2008

The impact of achievement goals and difficulty on mood, motivation, and performance

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January 2008

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by

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A Thesis

Presented to the Graduate and Research Committee

of Lehigh University

in Candidacy for the Degree of

Master of Science

in Psychology

Lehigh University

January 2008

Master's Thesis Approval

Date: December 3rd, 2007

Candidate: Laura S. Gelety

Thesis Title: The Impact of Achievement Goals and Difficulty on Mood, Motivation, and Performance

Approved and recommended for acceptance as a thesis in partial fulfillment of the requirements for the degree of Master of Science

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Acknowledgments

I would like to express my sincerest thanks and gratitude to my advisor, Heidi Grant, for all of the guidance, wisdom, and understanding that she has provided me through out the process of completing my thesis. I would also like to thank my committee members, Gordon Moskowitz and Michael Gill, for all of their helpful insight and suggestions. Finally, special thanks go out to my parents whose unconditional love, support, and encouragement has greatly helped me along in my journey as a graduate student.

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Abstract

The effects of achievement goals (particularly performance goals) on expectancies, mood, motivation, and performance should vary as a function of task difficulty. However, very little research looking at the effects of achievement goals has considered this factor. In this paper, I will present two studies that assessed how and why task difficulty interacts with goal type (performance vs. learning) to impact subsequent goal pursuit. In Study 1, participants worked on a set of logic problems and were interrupted by the computer either zero or one time. In Study 2, participants worked on a trial set of five anagrams that were either mostly solvable or mostly unsolvable. All participants were then asked to complete a test set of ten anagrams (all of which were solvable). In both studies, participants' expectancies, mood, motivation, and actual performance were assessed. In general, it was found that participants with performance goals were negatively impacted by difficulty but those with learning goals were not. More specifically, in the easy conditions, participants with performance goals did better on the tasks and had higher expectancies than participants with learning goals. However, the benefits of performance goals disappeared in the difficult conditions - participants with performance goals reported greater drops in expectancies than those with learning goals, which in turn were associated with lower scores. In addition, for learning goal participants, drops in expectancies did not negatively impact task performance. The implications of these results as well as directions for future research are discussed.

Introduction

Achievement goals have been found to predict unique patterns of intrinsic motivation, affective reactions, and performance both in and out of the classroom, and as a result have been the subject of a great deal of research in the last two decades. Relatively little of this research, however, has focused on potential moderators that may interact with achievement goals to influence goal pursuit. For instance, some have argued that *task difficulty* may be one such moderator, clarifying when particular goals will facilitate or hinder achievement (see Barron & Harackiewicz, 2001; Grant & Dweck, 2003). Surprisingly, very little research has been done that directly manipulates difficulty to observe its impact. Therefore, in this paper I will present evidence from two studies to show that task difficulty does indeed interact with achievement goals to significantly affect mood, motivation, and performance.

Different Goal Systems: Performance and Learning Goals

For this research, I focus on two major classes of achievement goals referred to as *performance* and *learning goals*. Individuals who pursue *performance goals* are concerned with demonstrating and/or validating ability. Performance goals can also involve a normative component whereby an individual strives to outperform others (Dweck, 1986; Elliot & Dweck, 1988; Elliot & McGregor, 2001; Grant & Dweck, 2003; Schunk, Pintrich, & Meece, 2008). For example, a person who strives to get an A in order to demonstrate her intelligence or to get the highest grade in a course has a performance goal with respect to that course. Performance goals are also commonly

referred to as *ego-involving* goals (Nicholls, 1984) or *ability-linked* goals (Grant & Dweck, 2003).

On the other hand, those who pursue *learning goals* are concerned with developing skills and acquiring new knowledge. Individuals with learning goals might also be concerned with mastering a challenge, self-improvement, or any other progress-related focus (Dweck, 1986; Elliot & Dweck, 1988; Elliot & McGregor, 2001; Grant & Dweck, 2003; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Schunk, Pintrich, & Meece, 2008). For example, if a person is focused primarily on learning as much as he can in a course to improve his mastery of the topic, then he has a learning goal with respect to that course. Learning goals may also be referred to as *task-involving* goals (Nicholls, 1984) or *mastery goals* (Ames & Archer, 1988; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997).

The Approach-Avoidance Distinction

It is important to note that, in addition to the performance and learning distinction, there exists a distinction between the valences of achievement goals. *Performance-approach* goals focus on demonstrating competence whereas *performance-avoidance* goals focus on avoiding the demonstration of incompetence. *Learning-approach* goals focus on gaining knowledge and skill while *learning-avoidance* goals focus on avoiding losing skills or not learning as much as one could (Elliot & McGregor, 2001). Given this bifurcation of valence, these goals have been found to have very different effects on mood, motivation, and performance (Elliot & Church, 1997). Specifically, approach forms are thought to be beneficial while avoidance forms (particularly performance-avoidance goals) are shown to predict lowered performance, loss of intrinsic motivation,

and withdrawal from the goal. For this research, I focus only on approach goals because they are the most commonly endorsed and most often studied goals (see Grant & Dweck, 2003). In addition, while there is little disagreement as to the maladaptive effects of performance-avoidance goals, the effects of performance-approach goals are not so clear and warrant further investigation.

Goal Measurement

Achievement goals can be measured as individual difference variables or they can be experimentally manipulated (i.e. situationally activated). Both methods have been widely used in the domain of achievement goal research. Learning goals are measured or manipulated by emphasizing a focus on improvement, development, effort, and maximization of learning. In contrast, performance goals are measured or manipulated by emphasizing competition, evaluation of ability, and a focus on obtaining high grades or scores on a task. For instance, Ames and Archer (1988) measured high school students' perceptions of the classroom goal orientation through a goal orientation questionnaire. Two examples of learning-goal items included: "The teacher pays attention to whether I'm improving" and "I work hard to learn". The performance-goal component of the questionnaire contained items such as "Students want to know how others score on assignments" and "I work hard to get a high grade". As another example, Elliot and McGregor (2001) developed a questionnaire that measures college students' course related achievement goals (called the Achievement Goal Questionnaire). This questionnaire includes items such as "I want to learn as much as possible from this class" to assess learning goals and "It is important for me to do well compared to others in this class" to assess performance goals.

Elliott and Dweck (1988), on the other hand, experimentally manipulated performance and learning goals through their task instructions. For their study, Elliott and Dweck had fifth-grade children complete a card discrimination task. The instructions for this task were framed as either a performance goal or a learning goal. Children in the performance goal condition heard such statements as "although you won't learn new things, it will really show me what kids can do" and were told that their performance would be evaluated by experts, thus, adding a normative facet to this condition. By contrast, children in the learning goal condition heard statements such as "you'll probably make a bunch of mistakes, get a little confused, maybe feel a little dumb at times, but eventually you'll learn some useful things" and were told that the task helps to 'sharpen the mind'. Similarly, Grant, Baer, and Dweck (2006) manipulated goal type through task instructions. In their third study, Grant et al. framed a problem-solving task as either a performance goal or learning goal. Performance goal participants read instructions indicating that "this is a new kind of intelligence test designed specifically for 'elite' students" and "it is a very challenging task we will use to discriminate between truly gifted students and average students". By contrast, learning goal participants read instructions indicating that "although it is a very challenging task, it is simply a training tool that college students can learn from and use to improve their problem-solving skills" and "you will have an opportunity to improve". In the two studies presented in this paper, achievement goals are manipulated through the task instructions.

The Impact of Achievement Goals

In general, learning goals have been found to predict a more adaptive pattern of responding to difficulty. Performance goals, by contrast, have been found to predict a

helpless pattern of responding (Dweck, 1986; Dweck & Leggett, 1988; Nicholls, 1984). The impact of performance and learning goals on the cognitive, emotional, and behavioral components of goal pursuit can be explained by the different concerns inherent in these goals. Therefore, any subsequent changes in goal pursuit should be congruent with these different achievement concerns.

Attributions and Expectancies

Why do performance and learning goals lead to such different patterns of responding to difficulty? Perhaps most important, performance goal- and learning goal-oriented individuals differ in their attributions for failure and expectancies for future success. At the outset of goal pursuit, both learning and performance goal individuals tend to have high and equal expectancies for goal attainment (Elliot & Church, 1997). However, upon encountering difficulty, individuals pursuing performance goals, because of their focus on demonstrating high ability, commonly attribute failure to *lack of ability* (Ames & Archer, 1988; Dweck, 1986; Dweck & Leggett, 1988). In addition, these individuals believe that the more effort they need to expend for a given task, the less ability they have to complete it. Not surprisingly, their expectancies for future success in the face of difficulty decrease (Dweck, 1986). On the other hand, individuals with learning goals, given their emphasis on skill development, often attribute failure to *lack of effort* or *inappropriate strategy use*. These individuals believe that goal attainment is still possible if they increase their effort or choose a better strategy. As a result, their expectancies for future success remain the same or increase (Ames & Archer 1988; Dweck, 1986; Dweck & Leggett, 1988).

