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The role of personal best (PB) goal setting in students' academic achievement gains☆

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ABSTRACT

An experimental study was conducted to assess the role of personal best (PB) goal setting in gains (or declines) in mathematics achievement. A total of 89 elementary and secondary school students participated in a pre/post treatment/control group experimental design to test whether setting a specific PB target score for an upcoming achievement test leads to achievement growth on that test. The treatment group (PB goal setting) demonstrated greater achievement growth than the control group between pre- and post-testing, including after controlling for mastery, performance-approach, performance-avoidance, and test strategy goals. This study provides support for the proposition that PB goal setting is associated with achievement growth in students' academic lives.

1. Introduction

In a climate of benchmarks, comparisons, accountability, and league tables, it is important to ensure that students are not excluded from access to academic success or denied a sense of academic progress (Anderman, Anderman, Yough, & Gimbert, 2010). Greater attention to individuals' academic growth may provide a foundation for giving a wide range of students a better sense of their academic progress. The present research investigates growth by way of personal best (PB) goal setting, and its role in academic achievement gains. PB goals are defined as specific, challenging, competitively self-referenced targets to which students strive to match or exceed a previous best. Examples of such targets include increased learning or better performance on current schoolwork than in previous efforts (Martin, 2006, 2011; Martin & Liem, 2010; Yu & Martin, 2014). PB goals reside alongside other growth approaches to student development, such as value-added models and the modeling of academic trajectories (Anderman et al., 2010; Harris, 2011). Prior work into PB goals has been survey-based and correlational. The present study investigates a PB goal setting intervention (having students set a PB goal) using an experimental design.

2. Prior research on PB (and other growth) goals

2.1. PB (and other growth) goals: Correlational work

A number of survey-based studies have demonstrated a connection between PB goals and academic outcomes. In a cross-sectional study of high school students, Martin (2006) showed that PB goals positively predicted students' educational attainment aspirations, class participation, enjoyment of school, and perseverance. In cross-lagged longitudinal work with high school students, Martin and Liem (2010) found that PB goals predicted later literacy achievement, numeracy achievement, effort on tests, perseverance, school enjoyment, class participation, homework completion, educational attainment aspirations, and engagement. In a study focusing on academically at-risk (attention-deficit/hyperactivity disorder; ADHD) students, Martin (2012) found that the positive effects of PB goals generalized to students with ADHD. Following this, Yu and Martin (2014) and Martin and Elliot (2015) examined PB goals alongside "classic" mastery and performance goals among Chinese and Australian (respectively) middle and secondary school students, finding a positive role for both PB and mastery goals. A study using a longitudinal cross-lagged panel design found that high school students' PB goals played a role in the development of their implicit beliefs about intelligence, with PB goals positively predicting subsequent incremental beliefs about intelligence and negatively predicting subsequent entity beliefs (Martin, 2014).

Other research has also investigated growth goals. Elliot, Murayama, and Pekrun (2011) explored self-based goals. According to these researchers, "self-based goals use one's own intrapersonal trajectory as

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the evaluative referent" (p. 633). Interestingly, the statistically significant findings for these goals were sparse; self-approach goals were significantly positively related to approach temperament and feeling energized in class, but were not significantly related to several other variables, including intrinsic motivation and achievement. More recent work by Elliot, Murayama, Kobeisy, and Lichtendfeld (2014) explored past- and potential-based (growth-oriented) goals, finding separability between these goals and a sound psychometric basis upon which to explore their relationships with academic outcomes. Of note, in both studies, the goals that were studied by Elliot and colleagues focused on exams (hence, a possible reason for equivocal findings), but each of these goals – self-based, past-based, and potential-based – is equally applicable to other activities and outcomes.

2.2. PB (and other growth) goals: Experimental or intervention work

Very little work has been conducted on PB goal setting interventions. One recent study of PB goals found that students in a PB goal setting treatment group for a self-paced science education program reported significantly higher science aspirations at the end of the program, compared with a no-goal control condition (Martin, Durksen, Williamson, Kiss, & Ginns, 2014). There has also been very little work investigating achievement gains following growth goal setting. In the earliest work to our knowledge, Alschuler (1969) found that typing students setting personally challenging goals aimed at faster typing speed through the course of their learning demonstrated a greater increase in speed than a control group. Early work by Slavin (1980) was also promising. He had students set individual targets that exceeded their prior level of achievement and provided rewards based on improvement. Slavin found that over time, students in the treatment (growth target) group outperformed students in a control group. However, in a follow-up study, Beady, Slavin, and Fennessey (1981) failed to find such an effect, and it is our understanding that no subsequent work has been conducted to better understand the discrepancy between these two studies. Thus, across experimental growth goal setting designs there is a tendency to see educational gains, but this finding should be considered tentative at present.

