



Teacher enthusiasm and self-efficacy, student-perceived mastery goal orientation, and student motivation in mathematics classrooms



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HIGHLIGHTS

- We used multilevel structural equation modeling with student and teacher data.
- Teacher-reported self-efficacy was related to mastery structure at the class-level.
- Teacher enthusiasm was related to mastery orientation in class at the student level.
- Mastery orientation in class was related to math-related task values at both levels.

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ABSTRACT

The purpose of this study is to examine whether teacher enthusiasm and classroom management self-efficacy are related to classroom mastery orientation and student motivation. We used data from 803 students in grades 9 and 10 (53.3% girls) and their mathematics teachers ($N = 41$; 58.5% men). Student-perceived teacher enthusiasm was related to classroom mastery orientation as well as to intrinsic value and cost at the student level. Teacher-reported self-efficacy was related to classroom mastery orientation at the classroom level. At both the individual and the classroom level, classroom mastery orientation was related to attainment and utility value.

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1. Introduction

Research has shown that teachers who are enthusiastic (Kunter, Frenzel, Nagy, Baumert, & Pekrun, 2011; Patrick, Hisley, & Kempler, 2000) and who report high self-efficacy (Midgley, Feldlaufer, & Eccles, 1989a) often have highly motivated students. However, little is known about the underlying mechanisms through which teacher enthusiasm and self-efficacy relate to student motivation. Given the consistent decline in adolescents' motivation (Fredricks & Eccles, 2002; Watt, 2004), there is a need to examine how teachers who are enthusiastic and efficacious successfully motivate their students. The purpose of this study was to examine whether teacher enthusiasm and classroom management self-efficacy were related to their students' motivation through student-perceived

mastery goal orientation in class. Teacher-reported enthusiasm (Carmichael, Callingham, & Watt, 2017) and self-efficacy (Wolters & Daugherty, 2007) have been shown to be positively related to mastery goal orientation in class. In line with achievement goal theory (Ames, 1992; Meece, Anderman, & Anderman, 2006; Murayama & Elliot, 2009), mastery-oriented classroom learning environments are expected to enhance the motivation of students in class. Based on these theoretical and empirical assumptions, a multilevel analytic approach was applied in this study to examine the interrelations between teacher-reported enthusiasm and self-efficacy, student-perceived mastery goal orientation, and student motivation. Thus, the relationship between mastery orientation and students' motivation in terms of individual and classroom climate effects was tested (Morin, Marsh, Nagengast, & Scalas, 2014). The study focused on mathematics because motivation in this domain is a critical filter for career choices (Ma & Johnson, 2008) and mathematics offers tools to analyze the economic, political, and social inequalities in our society (Ball, Goffney, & Bass, 2005).

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1.1. Teacher enthusiasm, teacher classroom management self-efficacy, and mastery goal orientation in class

The Eccles et al. (1983) expectancy-value theory indicates that the behaviors and beliefs of socializers (for example, teachers and parents) influence the motivation of adolescents. Socializers transmit their beliefs to adolescents through their support behaviors (Eccles, Wigfield, & Schiefele, 1998). Socializers' beliefs and support behaviors are assumed to shape the adolescents' perceptions of their socializers' beliefs and behaviors, which in turn are related to adolescents' motivation (Eccles et al., 1998; Gniewosz & Noack, 2012). Studies have only rarely tested these theoretical assumptions in the classroom context (Lazarides & Watt, 2015; Schiefele & Schaffner, 2015). This study therefore examined how teacher enthusiasm and teacher classroom management self-efficacy were related to students' perceptions of mathematics teachers' mastery orientation in class as well as to student motivation.

Teacher enthusiasm can be conceptualized as the enjoyment, excitement, and pleasure that teachers experience during teaching. It has been differentiated into enthusiasm for teaching and enthusiasm for the subject matter taught (Frenzel, Goetz, Lüdtke, Pekrun, & Sutton, 2009; Kunter et al., 2008, 2011, 2013). Teachers who are enthusiastic about their subjects and about teaching provide more support to their students, which in turn has a positive effect on their students' motivation (Kunter et al., 2013). Specifically, teachers who are enthusiastic in class may enhance their students' motivation by providing mastery-oriented activities. Mastery goal orientation in class is defined as a focus on students' learning and understanding (Ames, 1992; Meece et al., 2006) and enhances students' motivation (Meece et al., 2006). According to these assumptions, research has shown that mathematics teacher enthusiasm is related to students' perceptions of classroom mastery goal orientation (Carmichael et al., 2017). Studies that focused on teacher interest also showed that teachers who are interested in their subjects and in teaching enhanced students' interest through the provision of mastery goal orientation in class (Schiefele & Schaffner, 2015; Schiefele, 2017). Teacher interest and teacher enthusiasm are theoretically overlapping constructs as enthusiasm corresponds to the feeling-related component of interest (Schiefele, Streblow, & Retelsdorf, 2013). Taken together, teachers' enthusiasm is positively related to mastery orientation in class and this relationship partially explains the process through which teacher enthusiasm relates to student motivation.

