

Goals and responses to failure: Knowing when to hold them and when to fold them

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Abstract The ability to disengage from hopeless situations is critical to goal attainment and effective self-regulation. Two experiments investigated the effects of striving to attain success (approach goals) versus striving to avoid failure (avoidance goals) on persistence. Participants completed anagrams designed so that less persistence during an initial set of unsolvable anagrams was beneficial. In Study 1, participants reported how motivated they were by approach and avoidance goals. In Study 2, participants were primed to set approach or avoidance goals. Participants with avoidance goals persisted longer during failure, with more intense and enduring emotional distress, than those with approach goals. Greater anger predicted spending more time on subsequent unsolvable anagrams and accounted for differences in persistence. The results suggest that people with approach goals are better able to identify when they should disengage during failure, and disengage more completely, than people with avoidance goals.

Keywords Emotion · Goals · Approach · Avoidance · Failure

Introduction

According to conventional wisdom accomplishing goals depends on accurately discriminating situations that will lead to success from those that are doomed to failure. In addition to the poker truism “you got to know when to hold ‘em and know when to fold ‘em,” many folk sayings stress the importance of accurate assessments of the likelihood of success. The most common may be a statement referred to as the serenity prayer: “grant me the strength to change what I can, the courage to accept what I cannot, and the wisdom to know the difference.” Despite folk acknowledgment of the importance of such wisdom, people frequently persist in pursuing goals that are unlikely to succeed or that are unattainable. This persistence can waste time and resources better spent on attainable goals and lead to negative emotions such as disappointment and anger. The focus of this investigation was the conditions under which people continue pursuing goals despite repeated failure. Goals to avoid negative outcomes were expected to relate to more persistence and more negative emotions during a difficult task than goals to approach positive outcomes. In the following sections, we outline the importance of disengagement to success and reasons to expect that people with approach goals may more easily disengage during failure than people with avoidance goals. We then suggest that emotional reactions, particularly anger, may account for the relatively greater persistence of people focused on avoiding negative outcomes. We then describe two studies that assess the relationship of spontaneous and induced goals to persistence and emotional reactions.

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The value of disengagement

Persistence in the face of obstacles is generally seen as a virtue (Janoff-Bulman and Brickman 1982). For example, the health and performance benefits associated with optimistic outlooks have been attributed to persistence despite obstacles (Scheier and Carver 1993; Snyder et al. 1991). Similarly, the belief that one has control over situations, even if they are uncontrollable, is described as a positive illusion with benefits for well-being and health (Taylor and Brown 1988). Although persevering in difficult situations can lead to success, it can also lead to devastating failures. In fact, pursuing a goal that is unattainable may have more serious consequences than giving up too soon (Janoff-Bulman and Brickman 1982).

It is sometimes necessary to disengage from goals, even important ones, to preserve the resources and motivation needed to pursue alternate goals (Wrosch et al. 2003; Schulz and Heckhausen 1996). People who recognize repeated failure as a sign of defeat and switch careers, for example, will be more successful than people who persist in careers for which they lack the necessary ability. Disengagement is especially adaptive when situations are uncontrollable or goals are unattainable (Wortman et al. 1976; Heckhausen 1999). In such situations, the ability to disengage is associated with better health and well-being (Bower et al. 2003; Wrosch et al. 2003).

Whether persistence is adaptive is likely to depend on the likelihood that a goal can be attained or reinstated. Carver and Scheier (1998) discuss persistence despite obstacles within a broad theory of goal pursuit and self-regulation. They argue that, when goal pursuit is interrupted, people evaluate whether further effort will lead to goal attainment or whether the goal is unattainable and further effort is futile. People will increase their efforts and persist if they believe a goal is attainable, but decrease efforts and disengage if they believe a goal is unattainable. If people are to experience positive outcomes, they must be accurate when they assess the likelihood of attaining a goal. It may be this ability to discriminate, rather than sheer persistence, which leads to success. The question then becomes: what factors affect the ability to discriminate situations in which the best strategy is disengagement?

Goals and reactions to failure

Goals are likely to influence the ability to discriminate the best time to disengage because people compare their current situations to goals and this comparison motivates behavior (Elliot et al. 2006; Scherer 1999; see Austin and Vancouver 1996 for a review). Two types of goals, that have a powerful influence on behavior and emotion, are the

desire to approach a rewarding outcome and the desire to avoid a threatening outcome (Gray 1972; Shah et al. 1998; Lang 1995). These goals have been investigated both as dichotomous motivational states that are mutually inhibitory (e.g., Gray 1972; Lang 1995) and as continuous motivational states that can co-occur (e.g., Conroy et al. 2003). People who set approach goals are motivated by the potential for positive outcomes and emotions, whereas people who set avoidance goals are motivated by the potential for negative outcomes and emotions (e.g., Carver and White 1994; Gray 1972).

Past research has shown that approach goals generally lead to greater persistence and success than avoidance goals. Multiple studies have examined the effects of people's goals on their performance of challenging but tractable tasks such as taking tests or solving anagrams (unscrambling letters to form words). In these studies, people who focused on attaining success were more persistent and scored better than those who focused on avoiding failure (Dweck and Leggett 2000; Heckhausen 1982; Norman and Aron 2003; Sherman et al. 1981). Paradoxically, research shows that optimists, who tend to focus on potential positive outcomes, sometimes disengage faster during challenging tasks than people with less positive expectations. For example, Aspinwall and Richter (1999) had participants complete a task where less persistence would lead to greater success in the long run. They found that greater optimism tended to predict less persistence when participants had reason to expect that they could do better on subsequent tasks, although this relationship did not reach the standard level of significance. This study suggests that anticipating positive outcomes does not necessarily lead to persistence. The present investigation extends this work by examining the effects of goals for specific situations rather than general optimistic expectations. In addition, this investigation examines emotions as potential predictors of persistence.

Emotions and persistence

According to cognitive appraisal theories, emotions provide information about the status of current goals and the likelihood of goal attainment (e.g., Frijda 1987; Levine 1996; Scherer 1999). Emotions also lead to specific cognitive and behavioral tendencies that facilitate goal attainment (Frijda 1987; Lerner and Keltner 2001; Lench and Levine 2005). Thus emotions are likely sources of the motivation necessary to pursue goals and may vary depending on the type of goal being pursued.

