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Why does intrinsic motivation decline following negative feedback? The mediating role of ability self-concept and its moderation by goal orientations

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ABSTRACT

This study aimed to identify influencing factors that render students vulnerable to low intrinsic motivation. For this purpose, we investigated whether changes in students' ability self-concept after negative performance feedback affect their intrinsic motivation and whether this effect is moderated by achievement goals. In Experiment 1, 101 university students randomly received either negative or positive performance feedback after they had worked on a numerical test. As predicted, students' intrinsic motivation declined after negative feedback even if influences of actual performance were controlled. This effect was fully mediated by students' ability self-concept. Contrary to our expectations, the feedback effect on students' intrinsic motivation via ability self-concept was not moderated by their goal orientations. Experiment 2 ($N = 90$) replicated these findings and ruled out alternative explanations for the feedback effect such as general mood changes. Findings are discussed with regard to motivation theory and their implications for educational practice.

1. Introduction

Intrinsic motivation is an important prerequisite for lifelong learning and therefore a desired outcome of education. Studies investigating change in intrinsic motivation for school-related learning have observed that intrinsic motivation diminishes throughout elementary school and beyond (e.g. Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Spinath & Spinath, 2005). However, there are intraindividual differences in this development (e.g. Archambault, Eccles, & Vida, 2010; Nurmi & Aunola, 2005). For some students, the observed decline in intrinsic motivation is stronger than for others, whereas for still others the decline does not apply at all. Considering the significance of the construct for learning and achievement (e.g. Spinath, Spinath, Harlaar, & Plomin, 2006; Steinmayr & Spinath, 2009a), it seems necessary to identify the influencing factors that render some students vulnerable to low intrinsic motivation and others not. In prominent motivation theories it is supposed that a person's intrinsic motivation changes as a result of previous achievement-related experiences such as performance feedback, and that this effect is mediated by changes in a person's ability self-concept (e.g., expectancy-value model by Eccles et al., 1983). Furthermore, it is argued that the effect of ability self-concept on intrinsic motivation depends on a person's goal orientations as goals form the cognitive framework within which a person reacts to competence-relevant information (Dweck, 1986; Dweck & Leggett, 1988). In reference to these theories, the present study examines the interplay between ability self-concept and achievement goals for change in intrinsic motivation. In two experiments, first, we tested whether the effect of negative performance feedback on intrinsic motivation is mediated by students' ability self-concept and varies systematically according to students' achievement goal orientations. Second, we tested several alternative explanations for the hypothesized effects on intrinsic motivation.

1.1. The relation between ability self-concept and intrinsic motivation

In the present paper, ability self-concept (ASC) is defined as a cognitive representation of one's ability level in an academic achievement situation (see Eccles & Wigfield, 2002)—also called competence beliefs, perceived competence or ability self-perceptions. According to Marsh (1986), ASCs are formed in relation to external comparisons (comparing one's performance with the performance of others) and internal comparisons (comparing one's performance in one domain with one's performance in another domain or over time), also named frames of references (see Skaalvik & Skaalvik, 2002). Thus, it is not perceived achievement per se but the result of achievement comparisons that leads to changes in ASC. Therefore, we suppose that students' task-specific ASC changes depending on performance feedback for which

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the performance of students of the same age serves as an external frame of reference. We chose external achievement comparisons for the manipulation because these comparisons are usually highly salient in educational contexts (see Dijkstra, Kuyper, van der Werf, Buunk, & van der Zee, 2008).

We defined intrinsic motivation (IM) as the degree of positive affective evaluation of an activity (see Spinath & Steinmayr, 2012). Intrinsically motivated persons prefer and enjoy activities for reasons that lie within the activity itself, regardless of their consequences (e.g. Eccles & Wigfield, 2002; Ryan & Deci, 2000). According to Eccles et al.'s (1983; Eccles & Wigfield, 2002) expectancy-value model of achievement, Deci and Ryan's (1985; Ryan & Deci, 2000) self-determination theory, as well as White's (1959) seminal effectance motivation theory and its refinement by Harter (1978, 1981), positive competence beliefs are an important prerequisite for experiencing IM (for an overview, see Spinath & Steinmayr, 2012). These theories all suppose that more positive competence beliefs generate more IM for a given task, and that a decline in competence beliefs (due for example to negative performance feedback) should result in a diminishment of IM.

In line with these theories, in various cross-sectional and correlational studies, researchers have detected moderate to high positive correlations between IM and ASC within domains (e.g. Eccles & Wigfield, 2002; Spinath et al., 2006; Wigfield et al., 1997). Furthermore, there is ample evidence for a parallel decline in the two constructs across the school years, potentially providing indication that the relation is causal (e.g., Jacobs et al., 2002). However, longitudinal field studies investigating the hypothesis that prior ASC influences later IM in students from Grades 1 to 12 in different domains with different methods have revealed little evidence for this notion (Jacobs et al., 2002; Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2005; Nurmi & Aunola, 2005; Skaalvik & Valas, 1999; Spinath & Spinath, 2005; Spinath & Steinmayr, 2008, 2012; Viljaranta, Tolvanen, Aunola, & Nurmi, 2014). These studies do not necessarily prove that the theoretical approach mentioned above should be reconsidered because possible confounding variables are hard to control in the field so that experimental studies are needed. Confounding variables could be factors that turned out to be relevant for changes in intrinsic motivation like personality characteristics (see Barron & Harackiewicz, 2001; Denissen, Zarrett, & Eccles, 2007) and group-specific peculiarities (e.g., immigrant background; Kigel, McElvany, & Becker, 2015).

