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THE NATURE OF APPROACH AND AVOIDANCE GOALS AND THEIR ROLE IN EFFECTIVE SELF-REGULATION

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ABSTRACT

THE NATURE OF APPROACH AND AVOIDANCE GOALS AND THEIR ROLE IN EFFECTIVE SELF-REGULATION

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Previous research has presented avoidance goals as bad for performance, especially in achievement settings. The dominant model asserts that avoidance goals impair performance because they tend to induce problematic cognitive processes (e.g., anxiety, negative outcome focus) that interfere with goal pursuits. The present research examined two variables (level of aspiration and boundary for success) that have been neglected in previous research and might further illuminate the nature of avoidance goals. The results of Study 1 showed that, counter to expectations, avoidance goals resulted in higher task performance when compared to approach goals, regardless of boundary for success. Study 2 investigated a possible explanation for this finding, examining the role of social comparison in approach and avoidance goals and showed that participants with avoidance goals set higher levels of aspiration than participants with approach goals but only when the task lacked a social comparison focus; when the task had a social comparison focus, the typical approach goal advantage was found.

To my parents, Geraldine and Andrew

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INTRODUCTION

Humans are fundamentally motivated to approach pleasure and avoid pain. These basic motivational tendencies are expressed throughout the lifespan from a baby's first cry for care to a chronically ill person's last request for relief. Research into the constructs of approach and avoidance has been extensive. In psychology, the work dates back to William James (1890), who wrote of pleasure and pain as "reinforcers" and "inhibitors," respectively. In fact, nearly all of the great thinkers in the field have touched on this basic distinction at some point in their careers (e.g., Lewin, Miller, Hull, McClelland, Atkinson, Maslow, Eysenck). The dominant view, expressed by researchers like Elliot (1999), asserts that approach motivation is responsible for the energization of behavior by positive (i.e., pleasing) stimuli, whereas avoidance motivation is responsible for the energization of behavior by negative (i.e., painful) stimuli (see also Elliot, 2008). Approach and avoidance motivation lead to the adoption of approach and avoidance goals (Elliot, 2006), and these goals symbolize a "concrete cognitive representation of a desired or undesired end state used to guide behavior," (Elliot & Thrash, 2002, p. 806).

The motivations to approach and avoid stimuli are rooted in biological systems and have persisted throughout evolutionary history because of their ability to aid human survival. The activation of the avoidance motivational system aids in escape from dangerous situations; the activation of the approach system encourages exploration and growth (Kenrick & Shiota, 2008). The inherent motivational tension is apparent: all organisms must go out and explore the world in order to find food and survive, but those organisms that are too bold and careless in their endeavors will suffer attack or predation, failing to survive and reproduce. Thus, both the approach and avoidance motivational

systems are important – in fact, necessary – for survival and optimal functioning.

However, research in the achievement motivation tradition (Cury, Elliot, Da Fonseca, & Moller, 2006; Elliot & McGregor, 2001) has suggested that avoidance motivation generally has negative consequences on performance when compared to approach motivation – via the adoption of performance avoidance goals. It has also been proposed that the adoption of avoidance personal goals is responsible for decreases in subjective well-being (SWB; Elliot & Sheldon, 1997; Elliot, Sheldon, & Church, 1997) and intrinsic motivation (Elliot & Church, 1997), especially in academic contexts. Generally, these negative consequences have been characterized as an inherent part of avoidance goals, insofar as avoidance goals induce problematic cognitive processes (e.g., anxiety and a focus on negative outcomes) that are associated with poor performance outcomes.

The negative effects of avoidance goals may seem somewhat counterintuitive given the fundamental and necessary role of avoidance motivation in adaptive functioning. Perhaps these apparent negative effects may be explained by the fact that previous research has focused exclusively on a relatively narrow range of situations in which approach goals are generally more beneficial than avoidance goals (i.e., growth situations). Furthermore, and more applicable to the present research, two important variables in the goal pursuit process have been neglected in past work on approach and avoidance: the *target criterion* at which people are aiming, that is, their *level of aspiration,* and the *boundary level* people set for determining when their goals have been attained (i.e., the level at which they will say "I have successfully attained my goal [either approaching success or avoiding failure] for this course"). Performance differences

between individuals who are predominately approach as opposed to avoidance motivated may be due to differences in one or both of these variables.

The purpose of the current research is to examine the role of both of these components in the goal pursuit process, as well as test whether the negative performance effects of avoidance goals are an inherent part of these goals or whether equating each goal in terms of some dimension (e.g., boundary level) can equate performance. Regarding boundary level, approach and avoidance goals may imply different boundary levels for success, with avoidance goals implying a low boundary for success and approach goals implying a high boundary for success in natural settings (as outlined in more detail below). This idea would suggest that by equating boundary level, it would be possible to equalize the performance outcomes of people with approach and avoidance goals. Alternatively, the negative effects of avoidance goals may be an inherent part of these goals, and this perspective suggests a different, competing hypothesis that avoidance goals may have an inherently bad quality that negatively affects performance even if boundary level is equated. That is, people with approach goals may strive to maximize their performance no matter what their lower boundary for success. People with avoidance goals, in contrast, may be aiming to just reach their minimum boundary for success. Even if minimizing is an inherent part of avoidance goals, it is still possible that good performance under avoidance goals may result. Level of aspiration is one variable that may explain when these good outcomes may occur. Before proceeding to the currently proposed studies, the basic issues outlined in this introduction will be further explored.

The Hierarchical Model of Motivation in the Achievement Context

In recent years, work concerning the approach/avoidance distinction in the achievement context has been especially fruitful (Elliot, 1999; Elliot & Thrash, 2001). Elliot has proposed and validated a hierarchical model of achievement motivation (Elliot & Thrash, 2002) explaining the relations between approach and avoidance motivation, approach and avoidance goals, and behavioral outcomes. In the model, approach and avoidance temperaments lead to the adoption of approach and avoidance goals, which lead to behavioral outcomes (see Figure 1). Temperament, in this context, means any broad, stable, early developing, and biologically-based disposition.

An approach temperament is defined by sensitivity to reward and positive affect, and an avoidance temperament is defined by sensitivity to punishment and negative affect. Approach goals specify movement toward a positive end state, whereas avoidance goals specify movement away from a negative end state – discrepancy reducing and enhancing, following Carver and Scheier's (2000) terminology. In this model, goals are the proximal predictors of behavior; temperament is a distal predictor. However, the model acknowledges that sometimes temperament can directly influence behavior. Approach and avoidance temperaments predict the adoption of approach and avoidance goals, respectively, but it has also been demonstrated that temperamentally avoidant people will sometimes use approach goals in service of their underlying avoidance motivation (i.e., approach to avoid, see Elliot & Church, 1997). For example, a person who is generally concerned with the possibility of negative outcomes (e.g., someone high in negative affect) can still utilize an approach goal (e.g., outperform others) as a means to fulfill this need to avoid unpleasantries.

The current research will focus on the latter half of Elliot's hierarchical model, the

goals-to-performance connection, specifically in the domain of achievement. It is acknowledged that temperamental processes play an important and interesting role in the selection of different goals, but it is the goals themselves that ultimately have proximal impact on behavior and performance outcomes. A focus on the goal-to-behavior link is worthwhile, additionally, because goals (levels of aspiration and boundaries for success, specifically) should be relatively malleable entities. In other words, levels of aspiration and boundaries for success are amenable to manipulation such that performance outcomes might be affected in an experimental context. In contrast, temperamental factors are viewed as relatively stable entities, implying that it would be difficult to affect these variables in an experimental setting. For example, it would be difficult to tell a temperamentally avoidance-oriented person to stop thinking about the world in avoidance terms. It would, however, be possible to instruct that person to adopt more ambitious levels of aspiration or higher boundaries for success, regardless of their temperamental focus on avoidance.

Effects of Adoption of Avoidance Goals in Achievement Contexts

Research on achievement goals has generally shown that the adoption of performance avoidance goals results in poorer outcomes compared to the adoption of performance approach goals. In these studies, students' adoption of approach and avoidance goals is measured by the Achievement Goals Questionnaire (Elliot & McGregor, 2001). An example of an approach goal item is "It is important for me to do well compared to others in this class," and an example of an avoidance goal item is "I just want to avoid doing poorly in this class." Several semester-long longitudinal studies (e.g., Church, Elliot, & Gable, 2001; Cury, Elliot, Da Fonseca, & Moller, 2006; Elliot &

Church, 1997; Elliot, McGregor, & Gable, 1999; Lee, Sheldon, & Turban, 2003) have demonstrated that the endorsement of performance avoidance goals is negatively associated with assignment, exam, and course grades. Adoption of avoidance goals is also negatively correlated with past performance (i.e., grade point averages (GPAs) and SAT scores, see e.g., Elliot, McGregor, & Gable, 1999). Therefore, GPA or SAT score is always controlled for in analyses to eliminate the possibility that low ability is responsible for the observed effects. That is, researchers want to make certain that the negative performance outcomes that they claim come from adopting avoidance goals do not actually come from low scholastic ability.

Other research has shown that the adoption of avoidance goals is associated with poorer study strategies and lower levels of course engagement (compared to approach goals). Specifically, studies have demonstrated that adopting avoidance goals is positively associated with procrastination (McGregor & Elliot, 2002), adoption of surface processing study strategies, disorganization in study habits, and negatively associated with deep processing study strategies (Elliot, McGregor, & Gable, 1999; Elliot & McGregor, 2001), absorption in course content (McGregor & Elliot, 2002), and intrinsic motivation (Church, Elliot, & Gable, 2001; Elliot & Church, 1997).

Further, avoidance goals have been associated with several maladaptive cognitive strategies. Expressly, avoidance goals have been positively associated with state test anxiety (TA), worry, emotionality (Elliot & McGregor, 1999, 2001), and construing exams as threatening. They have also been negatively associated with mental focus (Lee, Sheldon, & Turban, 2003), exam preparation, and feelings of calmness due to preparation (McGregor & Elliot, 2002). Finally, research has found adoption of avoidance goals to be

negatively related to well-being (Elliot, Chirkov, Kim, & Sheldon, 2006; Elliot & Sheldon, 1997) and positively related to decreases in over the course of a semester (Elliot, Sheldon, & Church, 1997). More specifically, avoidance goals have been related to lower perceptions of goal progress, less satisfaction with goal progress, less enjoyable and fulfilling goal pursuits, lower perceptions of personal control, lower ratings of life satisfaction (Elliot & Sheldon, 1997), and even physical symptoms (e.g., headaches, stomach aches; Elliot & Sheldon, 1998). In sum, avoidance goals have been associated with a number of problematic outcomes and processes, including lower grades, poorer study strategies, increases in worry and anxiety, and lower well-being. For now, we turn to the first of two previously unexplored constructs (level of aspiration and boundary for success), both of which are potentially crucial for understanding the true effects of avoidance goals in achievement settings.