Dweck (1986) and Dweck and Leggett (1988) argue that the helpless pattern of responding characteristic of performance goals only occurs when a person with this goal has low perceptions of ability. However, when a person with a performance goal has high perceptions of ability, then he/she is likely to display a pattern of responding similar to that of learning goals. In their studies, ability perceptions are often manipulated through failure or success feedback. It is possible that ability perceptions may also be influenced by task difficulty (i.e. through varying the complexity of the experimental task itself), a hypothesis I will turn to again in greater detail.

Mood and Motivation

In the face of negative feedback, both performance and learning oriented individuals experience negative affect. More specifically, feelings of anxiety, frustration, and sadness are commonly reported when individuals encounter hardship. For instance, Dykman (1998) assessed college students' goal orientations, negative life events, and depression levels through a series of questionnaires. It was found that both students with performance and learning goals reported increased depression after experiencing a negative life event. However, performance oriented students experienced depression to a greater degree than learning oriented students. Similarly, Grant, Baer, and Dweck (2006) found that both performance and learning oriented participants reported experiencing greater depressed affect after failing at an experimental task but that learning oriented participants experienced it to a lesser degree than did performance oriented participants. Moreover, learning oriented participants utilized this negative affect in a more adaptive way. They took the experience of depression as a sign that their effort needed to be increased or that they should engage in more adaptive coping strategies. By contrast,

performance oriented participants perceived the negative affect as a sign that they had failed, thus, they were more likely to disengage from the goal entirely. Grant, Gelety, Baer, and Dweck (2007) found a similar pattern of results in their studies.

It should be noted that some researchers have found that learning goals actually predict *positive* affect in the face of negative feedback (Dweck & Leggett, 1988; Pekrun, Elliot, & Maier, 2006). Dweck and Leggett (1988) argue that performance oriented individuals perceive difficulty as a threat to the self. As a result, these individuals should experience anxiety followed by depression and shame after repeated setbacks. Learning oriented individuals, by contrast, view difficulty as a challenge to master. Therefore, they should experience feelings of optimism and determination. However, there is some debate as to whether optimism and determination are 'true' emotions. In addition, while it is plausible that learning goals predict positive affect in the face of relatively few setbacks, this might not be the case after repeated encounters with difficulty (which the above research does not address).

Performance and learning oriented individuals also differ in their levels of intrinsic motivation for completing a task. Given the different concerns of achievement goals highlighted above (i.e. validation vs. development), learning goals should predict greater intrinsic motivation overall as well as maintenance of it for a difficult task whereas performance goals should predict a decrease in intrinsic motivation (Dweck, 1986). Indeed, Elliot and Church (1997) found that learning goals facilitated intrinsic motivation through challenge appraisal, excitement, and task absorption for students in an introductory psychology course. Performance approach goals were found to be unrelated to intrinsic motivation. Likewise, in a series of studies conducted by Grant and Dweck

(2003), learning goals were found to predict sustained motivation while performance goals were found to predict motivational withdrawal in the face of difficulty.

Task Performance

The findings with regard to the effects of achievement goals on task performance are mixed. While there is a general agreement that learning goals are the more adaptive of the achievement goals, performance goals have also been found to predict some beneficial achievement outcomes. More specifically, in some studies, performance goals have been found to predict higher exam and course grades whereas learning goals have been found to predict higher intrinsic motivation and interest only (Elliot & Church, 1997; Elliot & McGregor, 2001; Elliot, McGregor, & Gable, 1999; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Senko & Harackiewicz, 2005). For instance, in their third study, Elliot and McGregor (2001) found that performance goals predicted higher grades on both multiple choice and short answer/essay exams whereas learning goals were unrelated to graded performance. In a related vein, Elliot, McGregor, and Gable (1999) found in both of their studies that performance goals were positively correlated with exam performance while learning goals were unrelated to exam performance.

By contrast, other researchers have found that performance goals are detrimental to performance while learning goals are beneficial, confirming the notion that performance goals are generally maladaptive in difficult achievement situations (Ames & Archer, 1988; Dweck, 1986; Dweck & Leggett, 1988; Elliott & Dweck, 1988; Grant, Baer, & Dweck, 2006; Grant & Dweck, 2003; Grant, Gelety, Baer, & Dweck, 2007). Dweck and Leggett (1988) argue that impaired performance occurs for those with

performance goals because they are more likely to have low expectancies for the utility of greater effort, believe effort to indicate lack of ability, experience anxiety in the face of difficulty, and lack the intrinsic motivation necessary for persistence. Learning goals lead to improved performance because those with these goals view difficulty as an opportunity for improvement, have high expectancies for future success, experience positive affect in the face of difficulty, and are motivated by difficulty.

It is important to emphasize that the researchers who found benefits of performance goals did not take the difficulty of the achievement situation into account. Instead, they looked at the effects of performance and learning goals in achievement situations in *general*. It does seem that researchers who found maladaptive effects of performance goals tended to find them in difficult achievement contexts. Studies assessing the effects of achievement goals have utilized a variety of different tasks. For instance, some studies implemented fun, easy tasks (i.e. NINA puzzles, boggle, or pinball) while others involved tougher, more complex tasks (i.e. difficult math problems, analytical problems, or actual course exams). However, very little research has directly addressed *how* task difficulty itself affects achievement. Failure to take into account important potential moderators (difficulty in particular) of these effects may account for the discrepant findings.

Difficulty and Goal Pursuit

Expectancy-Value Theory

The expectancy-value model of motivation has a long history in social psychology, particularly in the domain of achievement (for a review, see Weiner, 1992). Expectancy-value theories share the assumption that motivation to pursue a goal is a

function of expectancies for success as well as the value that is placed on the attainment of the goal. Therefore, motivation to pursue any given goal should be maximized if expectancies for reaching it are high and the outcome is valuable. Atkinson (1957, 1964) was the first to apply these principles directly to the study of achievement, in order to predict behaviors such as task choice and persistence. More recent expectancy-value models have focused on the many potential sources of value and expectancy (e.g., Eccles & Wigfield, 1995; Feather, 1982; Rokeach, 1973). Sources of expectancies include one's sense of self-efficacy, beliefs about the utility of effort, , the context/environment in which the goal is to be pursued, and most germane to this discussion, the individual's perception of task difficulty (Bandura, 1989; Eccles & Wigfield, 1995). Thus, expectancy-value theories predict that difficulty (or perceived difficulty) is detrimental to motivation, and should lead to relatively poorer performance.[1]

While expectancy-value models have well established their utility across domains, in recent years several important moderators have emerged. For instance, Shah and Higgins (1997) found that regulatory focus influences the interaction of expectancies and value on goal commitment and action. Within a promotion focus (maximizing positive outcomes to obtain a sense of accomplishment), both expectancies and value matter for goal commitment. However, within a prevention focus (minimizing negative outcomes to obtain a sense of security), goals are experienced as *necessities*, and consequently the value of the goal predicts commitment, while expectancies are given less weight. Put

[1] Atkinson (1964) argued that expectancy and value are inversely related, such that success on a more difficult task is valued more than success on an easier task. In this sense, lower expectancies can lead to *greater* motivation, as a result of increased value. It is important to keep in mind, however, that this is only one source of value – easier goals may still be of high value for a variety of reasons – for example, because success on the task is taken as evidence of high aptitude or because it results in a large reward.

more simply, when you are danger, you feel you have to try to get to safety no matter how much the odds are against you. Thus, the expectancy-value model seems to capture promotion regulation but not prevention regulation.

Temporal construal is another factor thought to moderate expectancy-value effects. In their review on temporal construal, Trope and Liberman (2003) argue that the temporal distance from the occurrence of a future event will influence perceptions of desirability (value) and feasibility (expectancy) of the event. Distant-future events are represented in broad abstract terms (called high-level construals) whereas near-future events are represented in concrete, detailed terms (called low-level construals). Moreover, Trope and Liberman hold that the desirability (or value) of an event is a high-level construal and should guide distant-future decisions with regard to that event. The feasibility (or expectancy) of an event, in contrast, is a low-level construal and should, thus, influence near-future decisions with regard to that event. In other words, we are more motivated by value when pursuing temporally distant goals, and more motivated by expectancies when pursing temporally proximal goals.

For my research, I hypothesize that the type of achievement goal one pursues is another possible moderator of the expectancy-value effects on task performance. I will turn to this proposal in more detail later in the paper.