Gray (1972) proposed that the approach system is consistently associated with positive emotions and the avoidance system is consistently associated with negative

emotions. Recently, Carver (2004) argued against this proposition. Carver proposed that emotions provide feedback about the status of goals on a continuum from doing well to doing poorly and thus negative emotions can exist in either system when progress toward goals is poor. He argued that happiness, sadness, and anger are related to approach motivation, whereas anxiety and relief are related to avoidance motivation. This argument is partially supported by evidence that sadness and depression are associated with the loss of a desired outcome and anxiety is associated with the threat of a negative outcome (Scherer 1999; Seligman et al. 1999). Also supporting Carver's (2004) suggestion, Higgins et al. (1997) gave participants either an approach goal ("try to attain success") or an avoidance goal ("try to avoid failure") and then assigned them to succeed or fail at a laboratory task. Participants with an approach goal experienced sadness when they failed and happiness when they succeeded. Participants with an avoidance goal experienced anxiety when they failed and calmness when they succeeded. Using an individual difference measure, Carver (2004) found that after failure, higher approach scores predicted greater anger and sadness, whereas higher avoidance scores predicted greater anxiety. At first blush, these studies appear to contradict Gray's conceptualization that approach goals should engender positive emotion and avoidance goals should engender negative emotion. However, both of these studies examined emotion after goals had already succeeded or failed rather than in the midst of goal pursuit. During goal pursuit, where people place their attention may determine their emotional experience. People motivated by avoidance goals attend longer to negative information and have more difficulty diverting their attention compared to people motivated by approach goals (Derryberry and Reed 1994). The present investigation assessed emotion during goal pursuit. We expected approach goals to be associated with more intense positive emotions and avoidance goals to be associated with more intense negative emotions.

Once elicited, specific emotions generate action tendencies for particular behaviors (Frijda 1987). Little research has addressed how fleeting emotional reactions to failure influence behavioral persistence as opposed to more lasting states such as optimism or trait anxiety. The threat of goal failure can elicit a range of discrete negative emotions such as anger, sadness, shame, and anxiety (e.g., Scherer 1999) but feelings of anger are especially likely to be associated with persistence. Anger, sadness, anxiety, and happiness were included in the present investigation because these emotions have been linked to approach or avoidance goals (Carver 2004) and because these emotions relate to discrete cognitive and behavioral tendencies (Frijda 1987; Lerner and Keltner 2001). Although negative emotions frequently co-occur in response to negative

situations and are correlated, each emotion is associated with specific behavioral tendencies.

People experience anger during negative experiences when they perceive that there is an obstacle to goal attainment that could be overcome with additional effort (Carver 2004; Frijda 1987; Levine 1996). This aversive situation, where people want something they cannot get, consistently elicits anger (Berkowitz and Harmon-Jones 2004; Levine 1995). Thus, the causes of anger are negative experiences that are more likely to be perceived by people with avoidance goals who focus on negative experiences. Anger also has consequences for action and these consequences relate to the fact that anger engenders approach motivation to attempt to overcome the obstacles that prevented goal attainment (Frijda 1987; Harmon-Jones 2004; Harmon-Jones et al. 2006). In sum, anger is caused by negative experiences that are more likely to be perceived by people with avoidance goals, but results in approach behaviors to overcome obstacles and was expected to relate to persistence in the present investigation.

The relationship of goals to persistence has typically been studied in situations likely to result in success. Approach goals in these situations are associated with greater persistence in the face of obstacles and avoidance goals are associated with less persistence (for a review in the achievement domain, see Dweck 1999). For example, students with approach goals to master a task or perform well persisted longer in studying and performed better than students with avoidance goals to avoid performing poorly (Elliot et al. 1999). Frequently, however, disengagement would be the best strategy in order to save the resources and motivation needed for other pursuits that are more likely to succeed. Little is known about persistence in such situations. The present investigation examined the effects of goals on persistence in a situation with a low probability of success. Based on evidence that people focused on positive outcomes recognize situations that are unlikely to result in success and theory that suggests those with avoidance goals will experience more anger, we predicted that those with avoidance goals would persist longer during an unsolvable task than people with approach goals.

The present investigation

In two studies, participants had a limited amount of time to complete three sets of anagrams (i.e., words to unscramble). The first set, which was unsolvable, was followed by two solvable sets. The unsolvable set was given first so that all participants had the same initial experience with failure. The anagram task was designed to yield better overall results if participants were less persistent trying to solve the first set of unsolvable anagrams, saving time for later sets

(Aspinwall and Richter 1999). Participants were told that each set of anagrams measured a different type of verbal intelligence. Thus, even if they did poorly on the first set, they could expect to do better on the second and third sets. We assessed how long participants persisted on each anagram before moving on to the next anagram. For the purpose of this study, “disengagement” from a specific anagram was operationalized as the point at which participants forwarded to the next anagram. This definition is not without limitations because even people who behaviorally stop pursuing a goal may continue to value the goal (Wrosch et al. 2003). Moving on to the next anagram was not a perfect measure of ceasing to value the goal, but provided a simple observable measure of disengaging efforts toward the goal of solving each anagram. Two studies were conducted to examine the relations among both spontaneous and induced goals and persistence. In Study 1, participants reported the extent to which they were motivated by approach or avoidance goals. In Study 2, participants were randomly assigned to conditions in which they were primed to set approach or avoidance goals. Predictions were as follows:

Prediction 1: Participants with avoidance goals were expected to persist longer on the unsolvable anagrams than participants with approach goals. Goals may have a stronger impact on persistence after repeated failure and an interaction was possible, such that the difference in persistence between participants with approach and avoidance goals would be more pronounced on later versus earlier anagrams.

Prediction 2: Participants with avoidance goals were expected to experience more intense negative emotions during failure than participants with approach goals.

Prediction 3: The negative emotion of anger was expected to predict persistence. Anger was also expected to account for the greater persistence of participants with avoidance goals compared to those with approach goals. In other words, anger was expected to partially mediate the relationship between goals and persistence.

Study 1

Method

Participants

Participants were 82 college students who received partial course credit through their psychology courses. Four participants were excluded due to computer failure and missing data. Participants' average age was 21 years ($SD = 2.4$ years) and 66% were female. Year in school

ranged from one to six years ($M = 2.92$, $SD = 1.21$) and participant GPA ranged from 1.50 to 3.94 ($M = 3.11$, $SD = 0.46$).

Participants were told that the purpose of the study was to examine verbal intelligence. This deception was utilized to reduce experimenter demand effects and provide a plausible cover story for the experimental tasks. During debriefing, only four participants reported suspicions that the anagrams were not solvable (two additional participants noted that the first set was discouraging).