Role of Level of Aspiration in Goal Pursuit

The level of aspiration construct is inherent in the concept of goal-directed behavior. As stated previously, goals represent concrete cognitive representations that direct and guide behavior. Goals direct self-regulation toward desired end states and away from undesired end states. A student of Kurt Lewin (Tamera Dembo) first introduced the idea of level of aspiration in the 1930s. Research on the construct continued throughout the 1930s and 1940s (e.g., Lewin, Dembo, Festinger, & Sears, 1944), but since then, level of aspiration has been relatively ignored – especially in the achievement literature. Level of aspiration is defined as the target level of performance that a person desires to achieve. Colloquially, level of aspiration corresponds to the outcome that a person is "shooting" or "aiming" for on a given task. Level of aspiration

usually represents a specific type of performance goal[1]. However, without concrete benchmarks to signal task achievement, success and failure experiences become meaningless and undefined (Lewin, 1958). Indeed, Bandura noted: "Simply adopting a goal, whether an easy or challenging one, without knowing how one is doing, or knowing how one is doing in the absence of a goal, has no lasting motivational impact" (1989, p. 27). Thus, levels of aspiration are an integral and important part of effective goal pursuit.

Levels of aspiration can be absolute (i.e., defined by a specific level of performance) or socially defined (e.g., wanting to achieve more than the group average). When playing a game of darts, for instance, one can either strive to achieve a given amount of points in a given number of tosses (absolute level of aspiration) or to simply beat one's opponent (normative level of aspiration). To be clear, normative levels of aspiration can be linked to specific levels of performance (e.g., my competitor has scored 20, and I want to do better than him, therefore I need to do better than 20). However, in the former case, feelings of success depend on achieving the specific level of performance desired, whereas in the latter case, success depends on the dynamic interplay between one's own performance and one's partner's performance, and thus the factors that come into play are surely different in each case. For instance, in a classroom in which grades are determined normatively, the student who wants to earn an "A" has to outperform her fellow students, but it is not completely defined at any given point what outperforming the others means. As the semester progresses, the student will have a

[1] The current studies will investigate the effects of approach and avoidance goals only within performance contexts; mastery approach and avoidance (i.e., learning) goals will not be examined (see Elliot & McGregor, 2001 for more on the mastery/performance goal distinction). However, it is noted that mastery levels of aspiration could, in theory, exist (i.e., one could aspire at the onset of learning a new skill to learn a specified amount, and this specified amount represents the mastery level of aspiration).

clearer and clearer idea of what is needed to beat her classmates, but at semester's onset, it is only clear that she must perform very well to achieve her goal of an "A." This example demonstrates that levels of aspiration (whether absolute or normative) can shift during the course of goal pursuit, adjusting upwards or downwards depending on the context (e.g., perceptions of progress toward the goal, other concurrently occurring goal pursuits).

Lewin and his colleagues researched the level of aspiration construct extensively (see Lewin, 1958). Given a task to perform, people will spontaneously adopt a certain level of performance that they want to "aim for," and this standard will be revised dynamically as people learn about the task and their ability to perform the task (Lewin et al., 1944). The specific level of aspiration that is chosen depends on several factors including past performance, one's self-efficacy at the task, and knowledge of task performance norms, but levels of aspiration generally increase over time in response to meeting or exceeding previous levels of aspiration (Donovan & Hafsteinsson, 2006) and decrease in response to failing to meet previous levels of aspiration (see Lewin et al., 1944).

In recent research, the general features of achievement goals (e.g., goal content, goal valence) have been explored, but treatment of the more specific features of goals (such as levels of aspiration) has been lacking. The dominant model (e.g., Elliot, 1999) seemingly ignores level of aspiration, but asserts that cognitive factors (like worry and anxiety) are key in the negative effects of avoidance goals, implying that levels of

aspiration are not the crucial element in the process[2]. Changes in level of aspiration are inconsequential in the dominant model. In that model, when people are self-regulating using avoidance goals, negative outcomes necessarily result. In the current research, it is asserted that adoption of avoidance goals does not necessarily imply negative outcomes. Level of aspiration is one variable that may affect when avoidance goals do or do not result in negative outcomes.

Thus, the present research will explore the role of level of aspiration in the goal pursuit process. Level of aspiration is presumed to be an important factor in this process, because it has been demonstrated that people use their levels of aspiration as motivational tools in goal pursuit (Lewin, 1958). That is, people strategically set their levels of aspiration at levels that motivate them to work harder and persist longer in their goal pursuits. It may be the case, then, that people who adopt avoidance goals are setting lower levels of aspiration than people who adopt approach goals. But if people who adopt avoidance goals were to set their levels of aspiration at levels equal to or exceeding the levels of aspiration of people with approach goals, it would be expected that their performance could equal or exceed the performance of people with approach goals (via the mechanisms of effort and persistence). However, the role of level of aspiration in the goal pursuit process is intertwined with the role of boundaries for success. Both may be important factors in this process, but it would be desirable to try to determine their

[2] It may be the case that level of aspiration is implicitly a part of the distinction between mastery and performance goals, but this distinction has never been recognized or explored by researchers using the dominant model. For performance goals some fixed criterion must be surpassed in order for a person to experience success, whereas for mastery goals, any improvement or learning is experienced as success. Thus, mastery goals may be more motivating than performance goals insofar as the lower level of aspiration that they imply sets people up to experience success more frequently than people with performance goals.

separable effects. The potential roles for both of these factors are detailed in the next section.

Explanations for the Apparent Negative Effects of Avoidance Goals

Researchers have suggested that the cognitive variables (e.g., threat construal, test anxiety, worry, perceptions of goal progress) and superficial study strategies discussed above are to blame for the negative effects of avoidance goals on achievement outcomes. Mediational analyses in several studies (e.g., Elliot, McGregor, and Gable, 1999) have shown that these variables can explain a statistically significant portion of the association between avoidance goals and performance outcomes. However, two crucial elements of the process of goal pursuit that have been missing from the majority of previous work are the concepts of level of aspiration and boundary for success. Because these variables have been omitted from previous work, it is difficult to know the true effects of approach and avoidance goals on performance outcomes[3]. In fact, it might be that differences in performance between people with approach and avoidance goals stem from differences in how these people choose their level of aspiration or set their lower boundary for success.

The focus of avoidance goals on negative outcomes in the classroom (i.e., getting an "F") implies a low boundary for success and a wide range of possible levels of aspiration. That is, the avoidance goal to "avoid an F" implies a low boundary for success (anything above an "F" is success) and also a wide range of possible levels of aspiration (anywhere from a "D-" to an "A"). In contrast, the approach goal to outperform one's classmates implies a high boundary for success (at least an "A-" in a class with normative

[3] Note that simply controlling for past performance (i.e., GPA or SAT score) does not account for the effects of level of aspiration or boundary for success on performance outcomes because past performance is simply a proxy for expectancy, which is not the same as level of aspiration.

grading) and a narrower range of possible levels of aspiration (from "A-" to "A"). Thus, the type of goal (approach or avoidance) implies a specific range of levels of aspiration that the performer may adopt, and this difference in range of possible values of levels of aspiration may explain the apparent negative effects of avoidance goals (see Figure 2). To put it another way, if avoidance goals imply a lower boundary for success than approach goals and people who adopt avoidance goals are free to choose a level of aspiration anywhere within this broad range of success, then some people with avoidance goals are going to adopt high levels of aspiration and some people are going to adopt low levels of aspiration. But, on average, the levels of aspiration of people who adopt avoidance goals will be lower than the average level of aspiration of people who adopt approach goals (because approach goals imply a much higher boundary for success). If this assessment is correct, then the negative effects of avoidance goals could really be due to the lower boundary for success that avoidance goals imply – at least when avoidance goals are operationalized as literal failure (i.e., avoiding an "F") as they were in previous research. This assessment predicts that equating boundary for success should produce equal performance outcomes among people with approach and avoidance goals.

Another possible explanation for the apparent negative effects of avoidance goals could lie in the nature of approach and avoidance goals themselves and the inherent differences in level of aspiration striving between them. That is, rather than boundary for success being the key construct that explains these negative effects of avoidance goals, the nature of approach and avoidance goals alone could provide a sufficient explanation for the effects. It would seem that adopting approach goals naturally implies a focus on maximum achievement and adopting avoidance goals implies a focus on minimum

achievement. Thus, even when boundary for success is equated, people with approach goals might outperform people with avoidance goals because people with approach goals will be striving to do their absolute best, rather than simply surpassing their minimum boundary for success. This effect of maximizing versus minimizing (if it exists) would be particularly apparent at low boundaries for success. For example, if a boss were to tell her employees that to be a good employee one should complete at least 50% of projects by their due dates, then the lower boundary for success would be set at 50%. If approach goals imply a focus on maximizing, people with approach goals would strive to achieve well more than the minimum boundary of 50%, and they would do so by setting levels of aspiration that were much higher than 50% (i.e., in the 60-70% range). If avoidance goals imply a focus on meeting minimum standards, people with avoidance goals would strive to complete close to 50% (i.e., 51-55%) of their projects on time. That is, their levels of aspiration would be only slightly above the lower boundary of 50%. At higher boundaries for success (say 90%), this differential effect would not be observed because of the narrow range of possible levels of aspiration that is implied by the higher boundary for success (i.e., everyone, regardless of goal frame, has a level of aspiration in the 90-100% range).

Thus, it seems that either boundary for success or the maximizing/minimizing effects of approach and avoidance goals could provide a sufficient explanation for the previously observed negative effects of avoidance goals. In fact, the "boundaries for success hypothesis" and the "minimizing nature of avoidance goals hypothesis" represent competing explanations for these negative effects. According to one hypothesis, boundary for success is the most important determinant of performance, and avoidance

goals have been shown to be detrimental in past research because avoidance goals imply a lower boundary for success. This lower boundary for success suggests a wider range of acceptable performances for people with avoidance goals, but this wider range in conjunction with a lower boundary implies that lower performance (on average) can result. According to the second hypothesis, achieving the maximum possible is an inherent part of the approach goal mindset, whereas just reaching the minimum boundary for success is an inherent part of the avoidance goal mindset. This focus on maximums and minimums means that when boundary for success is equated, people with approach goals will still outperform people with avoidance goals, but only at low boundaries for success. This effect may occur because people with avoid goals adopt lower levels of aspiration than people with approach goals. At high boundaries for success, people with avoidance goals will set levels of aspiration as high as people with approach goals and will therefore perform as well as people with approach goals. In sum, then, equating boundary for success and testing subsequent performance (e.g., performance on a verbal skills test) would be a relevant test of these competing mechanisms.