Goal-Setting Theory

A very different view of the impact of difficulty on goal pursuit can be found in the research conducted by proponents of Goal Setting Theory (see Locke & Latham, 2002), where difficult goals have generally been found to be beneficial for motivation and performance. In their review on goal setting and task performance, Locke, Shaw,

Saari, and Latham (1981) argue that the positive linear relationship between goal difficulty and task performance is one of the most robust and replicable findings in this domain. Assuming that an individual has sufficient ability to complete a task, assigning a specific and difficult goal for task completion leads to enhanced performance. This enhancement is thought to occur because specific difficult goals direct one's attention to task-relevant behaviors, increase effort and persistence, and motivate the individual to seek out adaptive strategies for completing the task (see also Earley, Wojnarski, & Prest, 1987). Furthermore, Latham and Locke (2006) contend that difficult goals are also beneficial because they increase feelings of personal effectiveness and self-satisfaction (see also Bandura & Cervone, 1983; Earley & Lituchy 1991). In essence, specific difficult goals give meaning and direction to tasks that are otherwise meaningless (Latham & Locke, 2006).

However, some research suggests that the benefits associated with difficult goals occur only under certain conditions. For example, Gellatly and Meyer (1992) looked at how goal difficulty influences sympathetic arousal. More specifically, they conducted two studies aimed at determining whether arousal (as measured through heart rate) is affected by goal difficulty and, subsequently, if arousal is related to the cognitive and behavioral changes during task completion. They posited that arousal is elicited by the task itself as well as the goal that has been set for completing the task. Results showed that when task arousal is low, the arousal produced by a more difficult goal increases mental effort and energy and, in turn, boosts performance. When task arousal is high, a difficult goal creates a state of overarousal, leading to performance decrements (either through feelings of anxiety or disengagement). In a related vein, Mossholder (1980)

looked at the effects of goal difficulty on intrinsic motivation, and found that difficult goals are beneficial to intrinsic motivation only when the task itself is a relatively boring one to complete. These studies suggest that difficult goals can have both adaptive and maladaptive influences on subsequent task performance, depending on the task involved. I will argue that the content of the goal itself (namely, whether it is a performance or learning goal) is another important factor to consider in understanding the impact of difficulty.

Before continuing, it is worth noting that there are (at least) two possible senses in which goal pursuit can be 'difficult'. Locke, Shaw, Saari, and Latham (1981) distinguish between *task* difficulty and *goal* difficulty. They define a difficult *task* as a specific thing to be accomplished that requires a high level of skill, knowledge, and/or effort. For example, chess is a more difficult game than checkers. A difficult *goal* refers to a standard of performance that is hard to reach (e.g. obtaining a score of 90 out of 100 is a more difficult goal than obtaining a score of 80). Difficult goals might also require a high level of skill, knowledge, and/or effort. These two conceptualizations of difficulty are often used interchangeably because it is common for the task to be conceptualized as the actual goal to be attained (e.g. succeed on this easy task vs. succeed on this harder task). In the goal-setting studies of Locke, Latham, and colleagues, goal difficulty is the most commonly manipulated variable. In other words, these researchers raise or lower the bar in terms of a performance standard. In contrast, for Study 1, I manipulate *task* difficulty by incorporating different numbers of external obstacles (computer interruptions) through out a set of ten analytical problems. For Study 2, I manipulate participants' perceptions of difficulty by incorporating different numbers of unsolvable

anagrams within a trial set of five completed at the beginning of the experiment. For both studies, I examine how the types of achievement goals to which one is assigned influences how that person would respond to the difficulty of the task.

Task Difficulty and Achievement Goals

While the goal-setting research has considered in depth how difficulty affects motivation and task performance, it has only considered goals in a general sense. In much of this research, no distinction is made between the different types of goals that an individual may pursue. More specifically, how might performance and learning goals differentially interact with task difficulty to affect these variables? Only two sets of published studies exist where the interaction between goal type and difficulty was explicitly assessed.

Barron and Harackiewicz (2001) conducted two experiments that compared the 'multiple goal perspective' (which argues that both performance and learning goals contribute to optimal motivation) to the 'mastery goal perspective' (which focuses on the adaptive effects of learning goals and the maladaptive effects of performance goals). Most relevant to my research, Barron and Harackiewicz manipulated task difficulty in their experiments in order to compare the two perspectives under easy and difficult achievement situations. They also implemented the difficulty manipulation to test Dweck and Leggett's (1988) assertion that performance goals are only maladaptive in difficult achievement contexts.

In their first study, undergraduate students' chronic goal orientations were measured. They were then asked to complete a set of math problems using a new mental math technique taught to them during the experimental session. Difficulty was

manipulated by presenting some participants with an easy set of problems and presenting others with a different, more difficult, set of problems. The results indicated that participants with high levels of learning goals found the math problems to be more interesting and enjoyable than those with low levels (irrespective of difficulty). Learning goals were unrelated to performance. By contrast, individuals with high levels of performance goals completed more problems than those with low levels, but this difference was significant only in the easy task condition. These findings, however, failed to replicate in a second study in which goals were manipulated rather than measured – no significant effects on task performance emerged. Barron and Harackiewicz concluded that performance goals appear to be beneficial for performance of easy tasks. Unfortunately, because these results did not replicate across the two studies, they remain inconclusive. In addition, since different tasks were used in the easy versus difficult conditions, it is not possible to compare performance for the same goal across conditions. For example, we cannot know if individuals pursuing learning goals are more motivated and perform better when a task is easy or difficult.

Senko and Harackiewicz (2005) hypothesized that perceptions of goal difficulty explain the distinct associations of learning goals to interest and performance goals to task performance. More specifically, they hypothesized that learning goals facilitate more interest because they appear to be easier to meet than performance goals. Performance goals, on the other hand, promote better task performance because they appear to be more difficult to meet than learning goals; which, consequently, facilitates greater motivation. In general, it was found across two studies that participants in the performance goal conditions did indeed perceive the goal to be harder to meet than those

in the learning goal conditions. Moreover, performance goal participants scored higher on each task than learning goal participants. However, perceived goal difficulty did *not* mediate the relationship between goal type and performance in either study. Thus, the role played by difficulty in producing these effects is unclear. Finally, while Grant and Dweck (2003) did consider the idea that difficulty is an important moderator of the effects of achievement goals on task performance, they did not directly test their hypothesis by comparing easy versus difficult conditions in their studies. Rather, they focused only on difficult achievement contexts. Thus, no clear picture of the impact of difficulty on performance and learning goal pursuit has yet emerged.

The Present Research

The purpose of the current research is two-fold. First, the present studies were designed to improve methodologically upon previous research examining achievement goals and difficulty. For my studies, task difficulty was directly manipulated, unlike in past studies where perceptions of difficulty were measured. I also manipulated, rather than measured, goal orientations so that the causal role of goals in producing any observed effects might be clarified. In addition, regardless of goal and difficulty condition, all participants in Study 1 worked on the same set of test problems and all of those in Study 2 received the same test set of anagrams (unlike in the Barron and Harackiewicz (2001) studies where participants worked on different sets of math problems depending on the difficulty condition they were in). This allowed for a direct comparison of the performance of participants in all conditions. I also varied when participants would experience task difficulty. In Study 1, participants experienced difficulty *during* the completion of the experimental task whereas in Study 2, participants

experienced difficulty *before* completing the experimental task. I also manipulated difficulty in two different ways: (1) through time pressure caused by interruptions to the task (Study 1) and (2) through the introduction of unsolvable anagrams (Study 2) to begin to explain whether or not the *source* of difficulty matters.

A second goal of this research is to better understand *why* goal type and difficulty interact to influence performance. I included measures of expectancy, mood, and motivation to capture some of the possible mediating factors of the goal X difficulty interaction.

Overview of Experiments

For both studies, goal type was manipulated through the task instructions that were presented orally to the participants. More specifically, participants were assigned to either a performance goal or learning goal. Task difficulty was manipulated by presenting participants with computer interruptions (Study 1) or different numbers of unsolvable anagrams (Study 2). The primary dependent variables of interest in both studies were: (a) task performance (number of correct solutions), (b) performance expectancies, (c) mood, and (d) self-reported motivation.

Hypotheses

Based on the findings of past research and the purposes of the present research highlighted above, three overall hypotheses were made. The first hypothesis predicts that individuals with performance goals should be negatively impacted by difficulty. While performance goals might predict performance boosts for easy tasks, this boost should disappear for difficult tasks. The second hypothesis asserts that individuals with learning goals should not be negatively impacted by difficulty. These hypotheses are tested in

Study 1. The third hypothesis concerns the role of expectancies in producing these effects; namely, that difficulty should lead to lowered expectancies, but more so for performance goals than learning goals. Lowered expectancies, in turn, should lead to loss of motivation and lowered achievement for performance goals but not for learning goals. To be clear, I am predicting that individuals with performance goals will suffer for two related reasons. First, individuals with performance goals should experience greater drops in expectancies than those with learning goals in the face of difficulty. Secondly, individuals with performance goals should be impacted more negatively by drops in expectancies than people with learning goals. This hypothesis is tested in Study 2.