Procedure

Participants completed a demographics form, an initial mood scale, and rated their goals and expectations for the anagram task. They then completed three sets of anagrams and rated their current emotional state after each anagram.

Initial mood scale In order to assess whether participants differed in their initial emotional state, participants completed a brief mood scale, rating how intensely they felt five emotional states on a scale ranging from “not at all” (1) to “extremely” (7). Two synonyms were provided for each state: happy/glad, sad/discouraged, angry/frustrated, anxious/worried, and relieved/calm. Because participants' ratings of relief were nearly identical to their ratings of happiness throughout the study, ratings of relief are not considered further.

Anagram task Participants were then informed that they would complete anagrams. A 25-min time limit was given for completion of the anagrams to make it clear that there was a limited resource. They were told that they would complete three sets of anagrams, each of which was designed to measure a different form of verbal intelligence. Thus participants could reasonably expect that they might do better on some sets than others, although they were not explicitly told this. The anagram task, adapted from Aspinwall and Richter (1999), contained five letter anagrams. Moderately difficult anagrams were chosen based on pilot testing, with the requirement that 50–60% of pilot participants solved the anagram correctly. Anagrams were presented on a computer and participants recorded their answers on paper. Participants could move to the next anagram at any time by clicking a “next question” button. Participants could not return to skipped questions and had to completely disengage from the goal of solving the anagram to move forward. Participants were presented with seven unsolvable anagrams, followed by two sets of seven solvable anagrams. The task was designed to be relevant to college students who typically value learning and intelligence. No feedback was provided during the anagram task and the consent form indicated that data would be confidential.

Goal assessment Participants answered four questions about their goals during the anagram task. Specifically, participants rated on 7-point scales the extent to which they wanted to get answers correct and wanted to succeed on the anagrams. These two questions were combined to form a measure of approach goals ($\alpha = .81$). Participants also rated the extent to which they wanted to avoid errors and wanted not to fail on the anagrams. These two questions were combined to form a measure of avoidance goals ($\alpha = .63$). Each participant was also coded as having either an approach ($n = 57$) or avoidance goal ($n = 25$) based on the goal that the participant primarily endorsed. Participants were considered to primarily endorse a particular goal when their mean endorsement for that goal was greater than mean endorsement for the other goal. This distinction is based upon theoretical propositions and empirical evidence that one goal or the other is primarily endorsed in specific situations (e.g., Gray 1972; Lang 1995).

Expectations Because optimism has been related to disengagement from unsolvable tasks (Aspinwall and Richter 1999), measures of optimism were included. Participants completed the Revised Life Orientation Test (LOT-R; Scheier et al. 1994), a measure of optimism. On this measure, participants answered six questions about their future expectations, three reverse scored, on a scale ranging from 0 to 4 ($\alpha = .66$). Participants also reported how many anagrams they expected to solve overall (out of 21 anagrams) and rated how they thought they would perform compared to other college students on a scale ranging from *much worse than average* (1) to *much better than average* (7).

Persistence A computer program presented all materials and timed participants' responses (Jarvis 2004). The time participants spent on each anagram was assessed as well as the total amount of time spent on the first set of unsolvable anagrams before advancing to the second set.

Emotion assessment Participants rated the intensity of their current emotions, after each anagram, on a scale ranging from "not at all" (1) to "extremely" (7). Participants were instructed to: "rate your current level of" each emotion. The emotions (with two synonyms provided for each) were: happy/glad, sad/discouraged, angry/frustrated, and anxious/worried. These specific emotions were included because they have been proposed to relate differentially to approach and avoidance goals (Carver 2004) and prior research has demonstrated that they relate to different cognitive and behavioral tendencies (Frijda 1987; Lerner and Keltner 2001). Participants' current emotion, not specific reactions to the anagram task, was

relevant because it is momentary emotion that frequently influences behavior (e.g., Lerner and Keltner 2001). Participants were instructed that they would have 25 min to complete the anagrams and that time spent rating emotions would not count toward this time. Because of programming limitations, however, this was not possible to execute and the time required to rate emotions counted toward the total time allotted for the anagrams. To compensate for this time, participants were allowed 30 min to complete the anagram task.

Results and discussion

Results are organized in three sections. First, we examined whether approach and avoidance goals predicted participants' persistence during failure (time spent on the first set of unsolvable anagrams). Second, we examined the relation of approach versus avoidance goals to emotions during failure. Third, we investigated whether the emotions participants experienced during failure predicted their persistence. Table 1 presents a correlation matrix of the primary Study 1 variables. As shown, approach goals were negatively correlated with persistence and avoidance goals were negatively correlated with happiness and positively correlated with sadness, anger, and anxiety. Approach versus avoidance goals were negatively correlated with persistence and sadness, anger, and anxiety. Happiness was negatively correlated with all negative emotions and all of the negative emotions were positively correlated with one another.

Persistence during failure (Prediction 1)

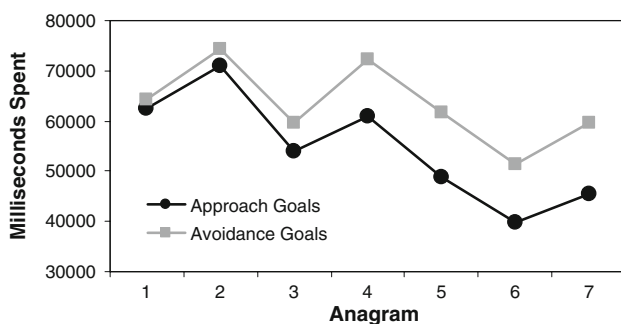
Did participants with avoidance goals persist longer during failure than participants with approach goals? Figure 1 illustrates the time spent on each anagram by participants with approach and avoidance goals. We conducted a repeated-measure ANOVA with time spent on the six anagrams in the unsolvable first set as the repeated measure and goal type (approach, avoid) as the between-subject factor. Time spent on the first anagram was excluded because participants had not yet experienced failure. We found a main effect of anagram, $F(5, 400) = 18.24$, $p < .001$. There was fluctuation in the amount of time participants spent on each anagram (likely due to some combinations appearing more solvable) and a slight though nonsignificant trend for participants to spend less time on successive anagrams (M seconds on anagrams consecutively = 72.57, 56.92, 66.64, 55.32, 45.63, 52.43). Contrary to Prediction 1, there was no significant effect of goal type on persistence, although participants with avoidance goals spent marginally more time on the

