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Achievement goals, behavioural engagement, and mathematics achievement: A mediational analysis

David W. Putwain[a,*], Wendy Symes[b], Laura J. Nicholson[c], Sandra Becker[d]

[a] School of Education, Liverpool John Moores University, Liverpool, UK
[b] Department of Education and Social Justice, University of Birmingham, Birmingham, UK
[c] Faculty of Education, Edge Hill University, Lancashire, UK
[d] Department of Psychology, University of Munich, Munich, Germany

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ABSTRACT

Previous studies have shown that mastery-approach and performance-approach goals can be positively associated with adaptive educational outcomes. Few studies, however, have examined links with behavioural engagement. The aim of the present study was to examine whether behavioural engagement mediated relations between mastery-approach and performance-approach goals and subsequent achievement in mathematics. Data were collected from 1057 students aged 9 to 11 years in a longitudinal design over the course of a single school year. Results showed that a mastery-approach, but not a performance-approach, goal predicted behavioural engagement. Behavioural engagement, in turn, predicted mathematics achievement. Furthermore, behavioural engagement mediated relations between mastery-approach and subsequent mathematics achievement. This study contributes to the evidence base for the adaptive role of mastery-approach which can be encouraged by students setting personal best goals, teachers ensuring that feedback is task-focused, and that the classroom climate is mastery-focused.

1. Introduction

Achievement goals are thought to influence the direction of achievement behaviours such as behavioural engagement (Elliot, 2005; Elliot & Hulleman, 2017). Specifically, approach-orientated goals energise behavioural engagement that would ultimately manifest in improved achievement (Elliot & Church, 1997; Rawsthorne & Elliot, 1999). Mastery-approach goals have been linked to a variety of positive academic outcomes including interest, positive achievement emotions and achievement (e.g., Huang, 2011, 2012; Hulleman, Schrager, Bodman, & Harackewicz, 2010). Findings for performance-approach have been equivocal; partly due to the ways that the construct has been differently operationalised (Hulleman et al., 2010; Senko & Dawson, 2017). In their meta-analysis of 243 studies, Hulleman et al. (2010) showed that performance-approach goals correlated positively ($r = 0.14$) with achievement when items emphasised performing well relative to others and negatively ($r = -0.14$) when items emphasised appearing competent to others.

Few studies, however, have examined how achievement goals might be related to behavioural engagement (e.g., Gonida, Voulala, & Kiosseoglou, 2007, 2009), or how behavioural engagement could mediate relations between achievement goals and subsequent educational achievement (Liem, Lau, & Nie, 2008). In the present study we address this gap in the literature by examining how behavioural engagement mediates the relations between mastery-approach and performance-approach goals, and subsequent mathematics achievement in a sample of primary school students aged 9 to 11 years. Using a longitudinal design with five waves of data collection, we control for prior behavioural engagement and mathematics achievement.

1.1. Achievement goals

Achievement goals are defined by Hulleman et al. (2010) as "a future-focused cognitive representation that guides behavior to a competence-related end state that the individual is either committed to approach or avoid" (p. 423). In the goal standards approach, achievement goals are differentiated relative to the standard or criterion used to judge competence (Elliot, 2005; Senko & Tropiano, 2017). These can be relative to others (e.g., correctly solving more mathematics problems than the class average or a particular classmate), relative to the absolute demands of a task (e.g., solving a mathematics problem correctly), or relative to one's own past achievements or future potential (e.g.,

* Corresponding author at: Liverpool John Moores University, IM Marsh Campus, Mossley Hill Rd, Liverpool L17 6DB, UK.
E-mail address: D.W.Putwain@ljmu.ac.uk (D.W. Putwain).

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beating one's previous number of mathematics problems solved correctly). In terms of valence, approach goals occur when a student is striving for success, whilst avoidance goals occur when a student is striving to avoid failure (Elliot & Church, 1997).

The 2 × 2 framework of achievement goals proposes that mastery and performance goals are differentiated along dimensions of approach and avoidance (Elliot & McGregor, 2001; Elliot & Murayama, 2008). In the present study, however, we focused solely on approach-orientated mastery and performance goals. Younger students are less likely to be able to adequately distinguish between approach and avoidance goals (Bong, 2001, 2009; Ross, Shannon, Salisbury-Glennon, & Guarino, 2002) potentially leading to reduced predictive power and statistical suppression. Mastery-approach goals are judged against self or task-determined standards of competence; to develop one's competence in order to successfully complete a task or improve on one's previous performance. Performance-approach goals are judged relative to others; to demonstrate one's competence is better than that of classmates. Although mastery-approach and performance-approach goals have distinct foci it is likely they will be positively related due to shared antecedents such as strong competence beliefs and a strong need for achievement (Elliot & McGregor, 2001; Hulleman et al., 2010).

Meta-analyses show that mastery-approach goals are positively related to interest and achievement (Huang, 2012; Hulleman et al., 2010), and positive achievement emotions such as enjoyment (Huang, 2011). Meta-analytic studies have also shed some light on the equivocal relations found between performance-approach and achievement. Performance-approach has not been consistently operationalised in the literature; some measures use normative items that focus on performance relative to classmates and others use items that focus on *appearing* competent to others. When measured using normative items, focusing on performance relative to others, performance-approach shows positive relations with achievement (Huang, 2012; Hulleman et al., 2010), self-regulation, competence beliefs, and use of deep and adaptive surface learning strategies (Senko & Dawson, 2017). Furthermore, performance-approach goals are positively related to positive achievement emotions and negatively related to negative achievement emotions (Huang, 2011).

