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Achievement after failure: The role of achievement goals and negative self-related thoughts

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Abstract

Theory on achievement goals favours a trichotomous model encompassing learning goals, performance-approach, and performance-avoidance goals. Performance-avoidance goals are associated with lower achievement compared to performance-approach and learning goals. The present study investigated the predictions of this model as regards achievement after failure. Low achievement of participants with performance-avoidance goals was expected to be mediated by a high degree of negative self-related thoughts. Before manipulating achievement goals, achievement on verbal analogies was assessed. After manipulating achievement goals for an anagram task, all participants ($N = 87$) were exposed to failure. Subsequently, achievement on a parallel version of the verbal analogies task was assessed. Participants in the performance-avoidance goals condition showed low achievement after failure, mediated by a high degree of negative self-related thoughts.

Keywords: Achievement goals; Failure; Negative self-related thoughts; Goal orientations

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1. Introduction

In achievement settings, individuals pursue different types of goals. The pursuit of these goals is associated with differences in learning behaviour and learning outcomes. As different instructional settings foster different goal pursuits, the role of goals in learning and instruction is of great interest to educational researchers.

More than two decades ago the achievement goals theory was introduced to the field of motivational psychology in order to describe the different goals that are important in achievement settings (Ames, 1984; Dweck, 1986; Nicholls, 1984).[1] Researchers initially suggested a dichotomous model of achievement goals, that distinguished between goals aiming to develop one's competence (learning goal) and goals aiming to demonstrate high or to avoid demonstrating low competence (performance goal) (Dweck, 1986; Dweck & Leggett, 1988). Learning goals were assumed to lead to adaptive emotions, thoughts, and behaviour in achievement situations irrespective of an individual's perceived competence. In contrast, the effects of performance goals were postulated to depend on perceived competence, that is, performance goals were suggested to lead to adaptive patterns of behaviour when perceived competence is high. In cases where perceived competence is low, performance goals were assumed to lead to maladaptive behaviour.

Situations which emphasize the importance of effort in learning outcomes are assumed to be associated with preferences for learning goals. Situations which enforce assessment and comparison of students' competences based on a social norm foster performance goal preferences. Therefore, it can be assumed that goal preferences can be produced by situational constraints (e.g., specific instructions) in the classroom created by the teacher (see Ames, 1992).

Previous studies have found that the pursuit of learning goals is associated with positive achievement-related outcomes such as higher self-efficacy, higher persistence, more adaptive self-regulated learning, positive affect, and more adaptive help-seeking behaviour in the face of difficulties (Butler & Neuman, 1995; Elliot, 1999; Kaplan, Middleton, Urdan, & Midgley, 2002; Midgley, 2002; Pintrich, 2000; Urdan, 2004). In line with these findings, many studies also found that pursuing learning goals generally improves achievement (for a meta-analytical review see Payne, Youngcourt, & Beaubien, 2007). However, concerning the pursuit of performance goals, there was no clear pattern. Some studies found that pursuing performance goals was adaptive in relation to achievement-related outcomes (Harackiewicz, Barron, & Elliot, 1998; Harackiewicz & Elliot, 1993) while others found support for maladaptive consequences (Meece, Blumenfeld, & Hoyle, 1988; Spence & Helmreich, 1983). As such, the dichotomous model has not offered a complete explanation for the pattern of relations between goals and achievement.

1.1. The trichotomous model of achievement goals

Elliot (2005) argued that the mixed findings concerning performance goals and learning outcomes are due to the lack of distinction between the two valence-

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[1] Originally defined as purposes for action which are induced by the situation (Ames, 1992; Dweck, 1986; Nicholls, 1984), goals have also been analyzed at a dispositional level (Nicholls, 1992). Thus, past research has investigated goal pursuit as a "state" (via questionnaires that focused on task-specific engagement or through experimental manipulation) or as a "trait" (focusing on cross-situational engagement). In the following, we use the term "goal pursuit" or "goals" to denote both situation-specific manifestations of goals and dispositional goal orientations.

components of motivation, namely "approach" and "avoidance" motivation within performance goals (Atkinson, 1957). Whereas an "approach" motivation focuses on the possibility of attaining success, an "avoidance" motivation focuses on the possibility of failure, and aims to avoid failure. Thus, goal theorists suggested a trichotomous model, further distinguishing performance goals into approach and avoidance (Elliot & Harackiewicz, 1996; Middleton & Midgley, 1997). This trichotomous goal framework incorporates the performance versus learning goals distinction and the approach versus avoidance distinction as regards performance goals. Consequently, three types of achievement goals are delineated: (a) learning goals (approach goals focused on the development of self-referenced competence); (b) performance-approach goals (approach goals focused on the attainment of favourable evaluations concerning normative competence), and (c) performance-avoidance goals (avoidance goals focused on avoiding unfavourable evaluations concerning normative competence).[2] Concerning the consequences of adopting the three types of goals, performance-avoidance goals (i.e., avoiding demonstrating low competence) have been consistently shown to be maladaptive in achievement situations (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Harackiewicz et al. 1998).

In the meta-analytical review of Payne et al. (2007), who distinguished between proximal and distal consequences of achievement goals, performance-avoidance goals were found to be associated with low self-efficacy and high state anxiety (proximal consequences) and low academic performance as a distal consequence. Concerning performance-approach goals, most goal theorists emphasize their positive potential because they have been found to be associated with positive affect and high achievement (Cury, Da Fonséca, Rufo, Peres, & Sarrazin, 2003; Harackiewicz et al., 2002). Other researchers, however, have warned of the possible negative consequences of performance-approach goals in the long run (Midgley, Kaplan, & Middleton, 2001). These researchers argued that performance-approach goals could lead to a kind of "learning to test", with the intention of attaining good grades instead of a deep processing of the learning material.[3]

The effects of performance-approach goals on learning are complex and further investigation of different settings and various conditions is still needed, especially concerning failure (Elliot & Harackiewicz, 1996; Heyman & Dweck, 1992; Midgley et al., 2001; Pintrich, 2000). As stated by Elliot and Harackiewicz (1996, p. 472), «One of the most important issues related to perceived competence that awaits empirical exploration is the stability of the performance-approach orientation on receipt of negative feedback. Do individuals maintain a performance-approach goal in the face of failure or does this inevitably elicit a performance-avoidance orientation?» If individuals with performance-approach goals slip into a performance-avoidance

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[2] More recently, the approach versus avoidance distinction was also applied to learning goals (Cury, Elliot, Da Fonseca, & Moller, 2006; Pintrich, 2000; Linnenbrink & Pintrich, 2002), but the sparse research conducted on learning-avoidance goals makes it hard to derive hypotheses regarding the achievement patterns associated with learning approach and learning avoidance goals (Pintrich, 2003; see also Kaplan & Maehr, 2007). Therefore, the present work is limited to the trichotomous goal model.