Table 1 Correlation matrix of Study 1 variables

	2	3	4	5	6	7	8
1. Approach goals	.17	.52***	-.28*	.13	.08	.13	-.01
2. Avoidance goals	–	-.52***	.19 [†]	-.22*	.46***	.41***	.41***
3. Approach versus avoidance goals		–	-.13	.12	-.29**	-.23*	-.32**
4. Persistence			–	-.11	.16	.15	.25*
5. Happiness				–	-.54***	-.49***	-.42***
6. Sadness					–	.85***	.78***
7. Anger						–	.75***
8. Anxiety							–

Note: Persistence indicates the time spent on the first set of unsolvable anagrams and the emotion terms indicate average emotion ratings during the first set

* $p < .05$, ** $p < .01$, *** $p < .001$, [†] $p < .10$

**Fig. 1** Time spent during failure in Study 1

anagrams ($M = 65.16$) than participants with approach goals ($M = 54.10$), $F(1, 80) = 3.16$, $p = .08$. These effects were qualified by an interaction between anagram and goal type, $F(5, 400) = 2.19$, $p = .05$. Consistent with Prediction 1 and as shown in Fig. 1, participants with approach goals spent less time than participants with avoidance goals attempting to solve anagrams later in the set.

Goals were dichotomized in Study 1 because theoretical models and empirical evidence suggest that approach and avoidance motivations are mutually exclusive and unlikely to be simultaneously activated (e.g., Gray 1972; Lang 1995). Approach and avoidance goals are sometimes considered as two separate constructs (e.g., someone highly motivated to do well in school might hold approach goals to do well and at the same time hold avoidance goals to avoid failing in the course). We therefore also conducted regression analyses with approach goals and avoidance goals entered simultaneously as two separate continuous predictors. The results of these analyses were consistent with those reported above. Specifically, the predictors (approach goals, avoidance goals) accounted for significant variance in the time spent on the anagrams, $R^2 = .06$, $F(2, 79) = 4.76$, $p < .05$. Approach goals predicted less time spent on the unsolvable anagrams, $\beta = -.27$, $t = -2.26$,

$p < .05$ and avoidance goals did not predict time spent, $\beta = .02$, $t = .17$, *n.s.*

Because optimism has previously been related to disengagement from unsolvable tasks (Aspinwall and Richter 1999), we also conducted regression analyses with optimism as a predictor of time spent on the first set of unsolvable anagrams. Optimism did not predict the time that participants spent on the first set of unsolvable anagrams, $R^2 = .01$, *n.s.* This finding contrasts with previous findings reported by Aspinwall and Richter (1999). Because trait measures may not be as predictive of behavior in specific situations as measures related to the situation, we also examined participants' optimism concerning the anagrams. Time spent on the first unsolvable set of anagrams was not predicted by how many anagrams participants expected to solve, $R^2 = .00$, or how they thought they would do on the task in comparison to other students, $R^2 = .01$. These expectations were not related to any study variables.

Emotions during failure (Prediction 2)

Did participants with approach and avoidance goals differ in their emotional responses to failure? Before beginning the anagram task, the emotions of participants who set approach and avoidance goals did not differ, $t_s < 1.32$, $p_s > .19$. As participants became involved with the task, however, differences quickly emerged. Figure 2 shows participants' emotion ratings following each of the seven unsolvable anagrams. Consistent with Prediction 2, participants who primarily endorsed approach goals continued to experience more positive emotions than negative emotions across all seven unsolvable anagrams (Fig. 2, top). In contrast, participants who primarily endorsed avoidance goals began to experience more negative emotions than positive emotions as they failed on unsolvable anagrams (Fig. 2, bottom). Next, we statistically examined these relationships. Independent sample *t*-tests were conducted

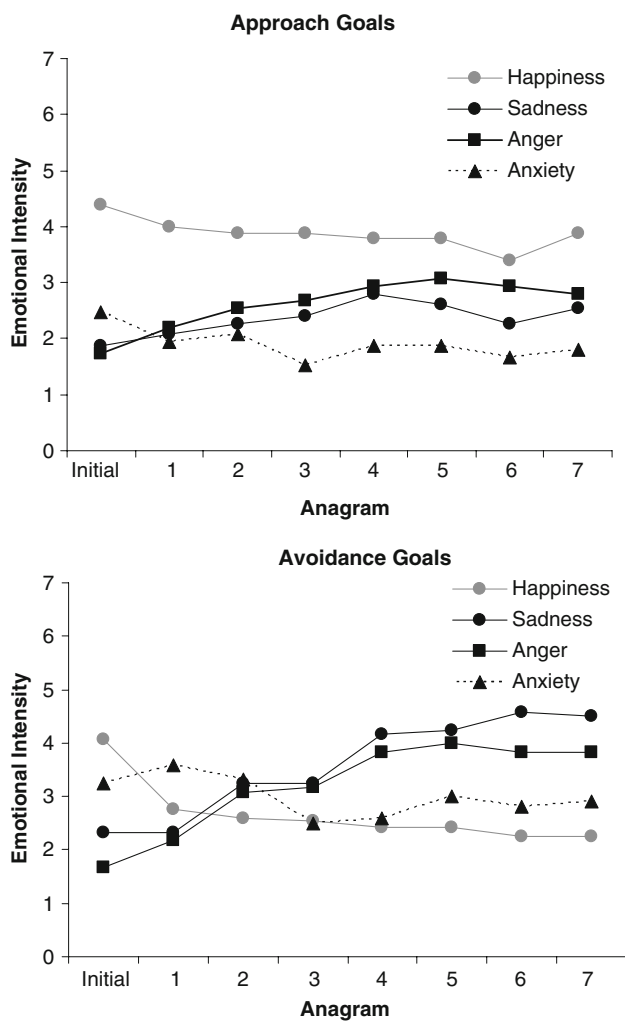


Fig. 2 Positive and negative emotions during failure in Study 1

on each emotion averaged over the first set of anagrams. As shown in Table 2 and consistent with Prediction 2, approach goals were associated with less sadness, anger, and anxiety over the unsolvable anagrams compared to avoidance goals.

