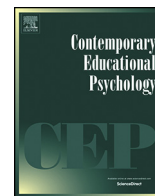




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Theoretical Analysis

Achievement goals, academic self-concept, and school grades in mathematics: Longitudinal reciprocal relations in above average ability secondary school students

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ABSTRACT

This study examined the longitudinal reciprocal relations between academic self-concept, achievement goals (i.e., performance-approach, performance-avoidance, and mastery), and achievement (i.e., self-reported grades) in mathematics. The research aim was twofold. First, we examined the confound hypothesis, which states that performance-approach goals do not feature any incremental validity in predicting achievement over and above students' competence perceptions (i.e., academic self-concept). In addition, we expanded research on the confound hypothesis by also investigating performance-avoidance and mastery goals. Second, we investigated the predictive validity of all three achievement goals for changes in academic self-concept. Seven hundred sixty-nine students (50.78% female) attending the highest track of the German three-tier secondary school system participated in three waves of measurement in Grades 5, 6, and 8. Our findings confirmed the confound hypothesis: Performance-approach goals did not explain achievement over and above academic self-concept. The same findings applied to performance-avoidance and mastery goals. Furthermore, performance-approach goals were positively related to academic self-concept changes, whereas performance-avoidance goals showed a negative relation to academic self-concept changes over time. Mastery goals were not associated to changes in academic self-concept. Academic self-concept and achievement showed positive reciprocal relations. To conclude, our results point to complex relations between achievement goals, academic self-concept, and academic achievement over time.

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1. Introduction

Academic self-concept describes the mental representation of one's academic ability. Achievement goals comprise different types of goals in competence-related settings, including mastery goals (e.g., developing one's competence), performance-approach goals (e.g., validating one's ability in comparison to others), and performance-avoidance goals (e.g., avoiding demonstrating a lack of ability in comparison to others). Academic self-concept and achievement goals have proven to be central constructs in research on motivational processes and outcomes in educational contexts (e.g., Elliot, 2005; Huang, 2012; Marsh, 2006; Marsh & Martin, 2011; Payne, Youngcourt, & Beaubien, 2007; Senko, Hulleman, & Harackiewicz, 2011; Valentine, DuBois, & Cooper, 2004). Both constructs are tied

to comparison processes (e.g., Marsh, 2006; Régner, Escribe, & Dupeyrat, 2007). On the one hand, academic self-concept development has been shown to be highly reliant upon comparison processes (e.g., Huguet et al., 2009; Möller & Marsh, 2013). On the other hand, achievement goals seem to drive students to make comparisons (e.g., Régner et al., 2007). Indeed, recent studies found some evidence that achievement goals (i.e., performance-approach, performance-avoidance, and mastery goals) are related to academic self-concept development (i.e., Wouters, Colpin, Van Damme, & Verschueren, 2013) but the research base is rather scarce. Of note, the relationship between goals and academic self-concept is at the heart of a current debate on the so-called confound hypothesis (Senko et al., 2011, for an overview). While it is widely agreed upon that mastery goals exert a genuine and beneficial impact on learning, researchers disagree about the role of performance-approach goals. Here, the main question is whether the link between students' performance-approach goals and students' actual achievement is spurious due to a confounding effect of students' competence perceptions (Brophy, 2005; Senko et al., 2011). The present study examines both research questions (i.e., relation of goals to academic self-concept development and test of the confound hypothesis)

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through an investigation of the relations between achievement goals, academic self-concept, and achievement across a time span of 3 years for students enrolled in the highest track of German secondary school—the so-called *Gymnasium*. Previous research has indicated that both academic self-concept and achievement goal constructs are highly specific to particular school subjects (e.g., Bong, 2001, for achievement goals; Marsh, 1992, for academic self-concept). The present study therefore focuses on the domain of mathematics.

1.1. Academic self-concept and academic achievement

Shavelson, Hubner, and Stanton (1976) characterized self-concept as a personal self-perception which is formed through one's experience with one's environment. Academic self-concept can thus be characterized as the personal self-perception of one's academic ability which is formed through one's experience in learning- and achievement-relevant contexts. Academic self-concept is typically conceived to be hierarchically organized and to be highly specific to particular school subjects, with a general academic self-concept at the apex (Brunner et al., 2010). Academic self-concept has been found to have beneficial effects on a broad range of academic outcomes, for example, on subsequent academic achievement (Marsh et al., 2008; Valentine et al., 2004), academic interests (Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2005), academic choices (e.g., advanced coursework selection; Marsh, 1991), academic emotions (Götz, Preckel, Zeidner, & Schleyer, 2008), and occupational aspirations (Ireson & Hallam, 2009). The relation between academic self-concept and academic achievement has often been found to be reciprocal (i.e., reciprocal effects model, e.g., Guay, Marsh, & Boivin, 2003; Marsh & Craven, 2006; Marsh & Martin, 2011; Marsh et al., 2005; see also Calsyn & Kenny, 1977), which implies that higher achievement enhances self-concept (while controlling for previous self-concept; i.e., skill development processes) and higher self-concept enhances achievement (while controlling for previous achievement; i.e., self-enhancement processes). Although the empirical knowledge base on reciprocal relations between academic self-concept and achievement is well established and ever increasing, the exact mechanisms that underlie self-enhancement processes are not yet completely understood (Green, Nelson, Martin, & Marsh, 2006; Marsh, 2006; Möller, Retelsdorf, Köller, & Marsh, 2011). One plausible explanation is provided by the expectancy-value theory. Eccles (2009) understood academic self-concept as a predictor of expectations for success and, thus (in addition to the subjective value of a given task), as an antecedent of a certain behavior (e.g., doing homework, studying for exams, paying attention or putting effort in mathematics classes).