Stated differently, I am suggesting that achievement goals (like regulatory focus and temporal construal) moderate the impact of expectancies predicted by expectancy-value theories. Expectancies should be positively related to motivation for individuals pursuing performance goals, but not for those pursuing learning goals.

Study 1

Method

Participants

Participants were 106 Lehigh University undergraduates recruited through the psychology participant pool. They participated as part of a research requirement for their introduction to psychology course. Due to failure to answer all of the experimental questions, the data for eight participants were omitted. Therefore, the data for 98 participants (66 men and 32 women) were used in all subsequent analyses.

Task

Participants completed a set of 10 moderately difficult LSAT-type analytical problems (**see Appendix A**). During the completion of the problem set, the computer interrupted participants zero or one time. This interruption served as my difficulty manipulation. The interruption consisted of a 1-minute reaction-time task in which participants were required to press the spacebar as fast as possible upon hearing an audible beep from the computer. After the minute expired, participants were able to continue working on the problems.

Design

The design was a 2 X 2 between-subjects factorial. My independent variables were: (a) goal type: performance or learning and (b) difficulty: zero or one interruption. Goal type was manipulated through the experimental instructions. Our dependent measures of interest were participants': (a) task performance, (b) performance expectancies, (c) mood, and (d) self-reported motivation.

Procedure

Up to four participants per session entered the lab and were seated at four individual computers. All participants read and signed two documents of informed consent before beginning the experiment. After giving their consent, the experimenter read the task instructions to participants. All participants were told that they would participate in a study looking at how people perform when they are presented with dual tasks. They were told that they would work on a set of analytical problems and that they had 15 minutes to complete it (in reality, they had as much time as needed to complete the set). Furthermore, participants were informed that they might be randomly chosen by the computer to complete a second interruption task zero, one, or more times while

completing the problems. Finally, participants were told that if they were interrupted, it will make it harder for them to do well on the problems, but that it was still possible to solve them all even if they were interrupted many times. The interruption task consisted of a 1-minute reaction-time task in which participants were required to hit the spacebar as quickly as possible upon hearing an audible beep from the computer. While participants were told that the interruption could occur at any random time, we actually programmed the interruption to occur at a set time during the task set. Participants in the easy condition simply completed the 10 analytical problems without interruption. In the difficult condition, participants were interrupted after the 3rd problem.

The experimenter next read further instructions based on the goal condition in which the participants were placed. These instructions were modified versions of the task instructions used in Grant, Baer, and Dweck (2006) study and framed the task as either a performance goal or learning goal. Participants in the performance goal condition heard the following:

> *We would like you to complete the following set of problems. Your performance on these problems depends on your conceptual and analytical abilities. Your score will be given to you both in terms of the number of correct solutions you produce, and what your performance level is relative to the other Lehigh students who have participated in this study. It is important to do your best and try to get a high score.*

Participants in the learning goal condition heard the following:

> *We would like you to complete the following set of problems. This task is a training tool that college students can learn from to develop their conceptual and*

analytical skills. Our research indicates that these are skills that can be acquired over time, and you will have a chance to improve. It is important to take advantage of this valuable learning opportunity.

After hearing the instructions, participants filled out a mood assessment rating their expectancies, mood, self-reported motivation, and performance perceptions and attributions. Participants rated on a scale of 1 (not at all) to 7 (a lot) the extent to which they were feeling ten emotions. They also rated on a scale of 1 (not at all well) to 7 (very well) how well they expected to do on the task. Also on a seven-point scale, participants rated their perceptions of control as well as performance attributions (i.e. to effort or ability; **see Appendix B**).

Upon completion of the mood assessment, participants began working on the problem set; after which they completed a second mood assessment (identical to the first). Upon completion of the assessment, participants were fully debriefed on the nature of the study, thanked for their participation, and dismissed from the laboratory.

Results

Analysis Strategy

In order to examine how goal type and task difficulty interact to affect expectancies, mood, motivation, perceptions of control, and performance, a series of ANOVAs were conducted for each dependent variable.[2] All means reported here are estimated marginal means controlling for covariates (and consequently, variability is reported in the form of standard errors). For Time 1 variables (expectancy, mood, self-reported motivation, and perceptions of control), goal type, gender, and their interaction

[2] We also measured participants' performance attributions (innate ability, effort, and luck). However, none of the statistical tests reached significance. Therefore, the results for these variables will not be discussed.

were entered as predictors (difficulty was not entered as a predictor since participants had not yet begun the task, though they had already been given the goal-framing task instructions). There were no significant effects of the goal manipulation (**see Table 1** for Time 1 variable means).

Goal type, task difficulty, gender, and all two- and three-way interactions were entered as the predictors for measures of changes in mood, motivation, perceptions of control, and actual performance from Time 1 to Time 2 (**see Table 2**). When three-way interaction terms did not approach reliability, they were dropped and the analysis was re-run including only two-way interaction terms.

Creating Composite Mood Variables

Due to the high intercorrelation among some of the mood items, four composite mood variables were created. The first composite variable, *mad*, consisted of scores for the items 'angry' and 'frustrated', taken at both assessment intervals. The alphas for *mad* at each time interval indicated reliability (.65 and .74, respectively). The second composite variable, *agitation*, consisted of scores for the items 'anxious' and 'tense'. The intercorrelations for *agitation* also proved reliable (alphas were .78 and .75, respectively). The third composite variable, *sad*, consisted of the scores for the items 'dejected' and 'depressed'. The alphas for Times 1 and 2 indicated high reliability (.75 and .72, respectively). The final composite variable, *motive*, consisted of the scores for items 'determined' and 'motivated', and was reliable as well (alpha equaled .81 for both Time 1 and Time 2). These composite variables were used in all subsequent analyses regarding participant mood and motivation.

Goal and Difficulty Effects on Performance

My primary hypothesis was that the effect of difficulty on performance would be moderated by goal type. Though it was not statistically significant, the pattern of the goal X difficulty interaction was consistent with my hypothesis, $F(1, 91) = 1.66$, $p = .20$ (**see Figure 1**). In the easy condition, performance goal participants correctly solved more problems ($M = 9.15$, $SE = .47$) than learning goal participants ($M = 8.44$, $SE = .35$). By contrast, in the difficult condition, performance and learning goal participants did not differ in number of correct solutions ($M = 8.72$, $SE = .31$ and $M = 8.89$, $SE = .31$, respectively).

Goal and Difficulty Effects on Changes in Mood, Motivation, and Control Perceptions

I was also interested in how the impact of difficulty on performance and learning goal pursuit might extend to differences in affective experience, motivation, and perceptions of control. After controlling for sadness at Time 1, a marginal goal X difficulty interaction was found, $F(1, 89) = 2.82$, $p = .10$. In the easy condition, learning goal participants became sadder than performance goal participants. By contrast, performance goal participants became sadder than learning goal participants in the difficult condition. No other significant effects of goal and difficulty emerged.

Summary

Overall, while the results were not statistically reliable, their patterns were consistent with my prediction regarding the impact of difficulty on individuals with performance and learning goals. Namely, the achievement advantage associated with performance goals for the relatively easy task disappeared when the task became difficult.

In order to replicate and extend the findings of Study 1, I conducted a second study similar in design but with three important differences. First, I used a different experimental task. Participants were asked to complete two sets of anagrams (a trial set and a test set) rather than analytical problems. Secondly, I manipulated task difficulty by presenting participants with one or four unsolvable anagrams instead of using a computer interruption. Finally, unlike Study 1 where participants experienced difficulty while working on the experimental task, I implemented my difficulty manipulation by presenting participants with the unsolvable anagrams in the trial set *before* they began working on the test set of anagrams. This kept the task on which performance was measured constant across conditions so that performance would be directly comparable. More importantly, it allowed for an analysis of how changes in expectancy brought about by the experience of difficulty impact *subsequent* performance, and thus more directly tested the proposed mechanism through which goals and difficulty interact to predict performance.

Method

Participants

Participants were 171 Lehigh University undergraduates recruited through the psychology participant pool. They participated as part of a research requirement for their introduction to psychology course. Due to failure to answer all of the experimental questions, the data for one participant was omitted. In addition, the data for 18 participants were omitted because they did not provide any word solutions at all on the practice anagram set, or because they provided four or more incorrect word solutions on the test set of anagrams (indicating that they did not fully understand the instructions,

which emphasized that incorrect guesses would be penalized). Therefore, the data for 152 participants (67 men and 85 women) were used in all subsequent analyses.

Task

Participants completed a trial set of five anagrams (**see Appendix C**). I implemented my difficulty manipulation during this task. Some participants received one unsolvable anagram while the remaining four were solvable (the easy condition). The rest of the participants received only one solvable anagram while the remaining four were unsolvable (the difficult condition). After completing the trial set, participants then completed a test set of ten anagrams (**see Appendix D**). All of the anagrams were solvable in this set. I assessed performance using participants' solutions for the anagrams in the test set.