As in the previous section, we also conducted regression analyses that included approach goals and avoidance goals as continuous predictors of emotions. Approach goals predicted greater happiness and avoidance goals predicted

Table 2 Study 1 means and standard deviations for emotional intensity across the first set of unsolvable anagrams

Emotion	Approach	Avoidance
Happiness	2.60 (1.41)	2.24 (1.53)
Sadness	3.00 (1.40)	3.97 (1.64)*
Anger	2.97 (1.65)	3.82 (1.76)*
Anxiety	2.53 (1.64)	3.76 (1.80)**

* $p < .05$, ** $p < .01$

less happiness on the first set of anagrams, $R^2 = .06$, $F(2, 79) = 4.27$, $p < .05$ (approach $\beta = .33$, $t = 2.72$, $p < .01$, avoidance $\beta = -.31$, $t = -2.57$, $p < .05$). Approach goals also predicted less sadness whereas avoidance goals predicted greater sadness during the anagrams, $R^2 = .14$, $F(2, 79) = 10.36$, $p < .001$ (approach $\beta = -.24$, $t = -2.14$, $p < .05$, avoidance $\beta = .51$, $t = 4.46$, $p < .001$). Approach goals did not significantly predict anger, but avoidance goals predicted greater anger during the unsolvable anagrams, $R^2 = .09$, $F(2, 79) = 6.19$, $p < .01$ (approach $\beta = -.12$, $t = -0.98$, $n.s.$, avoidance $\beta = .38$, $t = 3.22$, $p < .01$). Approach goals predicted less anxiety whereas avoidance goals predicted greater anxiety while working on the anagrams, $R^2 = .09$, $F(2, 79) = 6.67$, $p < .01$ (approach $\beta = -.28$, $t = -2.38$, $p < .05$, avoidance $\beta = .43$, $t = 3.65$, $p < .001$). In sum, these analyses were consistent with those reported above for the dichotomized goal variable.

Two potentially related variables were also examined. First, overall motivation may explain the effects of goals on behavioral and emotional reactions, with highly motivated participants reporting greater approach or avoidance goals and reacting strongly to failure. Second, participants who expected to do well on the anagrams may have reported approach goals and those who expected to do poorly may have reported avoidance goals. The findings remained identical when controlling for overall motivation (average intensity of both approach and avoidance goals), total number of anagrams solved, and participants' rating of how they would do on the anagrams compared to the average student. The alternate explanations outlined, therefore, are not viable.

The effects of emotion on persistence (Prediction 3)

Analyses thus far demonstrated that participants with approach and avoidance goals differed in how much time they spent on the first set of unsolvable anagrams and in how they felt during failure. Next we were interested in determining whether participants' emotions were related to the amount of time they spent on the anagrams. Contrary to Prediction 3, average emotions did not predict the average time that participants spent on the first set of unsolvable anagrams. Most participants in Study 1 set approach goals and participants with approach goals reported more happiness than other emotions (see Fig. 2). For these reasons, our ability to detect effects related to anger may have been reduced in Study 1 because of the small sample size that experienced relatively intense anger. The second part of Prediction 3 indicates that anger should partially mediate the relationship between goals and time spent on the anagrams. The Sobel test for this analysis was not significant, but may be conservative in small samples and thus we also

calculated the proportion of reduction in the beta between goals and persistence on the last anagram in the unsolvable set. The proportion of reduction was 10%, from $\beta = .21$ to $\beta = .19$. This examination suggested that anger partially mediated the relationship between goals and persistence, although this relationship should be interpreted cautiously.

Summary

Results from Study 1 indicated that approach and avoidance goals predicted the time spent on unsolvable anagrams. In addition, participants with avoidance goals experienced more intense negative emotions during failure than those with approach goals. However, participants in this study reported their goals for the anagram task. Thus it was not possible to establish the direction of causation in Study 1. Study 2 examined the influence of manipulated goals on persistence and emotions during the same difficult task.

Study 2

Overview

Study 2 addressed issues of causality and group size by randomly assigning participants to be given approach or avoidance goals for the anagram task. Participants in the avoidance condition were expected to persist longer on the first set of unsolvable anagrams and experience more intense negative emotions, than participants in the approach condition. The negative emotion of anger was expected to account for differences in persistence.

Participants

Participants were 100 college students who received partial course credit for taking part in the study. Thirteen participants were excluded because computer failure led to missing data. Participants' average age was 21 years ($SD = 4.2$ years) and the sample was 73% female. Year in school ranged from one to seven years ($M = 2.85$, $SD = 1.37$) and participant GPA ranged from 1.80 to 4 ($M = 3.10$, $SD = 0.46$). As in Study 1, participants were led to believe that the purpose of the study was to examine verbal intelligence and educational techniques. Only four participants expressed suspicion that the anagrams were not solvable during debriefing.

Procedures

The procedure was identical to that described in Study 1 with the exception that goals were manipulated.

Participants completed the mood scale described in Study 1. They were then told that they would have 25 min to solve three sets of anagrams that measured three different forms of verbal intelligence. The first set was not solvable. Participants could stop working on an anagram at any time, but could not return to skipped anagrams. Between each anagram, participants rated their emotions using the scale described in Study 1 and a software program recorded the time that they spent on each anagram (Jarvis 2004).

Induced approach or avoidance Participants were randomly assigned to one of two conditions. In the Approach condition ($n = 50$), participants were introduced to the anagrams as, “the three sets of anagrams measure your *strengths* on three different forms of verbal intelligence” (emphasis added). In addition, these participants were instructed to “try to attain success” immediately before beginning the anagram task. In the Avoidance condition ($n = 50$), participants were introduced to the anagrams as, “the three sets of anagrams measure your *weaknesses* on three different forms of verbal intelligence” (emphasis added) and participants were told to “try to avoid failure” immediately before beginning the anagrams. This method has been shown to encourage approach and avoidance goal setting, respectively (Higgins et al. 1997). These instructions were given within a set of instructions about the task and the computer program read by an experimenter.

Goal assessment The same questions asked in Study 1 about goals were used as a manipulation check in Study 2 after participants completed the anagram task. Participants in the approach goal condition reported greater approach goals ($M = 6.12$, $SD = 0.97$) than participants in the avoidance condition ($M = 4.20$, $SD = 1.28$), $t(98) = 8.46$, $p < .001$. Participants in the avoidance condition reported greater avoidance goals ($M = 5.67$, $SD = 1.15$) than participants in the approach condition ($M = 4.27$, $SD = 1.07$), $t(98) = 6.33$, $p < .001$. Thus, the goal manipulation was effective.

