tool for teachers to identify students in need for extra support, to adapt instruction based on assessment information, and to evaluate the effectiveness of the intervention (L. S. Fuchs & Fuchs, 1998). Progress monitoring assessments are characterized by the following properties: they are administered regularly at short intervals, they are brief and easy to administer in the classroom, they use a constant metric to measure student progress, they are predictive for end of year outcomes, and they are not

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biased by practice effects or form effects (Deno, 1986; Francis et al., 2008). Curriculum-Based Measurement (CBM) (Deno, 1985) is a well-established method of progress monitoring that covers these characteristics.

CBM has a long history of use in the U.S. for monitoring the learning progress of students with special needs or low achieving students (Deno, 1985; Stecker, Fuchs, & Fuchs, 2005). Regressive or stagnating trajectories, however, are not only an outcome for low-achieving students (Lerkkanen, Rasku-Puttonen, Aunola, & Nurmi, 2004; Salaschek et al., 2014). Förster and Souvignier (2011) have recommended monitoring the learning progress of all students in a classroom. In two recent papers this approach was termed *learning progress assessment* (LPA) (Förster & Souvignier, 2014a, 2015). Thereby, LPA follows the same principles as progress monitoring assessments as outlined above by assessing students' skills every 3 weeks throughout the school year using equivalent, short, computer-based assessments that provide reliable and valid scores on a constant metric to inform teachers about students' progress. In contrast to CBM, in which typically robust indicators as reading aloud or a maze task are used to measure reading progress, the tests in LPA are more complex and combine a maze task and reading comprehension questions in the same probe to provide teachers with differentiated information about students' reading skills (Förster & Souvignier, 2011). A more detailed description of LPA is given in the methods section.

1.2. Effects of teachers' use of LPA information

Substantial evidence exists demonstrating the effectiveness of progress monitoring in promoting student learning when teachers use the CBM progress information to adapt instruction (see Stecker et al., 2005 for a review). Some intervention studies used three-group designs in which a control group was compared to two intervention groups—one regular progress monitoring group and one progress monitoring group with additional teacher support. Teacher support varied from feedback on skills analysis (L. S. Fuchs, Fuchs, Hamlett, & Stecker, 1990), providing teachers with specific information about instructional decision making (L. S. Fuchs, Fuchs, Hamlett, & Ferguson, 1992), instructional recommendations (L. S. Fuchs, Fuchs, Hamlett, Phillips, & Bentz, 1994), to teacher self-monitoring (Allinder, Bolling, Oats, & Gagnon, 2000). Collectively, the results from these studies indicate the need for additional support for teachers in using CBM progress information to positively affect student learning.

The first studies on the effectiveness of LPA in whole classrooms in general education also found higher student growth in reading achievement when teachers were provided with information about their students' reading progress (Förster & Souvignier, 2014a, 2015). Effect sizes, however, were low to moderate. Notably, students' learning growth in these studies was compared to an informed control group in which teachers were provided with information based on standardized achievement tests about their students' achievement status at the beginning of the study. Thus, LPA seems to provide teachers with unique information that goes beyond status information and supports instructional decision making (Förster & Souvignier, 2014a, 2015).

In their LPA intervention study in general education, Förster and Souvignier (2015) investigated the effects of an additional teacher training (three afternoons) on data-use, reading fluency, and reading comprehension instruction. Findings indicate that LPA had positive effects on student growth in reading fluency and reading comprehension, but the teacher training failed to increase these effects. This finding is consistent with Fuchs et al. (1992) in which additional teacher support was also investigated in the field of reading. Despite the positive effects of teacher support on learning growth in mathematics (Allinder et al., 2000; L. S.; Fuchs et al., 1994; L. S.; Fuchs et al., 1990; L. S.; Fuchs, Fuchs, Hamlett, & Stecker, 1991), these effects were not found in the few studies that investigated learning growth in reading (Förster & Souvignier, 2015; L. S.; Fuchs et al., 1992).

In sum, both CBM and LPA have been found to be effective in fostering student learning. The additional support also helps teachers to make data-based instructional decisions, which generally provides a means to increase the effects of progress information. In reading, however, evidence for positive effects of teacher support is lacking.

1.3. Differentiated instruction to foster reading competence

The effects of CBM and LPA on student growth are ascribed to teachers' use of data to adapt instruction to individual needs, which is consistent with the idea that the effect of instruction may depend on the fit of instruction to students' abilities. The idea of providing students with differentiated instruction is subject of ongoing discussions. On the one hand there is a broad consensus that student differences in readiness, interest, and learning profile should be addressed by general principles as building community, high quality learning goals, ongoing assessment to inform instruction, flexible grouping, and respectful tasks (e.g. Tomlinson, 1999). On the other hand, it needs to be emphasized that "fulfilling the need for differentiated instruction at the classroom level is often beyond the skill set of even the most proficient teachers" (Fuchs & Vaughn, 2012, p. 198, see also; Reis, McCoach, Little, Muller, & Kaniskan, 2011). Fuchs and Vaughn (2012) therefore suggest that teachers need to be provided with computer-assisted assessment and prescriptive teaching approaches. This is in line with Mandinach's (2012) claim for data-driven decision making. This general approach has been investigated using sophisticated analytic strategies such as hierarchical linear modeling and elaborated study designs with multiple classroom observations and multidimensional conceptualizations of reading instruction in a substantial number of studies (Connor et al., 2004, 2007, 2009, 2011, 2013). Connor and colleagues characterize reading instruction across the two dimensions content and management. The content of reading instruction can be code-focused and designed to teach alphabetic principles, orthographic knowledge, and fluent decoding, or it can be meaning focused intending to improve students' ability to understand what they read. On the management dimension it is identified whether the student works alone or in pairs (child managed) or together with the teacher (teacher-child managed). The evidence from these studies on the interaction between students' skills and the instruction they receive indicates that students' growth in reading ability depends on the fit of students' achievement and instructional method. Juel and Minden-Cupp (2000), for example, found that reading progress for students with stronger reading skills was higher when they received a meaning-based reading instruction, whereas children with weaker reading skills benefited more from a code-based (phonics) approach. Several studies from Connor and colleagues supported these findings, showing that the effects of reading instruction depended on students' reading comprehension abilities (Connor et al., 2004), that individualized reading instruction is more effective than business-as-usual instruction and that effects cumulate over time (Connor et al., 2013), and that growth of literacy skills was stronger, the more precisely children received recommended amounts of reading instruction (Connor et al., 2009, 2011). Overall, findings indicate that the lower the students' reading skills, the more they benefited from teacher-managed instruction that was code-focused. In contrast, students with higher reading abilities demonstrated greater reading growth in child-managed reading activities that aimed at extracting meaning from text (e.g., Connor et al., 2004; Connor et al., 2007; Connor et al., 2011; Juel & Minden-Cupp, 2000).

Developmental models of reading comprehension (Perfetti, Landi, & Oakhill, 2005), the automaticity theory for guidance (LaBerge & Samuels, 1974), and especially the simple view of reading (Hoover & Gough, 1990) emphasize the importance of decoding skills for reading comprehension. According to these models, low levels of decoding preclude comprehension, because readers who need all of their cognitive resources for word recognition fail to simultaneously comprehend. Instead, they switch their cognitive resources to meaning construction