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The relation between teacher-set performance goals and students' mathematical achievement

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ABSTRACT

The relation between teacher-set performance goals for 361 individual students and these students' mathematics achievement was investigated. High performance goals were found to strongly relate to student performance, with an effect size of $d = 0.80$. The performance goals were set by the teachers at the end of a step-by-step procedure, consisting of initial teacher expectations, the use of data, and team input. This procedure was expected to decrease negative expectancy bias. Higher teacher performance goals than teachers' initial expectations, so-called positive changes, were positively associated with the performance of initially low achievers. Initially high achievers, for whom the teachers made a positive change, performed worse than comparable students for whom initial expectation and final goal were the same.

1. Introduction

Although the proficiency level of students in the Netherlands ranks comparatively high in international studies (Meelissen and Drent, 2008; Meelissen et al., 2012), there is concern about Dutch students' mathematical skills (Expert Group Continuous Learning Progression, 2008; Royal Netherlands Academy of Arts and Sciences, 2009). In particular, the low spread between the proficiency levels of the students, combined with the fact that the number of excellent students is decreasing (Meelissen et al., 2012), leads to doubts about whether teachers succeed in fitting their teaching to the varying needs of students and whether all students are challenged sufficiently.

In line with recent international educational policymaking, these concerns resulted in a focus on basic skills, on educational targets, and on data-driven decision making (DDDM). DDDM, or data use, can be used for school improvement purposes. Schildkamp and Kuiper (2010) defined data use as "systematically analyzing existing data sources within the school, applying outcomes of analyses to innovate teaching, curricula, and school performance, and, implementing (. . .) and evaluating these innovations" (p. 482). Through collecting, analyzing, and interpreting data – such as students' (standardized) test scores, results of informal assessments, daily work, information on classroom observations, etc. – schools and teachers create knowledge on which decisions for adequate instructional adjustments can be based, thereby reflecting a formative use of data. Adjusting teaching to better fit student needs is assumed to lead to targeted and deliberate teaching, resulting in better student achievement. Goals play a key role in this way of working as they make clear what the desired level of student performance is (Lai and Schildkamp, 2013).

1.1. The use of data for instructional improvement

In order to support DDDM for instructional improvement purposes, a data-friendly school context can facilitate the effective use of data in class. Effective data use often presupposes changes in school culture and in the way schools and school teams handle information (Datnow, Park, & Wohlstetter, 2007; Huffman and Kalnin, 2003; Levin & Datnow, 2012). Teacher collaboration can support the individual and common knowledge and skills. Teachers can analyze and interpret the data together, diagnose areas in which students experience difficulties, give each other advice on instructional strategies, ask each other for help, and reflect on practice (Schildkamp and Kuiper, 2010; Wayman, Midgley, & Stringfield, 2006; Young, 2006). Therefore, professional development programs in DDDM should make use of collaboration (Wayman, Jimerson, & Cho, 2012). Wayman pointed in this respect to the advantages of small-group learning: the limited number of people could foster changes more easily and promotes active engagement of the participants. Moreover, by organizing

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professional development on data use in grade-level teams, program content and discussions can become more targeted.

DDDM is supposed to positively affect student achievement, provided that teachers make appropriate adjustments in teaching and instruction based on the data. Such adjustments should be mainly informed by one of the key features of data use: that schools and teachers make explicit what they strive for (Lai and Schildkamp, 2013; Wohlstetter, Datnow, & Park, 2008; Means, Padilla, & Gallagher, 2010). When appropriate measurable learning goals are set, goal attainment can be monitored in order to evaluate teaching. Information about student performance and daily work, among other things, provides teachers with feedback on their own teaching performance and such feedback can be used as guidelines for instructional improvement (Hattie and Timperley, 2007; Kluger & DeNisi, 1996). This ongoing process can be supported using reflective cycles, such as the formative models of Black and William (2009) and, in the Dutch context, the more test result-based approach of Ledoux, Blok, and Boogaard (2009).

In the Netherlands, teachers seem to make insufficient use of data for formative purposes: teachers do collect data (e.g., results on standardized tests and seatwork, and on students' classroom participation), but 50% of teachers refrain from taking instructional actions that result from their analyses (Educational Inspectorate, 2010). Evaluating performance seems to be problematic as well, as only 25% of schools were found to establish explicit goals, whereas such goals are necessary to evaluate student outcomes in terms of the desired levels of performance (Educational Inspectorate, 2010). A study on educators' ability to interpret results from a digital student monitoring system further showed that more than 70% of principals, senior support coordinators, and teachers did not reach the standard of accurate interpretation (that is, 85% correct on the items used in a questionnaire), with teachers performing significantly worse than the other two groups (van der Kleij and Eggen, 2013). Although ecological validity issues may play a role in interpreting these results (in daily practice, teachers might get support from the senior support coordinator in interpreting the results of the student monitoring system), this is deemed an undesirable situation. It seems to be unlikely that adequate instructional decisions can be made if they are based on incorrect interpretations.