[3] It should be noted that Elliot and Harackiewicz (1996; for an exception, see Cury, Elliot, Sarrazin, Da Fonseca, & Rufo, 2002) almost always used college-age participants in their work, whereas Midgley et al. (2001) usually referred to middle- and high-school students. In this context, it was argued that performance-approach goals are only adaptive for individuals who are highly experienced in normative evaluative contexts. However, Cury et al. (2002) were able to show that the benefits of performance-approach goals are not limited to undergraduates but refer to early college-age participants, too.

orientation in the face of failure, they are assumed to show maladaptive reaction patterns concerning affect, cognitions, and learning outcomes.

At the beginning of a learning sequence, learners normally are not able to master a task on their own, and therefore experience inescapable failure. However, as Payne et al. (2007) pointed out, the question of how and whether individuals react differently to failure depending on the preference of learning goals, performance-approach goals, or performance-avoidance goals, remains unanswered.

1.2. Achievement goals and reactions to failure

Studies regarding reactions to failure are mainly based on the dichotomous model, and use qualitative analyses of statements made by children with learning versus performance goal preferences who have experienced failure (Diener & Dweck, 1978; Dweck & Leggett, 1988; Elliott & Dweck, 1988). It turned out that individuals with performance goal preferences and lower perceived competence[4] reported more thoughts about incompetence and showed less adaptive behavior (and, in a different study, lower achievement, see Spinath & Stiensmeier-Pelster, 2003) than individuals with higher perceived competence and individuals with learning goal preferences (irrespective of perceived competence). Dweck and Leggett (1988) concluded that individuals pursuing learning goals view failure as a challenge and use negative feedback as information about how their actual skills can be increased through effort. Therefore, they are expected to concentrate on the task and augment their effort expenditure, which is expected to enhance subsequent achievement. In contrast, individuals with performance goals are assumed to view failure as potentially threatening to their goal. If they perceive their competence as high, an approach form of regulation should result since they are expected to see failure as a challenge and continue trying to reach their goal by strengthening their effort after initial failure, which is supposed to enhance subsequent achievement. If individuals with performance goals perceive their competence as low, an avoidance form of regulation should result due to their view that negative feedback indicates a lack of ability. According to Dweck and Legett (1988), this is assumed to result in decreased effort and in ruminations about one's own incompetence instead of concentrating on the task.

1.3. Effects of achievement goals and achievement after failure

Thus far, to our knowledge, there have been no studies which have examined achievement after failure based on the trichotomous achievement goals model. Moreover, up to now there has been no research which has tested the effect of achievement goals on achievement after failure in a dissimilar task. Thus, the question regarding the sustainability of goal-specific reactions to a subsequent task after failure in a dissimilar task has remained unanswered.

As mentioned above, the pursuit of learning goals is expected to facilitate achievement after prior failure. Individuals with performance-approach and performance-avoidance goals are assumed to view failure as potentially threatening. However, the pursuit of performance-approach goals is presumably guiding individuals to focus on the possibility of performing well in the subsequent task. By viewing failure as a personal challenge, individuals with performance-approach goals

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[4] Perceived competence is conceptualized here as a relatively enduring belief in one's capacity to perform well on a particular task or domain.

are assumed to continue trying to reach their goal by strengthening their effort after an initial failure. Pursuit of performance-avoidance goals is supposed to focus individuals on the possibility of further failure. Therefore, individuals in this condition are presumably trying to avoid further self-blame by strengthening their effort after failure. However, due to their focus on the possibility of further failure, rumination about the initial failure and incompetence in the form of negative self-related thoughts may deteriorate subsequent achievement (Elliot, 2005; Elliot & McGregor, 1999). Thus, after failure, negative self-related thoughts are assumed to be influenced by the type of achievement goal endorsed. In contrast to the assumptions of Dweck and Leggett (1988), individuals trying to avoid further failure and trying to attain success are expected to generate similar level of motivation, only the qualitative nature of motivation is expected to differ (see Elliot & Harackiewicz, 1996). Elliot and Harackiewicz (1996) tested the trichotomous goal model in predicting intrinsic motivation in a puzzle task. They found that participants with performance-avoidance goals valued competence as much and exerted as much effort as their performance-approach and learning goal counterparts in solving the puzzles, but they reported less intrinsic motivation. As Elliot and Harackiewicz (1996, p. 472) stated, «Thus, an avoidance goal may be a "great motivator" in the sense that it can elicit affective investment and vigorous action..., but this process of "active avoidance" apparently exacts a phenomenological cost». In the face of failure, participants with performance-avoidance goals should be more susceptible to rumination about the initial failure and incompetence. Therefore, negative self-related thoughts about one`s achievement and competence (hereafter called "negative self-related thoughts"), instead of the amount of expended effort, are expected to mediate the relation between achievement goals and achievement after failure.

1.4. Negative self-related thoughts as a potential mediator

Research indicates detrimental effects of negative self-related thoughts on learning outcomes in achievement situations (Blankstein, Toner, & Flett, 1989; Seipp & Schwarzer, 1991). Thinking about incompetence limits the attentional resources allocated to the task, which impairs actual achievement (Kanfer & Ackerman, 1989; Sarason & Sarason, 1990; Wine, 1971). Individuals with performance-avoidance goals are expected to be vulnerable to negative self-related thoughts after prior failure and, thus, demonstrate impaired achievement.