1.2. Behavioural engagement

Behavioural engagement refers to active participation in school, lessons and classroom activities (e.g., Appleton, Christenson, Kim, & Reschly, 2006; Fredricks et al., 2011). Indicators include on task-behaviour, effort, persisting on challenging tasks, paying attention in class, attendance, and homework completion. Behavioural engagement is one of a number of ways that characterise students making maximum use of learning opportunities (see Fredricks, Blumenfeld, & Paris, 2004; Jimerson, Campos, & Gried, 2003; Reschly & Christenson, 2012). Other forms of engagement include emotional and cognitive engagement. Emotional engagement refers to positive and negative reactions to school, lessons, and relationships with teachers and peers, and cognitive engagement to the level of personal investment and involvement in learning and learning tasks (Appleton et al., 2006; Fredricks et al., 2011; Martin, 2007; Voelkl, 2012). We focused solely on behavioural engagement in the present study as theory proposes that achievement goals are the reasons why individuals engage in achievement related behaviours (Elliot, 2005; Elliot & Hulleman, 2017; Pintrich, 2003), although this has received little empirical attention. In contrast, multiple studies have examined how achievement goals relate to emotions (Daniels et al., 2009; Pekrun, Cusack, Murayama, Elliot, & Thomas, 2014; Putwain, Larkin, & Sander, 2013) and learning strategies (e.g., Diseth, 2011; Liem et al., 2008; Michou, Mouratidis, Lens, & Vansteenkiste, 2013), which are often used as proxies for emotional and cognitive engagement, respectively.

Models of engagement propose that behavioural engagement is a necessary prerequisite for achievement (e.g., Finn & Zimmer, 2012; Reschly & Christenson, 2012; Voelkl, 2012). Without high levels of school attendance or active participation in lessons students will not have the opportunity to receive instruction, extend or deepen their learning, or receive feedback on their learning. Numerous studies have supported this link in diverse samples of primary and secondary school students using various indicators of behavioural engagement. In secondary school students, measures of persistence, participation, and involvement positively correlate with standardised measures of numeracy and literacy (Martin & Liem, 2010), standardised measures of science achievement (Lee, Hayes, Seitz, DiStefano, & O'Connor, 2016) and class grades (Froiland & Worrell, 2016; Wang & Holcombe, 2010). In elementary school students, measures of participation, involvement, and attentiveness, positively correlate with class grades (e.g., Patrick, Ryan, & Kaplan, 2007; Reyes, Brackett, Rivers, White, & Salovey, 2012) and standardised tests of reading and mathematics (Dotterer & Lowe, 2011). Furthermore, it has been shown that effortful engagement predicts achievement on standardised reading and mathematics tests over time in elementary school children after controlling for prior achievement (Hughes, Luo, Kwok, & Loyd, 2008).

1.3. Behavioural engagement mediates relations between achievement goals and achievement

In achievement goal theory (Elliot, 2005; Elliot, Murayama, & Pekrun, 2011; Hulleman et al., 2010; Pintrich, 2003) achievement goals are theorised as a the reasons for engaging in achievement-orientated behaviours (effort, persistence, paying attention, on-task behaviour, attendance, and homework completion; collectively referred to as behavioural engagement). Stronger mastery-approach and performance-approach goals would be expected to relate to greater behavioural engagement; they are both appetitive goals that relate to positive emotions and achievement (Huang, 2011, 2012; Hulleman et al., 2010). The focus of mastery-goals on the *development* of competence, however, would result in a stronger link with behavioural engagement (in classroom settings) than performance goals with a greater focus on the *demonstration* of competence. It would be anticipated that performance-approach goals might show a stronger link with greater effort and engagement in testing situations. Empirical evidence collected to date using cross-sectional designs in samples of secondary school students has partially supported this theorising. As anticipated, Mih, Mih, and Dragos (2015), showed relations between mastery-approach and behavioural engagement were stronger than for performance-approach. Gonida et al. (2007, 2009), however, showed positive relations between mastery-approach, but not performance-approach, goals and behavioural engagement.

Since studies have also shown behavioural engagement to be a direct antecedent of achievement (e.g., Lee et al., 2016; Patrick et al., 2007; Reyes et al., 2012), it is plausible that behavioural engagement mediates the relations between achievement goals and subsequent outcomes. A possible alternative, that behavioural engagement moderates relations between achievement goals and achievement outcomes would be unlikely as behavioural engagement is both theoretically and empirically speaking an outcome of motivational factors such as achievement goals. Remarkably, only one study to date has examined how behavioural engagement mediated the relations between achievement goals and achievement. Using a longitudinal design to control for prior achievement, Liem et al. (2008) showed that effort (an indicator of behavioural engagement) mediated relations between mastery-approach, but not performance-approach, goals and performance on a class test in a sample of secondary school students. Relatedly, using a cross-sectional design, Mih et al. (2015) showed that the indirect link from mastery-approach to academic functioning (low absenteeism, completing homework, and high educational aspirations), mediated by behavioural engagement, was stronger in secondary school students than for performance-approach.

In Liem et al.'s (2008) study achievement goals were measured