2.3. PB goals: Conceptual and applied terrain

Achievement goal theory is one perspective relevant to the study of PB goals. At a fundamental level, achievement goal theory is grounded in a distinction between mastery-approach goals focused on understanding, developing skill, or improvement, and performance-approach goals focused on outperforming others or demonstrating comparative competence (Elliot, 2005). Two other "classic" goals include a mastery-avoidance goal (aiming to avoid misunderstanding and/or the loss of knowledge or competence) and a performance-avoidance goal (aiming to avoid the demonstration of incompetence relative to others and/or avoid poor performance in competitive or comparative tasks). PB goals are distinct from performance goals in that the former are set in relation to self (Martin, 2006), whereas the latter are set in relation to others (Elliot, 2005). PB goals may be differentiated from mastery-approach goals in that mastery goals, as operationalized in the present study (and elsewhere; e.g., see also Elliot & McGregor, 2001), are task-based (i.e., master a mathematics task, learn a mathematics skill) and self-based (i.e., do better than one did on a previous mathematics test; Vansteenkiste, Lens, Elliot, Soenens, & Mouratidis, 2014), whereas PB goals are self-based alone. Notably, the recently proposed 3 × 2 achievement goal framework now includes self-based (growth) goals along the lines of PB goals (Elliot, Murayama, & Pekrun, 2011).

We would also suggest that PB goals are highly dissimilar to mastery-avoidance and performance-avoidance goals in that the latter two goals are avoidance oriented and focused on the concept of incompetence (or a loss of competence). Of the two avoidance goals, performance-avoidance tends to be emphasized in empirical research and may also be more salient and recognizable in the classroom (Martin, 2013a, 2013b); it is therefore the performance-avoidance goal that is included in our research. Taken together, in order to understand the unique effect of PB goal setting, we include performance (approach and avoidance) and mastery-approach goals in analyses, so as to partial out variance attributable to these goals and gain a better understanding of PB goals, independent of "classic" achievement goals.

Goal setting frameworks (e.g., Locke & Latham, 2002) also provide useful insight into the mechanisms by which PB goals may positively impact educational outcomes. Specifically, PB (and other growth) goals may make it clear to students what they need to strive for to outperform a previous best; PB goals may help students direct attention and effort towards the goal-relevant tasks that are important to attain educational outcomes; through self-competition, PB goals may energize students; and, PB goals may create a discrepancy between current and desired attainment, a gap that students are motivated to close (Martin, 2011). Further, according to Senko, Hulleman, and Harackiewicz (2011), goals that comprise challenging standards create an internal pressure to perform, arouse energy and effort, and lead to success. On a related note, a meta-analysis by Hulleman, Schrager, Bodmann, and Harackiewicz (2010) found that challenge-seeking goals are more likely to predict achievement than mastery or learning-oriented goals. While challenging goals can apply to both PB and performance goals, we maintain that it is the personally-referenced challenge that is likely to be more aligned to the intrinsically-motivated striving central to achievement growth (Martin, 2011).

2.4. What more needs to be known?

There are three gaps in the research base. First, no published research, to our knowledge, has involved students setting a PB goal leading up to an achievement test and explored achievement gains beyond possible gains made by students who set no such goal. Second, little intervention research has investigated goal setting in a way that controls for individuals' other achievement goals. There is thus a need to explore the effects of a PB goal setting intervention controlling for the presence of other goals (e.g., mastery and performance goals) that students may pursue. Third, and finally, there is a need to differentiate any potential PB goal setting effect from students' PB goal orientation (i.e., students' general or characteristic tendency to pursue PB goals). A significant PB goal setting effect would suggest this as a successful intervention, irrespective of a students' general orientation to pursue PB – or other – goals.

3. Method

3.1. Sample

Participants were 89 elementary and secondary school students (25% non-government school, 75% government school; 88% co-educational, 8% single-sex boys, 4% single-sex girls) taking an annual mathematics test administered by a scholastic assessment center based in a capital city on the east coast of Australia. Students participated in 2012 and again in 2013. They were randomly assigned, in a stratified manner (to optimize demographic equivalence), to a treatment or control group. The treatment group comprised 41 students who set a PB goal (a score bettering their 2012 score) leading up to the 2013 test. The control group comprised 48 students who did not set a goal leading up to the 2013 test. For the treatment group: 44% were female, 56% were male; 51% were elementary school students, 49% were secondary school students; and the mean age was 12.32 ($SD = 1.85$) years. For the control group: 44% were female, 56% were male; 48% were elementary school students, 52% were secondary school students; and the mean age was 12.21 ($SD = 1.86$) years. In terms of demographics, there were no significant differences between treatment and control groups in gender representation, $\chi^2(1) = .01$, $p = .99$; school stage representation