Teacher self-efficacy refers to teachers' own judgments of their ability to bring about the desired outcomes of student engagement and learning, even among students who may be difficult or unmotivated (Tschannen-Moran & Woolfolk Hoy, 2001; Woolfolk Hoy & Spero, 2005). Teacher self-efficacy is positively related to student motivation (Midgley, Feldlaufer, & Eccles, 1989b). In our study, we refer to the theoretical concept of teacher self-efficacy that Tschannen-Moran and Woolfolk Hoy (2001) developed. The authors define three related aspects of teachers' senses of self-efficacy: self-efficacy for instruction, self-efficacy for classroom management, and self-efficacy for engagement. In this study, we focus on teacher classroom management self-efficacy because research has shown the importance of this facet of teacher self-efficacy for successful teaching (Dicke et al., 2014; Emmer & Hickman, 1991; Wolters & Daugherty, 2007). Teacher classroom management self-efficacy is the teacher's judgment of his or her own ability to successfully perform classroom management tasks (Pfitzner-Eden, Thiel, & Horsley, 2015). Studies have shown positive relationships between teachers' classroom management self-efficacy and classroom mastery goal orientation (Wolters & Daugherty, 2007), classroom management (Dicke et al., 2014),

and positive strategies in class (i.e., increasing desirable student behavior; Emmer & Hickman, 1991). Teachers who feel able to successfully perform classroom management tasks also focus on their students' gaining knowledge and mastery in class (Wolters & Daugherty, 2007). Mastery-oriented learning environments in turn enhance students' motivation (Meece et al., 2006). Thus, mastery orientation in class may partially explain the process through which teacher classroom management self-efficacy is related to student motivation.

1.2. Mastery goal orientation in class and student motivation

Achievement goal theorists have emphasized that classroom mastery goal structure (that is, the focus on students' learning and understanding in class) is substantially related to students' adaptive academic development (Ames, 1992; Meece et al., 2006; Murayama & Elliot, 2009). Various studies have shown the positive effects of students' perceptions of classroom mastery goal structure on students' competence beliefs (Wolters, 2004), positive affect (Kaplan & Midgley, 1999; Roeser, Midgley, & Urdan, 1996), interest (Schiefele & Schaffner, 2015; Urdan, 2004), and mathematics task value (Lazarides & Watt, 2015).

Eccles (2005) suggests that learning environments that enhance students' experiences of mastery learning might be theoretically related to students' subjective task value. Subjective task value is conceptualized as an individual's belief about the quality of a task and is differentiated into four components (Eccles, 2005): *intrinsic value* refers to an individual's expected enjoyment when engaging with the task, *utility value* refers to the individual's perception of the usefulness of the task for long-term goals, *attainment value* is defined as the individual's perceived personal importance, and *cost* is defined as the expected perceived negative consequences of engaging in a task.

According to Eccles (2005), students may perceive higher subjective task value in mastery-oriented learning environments because of the experience of personal competence and internal control. Students' subjective task value, in turn, is assumed to be related to students' career plans and activity choices (Wigfield & Eccles, 2002). Empirically, research has shown that intrinsic value (Durik, Vida, & Eccles, 2006; Nagengast et al., 2011) and attainment value (Eccles & Harold, 1991) are related to domain-specific free time involvement, utility value is related to adolescents' task-related career plans (Harackiewicz, Rozek, Hulleman, & Hyde, 2012), and cost is negatively related to academic retention intentions (Perez, Cromley, & Kaplan, 2014).

1.3. The present study

This study tested the assumptions of the Eccles et al. (1983) expectancy-value theory in the classroom context. The model indicates that socializers' actual beliefs and support behaviors are related to students' perceptions of these behaviors, which in turn are related to students' subjective task value and activity choices. Referring to these theoretical assumptions, this study examined whether socializers' beliefs (teacher-reported enthusiasm and classroom management self-efficacy) are indirectly related to students' subjective task value and activity choices through students' perceptions of socializers' behaviors (mastery orientation in mathematics classrooms). We examined teacher enthusiasm and classroom management self-efficacy because these variables are decisive components of teachers' professional competence (Kunter et al., 2013).

Based on previous theoretical and empirical work, we hypothesized that teacher-reported enthusiasm for teaching and for mathematics (Keller, Hoy, Goetz, & Frenzel, 2015; Kunter et al.,

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