1.5. Perceived competence as a potential moderator

In studies not explicitly triggering performance-approach or performance-avoidance goals, perceived competence is expected to be the determining factor for the direction of one's goals (see Elliott & Dweck, 1988; Spinath & Stiensmeier-Pelster, 2003). This is in line with the findings of Cury, Elliot, Da Fonseca, and Moller (2006) who demonstrated that perceived competence is a direct predictor of performance goals. However, in studies explicitly inducing either performance-approach or performance-avoidance goals through the use of situational constraints, the effect of individual dispositions like perceived competence is assumed to be minor (Cury, Elliot, Sarrazin, Da Fonseca, & Rufo, 2002; Cury et al., 2003; Cury et al., 2006; Elliot & Harackiewicz, 1996). This is in line with the conceptualisation of situational goals as goal preferences, which are likely to be induced by situational constraints that can overcome personal dispositions (for a summary, see Elliot, 2005).

1.6. The present study

The first aim of the present study was to investigate the effects of induced achievement goals on achievement in a verbal analogies task after encountering a failure situation. The theoretical framework on which the study was based is the trichotomous model of achievement goals. The specific feature of the present study was that failure was not part of the main task (i.e., the verbal analogies task), but of a dissimilar task, namely an anagram task. If any effects of achievement goals on achievement in the main task after failure on a dissimilar task can be found, this would demonstrate that achievement goals sustainably affect achievement.

A second aim was to investigate whether perceived competence, a factor which has been shown in the past to moderate the relation between achievement goals and achievement, will continue to do so even in a situation in which performance-approach, performance-avoidance, and learning goals are induced.

A third aim was to investigate whether perceived effort-expenditure and negative self-related thoughts act as mediators of the relationship between achievement goals and achievement after failure.

1.6.1. Hypotheses

The hypotheses concerning achievement after failure were as follows: (a) Participants in the performance-approach goals condition will perform better than participants in the performance-avoidance goals condition but equally well with the learning goals condition (Hypothesis 1). Participants in the performance-avoidance condition will report more negative self-related thoughts than participants in both the performance-approach and the learning goal condition (Hypothesis 2). Negative self-related thoughts will mediate the effect of performance-avoidance goals on achievement after failure (Hypothesis 3). Perceived effort expenditure was also expected to mediate the effect of achievement goals on achievement after failure (Hypothesis 4). Finally, perceived competence was expected to moderate the relation between achievement goals and achievement after failure (Hypothesis 5).

2. Method

2.1. Design

The main task of the study was a verbal analogies task. It comprised two sets of verbal analogies (two parallel versions) from the intelligence test Kognitiver Fähigkeitstest für 4. bis 12. Klassen – Revision [Cognitive Aptitude Test for Grades 4 to 12 – Revision] KFT 4-12+R; Heller & Perleth, 2000). The participants were initially given a sample of verbal analogies and upon completion they were required to rate their perceived competence on this type of task. This first set of the verbal analogies (Time 1, T1) was administered to all participants. After working on it, participants' achievement goals were manipulated in relation to a dissimilar task (anagram problems). Specifically, learning goals, performance-approach goals, and performance-avoidance goals were induced, and three groups of participants were formed, one for each type of achievement goals. Achievement goals were induced using procedures similar to Elliot and Harackiewicz (1996) and Elliott and Dweck (1988) (see Appendix A). Then, all participants were provided with a failure task

consisting of three unsolvable anagram problems. After failure, participants were asked to work on the second set of the verbal analogies task (Time 2, T2).

After having completed the second set of the verbal analogies, participants were asked to rate how much effort they had expended on them. Finally, participants had to rate their negative self-related thoughts concerning the verbal analogies task.

2.2. Participants

The sample consisted of 87 (65 female) university undergraduates ($\underline{M}$ = 24.03 years, $\underline{SD}$ = 5.57) who participated voluntarily and received 5 Euro as compensation. They were randomly assigned to one of three experimental conditions, that is, the learning goals condition, the performance-approach goals condition, and the performance-avoidance goals condition; four students were excluded (see subchapter 2.3.3).

2.3. Measures and tasks

2.3.1. Perceived competence

To assess perceived competence for verbal analogies, a five-item scale by Schöne, Dickhäuser, Spinath, and Stiensmeier-Pelster (2002) was used. Two example items are "For these tasks I feel..." and "Learning these new tasks is...". Responses were given on a 5-point Likert-type response scale ranging from 1 (not at all gifted / very hard for me, respectively) to 5 (very gifted / very easy for me, respectively). The internal consistency was high (Cronbach's α = .86).

2.3.2. Verbal analogies task

At Time 1 (before working on the failure task) participants were asked to work on the first set of the verbal analogies (comprising 15 analogies. Participants were given a pair of words indicative of a relation and a second pair with one word missing. They were asked to find the missing word from a set of five, using the first pair as an analogy guide (e.g., medical doctor: human :: veterinarian: ...? Answer A: veteran; B: colic; C: farm; D: animal; E: medicine. The correct answer is D). One point was accredited for each correct answer. The internal consistency of the verbal analogies task at T1 was satisfactory (Cronbach's α = .74).

At Time 2 (after working on the failure task) participants were asked to work on the second set of verbal analogies (comprising 15 analogies of the same type as those used at Time 1 but of different content). The internal consistency of the verbal analogies task at T2 was satisfactory (Cronbach's α = .71).

2.3.3. Failure task

To induce failure, participants were provided with three words and were instructed to form anagrams that would yield three new words for each – this task was intentionally impossible to achieve. Participants rated their performance in solving the anagrams by marking it as a success or failure. Four participants who viewed their performance as successful were excluded from the sample; all other participants viewed their performance as a failure. Additionally, as an implementation check, the participants' satisfaction with their achievement in the failure task was assessed, using a response scale from 1 (very unsatisfied) to 6 (very satisfied). Responses did not differ between the three goal conditions, $\underline{F}(1, 85) < 0.6$, $\underline{ns}$, suggesting that failure was not perceived differently in the three groups.