Design

The design was a 2 X 2 between-subjects factorial. My independent variables were: (a) goal type: performance or learning and (b) difficulty: one or four unsolvable anagrams. Goal type was manipulated through the experimental instructions.

My dependent measures of interest were participants': (a) task performance, (b) performance expectancies, (c) mood, and (d) self-reported motivation.

Procedure

Up to four participants per session entered the lab and were seated at four individual computers. All participants read and signed two documents of informed consent before beginning the experiment. After giving their consent, the experimenter read the task instructions to participants. All participants were told that they would participate in a conceptual problem-solving task consisting of two sets of anagrams.

However, the instructions about the purpose of the task differed depending on goal condition. The instructions used for this study were identical to the task instructions used for the performance and learning goal conditions in Study 1.

In addition, the experimenter told all participants that they would have fifteen minutes to complete the test set of anagrams (in reality, they had as much time as needed to complete the set). Giving participants a time limit ensured that they completed the task in a timely manner. Participants were told that one point for each correct solution would be added to their total score while one point for each incorrect solution would be deducted (in order to increase motivation to find as many solutions as possible without making up words that do not exist). Furthermore, learning goal participants were informed that their total net scores would be used to assess their current problem solving skills and to provide feedback on how they could improve those skills. Performance goal participants, on the other hand, were told that their total net scores would be used to assess their problem solving abilities and that it would be compared to the scores of other Lehigh students. Finally, the experimenter emphasized that ALL of the letters in each anagram must be used in each solution.

After hearing the instructions, participants filled out a mood assessment rating their performance expectancies, mood, self-reported motivation, and performance perceptions and attributions. Participants rated on a scale of 1 (not at all) to 7 (a lot) the extent to which they were feeling ten emotions. They will also rated on a scale of 1 (not at all well) to 7 (very well) how well they expected to do on the task and how well they thought they did after completing the task. Also on a seven-point scale, participants rated their perceptions of control as well as performance attributions **(see Appendix B)**.

Upon completion of the mood assessment, participants then completed the trial set of five anagrams. After completing the trial set, participants completed a second mood assessment (identical to the first). Participants then completed the test set of ten anagrams. All of the anagrams in this set were solvable. The computer program recorded the time spent on each anagram. Upon completion of the test set of anagrams, participants were fully debriefed on the nature of the study (emphasizing the fact that some of the anagrams were unsolvable and not indicative of problem solving abilities), thanked for their participation, and dismissed from the laboratory.

Results

Analysis Strategy

As in Study 1, a series of ANOVAs were conducted for each dependent variable in order to examine how goal type and task difficulty interact to affect performance expectancy, mood, motivation, perceptions of control, and performance.[3] For Time 1 variables (expectancy, mood, self-reported motivation, and perceptions of control), goal type was entered as a predictor (difficulty was not entered as a predictor since participants had not yet begun the task, though they had already been given the goal-framing task instructions; **see Table 3** for Time 1 variable means). Goal type, task difficulty, and their interactions were entered as the predictors for changes in expectancy,

[3] As in Study 1, we measured participants' performance attributions (innate ability, effort, and luck). However, none of the statistical tests for performance attributions reached significance. Therefore, the results for these variables will not be discussed.

mood, motivation, perceptions of control, and actual performance from Time 1 to Time 2 (see **Table 4**).[4]

Creating Composite Mood Variables

Again, four composite mood variables were created for this study. The first composite variable, *mad*, consisted of scores for the items 'angry' and 'frustrated', taken at each of the three assessment intervals. The alphas for mad at each time interval indicated reliability (.71 and .80, respectively). The second composite variable, *agitation*, consisted of scores for the items 'anxious' and 'tense', and it also proved reliable (alphas were .72, and .79, respectively). The third composite variable, *sad*, consisted of the scores for the items 'dejected' and 'depressed'. The alpha (.59) for Time 1 indicated moderate inter-item reliability, while the alpha for Time 2 indicated high reliability (alpha .75). The final composite variable, *motive*, consisted of the scores for items 'determined' and 'motivated', and was reliable as well (alphas .82 and .89, respectively). These composite variables were used in all subsequent analyses regarding participant mood and motivation.

Goal and Difficulty Effects on Performance

As for Study 1, my primary hypothesis for this study was that the effect of difficulty on performance would be moderated by goal type. Consistent with this, a goal X difficulty interaction was found, $F(1, 148) = 4.01$, $p < .05$ (**see Figure 2**). In the easy condition, performance goal participants found more correct anagram solutions ($M = 27.03$, $SE = .95$) than learning goal participants ($M = 23.17$, $SE = .91$; $p = .004$).

[4] All analyses were run with gender and its interaction with goal and difficulty as predictors. There were no significant interactions involving gender. Where main effects emerged, gender was retained in the model – where no effects emerged, models were re-run without gender as a predictor.

However, in the difficult condition, performance goal and learning goal participants did not differ in number of correct solutions produced ($M = 22.67$, $SE = 1.02$ and $M = 22.64$, $SE = .94$, respectively; $p = .99$). Planned contrasts revealed that task difficulty did not impact achievement in the learning goal conditions ($p = .69$), while performance goal participants in the easy condition performed significantly better than those in the difficult condition, $F(1, 148) = 9.71, p < .01$.

Not surprisingly, main effects of goal and difficulty were also found, such that on average, performance goals led to more anagram solutions than learning goals ($F(1, 148) = 4.12, p < .05$; $M = 24.85$, $SE = .70$ vs. $M = 22.90$, $SE = .65$), and the anticipation of an easy task led to more solutions than anticipating a difficult task ($F(1, 148) = 6.51, p < .05$; $M = 25.10$, $SE = .66$ vs. $M = 22.65$, $SE = .70$) .

Goal and Difficulty Effects on Expectancies

I hypothesized that the interaction of goals and difficulty on anagram performance should be accompanied by changes in expectancies, such that difficult tasks lead to larger drops in expectancies for individuals pursuing performance goals compared to learning goals. Goal type, difficulty, and their interaction were used to predict drops in expectancies controlling for expectancies at Time 1 as well as a main effect of gender ($F(1, 146) = 3.92, p = .05$). Consistent with our hypothesis, a goal X difficulty interaction emerged, $F(1, 146) = 4.25$, $p < .05$ (**see Figure 3**). In the easy condition, performance goal and learning goal participants did not differ in their performance expectancies on the subsequent set of anagrams ($M = -.52$, $SE = .18$ and $M = -.72$, $SE = .18$, respectively, $p = .29$). In the difficult condition, however, performance goal participants expected to do worse on the subsequent set of anagrams ($M = -2.41$, $SE = .20$) than learning goal

participants (M = -1.91, SE = .18, p = .07). Planned contrasts revealed that learning goal participants in the difficult condition reported greater drops in expectancies than those in the easy condition, $F(1, 146) = 21.85$, $p < .001$. Likewise, performance goal participants in the difficult condition reported greater drops in expectancies than those in the easy condition, $F(1, 146) = 51.88$, $p < .001$.

Not surprisingly, a difficulty main effect was found, $F(1, 147) = 70.47$, $p < .001$. Participants in the easy condition thought they would do better (M = -.62, SE = .13) than did participants in the difficult condition (M = -2.16, SE = .13).

When change in performance expectancy, goal type, and their interaction were entered as predictors in the ANOVA, a significant goal X change in expectancy interaction was found, $F(1, 148) = 9.72$, $p < .01$. More specifically, for performance goals, drops in expectancy were related to decreased performance, $r = .40$, $p < .01$. Drops in expectancies were not related to performance for learning goals, $r = .09$, *ns*.

Goal and Difficulty Effects on Changes in Mood and Perceptions of Control

I was also interested in how the impact of difficulty on performance and learning goal pursuit might extend to differences in affective experience and perceptions of control. For change in anger, a marginal goal X difficulty interaction was found after controlling for anger level at Time 1, $F(1, 147) = 2.88$, $p = .09$. In the easy condition, performance goal and learning goal participants did not differ in change in anger. In the difficult condition, performance goal participants reported becoming angrier than did learning goal participants. In addition a difficulty main effect was found for change in anger, $F(1, 147) = 57.25$, $p < .001$. In the difficult condition, participants reported becoming angrier than participants in the easy condition. When change in anger was

entered as a predictor (along with goal type and the interaction), a goal X change in anger interaction was found for performance, $F(1, 148) = 5.55, p < .05$. For performance goals, increases in anger were related to decreases in performance, $r = -.26, p < .05$. Increases in anger were not related to performance for learning goals, $r = .12$, *ns*.