Previous Research on Role of Level of Aspiration in Goal Pursuit

In a notable exception to the omission of the level of aspiration construct from previous research, Lee, Sheldon, and Turban (2003) examined the effects of achievement goal type and level of aspiration (called "goal level" in their terminology and operationalized as "grade goal for the semester," p.260) on performance and enjoyment in an academic context. The results showed that the adoption of performance avoidance goals was negatively related to students' semester grade levels of aspiration. Level of aspiration, in turn, was positively related to course performance. Thus, in natural settings,

it seems that adopting avoidance goals is associated with adopting lower levels of aspiration (note, however, that this evidence does not provide a critical test of the competing hypotheses of boundary for success and nature of avoidance goals).

Additionally, the adoption of performance avoidance goals was negatively related to mental focus, and mental focus was positively related to performance. The path coefficients connecting performance avoidance goals to mental focus and level of aspiration were nearly equal (β = -.16 and -.19, respectively). However, the path coefficient connecting mental focus to performance (β = .09) was smaller than the path coefficient connecting level of aspiration to performance (β = .15). Furthermore, the zero-order correlation between mental focus and performance was quite small (r = .13), whereas the correlation between level of aspiration and performance was larger (r = .37). These statistics lend preliminary evidence to the notion that level of aspiration might be an even more valuable predictor of performance than the previously studied cognitive variables such as mental focus. Another recent study (McGregor & Elliot, 2002) also found that performance avoidance goals were a negative predictor of semester grade goals (operationalized as the lowest grade with which a student would be satisfied). The evidence from both of these studies indicates that level of aspiration is an important contributor to performance outcomes and deserves further investigation.

Recent Research on Boundary for Success in Goal Pursuit

Recent work by Corker and Cesario (2008) has attested to the utility of the boundary for success construct in research on achievement goals. Ambiguity was present in the results of these studies, and thus, one purpose of the current studies is to address this ambiguity. In one study, participants solved anagrams under approach or avoidance

goal frames that either specified a certain boundary for success (find 90% of possible solutions) or was vague ("be successful" or "avoid failure"). In the specific boundary condition of this study, 90% of possible solutions represents the lower boundary for success. In the vague condition, no boundary for success was specified, meaning that participants were free to set their own boundary. Participants with a specific boundary for success outperformed those in the no-boundary condition, regardless of whether they worked under an approach or avoidance goal frame, as predicted by goal setting theory (Latham & Locke, 1991). It was expected that in the no-boundary goal condition the usual approach over avoidance goal advantage would be observed. However, participants in the no-boundary approach and avoidance goal frame conditions performed nearly identically to one another. Participants in these conditions were free to set any minimum boundary for success and any level of aspiration from 0% to 100%, and failure to find the expected approach goal advantage may have occurred because neither level of aspiration nor boundary for success was assessed and controlled.

In a second study, participants again solved anagrams under either approach or avoidance goal frames. Additionally, all participants were assigned a specific boundary for success, but half of participants were assigned a low boundary for success (find 10% of anagram solutions) and half were assigned a high boundary for success (find 90%). The results of this study showed no clear differences in performance between participants given low versus high boundaries for success. As for the effects of approach and avoidance goals, participants with avoidance goals actually outperformed participants with approach goals, $M = 22.02$ anagrams solved ($SD = 6.78$) versus $M = 20.10$ anagrams solved ($SD = 6.99$), $p = .05$, Cohen's $d = .28$. On the whole, these results were unexpected

and inconsistent with past work. Perhaps the inconsistent findings with boundary for success can be attributed to the fact that participants in this study were given very little information about the task. They were not, for example, given any information about the number of possible solutions to the anagrams or about the performance of other participants on the task. Therefore, participants had no way of determining how easy or difficult their goal to find 10% or 90% of possible solutions actually was (i.e., it was impossible for them to form an expectancy). Participants could only rely on the information contained in the goal itself. That is, to most people 10% probably sounds easy and 90% sounds difficult, but recall that students of varying levels of capability were present in both conditions. For the highly capable student, the goal to find 90% of anagram solutions is a specific, challenging goal and is therefore highly motivating. The 10% goal, however, is not challenging enough, performance decrements become more likely. For the less capable student, however, the 90% goal represents a seemingly impossible task, meaning that poor performance under this goal is likely. The 10% goal, although still not a challenging goal by any means, represents an achievable goal to the less capable student, and this fact implies that higher performance under this goal is more likely. The reversal in the typical approach/avoidance goal finding is more difficult to explain, and the current research was designed to help illuminate this finding.

In examining the results of both of these studies, it becomes apparent that participants' expectancies may play an important role in the goal pursuit process. Part of the purpose of the present research is to clarify the ambiguity that was present in the manipulations in previous work. One way in which the current work will attempt to remedy that ambiguity is to provide students with more information about the difficulty

of the anagram task. Another way it will reduce ambiguity is to anchor the goal to a more recognizable reference point, that of letter grades. Additionally, in neither the first nor the second study was any mid-level goal manipulation present. In the present work, a 50% boundary for success condition will be included to determine if any of the variables in the study (e.g., expectancies, level of aspiration) function differently at this middle level than at either a low or a high level. Finally, in addition to manipulating boundary for success, expectancies and level of aspiration will be assessed, allowing for the examination of all three of these important variables in the present studies.

Role of Expectancies in Goal Pursuit

In the previous section, it was noted that expectancies might play an important role in the interplay of achievement goals, levels of aspiration, boundaries for success, and performance outcomes. Expectancies are defined here as beliefs about the likelihood of a future state of affairs, or more specifically, future outcomes (Olsen, Roese, & Zanna, 1996). Expectancies are related to, but are not the same as, self-efficacy. Self-efficacy, in contrast, is defined an individual's belief about his/her ability to perform a task. For tasks in which outcomes are highly dependent on quality of performance, self-efficacy is positively related to outcome expectancy, but the relation between the two tends to be more complex for different kinds of tasks (Bandura, 1989). The exact function of expectancies in the context of achievement motivation is not completely known, but some previous research can shed light on the role that they may serve. Previous research has demonstrated (e.g., Bandura, 1989) that expectancies are generally positively associated with performance. However, this association is not always observed. It has been demonstrated that when the task is objectively easy, expectancies are unrelated to

performance (Marshall & Brown, 2006). Additionally, in learning contexts, expectancies may actually be negatively related to performance (Vancouver & Kendall, 2006), because when people feel competent at a task, they may feel they need to put less effort into preparation for the task, and lower performance may result.

It should be noted that level of aspiration is a type of goal, not a type of expectancy. Thus, the specific score that one is aiming for in a game of darts (i.e., one's level of aspiration) is distinct from how well one expects to perform in that game of darts (i.e., one's performance expectancy). Note that both of these are qualitatively distinct from how well one would ideally like to perform at a task (i.e., one's ideal goal) and the minimum acceptable level of performance (i.e., one's lower boundary of success). In fact for each type of goal (i.e., level of aspiration, ideal goal, boundary for success), a corresponding expectancy exists (however, only expectancies for boundary level will be assessed in the current research). Expectancies for achieving ideal goals should be very low, whereas expectancies for achieving the minimum boundary of success should be fairly high. The expectancy for achieving one's level of aspiration should fall somewhere between that for one's ideal goal and the minimum boundary for success. However, as one's performance expectancy increases, one's level of aspiration should increase in turn (but, there may be individual differences in the relation between level of aspiration and expectancy that will not be explored further here).

The Present Research

The concepts of level of aspiration and boundary for success represent valuable missing pieces of the puzzle that is the goal pursuit process, and the current research is a first step at examining the role of these variables in that process. A major purpose of the

present research is to demonstrate that avoidance goals are not detrimental to performance in achievement contexts when *either* (a) boundary for success *or* (b) level of aspiration is equated. If performance under approach or avoidance goals is comparable when boundary for success is equated, then it can be said that the detrimental effects of avoidance goals observed in natural settings are due to differences in the boundary for success that approach and avoidance goal-oriented students naturally set. However, if the performance of people with approach and avoidance goals differs within each boundary for success condition and this difference is eliminated after level of aspiration is controlled, then it can be said that the detrimental effects of avoidance goals observed in natural settings are due to differences in the inherent nature of approach and avoidance goals. Study 1 manipulated goal frame (approach vs. avoidance) and boundary for success (none/low/medium/high) and measured level of aspiration and expectancy. Boundary for success is a structural feature of the goal pursuit environment that is defined as the cutoff value at which a goal (either approaching success or avoiding failure) is achieved. A high boundary for success implies a narrow range of possible levels of aspiration, whereas a low boundary for success implies a wide range of possible levels of aspiration.

Additionally, Study 1 will demonstrate the utility of both level of aspiration and boundary for success in understanding the impact of performance approach and avoidance goals on performance in achievement settings. It is predicted that in the no boundary condition, people with approach goals will outperform people with avoidance goals when boundary level expectancy (i.e., the subjective probability of reaching the lower boundary for success) is controlled (the "typical approach goal advantage"). In

addition to the competing hypotheses mentioned above, and replicating our prior finding, it is hypothesized that participants in the non-specific goal condition will perform worse than participants in each of the three specific goal conditions. Additionally, it is predicted that expectancy will be positively related to self-efficacy. This association is predicted because skill at both tasks should be positively related to performance. If expectancy is positively related to self-efficacy, then an interaction between boundary expectancy and boundary for success is anticipated, such that for people with high boundary expectancies, boundary for success will have a positive relation with performance, and for people with low boundary expectancies, boundary for success will have an inverted U-shaped relation with performance. These relations are predicted because motivation will be at its peak when the goal is most challenging (but not impossible), regardless of expectancy. For people with high boundary expectancies, the goal is most challenging at the highest boundary for success, whereas for people with low boundary expectancies, the goal is most challenging at the middle boundary for success.

Study 2 was designed in response to some unanticipated findings in Study 1, and it utilized a different task than Study 1 – that of playing pinball. In Study 2, goal frame (approach vs. avoidance) was manipulated, and participants were allowed to set their own boundary for success, in addition to their level of aspiration. Additionally, whether the task was described as having a social comparison focus or not was manipulated (as described in more detail below). It was predicted that when social comparison was highlighted, participants with approach goals would outperform and set higher levels of aspiration than participants with avoidance goals, whereas the reverse would be true when social comparison was not highlighted.

Study 1

Overview

Participants solved a set of anagrams, and performance was measured by number of anagrams correctly solved. Boundary for success was manipulated by telling participants what percentage of possible anagram solutions must be found in order to be successful or to avoid failure (low = 10%, medium = 50%, high = 90%). Some participants were not given any specific boundary for success (no-boundary control group). The inclusion of a no-boundary control group allowed the interpretation of the performance of the other groups, and it allowed the comparison of these data to previous data that have been collected (i.e., Corker & Cesario, 2008). Participants were instructed to "be successful" (approach frame) or to "avoid failing" (avoidance frame). To make the manipulations more concrete and easier to understand, each boundary for success was linked to an academic letter grade (A, C, or F). All participants were told that the average participant finds about 50% of possible anagram solutions. Giving participants this information helped them to assess the difficulty of their assigned goal and establish expectancies regarding their performance at the task (see Table 1 for the exact text of the manipulations).