2.3.4. Perceived effort expenditure

After having completed the set of verbal analogies at Time 2, participants were asked to rate how much effort they had expended on them. Responses ranged from 1 (not any) to 4 (very much).

2.3.5. Negative self-related thoughts

Two items (Items 1 and 2) were adapted from the Negative Self-Reactions scale developed by Kanfer and Ackerman (1989) and one more item (Item 3) was added for the assessment of negative self-related thoughts. The three items are: "In completing the analogies, I thought about how poorly I was doing / I thought about how dissatisfied I was with my achievement / I thought about how unskilled I was for these tasks". Participants were asked to indicate on a 5-point Likert-type response scale how true was for them the tag of the items. Responses ranged from 1 (true) to 5 (not true). Internal consistency was satisfactory (Cronbach's α = .77).

2.4. Procedure

Participants were informed that the study was about the handling of different types of verbal tasks. First, they were asked to work on the verbal analogies task (T1). Before starting to work on the verbal analogies task, participants were provided with a sample task and had to rate their perceived competence for the task. The purpose of rating perceived competence before working on the verbal analogy problems rather than after was to prevent the rating of perceived competence from influencing subsequent goal manipulation.

After finishing the first set of verbal analogies (T1), achievement goals were manipulated in relation to the anagrams task (see Appendix A for a detailed description). Upon receipt of the goal manipulation, participants were asked to indicate the aim of the experiment (see Elliot & Harackiewicz, 1996 for a similar manipulation check). Coding of these open-ended responses revealed that 95.1% of the participants correctly stated the aim of the experiment. Specifically, participants in the performance-approach and performance-avoidance goals conditions made explicit mention of normative comparison ("To do better than others" in the performance-approach condition and "Not to do worse than others" in the performance-avoidance condition), whereas participants in the learning goals condition made reference to developing their competence in problem solving without referring to normative comparison.

After goal manipulation, all participants were provided with the failure task consisting of three unsolvable anagram problems. Then, achievement on the second set of verbal analogies (T2) was assessed. Finally, participants were asked to rate how much effort they had expended and also to rate their negative self-related thoughts.

After obtaining consent, participants in all three groups were video-taped while completing the tasks to strengthen the goal manipulation (i.e., pointing to the evaluation focus in the performance goal conditions and the focus on the receipt of individual feedback concerning the problem-solving process in the learning goal condition).

2.5. Statistical analyses

In line with the statistical procedure of Elliot and Harackiewicz (1996), a set of contrasts tested the hypotheses, that is, the performance-approach goals versus performance-avoidance goals contrast compared the performance-approach goals condition (+1) and the performance-avoidance goals condition (-1) – learning goals condition = 0. When these analyses revealed a significant effect of performance-approach goals versus performance-avoidance goals contrast, further planned comparisons sought to anchor the performance-approach goals and performance-avoidance goals conditions to the learning goals condition. Specifically, the performance-approach goals versus learning goals contrast compared the performance-approach goals condition (+1) and the learning goal condition (-1), whereas the performance-avoidance goals versus learning goals contrast compared the performance-avoidance goals (-1) and the learning goals group (+1).

Multiple regression analyses were then conducted to investigate the effect of the predictor variables (achievement goals) on achievement after failure and to test the mediating effect of negative self-related thoughts. The predictors were the achievement scores at T1, the achievement goals contrasts, and the scores of the negative self-related thoughts. Sobel tests were also conducted in order to formally test the statistical significance of the mediation (Preacher & Hayes, 2004). A similar set of analyses was performed in order to test the mediating role of effort expenditure. Finally, a regression analysis was performed to test the possible moderating effect of perceived competence.

3. Results

3.1. Achievement at Time 1

None of the three goal groups differed from each other on achievement at T1. Specifically, for the performance-approach versus performance-avoidance goals contrast, $\underline{F}(1, 85) = 0.08$, $\underline{p} > .05$, $\underline{R^2} = .01$; for the performance-approach goals versus learning goals contrast, $\underline{F}(1, 85) = 0.01$, $\underline{p} > .05$, $\underline{R^2} = .01$; for the performance-avoidance goals versus learning goals contrast, $\underline{F}(1, 85) = 0.15$, $\underline{p} > .05$, $\underline{R^2} = .01$. Achievement at T1 was included in all analyses in which achievement at T2 was the dependent variable in order to predict changes in achievement at T2 as a function of T1 achievement and goal induction. Gender was excluded from the regression models in the present study because it was a nonsignificant factor in the preliminary analyses, all $\underline{F}$ values < 1.41, $\underline{p} > .05$.

3.2. Achievement at Time 2

The regression of the T2 achievement on the performance-approach versus performance-avoidance goals contrast and the respective T1 achievement revealed a statistically significant overall effect, $\underline{F}(2, 84) = 9.02$, $\underline{p} < .05$, $\underline{R^2} = .18$. Also, T1 achievement was a significant, positive predictor of T2 achievement, $\beta = .29$, $\underline{p} < .01$. In addition, the analysis yielded a significant effect of performance-approach goals versus performance-avoidance goals contrast, $\beta = .30$, $\underline{p} < .01$, indicating that participants in the performance-approach goals condition performed better ($\underline{M} = 9.35$, $\underline{SD} = 1.97$) than participants in the performance-avoidance goals condition ($\underline{M} = 7.74$, $\underline{SD} = 2.10$).

The regression of the T2 achievement on the performance-avoidance versus learning goals contrast and T1 achievement revealed a statistically significant overall

effect, $\underline{F}(2, 84) = 6.47$, $\underline{p} < .05$, $\underline{R^2} = .13$. Also, T1 achievement was a significant, positive predictor of T2 achievement, $\beta = .30$, $\underline{p} < .01$. Furthermore, the analysis yielded a significant effect of performance-avoidance goals **versus** learning goals contrast, $\beta = .21$, $\underline{p} < .05$, indicating that participants in the performance-avoidance goals condition performed worse ($\underline{M} = 7.74$, $\underline{SD} = 2.10$) than participants in the learning goals condition ($\underline{M} = 8.87$, $\underline{SD} = 2.34$). No other statistically significant effects on T2 achievement were obtained. Table 1 displays the means (and $\underline{SD}$) for T2 achievement by goal condition.