After controlling for Time 1 variables, main effects of difficulty were found for change in sadness ($F(1, 147) = 19.34, p < .001$), change in agitation ($F(1, 147) = 17.93, p < .001$), and changes in perceptions of control ($F(1, 148) = 27.45, p < .001$). Participants in the difficult condition reported becoming sadder, more agitated, and experienced less control over their performance than participants in the easy condition. No other significant effects were found.

Summary

The results for Study 2 provided statistically reliable support my prediction regarding the impact of difficulty on individuals with performance and learning goals. More specifically, the achievement advantage associated with performance goals for the relatively easy task disappeared when the task became difficult. Moreover, individuals pursuing performance goals reported greater drops in expectancies in the face of difficulty than those pursuing learning goals. Finally, drops in expectancies were associated with fewer anagram solutions in the performance goal conditions, but not in the learning goal conditions.

General Discussion

Together, the results of Studies 1 and 2 support the primary hypotheses. While performance goals seem to create an advantage over learning goals in terms of both expectancies for success and achievement when tasks are easy, these advantages

disappear when tasks become difficult. Put differently, these results suggest that performance goal pursuit is negatively impacted by difficulty, while learning goal pursuit is not. In the easy task conditions, performance goals led to more correct solutions than learning goals, while in the difficult task conditions, learning goal and performance goal participants did not differ in correct solutions generated (this pattern was obtained in both studies, though it was only statistically reliable in Study 2).

As mentioned earlier, my hypotheses were based on the idea that performance goals should be negatively impacted by difficulty because it should result in lowered expectancies for future success. As a result, these lowered expectancies should lead to loss of motivation and, ultimately, lowered achievement. By contrast, individuals with learning goals, while they also experience decreased expectancies in the face of challenge, are less likely to conclude that they cannot improve and can find value in learning even if they perform poorly. The correlational results for Study 2 support this reasoning. First, individuals in the performance goal condition reported greater drops in expectancies in the face of difficulty than those in the learning goal condition. Second, drops in expectancies were related to decreased performance for participants with performance goals, while expectancies and task performance were not related for participants with learning goals. In sum, the results indicate that when tasks are easy, having a performance goal with respect to those tasks is beneficial. However, when tasks become difficult, the benefits of performance goals disappear. According to Study 2 correlations, the loss of benefits of performance goals in difficult situations appear to be associated with drops in expectancies.

As mentioned earlier, my studies involved various improvements upon the methodology of previous studies. These improvements helped in obtaining a clearer understanding of *how* and *why* goals and task difficulty interact to influence goal pursuit. First, rather than measuring perceptions of difficulty, I directly manipulated it by presenting participants with interruptions (Study 1) or unsolvable anagrams (Study 2). Likewise, I also manipulated goal orientations through the task instructions rather than measuring them. Manipulating these variables allowed for an assessment of the causal role of goals in producing the observed effects on expectancies, mood, motivation, and performance. In addition, regardless of goal and difficulty condition, all participants in Study 1 worked on the same set of test problems and all participants in Study 2 received the same test set of anagrams. This allowed for a direct comparison of the performance of participants in all conditions. I also varied when participants would experience the task difficulty. In Study 1, participants experienced difficulty *during* the completion of the experimental task whereas in Study 2, participants experienced difficulty *before* completing the experimental task. I manipulated difficulty in two different ways: (1) through time pressure caused by interruptions to the task in Study 1 and (2) through the introduction of unsolvable anagrams in Study 2. Varying the types of difficult tasks allowed me to determine whether or not the *source* of difficulty matters – in this case, different types of difficulty produced similar effects. Finally, unlike past studies, I included measures of expectancy, mood, and motivation to capture some of the possible mediating factors of the goal by difficulty interaction.

While the current studies offer important insight with regard to goals and difficulty, there is still much research to be done to add to this understanding. For

example, further inquiry is required to address the potential importance of the *goal difficulty* versus *task difficulty* distinction. In my studies, I manipulated task difficulty rather than goal difficulty (i.e., raising or lowering the bar). However, I would make the same predictions with regard to both goal and task difficulty because both types involve changes in expectancies for future performance. In my studies, no maladaptive effects of performance goals or adaptive effects of learning goals emerged for difficult tasks. Rather, performance and learning oriented participants performed at similar levels on the tasks. However, future studies should address whether or not there is a point at which performance goals become clearly maladaptive and learning goals adaptive. In order to address this question, future studies would need to push the difficulty level (either in terms of goal difficulty or task difficulty) even further and such patterns may well emerge.

Future studies could also manipulate the source of difficulty (i.e., difficulty that is internally vs. externally based). For instance, internal sources of difficulty (such as perceived lack of aptitude) might result in anxiety-induced performance decrements, as this type of difficulty leaves the individual vulnerable to self-blame and loss of self-worth, while external sources (such as interruptions) might lead to withdrawal from the task altogether, due to the individual's lack of a sense of control over the outcome. While the results of my studies suggest that two different sources of task difficulty (interruptions vs. obstacles) lead to the same pattern of responding among different achievement goals, they do not rule out the possibility that the source of difficulty matters. Future studies might implement *multiple* kinds of setbacks during the completion of a task (in my studies, participants encountered only one type of setback:

interruptions or unsolvable anagrams). These studies can also examine how task complexity and clarity of the task instructions impact achievement. Tentatively, I would hypothesize that whatever the type of difficulty an individual encounters, so long as difficulty impacts expectancies, the relationships revealed in Studies 1 and 2 would obtain, but this hypothesis needs to be more fully explored.

Finally, another important (and related) question left unanswered concerns the issue of arousal. Gellatly & Meyer (1992) discussed at length the role that arousal might play during goal pursuit. Recall that they argued that when task arousal is low, a difficult goal should increase arousal by increasing mental effort and energy. The increase in mental effort and energy should, in turn, boost performance. When task arousal is high, a difficult goal should further increase that arousal, thus, causing a state of overerarousal; which should lead to performance decrements. However, since they did not manipulate task arousal, clear conclusions regarding their hypotheses cannot be drawn. Given the design of my studies, I currently cannot distinguish whether the performance decrements created by difficulty during performance goal pursuit were due to overarousal or withdrawal from the task. In other words, does achievement suffer because individuals pursuing performance goals are too anxious or are just giving up? Both could be true, in that overarousal may occur after only moderate difficulty while withdrawal may occur after prolonged or significant difficulty. Clearly, the role of arousal, and immediate causes of performance decrements, should be examined through future research.

In conclusion, the current studies provide evidence suggesting that difficulty does indeed interact with achievement goals to impact expectancies and, consequently, performance. This finding is not only theoretically illuminating, but has obvious practical

import – educators and managers hoping to optimize performance should not only think carefully about the kind of goals the set for their students and employees, but also about which goal is optimal given the particular task's demands.

Table 1

Study 1: Mean Scores on Time 1 Variables for Performance and Learning Goals

	Performance		Learning	
Time 1 Variable	Mean	SE	Mean	SE
Expectancy	5.06	0.24	4.65	0.21
Anger	2.59	0.22	2.36	0.19
Sadness	2.02	0.20	2.07	0.18
Agitation	3.35	0.24	3.24	0.21
Motivation	4.52	0.22	4.58	0.19
Control Perception	4.99	0.24	4.64	0.21

Note. Means = Estimated Marginal Means

Table 2

Study 1: Time 1 to Time 2 Change Scores for Achievement Goals and Difficulty Level

	Performance				Learning			
	Easy		Difficult		Easy		Difficult	
Change Variable	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Performance	9.15	0.47	8.72	0.31	8.44	0.35	8.89	0.31
Anger	0.58	0.52	0.48	0.28	0.59	0.32	0.32	0.27
Sadness	-0.12	0.39	0.44	0.21	0.38	0.25	0.03	0.21
Agitation	-0.57	0.51	-0.19	0.28	-0.22	0.32	-0.36	0.27
Motivation	-0.39	0.48	0.00	0.26	-0.43	0.30	-0.29	0.25
Control Perception	0.71	0.52	0.62	0.28	-0.11	0.33	0.57	0.27

Note. Means = Estimated Marginal Means

Table 3

Study 2: Mean Scores Time 1 Variables for Performance and Learning Goals

	Performance		Learning	
Time 1 Variable	Mean	SE	Mean	SE
Expectancy**	4.78	0.13	4.41	0.12
Anger	1.67	0.12	1.82	0.11
Sadness*	1.50	0.11	1.77	0.10
Agitation	2.73	0.14	2.72	0.13
Motivation	4.13	0.16	3.91	0.15
Control Perception***	5.18	0.14	4.58	0.13

Note. Means = Estimated Marginal Means

*$p < .10$

**$p < .05$

***$p < .01$

Table 4

Study 2: Time 1 to Time 2 Change Scores For Achievement Goals and Difficulty Level