After completing the anagram task, participants completed a series of personality measures (i.e., a Big 5 measure and a regulatory focus measure). Although the main focus of this research is on the relationship between achievement goals and performance outcomes, this study also provided an opportunity to explore the relations between individual differences, goals, expectancies, and performance. Participants also completed a measure of affect at the conclusion of the target anagram set. As mentioned earlier,

prior research has established anxiety as a key factor in the achievement goal-performance relation. Thus, understanding the role of anxiety in the task is important to understanding its effects on performance.

Method

Procedure. All questionnaires and the anagram task were administered over the computer using MediaLAB software. After consenting to participate, participants were presented with their assigned goal frame (approach or avoidance) and their lower boundary for success (none, low, medium, or high). They then completed the practice set of three anagrams. Next, participants were shown the correct solutions to the practice anagrams in order to allow them to assess their ability to complete the target anagrams. Participants were informed that the target anagrams would be similar in difficulty to the practice anagrams and that all anagrams had more than one solution. If participants were in the no-boundary control group, they were asked to set a boundary for themselves. Next, all participants reported their level of aspiration for the target anagram task and their expectancy of success (or expectancy of avoiding failure). Before completing the target anagram task, participants reported their affective state (on the Revised Worry-Emotionality Scale). They were then reminded of their goal to be successful (or to avoid failure) and completed the target anagram task. Participants had unlimited time to complete the target anagram task[4]. After completing the task, participants completed a manipulation check to ensure they knew their assigned boundary for success (if applicable) and their goal frame. They then completed the personality measures

[4] Time spent on the anagram task and task performance were highly correlated (r = .63). However, there was no effect of goal frame on time spent on the anagram task (p = .97). In previous research, analyses utilizing time as the dependent variable have paralleled analyses using task performance, but this was not the case in this study.

(Regulatory Focus Questionnaire and mini-IPIP), which were presented in a random order. Finally, participants reported their demographic information, were debriefed, and dismissed.

Participants. Three-hundred and fifty-four undergraduate psychology students participated in the study for partial course credit. Participants who were not native English speakers (n = 21) and participants who responded incorrectly on the manipulation check (n = 65) were eliminated from the analyses. The manipulation check and the manipulation itself were separated temporally by a period of about 20 minutes. Perhaps many of the participants who responded incorrectly on the manipulation check did not remember their assigned goal or did not fully internalize their assigned goal. For this reason, it seemed prudent to conduct the analyses with these participants excluded. The participants who were excluded did not differ from the included participants on any study variables, and the results do not change if the participants are included. The final sample consisted of 268 participants (188 women and 80 men). The majority of participants (82.5%) listed their race as White/Caucasian; the remaining participants were Black/African-American (6.0%), Asian-American (5.6%), Hispanic (1.9%), Native American (0.7%), and Other/Bi-/Multi-Racial (3.4%). Participants were somewhat uniformly distributed across years in college, with slightly more freshman and sophomores (35.8% and 29.5%, respectively) than juniors and seniors (20.9% and 13.1% respectively).

Materials. The exact manipulations that were used in this study are presented in Table 1. The anagrams used in this study have been used in previous research (Shah, Higgins, and Friedman, 1998). The practice set of anagrams was comprised of the

following three anagrams: EACHP, ALSET, and IKCTS, and the target set of anagrams was comprised of the following ten anagrams: NELMO, LEESTC, ANETLM, NIEDM, HRBOT, IDFEL, OLSPO, SDETRE, ILESM, VEERL.

To assess level of aspiration, participants were asked to indicate "What percentage of anagram solutions are you trying to find? That is, what percentage of anagram solutions are you aiming for?" To assess boundary for success (only among participants in the no boundary condition), participants were asked to indicate, "What is the minimum percentage of correct anagram solutions that you would need to find to consider your performance a success?" For both items, participants responded by entering a value between 0% and 100%.

Expectancy was assessed with the item, "How likely do you think it is that you will be able to achieve your goal to be successful [to avoid failing]? That is, what is the probability that you will be successful [avoid failing] at the anagram task?" Participants responded on an 11-point scale from 0% to 100%.

Affect was assessed with the revised Worry-Emotionality Scale (Morris, Davis, & Hutchings, 1991). This scale was chosen because of its previous use in the achievement goal literature (e.g., Elliot & McGregor, 2001). The scale is composed of two subscales (worry and emotionality), both of which are different components of anxiety. Emotionality is conceptualized as more affectively-based anxiety, whereas worry is theorized to be more cognitively-based. A sample emotionality item is "I feel my heart beating fast," and a sample worry item is "I feel I may not do as well on this test as I could." In this scale, participants rate the extent to which they agree or disagree with 10 statements (5 items per subscale; 1=strongly disagree to 5=strongly agree).

As a manipulation check, participants were asked to indicate "What goal were you assigned at the beginning of this task?" and they were forced to choose "be successful" or "avoid failure." If they were in one of six conditions in which boundary for success was assigned, they were then asked to report, "What was the cutoff value for being successful [avoiding failure] at this task?" and responded on an 11-point scale with options ranging from 0% to 100%.

Personality was assessed using two different measures. The International Personality Item Pool, 20-item version (IPIP-20; Donnellan, Lucas, & Baird, 2006) measured the Big 5 factors of personality. Some sample items are "I am the life of the party" (extraversion), "I feel others' emotions" (agreeableness), "I get chores done right away" (conscientiousness), "I get upset easily" (neuroticism), and "I have a vivid imagination" (openness). The Regulatory Focus Questionnaire (RFQ; Higgins et al., 2001) measured chronic promotion (six items, e.g., "Do you often do well at things that you try?") and prevention focus (five items, e.g., "How often did you obey rules and regulations that were established by your parents?").

Analyses

Target hypotheses. It was hypothesized that the underperformance of participants with avoidance goals as compared to those with approach goals may be due to differences in either (a) lower boundaries for success or (b) levels of aspiration (i.e., maximizing vs. minimizing). To test this hypothesis, it was first necessary to demonstrate that participants with avoidance goals were underperforming at the anagram task compared to participants with approach goals when boundaries and levels of aspiration were ignored. Participant sex was originally included in the analyses, but as there were no

main effects of or interactions with sex, it was removed from the analyses.

A one-way analysis of covariance (ANCOVA) was performed with goal type (approach vs. avoidance) predicting task performance (number of anagrams correctly solved). Number of practice anagram solutions was the covariate. A significant main effect of goal type was found, $F(1, 265) = 4.41$, $MSE = 18.55$, $p < .05$, such that, unexpectedly, participants with *avoidance* goals outperformed participants with *approach* goals, providing a little over than 1 additional anagram solution on average (Cohen's $d = .29$). Table 4 displays the task performance means and standard deviations, as well as the means adjusted for the covariate, for each goal type. The effect remained significant in a two-way ANCOVA with both goal type (approach/avoidance) and boundary for success (none/low/medium/high) included in the analysis, $F(1, 259) = 5.85$, $MSE = 18.70$, $p < .05$ (number of practice anagram solutions was again the covariate), and the effect was not moderated by boundary, $F < 1$. Further investigation revealed that when the same analyses were conducted with level of aspiration as the dependent variable (instead of anagram solutions), the pattern of results was the same.

A one-way ANCOVA with goal type (approach/avoidance) predicting level of aspiration (with number of practice anagram solutions as the covariate) produced a significant effect of goal type, $F(1, 264) = 3.88$, $MSE = 510.87$, $p = .05$, such that participants with avoidance goals set higher levels of aspiration than participants with approach goals (see Table 5). On average, participants with avoidance goals set their levels of aspiration 5.78% higher than participants with approach goals (Cohen's $d = .26$). Including boundary for success in a two-way ANCOVA with goal type did not alter the effect, $F(1, 258) = 4.27$, $MSE = 461.39$, $p < .05$, and the effect was not moderated by

boundary, $F < 1$. Thus, the typical approach goal advantage did not emerge in this study: with either task performance or level of aspiration as the dependent variable, participants with avoidance goals outperformed and set higher sights than participants with approach goals.

Part of the theoretical rationale for explaining the approach goal advantage that is typically seen in the achievement goal literature (outlined above) states that participants with avoidance goals may be setting lower boundaries for success for themselves, which results in a wider range of possible levels of aspiration (again, see Figure 2). It is therefore interesting to examine, in these data, whether participants with lower boundaries for success did, in fact, have a wider range of levels of aspiration. As can be seen in Figure 3, participants differed in the level of aspiration set, depending on their boundaries for success. At the lowest boundary (10%), level of aspiration ranged from 0% to 100% ($M = 61.06$, $SD = 29.22$). At the middle boundary (50%), level of aspiration ranged from 50% to 100% ($M = 69.02$, $SD = 16.74$). At the high boundary (90%), level of aspiration ranged from 60% to 100% ($M = 81.57$, $SD = 19.04$)[5]. It can therefore be seen that the range of possible LOAs does in fact decrease as boundary for success increases.

It was predicted that participants in the no-boundary condition would perform worse on the anagram task compared to participants in the specific goal conditions. A one-way ANCOVA with boundary for success predicting number of correct anagram solutions (with number of practice anagram solutions as the covariate) revealed no

[5] There were 6 outlying values (10%, 40%, 45%, 50%, 50%, 50%) that were excluded from the range calculation but are represented in the calculation of the mean and standard deviation. The mean with those values excluded is 87.00 ($SD = 11.3$).

differences in performance by boundary, $F < 1$ (see Table 6). Expectancy was unrelated to anagram task performance (r = -.03). Thus, controlling for expectancy did not change the results of the analysis (contrary to predictions).

The final hypothesis concerned the association between expectancy and performance. As noted above, overall, there was no association between expectancy and performance. It was predicted, however, that the association between expectancy and performance should vary depending on boundary for success, such that the association should increase as boundary for success increased. This hypothesis was not supported in the data. In the no, low, and medium boundary condition, there was no association between expectancy and performance (rs = .01, .00, and .00, respectively). In the high boundary condition, the association between expectancy and performance was r = -.15 (*ns)*, indicating that the association was (if anything) in the opposite of the predicted direction.