Among the most important influences on students' academic self-concept are performance feedback and social comparison processes (e.g., Huguet et al., 2009; Seaton, Marsh, & Craven, 2010). For example, when judging her ability in mathematics, a student tends to compare her mathematics performance against a frame of reference given by the mathematics achievements of her classmates. Research in dozens of countries over the last several decades has produced well-documented evidence of the influence of social comparison processes on the formation of academic self-concept (e.g., Marsh, 2006; Möller, Pohlmann, Köller, & Marsh, 2009; Seaton, Marsh, & Craven, 2009; Seaton et al., 2010). Given the importance of academic self-concept, enhancing our knowledge on potential predictors of its development is of immediate interest. Furthermore, recent support was found that mastery, performance-approach, and performance-avoidance goals may constitute moderators for students' sensitivity to social comparison processes; namely, on reference group effects which impact students' academic self-concept (Wouters et al., 2013; see discussion later).

1.2. Achievement goals and academic achievement

Goals have been characterized as personal cognitive representations of desired or undesired results or end states that guide one's behavior (Elliot & Thrash, 2002; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). In achievement contexts, individuals typically pursue different goals that are focused on *competence*—like the goal to understand and master the learning contents, to demonstrate ability to others, or to avoid doing poorly in comparison to others. Achievement goals can thus be defined as one's cognitive representations of desired or undesired competence-related results or end states in achievement contexts (Hulleman et al., 2010). Here, achievement goals have been shown to be domain-specific in particular subjects such as mathematics or english (Bong, 2001). The conceptualization of achievement goals has undergone a continuous evolution over the last 20 years. In the early stages of this research, achievement goals were based on a dichotomous theoretical framework that differentiated two patterns of goal adoption to define one's own competence: mastery goals and performance goals (Dweck & Leggett, 1988). Subsequent goal research refined the dichotomous conceptualization to encompass a further distinction in competence-related behavior: that of approaching positive outcomes and that of avoiding negative outcomes (Elliot & Harackiewicz, 1996). Elliot and Church (1997) proposed a *trichotomous framework* that differentiated mastery goals, performance-approach goals (i.e., the goal of outperforming others), and performance-avoidance goals (i.e., the goal of avoiding performing more poorly than others; Elliot, 1999; Elliot & McGregor, 2001; Pintrich, 2000; see also Vande Walle, 1997). Recent studies have confirmed the validity of this distinction for performance-based goals (Murayama, Elliot, & Yamagata, 2011). More recently, an equivalent distinction subdividing not only performance but also mastery goals into an approach and an avoidance component has been proposed in the so-called 2×2 achievement goal framework (Elliot & McGregor, 2001). In particular, mastery-approach goals refer to the goal of developing one's competence, whereas mastery-avoidance goals refer to the goal of avoiding self-referential incompetence. Furthermore, building on the 2×2 framework, Elliot, Murayama, and Pekrun (2011) further refined mastery-based goals into task-approach, task-avoidance, self-approach, and self-avoidance goals in a 3×2 achievement goal framework (whereas performance-based goals, referred to by the authors as other-based goals, remained unaltered; see Elliot et al., 2011). Yet relative to the avoidance-approach distinction within performance-based goals, an equivalent distinction within mastery-based goals has been endorsed considerably less in goal research (Hulleman et al., 2010). Moreover, empirical support (e.g., by means of structural equation modeling) for the 2×2 framework has been mixed (Hulleman et al., 2010). Furthermore, mastery-avoidance goals are less prevalent in achievement situations in typical educational settings such as the classroom context (see Elliot, 2005, for a discussion). In light of these findings, and given the prevalence of the trichotomous framework in previous research, we embedded the present study within a trichotomous framework which distinguishes between (a) performance-approach, (b) performance-avoidance, and (c) mastery (-approach) goals. For simplicity, in the remainder of this article, we use the term mastery goals to refer to mastery-approach goals.

The distinction of various goal components in the trichotomous framework has received ample empirical support (see Elliot, 1999, for a review), and achievement goals were found to be *differentially* associated with a broad range of different educational outcomes. For example, performance-approach goals have been identified as positive predictors of academic emotions such as pride, whereas performance-avoidance goals have been shown to be antecedents of anxiety, hopelessness, and shame (Pekrun, Elliot, & Maier, 2006). Mastery goals, in turn, are consistently related to

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