Insert Table 1 about here

3.3. Mediation effects

3.3.1. Effects of achievement goals on negative self-related thoughts

The regression of negative self-related thoughts on the performance-approach versus performance-avoidance goals contrast yielded a statistically significant effect, $\underline{F}(1, 85) = 5.19$, $\underline{p} < .05$, $\underline{R^2} = .06$, $\beta = -.24$, $\underline{p} < .05$, indicating that participants in the performance-approach goals condition reported fewer negative self-related thoughts ($\underline{M} = 2.81$, $\underline{SD} = 0.91$) than participants in the performance-avoidance goals condition ($\underline{M} = 3.44$, $\underline{SD} = 1.11$). Further planned comparisons revealed a statistically significant effect of performance-avoidance goals versus learning goals contrast for negative self-related thoughts, $\underline{F}(1, 85) = 6.12$, $\underline{p} < .05$, $\underline{R^2} = .07$, $\beta = -.26$, $\underline{p} < .05$, indicating that participants in the performance-avoidance goals condition reported more negative self-related thoughts ($\underline{M} = 3.44$, $\underline{SD} = 1.11$) than those in the learning goals condition ($\underline{M} = 2.76$, $\underline{SD} = 1.16$).

The above pattern of negative self-related thoughts (see Table 1) suggests that, similar to the results concerning T2 achievement, induction of a performance goal was detrimental only in the case of performance-avoidance goals.

3.3.2. Effects of negative self-related thoughts on achievement at Time 2

The regression analysis with T2 achievement as dependent variable and T1 achievement and negative self-related thoughts as predictors yielded a statistically significant overall effect of the regression model, $\underline{F}(2, 84) = 16.63$, $\underline{p} < .05$, $\underline{R^2} = .28$. Also, T1 achievement was a significant, positive predictor of T2 achievement, $\beta = .22$, $\underline{p} < .05$. Finally, negative self-related thoughts was a significant, negative predictor of T2 achievement, $\beta = -.45$, $\underline{p} < .01$, indicating that high negative self-related thoughts are associated with low achievement after failure.

3.3.3. The full mediation model

The mediation of negative self-related thoughts to the performance-approach goals versus performance-avoidance goals contrast was tested by regressing T2 achievement on the performance-approach versus performance-avoidance goals contrast, the T1 achievement, and the negative self-related thoughts (see Figure 1a). The model was statistically significant, $\underline{F}(3, 83) = 13.18$, $\underline{p} < .01$, $\underline{R^2} = .32$. Also, T1 achievement was a significant predictor of T2 achievement, $\beta = .22$, $\underline{p} < .05$. The direct effect for negative self-related thoughts on T2 achievement remained statistically significant, $\beta = -.40$, $\underline{p} < .001$. The direct effect of performance-approach versus performance-avoidance goals contrast also remained statistically significant, $\beta = .20$, $\underline{p} < .05$, but the decrease in the beta coefficient for this effect (from .30 to .20)

provides evidence that negative self-related thoughts partially mediated the effect of performance-approach versus performance-avoidance goals contrast on T2 achievement. The Sobel test, which was conducted to test this mediation formally, was also statistically significant, $z = 2.07$, $p < .05$.

Insert Figure 1a about here

Furthermore, the mediation of negative self-related thoughts to the performance-avoidance goals versus learning goals contrast on T2 achievement was investigated by regressing T2 achievement on the performance-avoidance goals versus learning goals contrast, T1 achievement, and negative self-related thoughts (see Figure 1b). The model was statistically significant, $F(3, 83) = 11.53$, $p < .001$, $R^2 = .29$. Also, T1 achievement was a statistically significant, positive predictor of T2 achievement, $\beta = .22$, $p < .05$. The direct effect of negative self-related thoughts on T2 achievement remained statistically significant, $\beta = -.42$, $p < .001$, whereas the direct effect for the performance-avoidance goals versus learning goals contrast no longer remained statistically significant, $\beta = .11$, $p > .05$, and the decrease in the beta coefficient for this effect (from .21 to .11) provides evidence that negative self-related thoughts (fully) mediated the direct effect of performance-avoidance goals versus learning goals contrast on T2 achievement. The Sobel test of this mediation was also statistically significant, $z = 2.21$, $p < .05$.

Insert Figure 1b about here

3.4. The mediating role of perceived effort expenditure

To test whether perceived effort expenditure was a mediator of the relation between achievement goal contrasts and T2 achievement regression analysis was conducted. In a first step, we tested the precondition for mediation, namely whether the independent variable (i.e., the achievement goals contrasts) predicted the mediator (perceived effort expenditure). Perceived effort expenditure was not predicted by any of the goal contrasts, all F values < 0.28, $p < .05$, indicating that there was no evidence of a difference in perceived effort expenditure ratings between goal conditions. Hence, perceived effort expenditure did not appear to mediate the relation between achievement goals and T2 achievement.

3.5. The moderating role of perceived competence

To test perceived competence as a moderator of the relation between achievement goals, negative self-related thoughts, and T2 achievement, regression analysis was conducted with T2 achievement as dependent variable and negative self-related thoughts, T1 achievement, and each of the Achievement Goals Contrasts x Perceived Competence interaction as predictors. As can be seen from Table 2, the perceived competence interactions provided no evidence of significant moderation.

Insert Table 2 about here
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4. Discussion

4.1. Theoretical implications of the findings

The present study tested the potential of the trichotomous model of achievement goals to predict achievement after failure. It also aimed at illuminating processes through which achievement goals influence achievement after failure. The results strongly support the ability of the trichotomous goal model to predict achievement after failure. As predicted (Hypothesis 1), achievement after failure (Time 2) was higher in the performance-approach goals and learning goals conditions than in the performance-avoidance goals condition. As also predicted in Hypothesis 1, achievement after failure in the learning goals condition did not differ from the performance-approach goals condition. Also, as expected (Hypothesis 2), the performance-approach goals and the learning goals conditions both led to fewer negative self-related thoughts than the performance-avoidance goals condition. In line with Hypothesis 3, the differences in achievement after failure were mediated by negative self-related thoughts. Perceived effort expenditure was not a significant mediator, contrary to Hypothesis 4. Moreover, perceived competence did not moderate the relation between achievement goals and achievement after failure, contrary to Hypothesis 5.