Additional analyses. As stated above, it has been well demonstrated that anxiety plays a crucial role in avoidance goal disadvantage typically observed in the achievement goal literature. Given the unexpected findings reported above, it would be interesting to know what the role of anxiety was in this study. Fortunately those data are available. To test the effect of goal frame and boundary for success on anxiety, a two-way MANOVA with goal frame and boundary for success as independent variables and the worry and emotionality subscales (Morris, Davis, & Hutchings, 1991) as dependent variables was conducted. The results showed no effect of either goal frame or boundary for success on worry, emotionality, or their multivariate composite (all ps > .15). Including ACT score as a covariate in the analysis yielded a marginally significant main effect of goal frame

on worry, $F(1, 240) = 2.83$, $MSE = 35.77$, $p = .09$, such that participants with avoidance goals experienced slightly higher levels of worry than participants with approach goals (covariate adjusted mean = 9.95 vs. 9.10) when accounting for ACT. In the context of the current research, this effect implies that, if anything, higher levels of worry are beneficial for task performance, given that participants with avoidance goals outperformed participants with approach goals and had higher levels of worry. Worry and task performance were, in fact, slightly positively correlated, $r = .11$, and this correlation was slightly larger for participants with avoidance goals ($r = .14$ for participants with avoidance goals vs. $r = .04$ for participants with approach goals). Drawing firm conclusions from these affective data seems premature, however, given the overall lack of effects with the worry/emotionality scales. These data do suggest, perhaps, that even if avoidance goals are associated with elevated anxiety, perhaps anxiety need not always be bad for task performance. Regardless, it is clear that the nature of the task must be considered when determining the effect of both goal frame and anxiety on task performance; this issue will be returned to in the General Discussion.

Discussion

Overall, the results of Study 1 were unexpected: the avoidance goal performance advantage that was demonstrated in our previous work (Corker & Cesario, 2008) was replicated. The results demonstrated that, regardless of boundary for success, participants with avoidance goals outperformed and set higher levels of aspiration than participants with approach goals on the anagram task. The question that follows from these findings is "Why?" What is it about this task or this goal manipulation that allows for participants with avoidance goals to perform better than participants with approach goals? Returning

to the manipulations themselves, it can be seen that the goal frame manipulation is such that only the valence of the goal is manipulated. That is, at a general level, participants are told to "be successful" versus "avoid failure." This interpretation of the meaning of the distinction between approach and avoidance goals can therefore be characterized as a *basic valence distinction.* This basic valence distinction can be contrasted with other (perhaps more typical) approach/avoidance goal frame definitions, such as Elliot and Murayama's (2008) *normative comparison focus* definition. This definition asserts that normative social comparison (that is, a focus on social comparison *relative* to others' standings) is inherent to the constructs of performance approach and avoidance goals. Elliot and Murayama write: "Most achievement goal theorists would concur that normative comparison and performance-based goals are closely connected" (2008, p. 616).

The goal frame literature, however, reflects some debate on this issue. Grant and Dweck (2003), for instance, make the distinction between normative performance goals (which are focused on outperforming/not performing worse than others) and ability performance goals (which are focused on demonstrating one's competence/avoiding seeming incompetent). They conclude that the distinction between normative and ability performance goals has not been heavily researched and that the impacts of the distinction are unclear. Although Grant and Dweck's (2003) measure of goal orientation is psychometrically suspect (see Donnellan, 2008), the logic behind the distinctions outlined in their paper may be supported. Thus, the centrality of social comparison focus in the performance goal construct is under debate and should be investigated further. The purpose of Study 2, therefore, was to investigate the role of social comparison focus as

one possible explanation for the unexpected reversal of findings obtained in Study 1.

Study 2

Overview

The purpose of Study 2 was to follow-up on the unexpected findings in Study 1 and Corker and Cesario (2008) that participants with avoidance goals outperformed participants with approach goals in the absence of explicit social comparison focus. To avoid focusing too much on one achievement task (i.e., solving anagrams), Study 2 utilized a different achievement task: playing pinball. Pinball was selected for the study because of its history of use in the achievement literature (e.g., Harackiewicz & Elliot, 1993). The design of Study 2 was based on previous studies in that literature (Elliot & Harackiewicz, 1996; Harackiewicz & Elliot, 1993, 1998). Elliot and Harackiewicz (1996) is perhaps the only published study in which performance approach and avoidance goals have been induced in participants via an experimental manipulation. In that study, participants attempted to solve Nina puzzles (a type of hidden figure puzzle similar to the kind published in the magazine *Highlights*) under performance approach, performance avoidance, and mastery approach goals. It was therefore desirable to design a study that compared the effects of Elliot & Harackiewicz's manipulation of approach and avoidance to the manipulation of approach and avoidance in Study 1 (using the novel pinball task) to begin to explain the unexpected findings in Study 1. A cursory comparison of Elliot and Harackiewicz's manipulations with the manipulations used in Study 1 reveals that the major difference between the two is the role of social comparison. Elliot and Harackiewicz's manipulations make clear to participants that the "purpose" of their experiment is to compare participants to one another and to determine their relative

abilities on the task, whereas the manipulations in Study 1 make no such claim. It is therefore possible that the unexpected results obtained in Study 1 are due to this absence of social comparison from the manipulations.

The design of the study was a 2 (goal frame: approach vs. avoidance) X 2 (social comparison focus: present vs. absent) between-subjects manipulation. It was determined that, at this early stage in the research, manipulating boundary for success would have created too large of a design – if the study had been conducted as it was in Study 1 but with the addition of the social comparison focus manipulation, it would have resulted in a 16-cell (2 X 2 X 4) design. Therefore, boundary for success was measured, rather than manipulated, in this study. There is some reason to suspect that measuring and manipulating boundary for success are conceptually quite a bit different from each other (due to potential differences between a self-set and experimentally provided goal structure), but consideration of these nuances is reserved for the General Discussion.

It was hypothesized that, in the social comparison focus present condition, participants with approach goal frames would outperform participants with avoidance goal frames, whereas the reverse would be true in the social comparison focus absent condition. It was additionally hypothesized that participants with approach goal frames should set higher levels of aspiration than participants with avoidance goal frames in the social comparison focus present condition, whereas the reverse should be true in the social comparison focus absent condition. Additionally, level of aspiration should be positively correlated with performance. Finally, it was predicted that level of aspiration and self-set boundary for success should be correlated and that participants should have lower boundaries for success in the avoidance goal condition, but only when social

comparison focus was emphasized.

Method

Procedure. Participants completed all portions of the study individually in soundproof booths on computers using the software MediaLAB. After consenting to participate in the study, participants were informed of the "purpose" of the study (either to compare students in their pinball playing ability or simply to play pinball) and received the goal frame manipulation (approach vs. avoidance). Participants then completed a brief questionnaire containing items assessing their experience with pinball and their enjoyment of pinball. They also rated how important it was for them to perform well at the pinball task (importance of task) and how well they thought they would perform at the task (anticipated performance). Participants then completed the 10-item Revised Worry/Emotionality Scale with regards to their feelings about the pinball task. Next, participants completed two practice balls (recording their score after each ball) to give them a sense of how to play the game, as well as how the scoring in the game worked. The practice balls also gave participants a basis for setting their subsequent levels of aspiration and boundaries for success.

After completing the practice rounds, participants were informed that they would be playing two complete games of pinball for the main part of the study. Before the first game, participants set a lower boundary for success (and a corresponding expectancy for that boundary), as well as a level of aspiration (and a corresponding expectancy for that level of aspiration), for the first game. After completing the first game, participants rated how well they did on their first game (perceived competence). They then set their boundaries for success and levels of aspiration (and corresponding expectancies for both)

for their second game. After completing their second game, participants again rated how well they thought they had performed on their second game. Participants then completed a brief questionnaire assessing their experience with the particular computerized pinball game they had just played (Robo Pinball), how absorbed they were in the task, how fun they thought the task was, and their level of overall perceived competence (how well they thought they did on the pinball task, overall). They then completed a series of personality questionnaires (the mini-IPIP, RFQ, and Rosenberg Self-Esteem Questionnaire). Finally, participants completed demographic questionnaires, were debriefed, and dismissed.

Participants. Two hundred and seventy-seven participants completed the study. Of these participants, 20 experienced technical problems with the pinball game at some point during the experiment and were eliminated from further analyses. Thus, the final sample consisted of 257 participants (192 females and 65 males). The majority of participants (86.4%) listed their race as White/Caucasian; the remaining participants were Black/African-American (5.1%), Asian-American (5.1%), Hispanic (1.6%), and Other/Bi- or Multi-Racial (1.9%). The majority of participants were freshman and sophomores (50.2% and 21.8%, respectively), but there was a sizable minority of juniors and seniors (17.9% and 9.7% respectively).

Materials. The exact manipulations used in this study are presented in Table 2. All of the measures (with the exception of the personality questionnaires) are presented in Table 3. Some of these measures (Anticipated Performance, Competence Valuation, Perceived Competence, Task Absorption, and Pinball Enjoyment) were adapted from Harackiewicz and Elliot (1998); the rest were designed specifically for this study. The affect and personality measures were the same as in Study 1.

Analyses

Data Preparation. The data were visually inspected prior to analysis using stem and leaf plots in conjunction with skewness and kurtosis statistics. This initial inspection revealed that the variables associated with the pinball game (boundary for success, level of aspiration, pinball score) were highly positively skewed due to the presence of several highly skilled participants. As a result, these variables were transformed before proceeding to final analysis in the following way. First, extreme outliers (standard deviation > 4) were eliminated from the data. The number of data points removed per variable ranged from 1 to 8 ($M = 3.63$, $SD = 2.50$). This action was performed in order to ensure that these extreme participants did not bias the remaining transformations. The remaining data were then normalized using a square root transformation. Finally, severe outliers (standard deviation > 4) were again removed (Raykov & Marcoulides, 2008). The number of data points removed per variable ranged from 0 to 2 ($M = 0.13$, $SD = 0.35$). Ultimately, there were 244 to 254 data points per variable (out of 257 possible) available for analysis. Participant sex was included in the analyses when there were significant main effects of or interactions with sex.

Target Analyses. It was predicted that the effect of goal frame on task performance (average pinball score) would depend on whether or not the task was framed in terms of social comparison. Specifically, it was predicted that avoidance goal frames would provide a performance boost when social comparison was not part of the task and a performance decrement when it was. A three-way ANCOVA was conducted with pinball experience and average practice ball score as covariates, and with goal frame (approach vs. avoidance), social comparison (present vs. absent), and sex predicting task

performance. The overall ANCOVA was significant, $F(9, 224) = 10.48$, $MSE = 1281.08$, $p < .001$, $R^2 = .30$. Additionally, there was a main effect of pinball experience, $F(1, 224) = 10.28$, $MSE = 1281.08$, $p < .001$, and of average practice ball score, $F(1, 224) = 20.10$, $MSE = 1281.08$, $p < .001$, such that higher levels of pinball experience and higher performance on the practice balls were associated with higher performance on the main pinball task. There was also a main effect of sex, $F(1, 224) = 25.14$, $MSE = 1281.08$, $p < .001$, such that men outperformed women on the pinball task. There was a non-significant main effect of social comparison, $F(1, 224) = 2.22$, $MSE = 1281.08$, $p = .14$, such that there was a trend for participants in the social comparison absent condition to outperform participants in the social comparison present condition. There was no main effect of goal frame, $F < 1$, and the two-way interactions were not significant.