Prior experimental studies investigating influences on IM (for an overview, see Deci, Koestner, & Ryan, 1999) were mainly guided by cognitive evaluation theory (CET; Deci, 1971), which postulates that perceived competence and perceived self-determination mediate the effect of external events such as reward and performance feedback on intrinsically motivated behavior (Ryan & Deci, 2000). Only a few experiments have directly tested the supposed mediation effect of perceived competence on intrinsic motivation (e.g., Vallerand & Reid, 1984, 1988). Results of the studies by Vallerand and Reid (1984, 1988) indicated that students who randomly received positive feedback for a motor task had a higher IM for this task as well as higher feelings of competence than students who received negative feedback. Furthermore, multiple regression analyses revealed that the total effect of the verbal feedback on IM was mainly explained by the effect of feelings of competence on IM. Nevertheless, the mediation effect was not confirmed by inferential statistics.

To summarize, the results of the experimental studies support the hypothesis that task feedback affects IM in controlled settings, and there is initial evidence that this effect might be mediated by changes in ASC. One aim of the present study is the replication of these results considering some improvements. First, the influences of actual task performance on IM should be controlled. Prior studies have demonstrated that actual ability on a test influences ability self-estimations independent of the feedback one attains (e.g. Herbert & Stipek, 2005; Steinmayr & Spinath, 2009b). Therefore, it might be the case that giving feedback that is independent of one's performance results in an overestimation of the effect of feedback on ability self-perceptions and thus leads to an unrealistic view of the effect of ASC on IM. Second, mediation effects should be confirmed by means of inferential statistics (see Preacher, Rucker, & Hayes, 2007). Third, it seems necessary to assess students' initial ASC and their initial IM, so that the initial relation of these constructs and the change in IM due to changes in ASC can be taken into account in the statistical analyses (see Cole & Maxwell, 2003). Finally, the relation between ASC and IM might depend on the goals a person pursues while working on a task because they are supposed to determine how a person reacts to achievement-related information. We thus considered the role of achievement goals for changes in IM.

1.2. Students' goal orientations as moderators of the association between ability self-concept and intrinsic motivation

Achievement goals are a person's set of beliefs that reflect the person's reasons for engaging in competence-related activities. A person's goal orientations create a framework for how this person interprets and experiences achievement settings and responds to challenges (Dweck & Leggett, 1988). Initially, researchers distinguished between two types of achievement goals: learning goals, which focus individuals on the expansion or development of their competence, and performance goals, in which individuals strive to demonstrate their competencies and to perform better than others (e.g. Dweck, 1986; Nicholls, 1984). The aforementioned goals mainly focused on the possibility to approach success. Later on, an additional distinction was made between learning and performance goals that focus on the avoidance of failure (Elliot & McGregor, 2001). The combination of the learning-performance dichotomy on the one hand and the approach-avoidance distinction on the other resulted in four types of goals: learning-approach goals, learning-avoidance goals, performance-approach goals, and performance-avoidance goals (for a review, see Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). In the present study, we concentrate on learning-approach and performance-approach goals because the considerations concerning the interplay between ASC and achievement goals for change in IM particularly refer to the two approach-based goals. Thus, the terms learning goals and performance goals henceforth refer to the approach-components of these goals.

In her social-cognitive approach to motivation and personality, Dweck (1986; Dweck & Leggett, 1988) already described goal orientations as possible moderators of the association between ASC and adaptive learning-related behavior such as IM. According to Dweck (1986), failure to show high ability is not supposed to alter IM of individuals with learning goals. Due to the belief that individuals are able to improve their abilities and perceive learning progress at various levels of actual ability, successful mastery of tasks is possible at every level of ASC. Thus, even individuals who perform poorly and hold realistically low beliefs about their current abilities should display IM as long as these individuals are geared toward learning goals (Grant & Dweck, 2003). By contrast, students who pursue performance goals are supposed to lose their task enjoyment if they experience a failure to demonstrate high ability and if, at the same time, they hold a negative ASC (Elliott & Dweck, 1988). ASCs are measured against social or criterion-based standards, and therefore, they assess exactly the kind of competence that is necessary to demonstrate high ability (see Spinath & Steinmayr, 2012). If students hold a negative ASC, achievement goal attainment is unlikely, and this will lead to reactions of helplessness (Grant & Dweck, 2003) and to negative affect, which is known to be incompatible with enjoyable feelings (Diener & Dweck, 1978, 1980; Elliott & Dweck, 1988).

Even though Dweck's (1986) considerations are convincing, very few studies have investigated them, and the results are heterogeneous. For example, some studies found a moderating role of goal orientations on the association between feedback or ASC and IM (e.g. Rakoczy, Harks, Klieme, Blum, & Hochweber, 2013; Shim & Ryan, 2005), whereas others