The results revealed that both the learning goals and performance-approach goals conditions led to adaptive behaviour after failure. Thus, even after failure, focusing on attaining success seems to be associated with positive self-regulation processes, which limits negative self-related thoughts. In turn, this is associated with higher achievement. On the contrary, focusing on avoiding failure is associated with more rumination about failure and incompetence, which in turn is associated with decreased achievement, probably because attentional resources are drawn away from the task.

It could be argued that due to the manipulation of performance goals, participants with performance-avoidance goals were led to believe that their performance on the failure task was unusually poor and that they stood out for performing poorly. This, and not the pursuit of performance-avoidance goals, could have led to their higher levels of negative self-related thoughts. However, this alternative explanation is not supported by the data, as the participants' satisfaction with their achievement in the failure task, which had been assessed in addition to the manipulation check, did not differ between the three goal conditions, suggesting that failure was not perceived differently in the three groups.

Self-perceived effort expenditure in the task after failure did not differ between the three achievement goals conditions. Individuals in the performance-avoidance goals condition did not report less effort expenditure, probably because they tried to avoid experiencing further self-blame and thereby strengthened their effort. Hence, contrary to the assumptions of Dweck and Leggett (1988), the lower achievement in a performance-avoidance goals condition, as compared to the other two conditions, does not seem to be due to a lack of effort expenditure. However, the assessment of expended effort by means of a single item does not rule out the possibility that the present nonsignificant result may be caused by a low reliability of the measure. In addition, measuring effort as a self-report of expended effort could have caused an impression management bias in that participants may have reported high expended effort in order to create the impression of being motivated. There are other indicators to assess effort expenditure, but they lead to other problems concerning the interpretability of the data. For example, time allocation to single tasks

(assessed via on-line techniques) does not provide information about the intensity of the solving process nor the concentration level of the participant on the task at hand. Thus, an individual can spend a long time on one single task without really trying to solve it. Another indicator of expended effort used in many studies is actual achievement. However, given that there are several processes which mediate achievement decrements, this measure of expended effort seemed inappropriate.

4.2. Limitations of the study

The present results are noteworthy for several reasons. First of all, to assess achievement after failure (T2) the parallel version of the verbal analogies task which was used at the beginning (T1) was applied at T2. At T1, participants of the three achievement goals conditions did not differ in their achievement on solving analogy problems. Thus, it seems that the later achievement differences (T2) cannot be explained by ability differences between the three groups but to variables associated with the induced goals.

Second, it is noteworthy that the task to assess achievement after failure was different from the task used to cause failure. Therefore, the findings illustrate sustainable achievement-goal-dependent effects after failure on subsequent achievement.

Third, the well-proven achievement goal manipulation from Elliot and Harackiewicz (1996) was used in order to contribute to a more uniform application of the achievement goal conceptualization in achievement goals research (see Elliot, 2005; Kaplan & Maehr, 2007). Given the fact that the role of performance-approach goals within the learning context is discussed rather controversially, the present study used a situation, for which it is unsure whether performance-approach goals can have positive consequences, that is, a failure situation. This is also the reason why failure was caused in all three goal groups without using a control condition without failure. Whether the present findings are limited to failure situations remains an open question.

Although performance-approach goals seem to elicit adaptive patterns of behaviour after failure in a second task in the short run, the results do not provide information about behavioural patterns after repeated failure over a longer period of time. If striving to attain success remains repeatedly unsuccessful, individuals with performance-approach goals might risk developing avoidance tendencies, which finally may elicit maladaptive behaviour (see Midgley et al., 2001 for a similar hypothesis).

Moreover, the data of the present study showed that negative self-related thoughts mediate the relation between achievement goal orientations and achievement, one may doubt whether our measure of negative self-related thoughts was unbiased. Specifically, participants filled out the negative self-related thoughts items after they had completed the task at Time 2. Poor performing participants might have been aware of their poor performance and subsequently reported high rates of "negative self-related thoughts". One alternative strategy to collect process data is to use thinking aloud protocols while participants work on the achievement test. This method was not opted for two reasons. First, the assessment of self-related thoughts while working on the task could make these thoughts very salient to the participants, which in a next step could lead to biased achievement. Second, even thinking aloud protocols may offer a biased measure of participant's thoughts because the cognitive

processes may be critically altered as a function of the thinking aloud process (Schooler, Ohlsson, & Brooks, 1993).

Even though the findings from the literature suggest that negative self-related thoughts may affect subsequent achievement, it has to be noted that the present study cannot establish without any doubt whether negative self-related thoughts were the cause of the observed differences in achievement, as the thoughts were not manipulated experimentally. One possibility would be to test the causal role of negative self-related thoughts in the future by experimentally reducing the amount of these thoughts via training and to assess possible training effects on achievement.

4.3. Practical implications of the findings

Overall, the findings suggest that a few verbal *cues* suffice to create a specific goal situation. This finding is in line with the literature concerning classroom goals, which provides the first clues about how teachers can create a perceptible motivational context. (Ames, 1992; Anderman & Midgley, 1997; Urdan, 2004). The perceived goal structure is expected to affect the students' personal goals and thereby influence their behavioral and experiential patterns (Anderman & Midgley, 1997; Church, Elliot & Gable, 2001).

Findings from the field of work psychology (Keith & Frese, 2005) suggest the possibility of endorsing a learning goal context by creating a positive climate of failure management. This can be done by highlighting the notion that mistakes and failures can have a positive and informative function in the learning process. In line with this, Turner et al. (2002) showed that sixth graders use fewer avoidance strategies (like self-handicapping, avoidance of help-seeking) in classrooms in which instructional practices provided motivational support for learning by emphasizing understanding and the development of new competencies. In part, the learning goal messages by the teachers were given «through explicit admonitions to students not to feel inadequate or ashamed when they did not understand. By modelling their own thinking processes, learning goal-oriented teachers demonstrated that being unsure, learning from mistakes, and asking questions were natural and necessary parts of learning» (Turner et al., 2002, p. 102).