The main effects were qualified, however, by a significant three-way interaction between goal frame, social comparison, and sex, $F(1, 224) = 5.73$, $MSE = 1281.08$, $p < .05$. Figure 4 displays the three-way interaction. Note, however, that there were far fewer male participants in the experiment than female participants ($n = 58$ vs. $n = 176$), so that when the effects are broken down by sex, they fail to attain statistical significance even though the effects are sizable. In spite of the small sample size, breaking down the interaction shows that the predicted effect was observed, but only for male participants. That is, among men, having an avoidance goal frame was associated with enhanced task performance when social comparison was not part of the task but was associated with decreased task performance when it was (for the two-way interaction between goal frame and social comparison for men only, $F(1, 52) = 3.35$, $MSE = 1933.32$, $p = .07$). However, the results were trending in the opposite direction for female participants (for

the two-way interaction between goal frame and social comparison for women only, F (1, 170) = 2.75, MSE = 1077.88, p = .10), such that having an avoidance goal was beneficial to performance when women were in the social comparison present condition, but neither beneficial nor detrimental when they were in the social comparison absent condition.

It was hypothesized that level of aspiration should be positively correlated with task performance, and there was support for this hypothesis. The correlation between level of aspiration and task performance (both averaged across the two games) was r = .59, implying that level of aspiration strongly predicted performance. Controlling for participants' expectancies of achieving their levels of aspiration did not change the strength of the correlation between level of aspiration and task performance (r = .58), although expectancy was a unique predictor of performance (r = .19). Furthermore, the correlation between level of aspiration and performance was not moderated by sex (t < 1), indicating that level of aspiration predicted performance equally for men and women. To further probe this association (and to parallel the analyses conducted with manipulated boundary for success in Study 1), the range of level of aspiration was examined by boundary for success – to do so, boundary was divided into four quartiles. The results of the analysis are displayed in Figure 5. As can be seen in the figure, the range of level of aspirations decreased as boundary for success increased (although there was also a trend toward increasing levels of aspiration as boundary increased, as is apparent in the high correlation between level of aspiration and boundary for success). These results are evidence for the idea that lower boundaries for success can result in a range of levels of aspiration, suggesting that if people who adopt avoidance goals are adopting lower boundaries for success, their average level of aspiration (and subsequent performance)

may be lower than people with approach goals.

What were the effects of goal frame and social comparison on level of aspiration? It was predicted that the effects of goal frame and social comparison on level of aspiration should mirror the effect of those variables on performance, such that (for men at least) level of aspiration should be higher in the social comparison absent condition when participants have an avoidance goal and in the social comparison present condition when participants have an approach goal. A three-way ANCOVA with pinball experience and average practice ball score as covariates, goal frame (approach vs. avoidance) and social comparison (present vs. absent) as independent variables, and level of aspiration as the dependent variable was significant, $F(9, 225) = 11.15$, $MSE = 2017.46$, $p < .001$, $R^2 = .31$. Of interest was a two-way interaction between goal frame and social comparison, $F(1, 225) = 4.03$, $MSE = 2017.46$, $p < .05$. Further examination of the interaction revealed that participants in the social comparison absent condition set higher levels of aspiration when they had an avoidance goal than when they had an approach goal, whereas participants in the social comparison present condition set higher levels of aspiration when they had an approach goal than when they had an avoidance goal (see Table 7). Thus, this hypothesis was supported, although it is unclear why women showed the predicted pattern of results for level of aspiration, but trended toward the opposite pattern in terms of their actual performance. None of the other higher order terms in the analysis were significant ($ps > .16$), nor were the main effects of goal frame and social comparison ($ps > .33$). There was a significant main effect of sex, $F(1, 225) = 16.25$, $MSE = 2017.46$, $p < .001$, such that men set higher levels of aspiration than women, and there were significant main effects of pinball experience, $F(1, 225) = 22.55$, $MSE =$

2017.46, $p < .001$, and average practice ball score, F (1, 225) = 22.53, MSE = 2017.46, $p < .001$, such that participants who had more pinball experience and scored higher on the practice balls set higher levels of aspiration.

As predicted, the correlation between level of aspiration and boundary for success was substantial ($r = .81$), as was the correlation between boundary for success and task performance ($r = .59$). To test whether (like performance and level of aspiration) boundary for success depended on social comparison focus and goal frame, a three-way ANCOVA was conducted with pinball experience and average practice ball score as covariates, goal frame, social comparison, and sex as independent variables, and boundary for success as the dependent variable. However, unlike the results for level of aspiration, neither the two-way interaction between goal frame and social comparison nor the three-way interaction between goal frame, social comparison, and sex was significant ($p > .22$). However, when a two-way ANCOVA was conducted separately by sex, it was observed that the two-way interaction between goal frame and social comparison approached significance, but only for men (for men: F (1, 54) = 3.23, MSE = 1909.92, $p < .07$; for women: F (1, 175) = .005, MSE = 1613.98, $p = .95$). Thus, the predicted effects were obtained for the effect of goal frame and social comparison on level of aspiration (for all participants) and on task performance and boundary for success (for men only).

Additional analyses. The role of anxiety was again of interest in Study 2. For the pinball task the worry subscale was negatively associated with average game score, r (241) = -.14, p =.03 (in opposition to the anagram task, but more in line with the typical role of anxiety in the achievement goal literature). Emotionality was unassociated with task performance, r (241) = -.06, p = .39. Neither goal frame, social comparison focus,

nor their interaction predicted worry or emotionality; a MANOVA with goal frame and social comparison focus as the independent variables and worry and emotionality as the dependent variables was not significant (all *p*s < .13). Including practice anagram score and experience with pinball as covariates did not change the results of the analysis. The general lack of findings with regards to anxiety in both Study 1 and Study 2 is revisited in the General Discussion.

Discussion

Overall the results of Study 2 showed support for the hypotheses, particularly for men. It was found that (for men only) participants with avoidance goals outperformed participants with approach goals when social comparison focus was absent, replicating the findings in Study 1 and Corker and Cesario (2008). Additionally, the typical approach goal advantage was found (for men only) when a social comparison focus was present, indicating that the emphasis in previous research on a social comparison focus definition of performance goals may have much to do with the approach goal advantage that is typically observed. On the other hand, a social comparison focus may be just one of several task components that contribute to the approach goal advantage observed in the present work. This notion highlights what may be a central principle of achievement goal research: task features are crucial to understanding the effects of a given goal frame on performance, and it may be these task features, more so than the inherently bad nature of avoidance goals, that determines task performance.

The results of the analyses also showed the predicted effects of goal frame and social comparison focus on level of aspiration (for both men and women). That is, when social comparison focus was absent, participants set higher levels of aspiration when they

had an avoidance goal than when they had an approach goal. Conversely, when social comparison focus was present, participants set higher levels of aspiration when they had an approach goal than when they had an avoidance goal. This pattern of results also held when boundary for success (instead of level of aspiration) was the dependent variable (for men only). Finally, the results also showed that having a higher boundary for success constricted the range of values of level of aspiration, indicating that insofar as people with avoidance goals set lower boundaries for success, they have a wider range of possible levels of aspiration, which may negatively impact their performance on average.

Given the sex differences that are apparent in this study, it may be prudent to briefly consider the nature of these effects. At a theoretical level, it is not apparent why the sex differences should have emerged. The theory predicts that the goal processes outlined in the introduction should hold equally for men and women. Considering the data themselves, however, it is apparent that there were a number of sex differences beyond the effects noted above. Before doing the pinball task, women reported liking pinball less than men (t (157) = -2.45, $p < .05$), having less experience with pinball than men (t (157) = -4.12, $p < .001$), lower levels of anticipated performance (t (157) = -4.89, $p < .001$), and lower levels of importance placed on the pinball task (t (157) = -1.84, p = .07). It is apparent, then, that there were a number of reasons why women may have been less motivated to do the task overall, perhaps explaining the general lack of effects of the manipulations on women's performance. Perhaps some minimal level of task motivation (i.e., valuation of the task combined with a willingness to exert effort) is necessary for goal manipulations to exert an effect.

Researchers (especially in the field of communication) have offered some

potential explanations for broader sex differences in gaming preferences. These researchers note that women generally prefer games that involve human interaction, lack violence, do not involve mental rotation, and lack competition/are cooperative (Hartmann & Klimmt, 2006). Women also prefer to play games more in the company of others rather than alone (Agosto, 2002). All of these sex-differentiated game features center around areas in which noted sex differences exist more broadly. Sex differences in mental rotation ability, for example, have been well demonstrated in a variety of contexts. That women enjoy games involving mental rotation less (when they are presumably less skilled on average at these games) is perhaps not too surprising. Pinball involves a number of these features that are less desirable to women – it does not involve human characters, it does involve spatial manipulation, and in this study, it was played alone, rather than with others. Previous research in the achievement literature (including Study 1, above) has not typically found sex differences on the impact of different goal frames on performance, but future research will need to employ different types of tasks to verify that these sex differences do not persist across different types of tasks.

General Discussion

Although unexpected at times, the results of Study 1 and Study 2 together suggest that the nature of avoidance goals need not be viewed as inherently negative. Study 1 actually demonstrated a situation in which an avoidance goal advantage was observed, and Study 2 replicated that finding. Together, the results show that the characteristics of the task, as well as the situation in which goal pursuit is occurring, need to be taken into account when predicting the effects of goal frame on performance.

Indeed, social comparison focus is just one variable among several that may

impact when an avoidance goal is more or less effective than an approach goal. In the introduction, it was noted that both approach and avoidance orientations were necessary for survival in the ancestral environment and were likely evolutionarily selected. An organism without one or the other orientation could not have survived for very long. It follows that there may still be some situations in the present world for which an avoidance orientation is functional and beneficial. Danger situations (whether physical or psychological) may represent exactly this type of situation. An employee in danger of losing his job or a student in danger of failing a class, for instance, may benefit from an avoidance goal orientation. Certainly, these low ability employees and students should not perform as well as higher ability employees and students who are not in danger of losing their jobs/failing a class, but they may outperform other low ability peers who have unrealistically positive outlooks on their situations. Other task features may also impact the efficacy of approach versus avoidance goals.

Whether the task is one for which anxiety facilitates or inhibits performance could be another important task feature. The results of Study 1 tentatively suggested that there may be some tasks or situations for which anxiety benefits, rather than inhibits, task performance. It may be the case that in Study 1, for instance, a little bit of anxiety was motivating to the participants, resulting in more effort and higher performance among participants with avoidance goals. For some tasks (e.g., putting in golf), the least bit of anxiety is detrimental to performance, whereas for others (e.g., monitoring an air traffic control station) some anxiety helps to maintain task vigilance and is beneficial to performance. A key goal for future research, then, will be establishing what task and situational parameters are important for determining when avoidance, as opposed to

approach, goals should be more or less beneficial.