Results and discussion

Results are organized in three sections. First, we examined the effects of goals on persistence during failure. Second, we investigated the effects of goals on emotional responses to failure. Third, we examined whether emotions accounted for the effects of goals on participants' persistence on the unsolvable anagrams. Table 3 presents a correlation matrix of study variables. As shown, approach versus avoidance

Table 3 Correlation matrix of Study 2 variables

	2	3	4	5	6
1. Approach versus avoidance goals	-.25*	.22*	-.30**	-.30**	-.36***
2. Persistence	-	-.06	.20*	.26**	.19 [†]
3. Happiness		-	-.41***	-.44***	-.45***
4. Sadness			-	.77***	.70***
5. Anger				-	.71***
6. Anxiety					-

Note: Persistence indicates the time spent on the first set of unsolvable anagrams and the emotion terms indicate average emotion ratings during the first set

* $p < .05$, ** $p < .01$, *** $p < .001$, [†] $p < .10$

goals were negatively correlated with time and negative emotions and positively correlated with happiness. Happiness was negatively correlated with all negative emotions and all negative emotions were positively correlated with one another.

Persistence during failure (Prediction 1)

Did participants with avoidance goals persist longer in pursuing a failing goal than participants with approach goals? To investigate this possibility, we conducted a repeated-measure ANOVA with time spent on the six anagrams in the unsolvable first set as the repeated measure and condition as the between-subject factor. Time spent on the first anagram was excluded from this analysis because participants had not yet experienced failure. We found a main effect of anagram, $F(5, 480) = 18.92$, $p < .05$. There was fluctuation on time spent on each anagram and a linear trend, $F(1, 398) = 8.99$, $p < .01$, for participants to spend less time on successive anagrams (M seconds on anagrams consecutively = 81.03, 61.27, 80.23, 56.52, 47.12, 52.11). A main effect of condition was found, $F(1, 96) = 4.34$, $p < .05$. Consistent with Prediction 1 and as shown in Figure 3, participants in the avoidance condition persisted an average of 18 s longer on

each anagram in the first set ($M = 73.14$, $SD = 44.91$) than participants in the approach condition ($M = 54.75$, $SD = 25.27$), indicating that participants spent nearly 10% of their allotted time trying to solve unsolvable problems, as in Study 1. No significant interaction was found between condition and anagram.

Emotions during failure (Prediction 2)

The next set of analyses assessed whether participants with approach and avoidance goals differed in their emotional responses to failure. Figure 4 shows participants' emotion ratings following each of the unsolvable anagrams. Participants in the approach condition clearly experienced emotional distress during the first set of anagrams, as demonstrated by the increase in negative emotions and decrease in positive emotions (Fig. 4, top). Yet participants in the avoidance condition experienced an even greater increase in negative emotions, reflecting their greater emotional distress during failure (Fig. 4, bottom), consistent with Prediction 2.

Next, we statistically examined these relationships. As shown in Part A of Table 4, independent t -tests revealed that participants in the approach and avoidance conditions differed in their initial (baseline) ratings of anxiety. Therefore, subsequent analyses controlled for initial emotions. ANCOVAs were conducted on the intensity of participants' average emotions during the first set of unsolvable anagrams. Condition (approach, avoidance) was entered as the between-subject factor, controlling for initial emotions. Consistent with Prediction 2 and as shown in Part B of Table 4, participants in the avoidance condition were more sad, $F(1, 96) = 7.19$, $p < .01$, angry, $F(1, 96) = 7.18$, $p < .01$, and anxious, $F(1, 96) = 9.43$, $p < .005$, than participants in the approach condition during the first set of unsolvable anagrams. Participants in the approach and avoidance conditions did not differ significantly in the intensity of happiness reported.

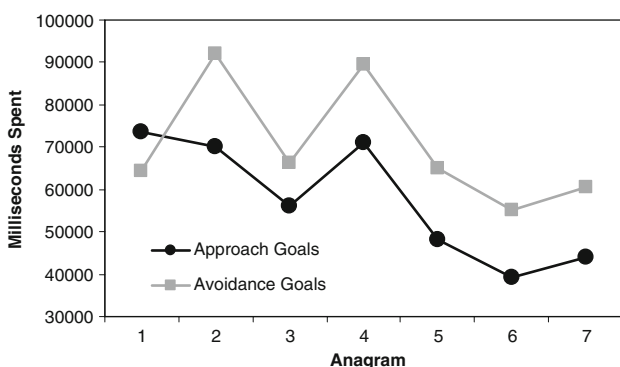


Fig. 3 Time spent during failure in Study 2

Effects of emotions on persistence (Prediction 3)

Next we examined whether the time participants spent on the anagrams was related to their emotions and whether emotions accounted for the relationship between goals and

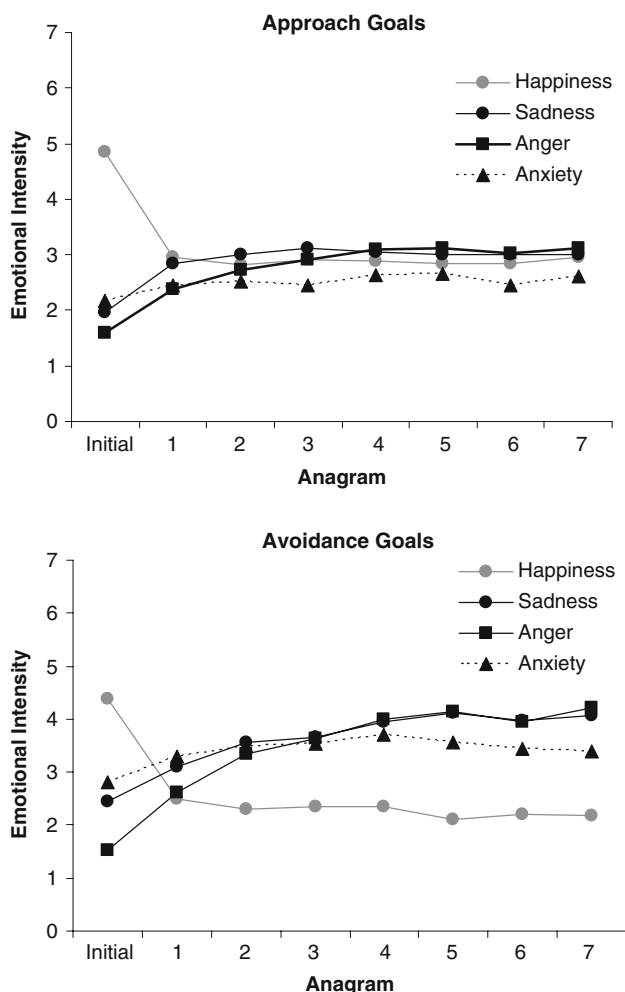


Fig. 4 Positive and negative emotions during failure in Study 2

Table 4 Study 2 means and standard deviations for emotional intensity across the first set of unsolvable anagrams