Future research is needed to find out whether the same kinds of instructions affect goal structure in college classrooms, too. In addition, future research should address the question of whether the effects of teachers' instructions on goal structure depend on the frequency of teacher-student interaction. This is especially important given that college classrooms in Europe are often less interactive than those in the U.S. and Australia.

The facilitation of performance-approach goals can be considered as enhancing performance under two preconditions: (a) one must clearly show the learner the potentially positive consequences of his or her action, and (b) one must avoid triggering any potentially negative consequences. Therefore, this situation has to prevent the learner from experiencing doubts concerning his or her ability in the case of difficulties and failure because such doubts may result in avoidance behaviour. However, it is in the nature of competition to yield winners and losers. Therefore, the risk of generating performance-avoidance goals, while endorsing performance-approach goals, is higher as compared to the endorsement of learning goals, although this claim has to be proven experimentally.

In line with achievement-goals literature, the findings of the present study imply that the endorsement of a performance-avoidance goal atmosphere in the

classroom should be avoided by all means. Communicating grades in public and corresponding pejorative comments on the abilities of the weak students, which presumably induces performance-avoidance goals, could decrease achievement even in subsequent unrelated tasks.

4.4. Questions for further research

The present study was run in a controlled laboratory setting, which allowed for careful testing of the hypotheses and precise comparison of the conditions. This, of course, limits the generalizability of our findings. Further research is needed to investigate the usefulness of the trichotomous goal theory for predicting reactions to failure in more natural settings. However, one has to take into account that the present study used tasks from an intelligence test in order to assess effects of goals on achievement. The nature of these tasks is cognitively demanding and the students are rather unfamiliar with them. Given the fact that in regular learning settings, a student is often confronted with new, difficult, and unfamiliar tasks, one would also expect similar effects of goals on achievement in natural settings outside the laboratory. Nevertheless, the present study leaves open the question concerning the generalizability of the results with respect to populations other than university students and to different achievement tasks.

Finally, the interaction of students' achievement goals as trait with situational induced goals in conditions that promote success or failure, or naturally evolving behaviours (no induced success or failure) should be studied.

Appendix A. Goal manipulation

All participants were told that the study investigated complex problem-solving. Performance goals were primed in the following way (for a similar priming procedure, see Elliott & Dweck, 1988; Elliot & Harackiewicz, 1996):

> The sets of problems are from intelligence tests. The focus of today's session is on anagrams. The purpose of this project is to compare students to one another in their abilities to solve anagrams.

Participants of the performance-approach condition read the following (formulations for the performance-avoidance condition are in brackets):

> In numerous studies, we have found that university students are comparable in their abilities to solve anagrams, but some students stand out as they do quite well [poorly] on the anagrams. This session will give you the opportunity to demonstrate that you are a good [not a bad] anagram solver. Hence, we want to discover whether you do better [worse] than other students.

All participants of the performance goal conditions were also provided with the following information:

> In order for experts to evaluate your performance in detail, we will film you while you complete the tasks. This procedure has proved to ameliorate the identification of students, who are outstanding because they are better than others [worse than others] in problem solving. After we have evaluated the tasks, you will receive feedback concerning your achievement in comparison to all participants in the experiment.

Learning goals were primed in the following way (see Elliott & Dweck, 1988; Elliot & Harackiewicz, 1996):

> The sets of problems we use provide the possibility to develop problem-solving skills. The focus of today's session is on anagrams. The purpose of this project is to give students the opportunity to develop their problem-solving skills. If you practice, you can train your ability in solving complex problems. Hence, we want to discover how students develop their competence in problem solving. In order to provide you with individual feedback of your problem-solving process (in which tasks did you become better or worse…), we will film you while you complete the tasks. This procedure has proved to ameliorate the analysis of the problem-solving process and allows for detailed feedback. After we have finished the experiment, you will receive individual feedback that you can use to develop your problem-solving strategies.

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Table 1

Means (and standard deviations) for the main variables depending on achievement goals condition

Measure	Performance-approach goals condition	Performance-avoidance goals condition	Learning goals condition
Perceived competence	3.63 (0.46) [a]	3.49 (0.66) [a]	3.63 (0.55) [a]
Achievement at Time 1	7.18 (2.04) [a]	7.00 (2.68) [a]	7.24 (2.52) [a]
Achievement at Time 2	9.35 (1.97) [a]	7.74 (2.10) [b]	8.87 (2.34) [a]
Perceived effort expenditure	3.18 (0.55) [a]	3.10 (0.55) [a]	3.03 (0.57) [a]
Negative self-related thoughts	2.81 (0.91) [a]	3.44 (1.11) [b]	2.76 (1.16) [a]

Within each dependent measure, means not sharing common superscripts are statistically significantly different from each other ($p < .05$ at minimum; Fisher's least statistically significant difference test).

Table 2

Summary of regression analyses testing perceived competence as a moderator of the relation between goal condition and achievement at Time 2

| Predictor	B	SE B	β	t	p
Achievement at Time 2					
Performance-approach vs. performance-avoidance goals contrast	0.56	0.26	.21	2.18	.03*
Perceived competence	-0.08	0.22	-.04	-0.37	.71
Performance-Approach vs. Performance-Avoidance Goals Contrast x Perceived Competence	-0.13	0.26	-.05	-0.48	.63
Achievement at Time 1	0.50	0.21	.22	2.42	.02*
Negative self-related thoughts	-0.89	0.22	-.40	-4.07	.01*
$F (5, 81) = 7.80$; $p < .01$; $R^2 = .33$)					
Achievement at Time 2					
Performance-approach vs. learning goals contrast	0.27	0.26	.10	1.04	.30
Perceived competence	-0.05	0.22	-.02	-0.21	.83
Performance-Approach vs. Learning Goals Contrast x Perceived Competence	-0.16	0.29	-.05	-0.54	.59
Achievement at Time 1	0.50	0.21	.22	2.36	.02*
Negative self-related thoughts	-1.01	0.22	-.45	-4.61	.01*
$F (5, 81) = 6.78$; $p < .01$; $R^2 = .30$)					
Achievement at Time 2					
Performance-avoidance vs. learning goals contrast	0.29	0.26	.11	1.10	.27
Perceived competence	-0.04	0.22	-.02	-0.19	.85
Performance-Avoidance vs. Learning Goals Contrast x Perceived Competence	-0.01	0.24	-.01	-0.03	.98
Achievement at Time 1	0.49	0.21	.22	2.33	.02*
Negative self-related thoughts	-0.95	0.23	-.43	-4.22	.01*
$F (5, 81) = 6.76$; $p < .01$; $R^2 = .29$)					