	Performance				Learning			
	Easy		Difficult		Easy		Difficult	
Change Variable	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Performance**	27.03	0.95	22.67	1.02	23.17	0.91	22.64	0.94
Expectancy	-0.52	0.18	-2.41	0.20	-0.72	0.18	-1.91	0.18
Anger*	0.42	0.21	2.33	0.22	0.45	0.20	1.66	0.20
Sadness	0.18	0.15	0.85	0.16	0.17	0.15	0.84	0.15
Agitation	-0.30	0.16	0.60	0.17	-0.09	0.15	0.39	0.16
Motivation	-0.08	0.19	-0.39	0.20	-0.10	0.18	-0.36	0.19
Control Perception	-0.20	0.21	-1.46	0.22	-0.37	0.19	-1.48	0.20

Note. Means = Estimated Marginal Means

*$p < .10$

**$p < .05$

Figure Captions

Figure 1. Study 1 Performance by Goal and Difficulty

Figure 2. Study 2 Performance by Goal and Difficulty

Figure 3. Study 2 Change in Expectancy by Goal and Difficulty

Figure 1

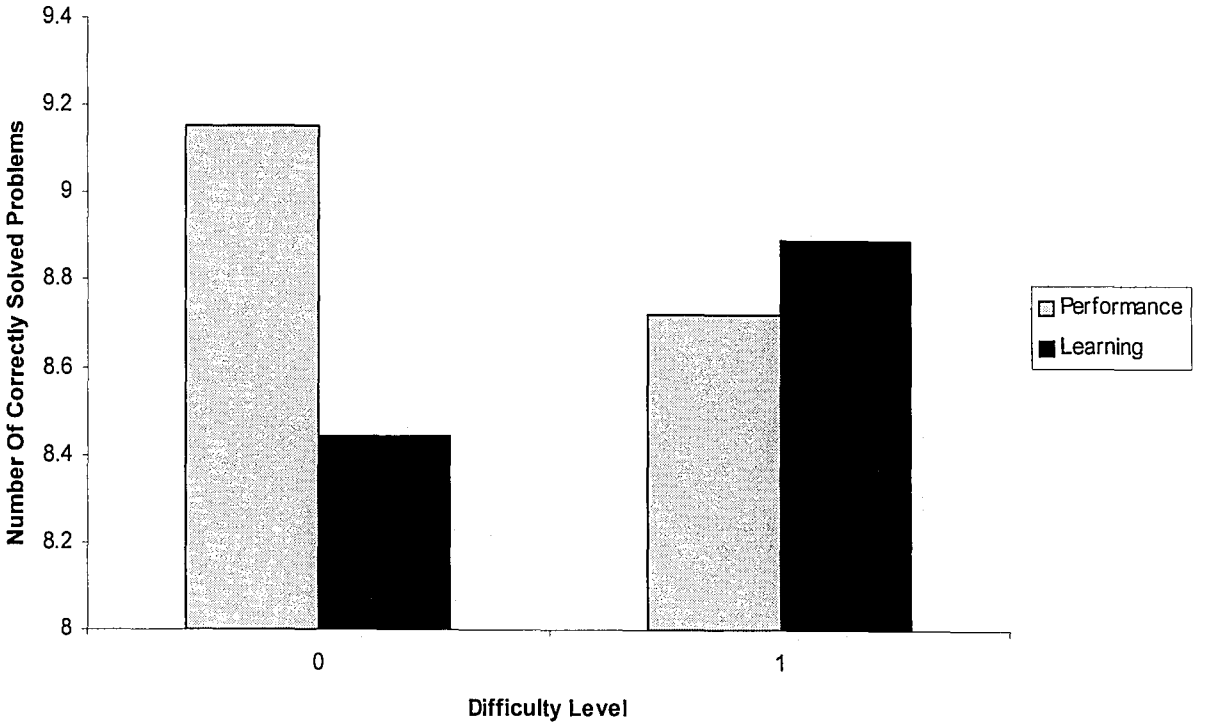

9.4
9.2
9
8.8
8.6
8.4
8.2
8
Number Of Correctly Solved Problems
0
1
Difficulty Level
Performance
Learning

Figure 2

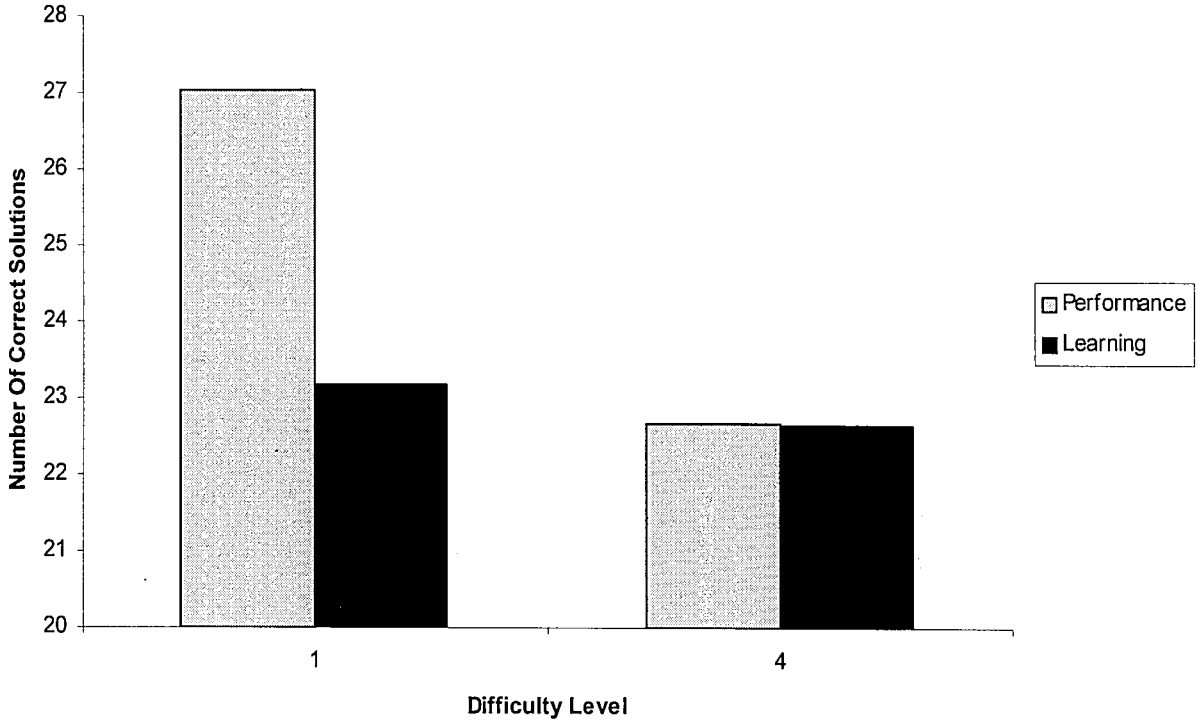
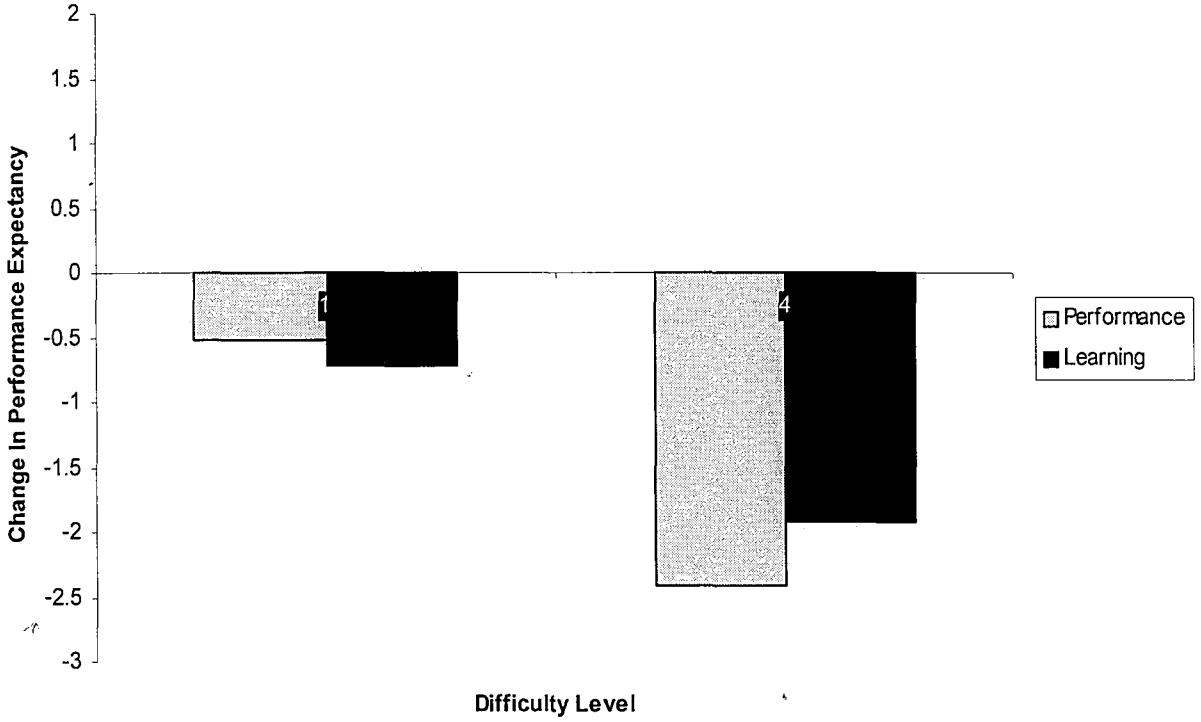