Emotion	Approach	Avoidance
(A) Initial (baseline) emotional intensity		
Happiness	4.86 (1.21)	4.38 (1.29)
Sadness	1.96 (1.22)	2.44 (1.30)
Anger	1.59 (1.26)	1.82 (1.45)
Anxiety	2.18 (1.27)	2.82 (1.45)*
(B) Average emotional intensity across the first set of unsolvable anagrams		
Happiness	2.85 (1.58)	2.24 (1.28)
Sadness	3.03 (1.40)	3.90 (1.46)**
Anger	3.10 (1.91)	4.21 (1.82)**
Anxiety	2.59 (1.43)	3.40 (1.72)*

Note: Significance values indicate that emotional intensity differed between participants in the approach and avoidance conditions

* $p < .05$, ** $p < .01$

persistence. To examine whether emotions predicted persistence, we conducted a regression analysis that included happiness, sadness, anger, and anxiety as simultaneous predictors of time spent on the first set of anagrams. Happiness ($\beta = .07$), sadness ($\beta = -.01$) and anxiety ($\beta = .04$) did not predict time spent. Consistent with Prediction 3, participants who were angrier spent more time on the first set of anagrams, $\beta = .29$, $t = 2.67$, $p < .01$. To examine the second portion of Prediction 3, we conducted a mediation analysis to determine if the effects of goals on persistence could be accounted for by anger. The results showed that participants in the avoidance condition, compared to participants in the approach condition, spent more time on the unsolvable anagrams, $\beta = .25$, $t = 2.52$, $p < .05$ and experienced more anger, $\beta = .28$, $t = 2.87$, $p < .01$. When anger was entered into the regression analysis, the association between goals and persistence no longer reached significance, $\beta = .18$, $t = 1.88$, $n.s.$, Sobel = 1.69, $p < .05$. Percent of beta for the total effect mediated by anger was also examined because the Sobel requires large samples. Anger accounted for 28% of the relationship between goals and persistence. Thus, anger partially mediated the relationship between avoidance versus approach goals and spending more time on unsolvable anagrams. Persistence on the anagrams varied over time, and thus we also examined whether anger on the sixth anagram predicted persistence on the seventh and last unsolvable anagram. The Sobel test was not significant, but anger on the sixth anagram accounted for 13% of the relationship between goals and persistence on the last unsolvable anagram.

Summary

The results of Study 2 demonstrated that participants with avoidance goals persisted longer in pursuing an unattainable goal and experienced more intense negative emotions during failure. Anger predicted greater persistence and anger mediated the relationship of goal type to persistence.

General discussion

When striving to reach goals, people are often faced with obstacles and must decide if they should persist or give up. If a goal is attainable with additional effort, then persistence can lead to success and perhaps to an even greater feeling of accomplishment because of the obstacles overcome. If a goal is not attainable, however, persistence can lead to wasted time and resources and perhaps to feelings of disappointment and decreased self-efficacy. In situations characterized by repeated failure, then, it is especially important that people be aware of how they are progressing and be willing to disengage when success is unlikely. This strategy permits people to save resources to pursue other, potentially attainable, goals (Wrosch et al. 2003; Schulz and Heckhausen 1996). The findings from the current studies demonstrate that the goals people set for a task influence their persistence during failure and their emotional reactions to failure. In both studies, participants who focused on avoiding negative outcomes persisted on the task whereas participants focused on attaining positive outcomes began to spend less time over the anagrams. Participants focused on avoidance also experienced more intense negative emotions than participants with approach goals. In Study 2, the greater anger experienced by participants with avoidance goals partially accounted for their greater persistence relative to participants with approach goals.

Persistence during failure

Relatively little is known about how goals relate to disengagement when success is unlikely (Shah 2005). In the present investigation, participants with avoidance goals spent more time on unsolvable anagrams than participants with approach goals. Because participants were told that each set of anagrams measured a different form of verbal intelligence, they could reasonably expect to do better on subsequent sets. It appeared to become clear to participants with approach goals that it was unlikely they would solve any of the anagrams in the first set. There was an interaction between goals and anagram in Study 1, reflecting the tendency of participants with approach goals to decrease persistence only after the second anagram, and a main effect of goals in Study 2. The pattern is similar across both studies and consistent with predictions, but may indicate a difference between spontaneously generated and induced goals. Past research has demonstrated that people with approach goals often persist on difficult tasks longer than people with avoidance goals (e.g., Dweck and Leggett 2000; Heckhausen 1982; Norman and Aron 2003; Sherman et al. 1981). Spontaneously generated approach goals may have led people to persist through the first few anagrams, consistent with this past research, before reducing their

effort. Participants with avoidance goals persisted in attempting the unsolvable anagrams after those with approach goals had moved on to the next set. Ironically, their focus on avoiding negative outcomes was associated with an inability to recognize that failure was inevitable and proceed to the next anagram.

Higgins and colleagues have shown that people motivated by approach goals generate alternative solutions and novel responses on a variety of creative tasks. In contrast, those motivated by avoidance goals tend to give repetitive solutions (Crowe and Higgins 1997; Friedman and Forster 2001). This lack of creativity may influence reactions to failure. Approach goals may lead to the generation of more alternate goal pursuit strategies than avoidance goals. An inability to generate alternate goal pursuit strategies would limit the ability of people with avoidance goals to disengage from a fruitless undertaking, as it would subjectively appear that their present strategy was their only opportunity to avoid failure. In contrast, people with approach goals are focused on success, and may be more likely to generate alternative ways to attain a goal, making it subjectively easier to disengage from a particular task during failure. In addition, goals may lead people to pay attention to different information and this attention may affect disengagement (Derryberry and Reed 1994). Specifically, people with avoidance goals may become focused on failure and unable to attend to other information. Future research should also examine the possibility that cognitive factors, such as expectations for success on the next task, may mediate the relationship between goals and persistence. It is interesting to note that the pattern of persistence across the anagrams was similar in the two studies, with participants persisting longer on some anagrams than others. The most likely explanation for this is that some anagrams appeared more solvable than others, but it is also possible that these differences reflect a pattern in motivational strength over time. Future research is needed to investigate this possibility.