Let us consider for a moment the variable of social comparison in more detail as an example of one of these situational parameters. The results of Study 2 showed that avoidance goals are detrimental to performance when paired with a social comparison focus but beneficial to performance in the absence of a social comparison focus. Why this should be the case is not immediately apparent – however there are several potential theoretical reasons for these results. The most parsimonious reason is that avoidance goals, in the absence of any other information, are more motivating than approach goals (as implied by Prospect Theory's principle that loss curves are steeper than gain curves). Put simply, people care more about avoiding failure than approaching success. In the social comparison absent condition, then, participants are more motivated not to fail than to succeed and therefore perform better in the avoidance condition than the approach condition. But in the social comparison present condition, the introduction of social comparison may induce feelings of anxiety especially for people with avoidance goals, because the idea of failing compared to one's peers may be more anxiety inducing than the idea of not succeeding compared to one's peers. Insofar as task performance is undermined by anxiety (as it was in the pinball task), then performance should suffer more in the avoidance condition than in the approach condition (when social comparison is present).

Another potential explanation for the results of Study 2 could lie in strategic differences between people with approach goals and people with avoidance goals. That is, people with approach goals might employ different tactics and strategies in their goal pursuits than people with avoidance goals. Avoidance goals seem to imply a defensive

mentality, combined with strategic vigilance against threats to the goal, whereas approach goals imply more expansive tactics, combined with energetic zeal in goal pursuit. Perhaps these strategic differences, when combined with a social comparison focus, suggest different outcomes. It may be the case that mentioning social comparison prepares an individual to compete with others, and if expansive tactics fit a competitive orientation better, then performance would be facilitated. On the other hand, in the absence of social comparison, an individual may be more focused on his/her own prior performance, and if expansive tactics do not fit with a self-focused orientation, such tactics would undermine performance. Thus, in the absence of social comparison, a defensive (avoidance goal oriented) strategy benefits and an expansive (approach goal oriented) strategy undercuts performance because an expansive strategy interferes with the non-competitive nature of the task. In contrast, in the presence of social comparison, an expansive strategy outperforms a defensive strategy because an expansive strategy fits with the competitive nature of the task.

Future research could attempt to tease these two potential explanations apart. The first explanation would be supported by evidence suggesting that people care more, in general, about failing as opposed to succeeding at a task. It would be further supported by evidence suggesting that a social comparison focus elevates anxiety relative to the absence of a social comparison focus, especially in the presence of an avoidance goal. Study 2 did not find evidence for an elevation in anxiety due to social comparison focus, but this lack of evidence may have been due more to the quality of the measure that was used than to the lack of an effect. Future research should employ more reliable and valid measures (e.g., the PANAS) to ensure that if the effect exists that it has the best chance at

being found. As for the second explanation, evidence suggesting that (a) people with approach and avoidance goals do in fact utilize different strategies in goal pursuit and that (b) those strategies result in different outcomes depending on whether or not social comparison is a factor would show support for that explanation. These hypotheses do not represent competing explanations for Study 2's effect; one, both, or neither of them may be at work. It may be the case, for instance, that anxiety plays a role in the strategic differences between approach and avoidance goals in the presence of social comparison. In any case, future research should explore the potential mechanisms underlying this social comparison effect.

In Study 2, boundary for success was measured as opposed to manipulated (as it was in Study 1). There is some reason to believe that this distinction between measured versus manipulated boundary may be theoretically meaningful. Imagine, for a moment, a company in which performance standards are set by management based on quarterly objectives and past performance. One's lower boundary for success in such a situation is dictated by the parameters of the situation: management defines acceptable and unacceptable performance. The employee in this situation is free only to set his/her level of aspiration at or above the assigned boundary for success; the boundary itself is fixed. Similarly, in a classroom situation, students' boundaries for success may be partially assigned to them. In the psychology department at Michigan State, for instance, students must achieve *minimally* a 2.0 in their psychology classes in order to graduate with a psychology major. For the majority of students, then, a 2.0 represents the boundary between success and failure in their psychology classes. They are, of course, free to set their level of aspirations higher than this lower boundary, but the boundary itself is fixed

by the parameters of the situation.

How, then, do self-set boundaries for success relate to imposed boundaries? The boundaries themselves are likely to be qualitatively different when they are imposed as opposed to self-set. In the first place, boundaries and levels of aspiration should be, on the whole, more strongly correlated to the extent that they are self-set as compared to imposed (exactly what was observed in comparing studies 1 and 2), but there may be individual differences in the strength of the correlation. For instance, previous research has shown that levels of aspiration can be utilized as motivational tools (Lewin et al., 1944). Thus, to the extent that some people set their levels of aspiration at unreachable levels (so as to motivate goal pursuit) but maintain their boundaries for success at attainably low levels (so as to avoid the experience of failure), the relationship between self-set boundary for success and level of aspiration would be expected to vary based on these individual differences in strategic use of levels of aspiration. Empirically, then, self-set boundaries should relate differently to other variables in the goal pursuit process than imposed boundaries. Secondly, the sense of agency and ownership that goes along with self-setting a boundary is absent in the case of an imposed boundary, and there may be important psychological ramifications because of this notion of ownership (as would be predicted by Self Determination Theory; Ryan & Deci, 2000), such that self-set boundaries may be more motivating or adhered to more strongly.

It should be the case that in situations in which clear task boundaries are not imposed by some authority or by the task constraints, people do self-set boundaries for success. In any type of goal pursuit, the tendency to set a range of acceptable performance for oneself ought to be commonplace. A parent going about his daily life,

for instance, might assert, "I'm really striving to get through all 10 loads of laundry and mow the lawn by the end of the day, but minimally, I've got to get through at least a couple of loads." Thus, for both types of boundaries, the experience of success or failure is contingent upon meeting or exceeding the boundary. There may be important differences in the nature of this experience, though, depending on whether the boundary that one has failed to meet was set by oneself or another person. The experience of failure may be more or less potent depending on whether a person has failed him/herself or someone else. It is clear, then, that self-set versus imposed boundaries could have important impacts on task construal and performance.

Turning briefly to the limitations of the current research, it is prudent to note that all of the participants in the current research were undergraduate college student (the majority being between 18 and 20 years of age). As is often the case with research utilizing college students, the results may not generalize to other populations. The vast experience of college students with achievement tasks like the ones used in these studies may have influenced the results, for example. Another limitation was that there was not as much variance on the worry and emotionality measures as would have been desirable. The mean response on the worry scale was 1.70 (SD = .59), and the mean response on the emotionality scale was 1.47 (SD = .49). Furthermore, the responses to the worry and emotionality scales were highly positively skewed (95% of participants had scores below 2.5 on both scales), and the maximum scores on both scales were below 3.5 out of 5. Any interpretation of the results concerning these scales should proceed with caution, and future research should employ different affective measures. A final limitation is that, as discussed above, the results of these studies may not generalize to other achievement

tasks, because (as I have shown), the impact of goal frame on performance depends on the nature of the task itself.

In sum, future research in achievement goals should reconsider the nature of avoidance goals, taking seriously the notion that there may be tasks and/or situations in which avoidance goals are beneficial for performance. Returning to the starting point of this research, future research must also further probe the role of boundaries for success and levels of aspiration in the goal pursuit process. Although researchers have investigated goal content in the past (i.e., using the mastery/performance goal distinction), there are other features of goal content (like boundary and level of aspiration) that have been neglected. For too long, researchers have assumed that much of goal content was irrelevant (or at least less relevant) to the goal pursuit process than goal valence. Both are necessary components of goal pursuit, and each deserves research attention – not only because both are important on their own but also because goal content and goal valence do not act independently of one another, but in concert. Overall, the findings described above suggest that avoidance goals need not be construed as uniformly negative. Rather, there is evidence to suggest that it is avoidance goals in concert with other problematic conditions (e.g., a socially comparative environment, low boundaries for success) that are so inimical to success. The findings further imply that interventions should be targeted at these contextual variables, not only because they are more malleable than goals but also because they are likely the epicenter of the problems surrounding avoidance goals.

APPENDICES

APPENDIX A

Tables

Table 1

Study 1 Manipulations

	Approach Goal Frame	Avoidance Goal Frame
Low Boundary for Success	Your goal for this anagram task is TO SUCCEED AT IT. During the task, keep in mind that you should try to do well on it! Most MSU students find the task to be moderately challenging – the average MSU student can solve about 50% of all possible anagrams. You will be assigned a grade based on your performance on the task. You will succeed if you get better than an 'F' on the anagram task! Find 10% or more of all possible anagrams to get better than an 'F' and be successful.	Your goal for this anagram task is to AVOID FAILING AT IT. During the task, keep in mind that you should try to avoid doing poorly on it! Most MSU students find the task to be moderately challenging – the average MSU student can solve about 50% of all possible anagrams. You will be assigned a grade based on your performance on the task. You will fail if you get an 'F' on the anagram task! Find no fewer than 10% of all possible anagrams to avoid an 'F' and avoid failing.
Medium Boundary for Success	Your goal for this anagram task is TO SUCCEED AT IT. During the task, keep in mind that you should try to do well on it! Most MSU students find the task to be moderately challenging – the average MSU student can solve about 50% of all possible anagrams. You will be assigned a grade based on your performance on the task. You will succeed if you get at least a 'C' on the anagram task! Find 50% or more of all possible anagrams to get a 'C' and be successful.	Your goal for this anagram task is to AVOID FAILING AT IT. During the task, keep in mind that you should try to avoid doing poorly on it! Most MSU students find the task to be moderately challenging – the average MSU student can solve about 50% of all possible anagrams. You will be assigned a grade based on your performance on the task. You will fail if you get less than a 'C' on the anagram task! Find no fewer than 50% of all possible anagrams to get at least a 'C' and avoid failing.
High Boundary for Success	Your goal for this anagram task is TO SUCCEED AT IT. During the task, keep in mind that you should try to do well on it! Most MSU students find the task to be moderately challenging – the average MSU student can solve about 50% of all possible anagrams. You will be assigned a grade based on your performance on the task. You will succeed if you get an 'A' on the anagram task! Find 90% or more of all possible anagrams to get an 'A' and be successful.	Your goal for this anagram task is to AVOID FAILING AT IT. During the task, keep in mind that you should try to avoid doing poorly on it! Most MSU students find the task to be moderately challenging – the average MSU student can solve about 50% of all possible anagrams. You will be assigned a grade based on your performance on the task. You will fail if you get less than an 'A' on the anagram task! Find no fewer than 90% of all possible anagrams to get an 'A' and avoid failing.
No Boundary for Success	Your goal for this anagram task is TO SUCCEED AT IT. During the task, keep in mind that you should try to do well on it! Most MSU students find the task to be moderately challenging – the average MSU student can solve about 50% of all possible anagrams. Remember, your goal is to be successful.	Your goal for this anagram task is to AVOID FAILING AT IT. During the task, keep in mind that you should try to avoid doing poorly on it! Most MSU students find the task to be moderately challenging – the average MSU student can solve about 50% of all possible anagrams. Remember, your goal is to avoid failing.