1.2. Goal setting

The importance of goals is stressed in the literature on DDDM, because they reflect the desired achievement levels of a district, school, class, or individual student (Levin and Datnow, 2012; Carlson, Borman, & Robinson, 2011; Wohlstetter et al., 2008). In the current study, the sole focus was on performance goals. Performance goals are expected to have a positive effect on achievement, because people are highly motivated to reach them. The goal "give (s) an activity meaning or purpose" (Maehr & Zusho, 2009; p. 78) and, therefore, directs behavior. Locke and Latham (1990, 2002) argued that performance goals enhance effort, strengthen perseverance, and cause some sort of arousal. Especially in situations where people are committed to the goal, feel confident that they can attain it ("self-efficacy"), and receive feedback on their progress, goals are found to strongly influence performance (Locke and Latham, 2002).

Findings on the educational effectiveness of performance goals were reported by Fuchs, Fuchs, and Deno (1985). In their study on goal mastery and goal ambition, moderate to high ambitious goals were related to better student performance. Retrospective interviews showed that teachers felt more aware of the concrete goals. Assessment and evaluation information further seemed to facilitate instructional decision making in order to reach the goal. The findings of Fuchs and colleagues are in line with Locke and Latham (2006), who found that people do not need to be consciously aware of the goal all the time, as they assume that "a goal, once accepted and understood, remains in the periphery of the unconsciousness as a reference point for guiding and giving meaning to subsequent mental and physical actions" (p. 267). Fuchs, Fuchs, and Hamlett (1989) further found that teachers who (regularly) adapted their performance goals according to students' actual performance were more ambitious than those who did not, which was related to higher student achievement. According to Fuchs et al. (1989), ambition thus seems to be inherent to the use of effective goals, although the authors also advocate that the goals should be attainable and not overambitious. Such realistic goal setting was promoted by providing the teachers in the experimental group information on the actual progress in student learning through performance information on several data points.

Performance goals that are set by teachers are probably to a large extent based on teachers' (tacit) beliefs and expectations in terms of their students' learning potential. By setting performance goals, teachers are requested to make these expectations explicit.

1.3. Teacher expectations

In a class, teachers are confronted with students who differ in terms of characteristics such as academic ability, concentration, motivation, effort, and classroom behavior. Teachers are aware of such differences and, as a result, develop implicit and explicit beliefs with respect to the class and its individual students. These naturally formed expectations can have an impact on aspects like teacher-student interaction, instructional decisions, opportunity-to-learn, materials used, and task difficulty (Rubie, 2003; Südkamp, Kaiser, & Möller, 2012; Jungbluth, 2012).

Teacher expectations can be held at different levels. At class level, teacher expectations can be high or low for the group as a whole. These general expectations at class level were found to be associated with differences in classroom climate, instructional decisions, and goal orientation (Rubie, 2003). At the student level, teachers have expectations of individual students in terms of their behavior, actual performance, and capabilities. Such individual expectancies may be influenced by the stereotypic beliefs a teacher has about certain groups. These expectations at group level have been a central topic in studies on inequalities in education (cf. for ethnic minorities: McKown and Weinstein, 2008 or Rubie-Davies, Hattie, & Hamilton, 2006; for social class: Ready and Wright, 2011; for sex: Jungbluth, 2012 or Tiedemann, 2002). Although teacher expectations can be biased by such group characteristics, Hattie (2009) and Good and Brophy (2003) both noted that the accuracy of the expectations improves once teachers are given information about prior achievements or students' participation in academic activities. A more refined picture of the individual student thus leads to more accurate expectations and such accurate beliefs about a student's capabilities enable teachers to make adequate instructional decisions (Martínez, Stecher, & Borko, 2009). A salient reason for avoiding teacher expectation bias is that a substantial part of such bias remains stable in time (de Boer et al., 2010Boer, Bosker, & van der Werf, 2010). Schools and teachers should thus become aware of their expectations and should aim to avoid being too hesitant or careful about what they expect from their students, as this would reflect negative expectation bias. A realistic and accurate view of what students are capable of is to be promoted, or perhaps even a somewhat (too) optimistic and ambitious expectation, reflecting positive expectation bias. The promotion of ambitious expectations is important, as positive expectancy bias has been found to positively affect student performance (de Boer et al., 2010). Hence, de Boer and colleagues (2010) advocated that " . . . schools and teachers should be more