Goals for a specific short-term situation were the focus of the present investigation. This approach contributes to understanding how specific goals influence behavior and emotions and allows insight into the ongoing process of self-regulation. In future research, it would be informative to investigate the influence of goals for specific situations within a larger context of individual differences in goal motivation. Kuhl (1992) has differentiated people who have a state orientation and focus on feelings from those who have an action orientation and focus on doing something about the situation. Another general motivation that has been identified is the tendency to strive for mastery (learning) or performance (impressing others) (e.g., Dweck 1999). It is likely that these general orientations influence whether people set approach or avoidance goals in various

situations and recent research suggests that people set mastery-approach, performance-approach, mastery-avoidance, and performance-avoidance goals for specific achievement situations (Conroy et al. 2003). Although it was not possible to determine whether participants set mastery or performance goals in the present investigation, it is likely that these goals also would influence persistence. It is also possible that these general orientations may interact with the short-term goals described in the present investigation to affect behavior. For example, people with avoidance goals who fail repeatedly over multiple situations may be especially likely to develop a state orientation focused on their own emotion.

Goals and emotions

The difficulty that participants with avoidance goals had disengaging was also demonstrated by their emotional reactions to failure. All participants experienced emotional distress during the first set of unsolvable anagrams. As participants continued to fail, however, clear differences emerged between participants with approach and avoidance goals and these differences remained across the task. Participants with avoidance goals reported more intense negative emotions during failure than participants with approach goals. The negative emotions experienced by participants with avoidance goals, particularly anger, may have encouraged even further their focus on solving the current anagram and hindered disengagement. As more time passed, participants with avoidance goals may have become increasingly negative about potential failure, more dedicated to finding the solution to a particular anagram and less able to disengage.

In the current research, approach goals were related to positive emotions and avoidance goals were related to negative emotions. This finding is consistent with proposals that these two types of goals are based on different biological systems (Gray 1972; see also Lang 1995). The system activated by approach goals is associated with positive emotions, which would motivate people to strive to attain the positive outcomes. In contrast, the system activated by avoidance goals is associated with negative emotions, which would motivate people to strive to avoid negative outcomes. The finding is also consistent with research suggesting that people focused on attaining positive outcomes in achievement situations experience more positive emotion and people focused on avoiding negative outcomes experience more negative emotion (see Dweck 1999, for a review).

This finding contrasts with recent proposals that approach and avoidance goals are associated with specific emotional reactions to success and failure. These proposals suggest that when approach goals are successful people

experience happiness and when approach goals have failed people experience sadness. In addition, when avoidance goals are successful people experience relief and when avoidance goals have failed people experience anxiety and/or anger (Carver 2004; Higgins et al. 1997). Models that postulate specific emotions related to approach versus avoidance goals have primarily been tested by examining people's reactions to success and failure feedback (Carver 2004; Higgins et al. 1997). Thus, goals may relate to specific emotions while receiving feedback about past goal pursuits. During active goal pursuits, however, such as those examined in the present investigation, approach and avoidance goals appear to be related to positively- and negatively-valenced emotion, respectively.

Emotions during failure

Although negative emotions are often associated with goal disengagement (Aspinwall and Leaf 2002; Snyder 1999), in the present study participants persisted longer when they experienced the negative emotion of anger. In Study 1, participants who set avoidance goals experienced more intense negative emotions, including anger, but these feelings did not significantly predict persistence. The fact that most participants in Study 1 set approach rather than avoidance goals, and that participants with approach goals felt mostly happy, may have reduced the ability to detect the effects of emotions. These effects were evident in Study 2, as anger was associated with greater persistence and partially accounted for the fact that participants with avoidance goals persisted longer than participants with approach goals.

Anger is an unusual emotion in the sense that it is evoked by the experience of a negative event but leads to approach-related behavior. People with avoidance goals are more attentive to negative information than people with approach goals (Derryberry and Reed 1994). Thus, people with avoidance goals may be particularly likely to experience anger and this is consistent with conceptualizations by Gray (1972) that people with avoidance motivations experience more negative emotion. Once it is elicited, however, anger leads to a tendency for approach action as people attempt to overcome the obstacles that prevented them from reaching goals (Frijda 1987). The findings of the present investigation suggest that avoidance goals are likely to lead to more intense anger than approach goals, but that anger leads to approach behaviors. Participants with avoidance goals in the present investigation experienced more anger and their anger partially accounted for their greater persistence, an approach behavior.

These findings have implications for theories of self-regulation more generally. Theories of self-regulation propose that people base their decision to persist in a goal

pursuit or disengage on their expectations that their current actions will result in success (e.g., Carver and Scheier 1998). The present findings add another dimension to this understanding of self-regulatory processes. Willingness to disengage from a current goal pursuit strategy may be related, not only to the perceived likelihood of success, but also to emotional reactions to failure.

Recommendations and limitations

This investigation extended previous research by focusing on the effects of approach and avoidance goals during repeated failure on a task where disengagement would lead to greater overall success. However, the best strategy is seldom so clearly recognizable. In addition, the effects of approach and avoidance goals may differ based on the situation. For example, when faced with an imminent threat to be avoided, people with avoidance goals may choose effective strategies more often than people with approach goals. It will be important, therefore, to examine the effects of approach and avoidance goals during a range of negative situations in the laboratory and naturally occurring settings. This investigation also extended previous research by examining whether emotions influence the association between goals and persistence. In the present investigation emotions were not experimentally manipulated independently of goals and therefore it was not possible to firmly establish the causal direction of the relationship between negative emotions and persistence. In order to evaluate the effects of emotions on persistence during failure, future studies should utilize direct manipulations. It would also be useful to identify whether participants set mastery or performance goals, as mastery approach goals may be more beneficial than other types of goals. It was not possible to differentiate whether participants set mastery or performance goals in the present investigation because participants could interpret doing well or avoiding doing poorly in multiple ways. For example, participants may have interpreted a call to do well as indicating that they should perform better than others (performance) or that they should do their best (mastery).

Conclusion

The present findings indicate that the ability to disengage from unattainable goals, and emotional reactions to failure, are directly related to whether people are focused on the potential success or failure of goals. Counterintuitively, people who focused on the potential failure of goals were less likely to recognize failure and persisted in their attempts to achieve an unattainable goal. Practically, these findings suggest that it may be possible to encourage success by teaching people to set appropriate goals. If people

could be taught to set approach goals before beginning a difficult task, the findings of this study indicate that they would ultimately be more successful, even if a goal is failing and it is time to fold a bad hand.

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