Table 2

Study 2 Manipulations

	Approach Goal Frame	Avoidance Goal Frame
Social Comparison Present	In today's session you'll play a computerized pinball game. What we are interested in is how well students play pinball compared to others. We're getting college students with different levels of pinball experience and collecting data on how well they play compared to others. In our previous work, we have found that most MSU students are fairly comparable in their ability to play pinball, but some students stand out because they do quite well at the pinball game. The average MSU student can score 23,000 points in a game. This session will give you an opportunity to demonstrate that you are a good pinball player.	In today's session you'll play a computerized pinball game. What we are interested in is how poorly students play pinball compared to others. We're getting college students with different levels of pinball experience and collecting data on how poorly they play compared to others. In our previous work, we have found that most MSU students are fairly comparable in their ability to play pinball, but some students stand out because they do quite poorly at the pinball game. The average MSU student can score 23,000 points in a game. This session will give you an opportunity to demonstrate that you are not a poor pinball player.
Social Comparison Absent	In today's session you'll play a computerized pinball game. Your goal for each pinball game is to SUCCEED AT IT. During each game, keep in mind that you should try to do well at it! In our previous work, we have found that most MSU students find the pinball game to be moderately challenging – the average MSU student can score 23,000 points in a game. Remember, your goal is to be successful.	In today's session you'll play a computerized pinball game. Your goal for each pinball game is to AVOID FAILING AT IT. During each game, keep in mind that you should try to avoid doing poorly on it! In our previous work, we have found that most MSU students find the pinball game to be moderately challenging – the average MSU student can score 23,000 points in a game. Remember, your goal is to avoid doing poorly.

Table 3

Study 2 Measures

Scale	Item	Responses	Alpha	$\bar{r}$
Pinball Experience	1. I have a lot of experience playing pinball in arcades. 2. I have a lot of experience playing pinball on the computer.	1 (SD) to 5 (SA)	.77	.63
Pinball Enjoyment	1. I enjoy playing pinball. 2. Playing pinball is boring. (R)	1 (SD) to 5 (SA)	.83	.70
Competence Valuation	1. How important is it to you to do well on these games today?	1 (Not at all) to 5 (Very)	-	-
Anticipated Performance	1. How well do you think you will do at these games today?	1 (Not at all) to 5 (Very)	-	-
Boundary for Success	1. What is the minimum score that you would need on your upcoming first [second] game to consider your performance a success? Note: a complete game consists of 3 balls.	Open-ended	-	-
Boundary Expectancy	1. What is the likelihood that you will be able to achieve this minimum score?	1 (0%) to 11 (100%)	-	-
Level of Aspiration	1. What score are you aiming for? That is, how many points are you trying to score in this pinball game?	Open-ended	-	-
LOA Expectancy	1. What is the likelihood that you will be able to achieve this score that you are aiming for?	1 (0%) to 11 (100%)	-	-
Perceived Competence	1. How well do you think you did on your first [second] game?	1 (Not at all) to 5 (Very)	-	-
Robo Pinball Enjoyment	1. This pinball game was very interesting. 2. This pinball game was a waste of time. (R) 3. I enjoyed this pinball game very much. 4. I thought this pinball game was boring. (R) 5. This pinball game was fun to play.	1 (SD) to 5 (SA)	.89	.61
Task Absorption	1. I was totally absorbed in the game while playing. 2. I though about things other than the game or the experiment while I was playing. (R) 3. While playing, I concentrated on keeping the ball in play.	1 (SD) to 5 (SA)	.59	.34
Overall Perceived Competence	1. I did very well at this game overall.	1(SD) to 5 (SA)	-	-

Note. LOA = Level of aspiration. SD = strongly disagree, SA = strongly agree. R = Reverse coded.

Table 4

Task Performance Means, Standard Deviations, and Covariate Adjusted Means: Study 1

	Mean	Standard Deviation	Adjusted Mean
Approach Goal	11.80	4.88	11.98
Avoidance Goal	13.33	5.74	13.10

Note. Adjusted means are the result of a one-way ANCOVA of goal type predicting number of correctly solved anagrams (practice anagram score is the covariate).

Table 5

Level of Aspiration Means, Standard Deviations, and Covariate Adjusted Means: Study 1

	Mean	Standard Deviation	Adjusted Mean
Approach Goal	71.91	24.62	72.04
Avoidance Goal	77.69	19.94	77.53

Note. Adjusted means are the result of a one-way ANCOVA of goal type predicting level of aspiration (practice anagram score is the covariate).

Table 6

Task Performance Means, Standard Deviations, and Covariate Adjusted Means: Study 1

	Mean	Standard Deviation	Adjusted Mean
No Boundary	12.39	5.73	12.23
Low Boundary	12.57	5.18	13.01
Medium Boundary	12.59	4.70	12.10
High Boundary	12.51	5.07	12.91

Note. Adjusted means are the result of a one-way ANCOVA of boundary for success predicting number of correctly solved anagrams (practice anagram score is the covariate).

Table 7

Level of Aspiration Means, (Standard Deviations), and [Covariate Adjusted Means]: Study 2

	Approach Goal Frame	Avoidance Goal Frame
Social Comparison Present	27,600 (3,400) [30,000]	24,600 (3,100) [27,500]
Social Comparison Absent	24,700 (1,900) [24,600]	26,800 (2,600) [31,600]

Note. Units are points in the Robo Pinball game and are rounded to the nearest 100 points for simplicity of presentation. Adjusted means are the result of a three-way ANCOVA of boundary for success, goal type, and sex predicting level of aspiration (average practice ball score and pinball experience are the covariates).

APPENDIX B

Figures

Figure 1. Elliot's hierarchical model of motivation.

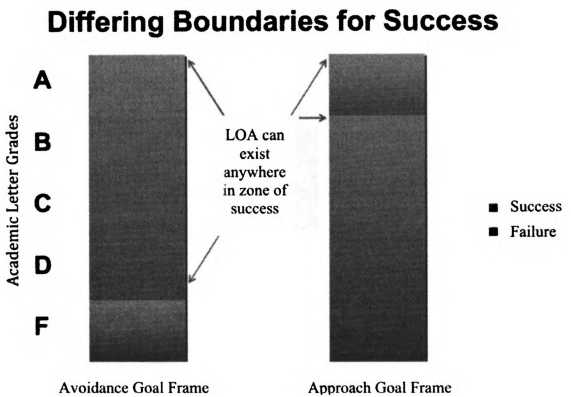

Figure 2. Example of differing boundaries for success in an academic context, according to the "Boundaries for Success" hypothesis. LOA = level of aspiration.

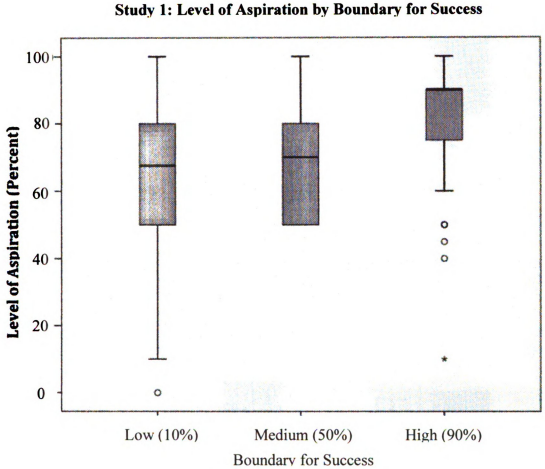

Figure 3. Range of level of aspiration set for the anagram task by manipulated boundary for success (expressed as percentage of total anagram solutions). The upper and lower edges of the box plot represent the 75^{th} and the 25^{th} percentiles, respectively. The upper and lower whiskers represent the maximum and minimum non-outlying values. Outliers (designated with a circle) are between 1.5 and 3 times the interquartile range, and extreme values (designated with a star) are greater than 3 times the interquartile range.

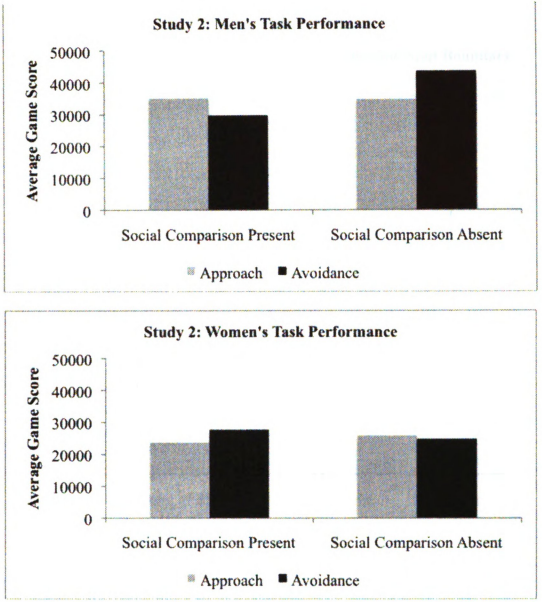

Figure 4. Means displayed are the result of an ANCOVA predicting average game score from sex, social comparison, and goal frame (controlling for pinball experience and practice pinball score).

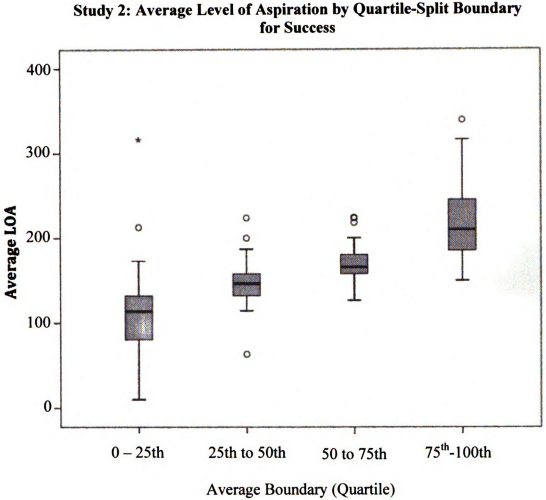

Figure 5. Units are square root transformed points in the pinball game. Both boundary for success and level of aspiration (LOA) are averaged over the two target games. The upper and lower edges of the box plot represent the 75th and the 25th percentiles, respectively. The upper and lower whiskers represent the maximum and minimum non-outlying values. Outliers (designated with a circle) are between 1.5 and 3 times the interquartile range, and extreme values (designated with a star) are greater than 3 times the interquartile range.

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