* $p < .05$.
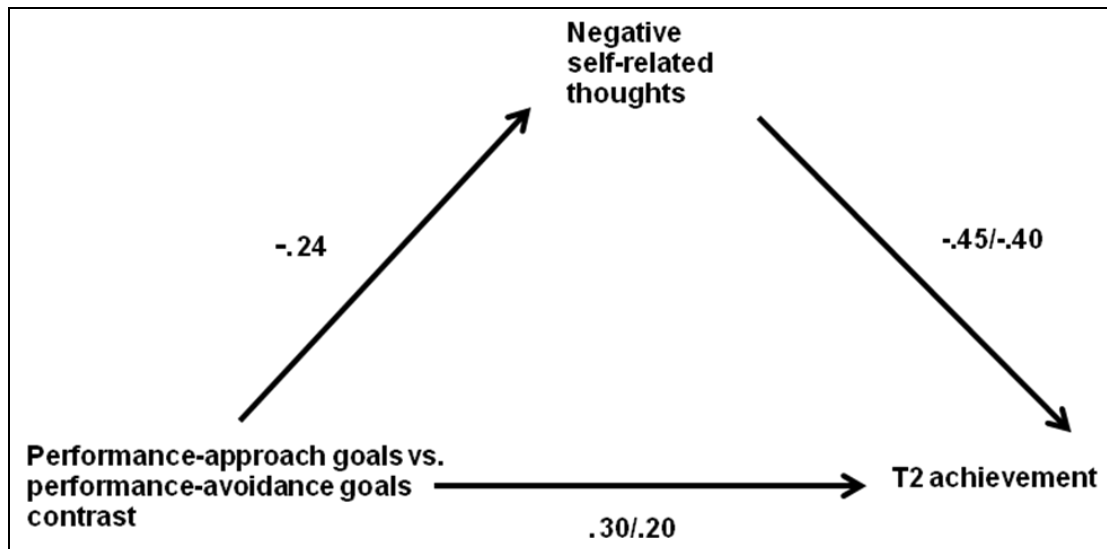
Fig. 1a. Path coefficients for mediation of performance-approach goals versus performance-avoidance goals contrast (performance-approach goals condition = + 1, performance-avoidance goals condition = - 1) and T2 achievement (after failure) after controlling for T1 achievement. For paths with two coefficients, the first value of the path represents the results for single prediction of the respective variable, that is, only negative self-related thoughts (or performance-approach goals versus performance-avoidance goals contrast) and T1 achievement as a control variable predicting T2 achievement; the second value represents the results for multiple predictions, that is, negative self-related thoughts, T1 achievement as a control variable and performance-approach goals versus performance-avoidance goals contrast predicting T2 achievement.
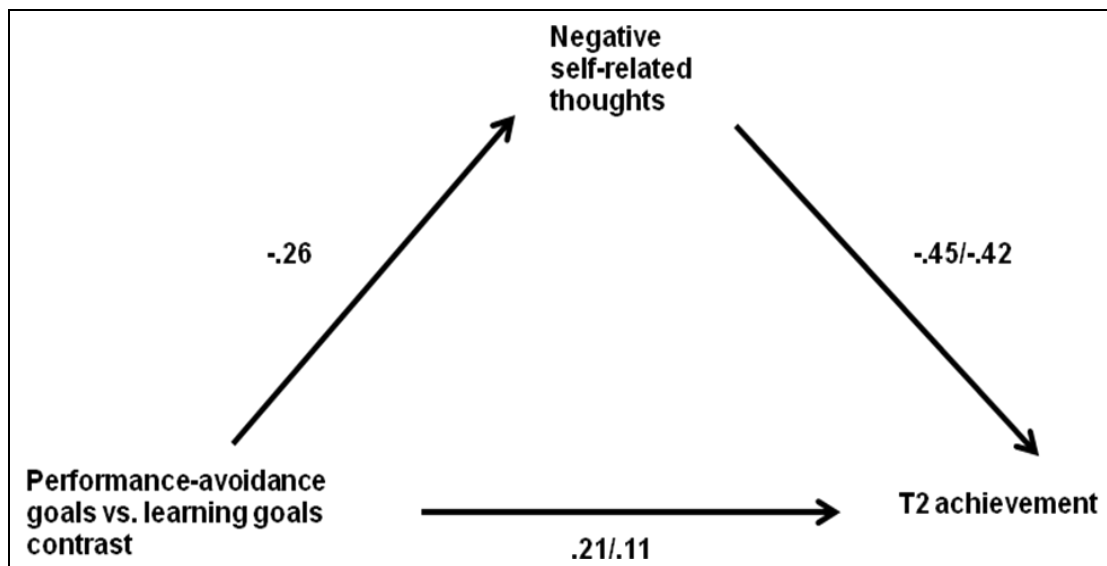

Fig. 1b. Path coefficients for mediation of performance-avoidance goals versus learning goals contrast (learning goals condition = + 1, performance-avoidance goals condition = - 1) and T2 achievement (after failure) after controlling for T1 achievement. For paths with two coefficients, the first value of the path represents the results for single prediction of the respective variable, that is, only negative self-related thoughts (or performance-avoidance goals versus learning goals contrast) and T1 achievement as a control variable predicting T2 achievement; the second value represents the results for multiple predictions, that is, negative self-related thoughts, T1 achievement as a control variable and performance-avoidance goals versus learning goals contrast predicting T2 achievement.