28
27
26
25
24
23
22
21
20
Number Of Correct Solutions
1
4
Difficulty Level
Performance
Learning

Figure 3


2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
Change In Performance Expectancy
1
4
Difficulty Level
Performance
Learning

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Appendix A

Logic Problem Set

Questions 1-3:

I was going through some old family photos in the attic when I stumbled upon our family tree. I studied it for a couple minutes then went back down stairs to tell my mom about the family tree. The problem is I didn't study it long enough to remember the whole thing. I only remembered a couple things about it, and recent memories. Can you help me figure out my family tree? There are two grandparents, who had two children who both got married and had 2 more children each, totaling 10 people in all (Alex, David, Jamie, Jessica, John, Justin, Lincoln, Martha, Mary, and Tina).

a. One of Jamie's ancestors was David.

b. John's sister gave birth to Tina.

c. Mary went bowling with her nephew last Saturday.

d. Alex is cousins with one of the girls.

e. Justin married Mary.

f. Jessica is not an ancestor, nor cousin of Tina.

g. Lincoln's brother showed Justin's son his baseball cards.

1. Who were the grandparents?

    a. Jessica and David

    b. Martha and David

    c. Martha and John

    d. Lincoln and Jessica

2. Who were their 2 children?

a. John and Alex

b. Martha and Mary

c. Jamie and Tina

d. John and Mary

3. Who were the children of Jessica?

a. Jamie and Lincoln

b. Jamie and Alex

c. Lincoln and Alex

d. Lincoln and Justin

Questions 4-6:

One Saturday morning, Millicent took four sets of sheets out of the linen closet to make the four beds in her house (one was her daughter's bed). Each set of sheets was of a different solid color (one was green). Combine this information with the clues below to put the four beds in the order in which Millicent made them and match each with the color of its sheets.

a. Millicent made the beds in this order: first the bed with the tan sheets, then her son's bed, then the guest bed, and finally the bed with the white sheets.

b. The white sheets didn't go on the master bed.

c. The blue sheets didn't go on her son's bed.

4. What color were the sheets on her daughter's bed?

a. White

b. Green

c. Blue

d. Tan

5. What color were the sheets on the bed that was made third?

   a. White

   b. Green

   c. Blue

   d. Tan

6. Which bed was made first?

   a. The daughter's bed

   b. The son's bed

   c. The master bed

   d. The guest bed

Questions 7-9:

Five sisters all have their birthday in a different month (February, March, June, July, and December) and each on a different day of the week. Using the clues below, determine the month and day of the week each sister's birthday falls.

a. Paula was born in March but not on Saturday.

b. Abigail's birthday was not on Friday or Wednesday.

c. The girl whose birthday is on Monday was born earlier in the year than Brenda and Mary.

d. Tara wasn't born in February and her birthday was on the weekend.

e. Mary was not born in December nor was her birthday on a weekday.

f. The girl whose birthday was in June was born on Sunday.

g. Tara was born in an earlier month than Brenda, whose birthday wasn't on Friday.

h. Mary wasn't born in July.

7. Who was born in February?

    a. Abigail

    b. Brenda

    c. Mary

    d. Tara

8. Who was born on a Monday?

    a. Abigail

    b. Brenda

    c. Mary

    d. Tara

9. What day was Tara born on?

    a. Tuesday

    b. Thursday

    c. Saturday

    d. Monday

Question 10:

7 dogs were boarding at the local Pet Lodge. Each dog was in a separate run, all in a single row. One of the employees left the cages unlocked and the dogs have all gotten out of their runs. She needs to put each of them back in the right cage, but this is all she remembers:

The dogs' names: Beau, Duke, Fluffy, Lady, Princess, Rover, and Spike.

a. Spike doesn't like other dogs much, so he was on one of the ends.

b. Princess was somewhere to the left of Beau.

c. Rover was in the third run from the right.

d. The only dog between Fluffy and Lady was Princess.

e. Duke was directly to the left of Lady.

10. Which of the following is the correct order of the dogs?

    a. Spike → Lady → Princess → Fluffy → Rover → Beau → Duke

    b. Spike → Lady → Princess → Rover → Fluffy → Beau → Duke

    c. Duke → Lady → Princess → Fluffy → Beau → Rover → Spike

    d. Duke → Lady → Princess → Fluffy → Rover → Beau → Spike

Appendix B

Mood Assessment

Below are a series of questions assessing your thoughts and feelings about this task. Please take a few moments to answer the questions.

Please circle the number that corresponds to how much you are currently feeling each emotion using the provided scale:

1. Tense:

Not at all						A lot
1	2	3	4	5	6	7

2. Dejected:

Not at all						A lot
1	2	3	4	5	6	7

3. Anxious:

Not at all						A lot
1	2	3	4	5	6	7

4. Depressed:

Not at all						A lot
1	2	3	4	5	6	7

5. Determined:

Not at all						A lot
1	2	3	4	5	6	7

6. Angry:

Not at all						A lot
1	2	3	4	5	6	7

7. Motivated:

Not at all						A lot
1	2	3	4	5	6	7

8. Calm:

Not at all						A lot

1 2 3 4 5 6 7

9. Frustrated:

Not at all A lot
1 2 3 4 5 6 7

10. Happy:

Not at all A lot
1 2 3 4 5 6 7

Please circle the number that corresponds to your thoughts on the following questions using the provided scales:

1. How well do you think you will do on this task?

Not at all well Very well
1 2 3 4 5 6 7

2. To what extent do you feel in control of:

a. Your performance on this task?

Not at all A lot
1 2 3 4 5 6 7

b. Your life in general?

Not at all A lot
1 2 3 4 5 6 7

3. To what extent do you think performance on this kind of task depends on:

a. Innate Ability?

Not at all Completely
1 2 3 4 5 6 7

b. Effort and Strategy?

Not at all Completely
1 2 3 4 5 6 7

c. Luck?

Not at all Completely
1 2 3 4 5 6 7

Appendix C

Trial Anagrams

Easy Condition:

1. LREA
2. SAPN
3. EBRER – unsolvable
4. PRTA
5. EDSO

Difficult Condition:

1. RILOY
2. EBRER
3. EDSO – solvable
4. BOLWA
5. EDAGE

Appendix D

Test Anagrams

1. ITDE
2. RDEA
3. PLSA
4. EAKTS
5. TNA
6. SHMA
7. ENST
8. WFLO
9. ERSU
10. SATRE

November, 2007

CURRICULUM VITAE

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EDUCATION

May, 2010 (expected)	Ph.D in Social Psychology, Lehigh University, Bethlehem, PA Advisor: Professor Heidi Grant
Jan., 2008 (expected)	M.S. in Social Psychology, Lehigh University, Bethlehem, PA Advisor: Professor Heidi Grant
Dec., 2004	B.S. in Psychology, The Pennsylvania State University, University Park, PA

HONORS AND AWARDS

2004	Psi Chi National Honor Society
2002	Penn State Hazleton Undergraduate Research Fair Second Place Award Recipient

RESEARCH INTERESTS

My research interests lie broadly under the rubric of social cognition. I conduct research in the areas of goals, motivation, and self-regulation. I am currently conducting studies examining how goal type (learning vs. performance goals) and task difficulty interact to influence mood, motivation, and performance.

RESEARCH EXPERIENCE

Sept., 2005-Present **Graduate Research Assistant** to Dr. Heidi Grant, Department of Psychology, Lehigh University

-I am currently assisting Dr. Grant on numerous projects investigating how goals influence mood, motivation, and task performance. More specifically, I am looking at how achievement goals and task difficulty interact to influence the emotional, motivational, and behavioral aspects of goal pursuit.

-Tasks include: reviewing relevant literature; preparing for, designing, and conducting experiments (i.e. writing IRBs and programming computerized experimental tasks on E-Prime); data analyses; managing lab research assistants; and any other research tasks.

Sept., 2004-Aug., 2005 **Employed Research Assistant** to Dr. Theresa K. Vescio, Department of Psychology, The Pennsylvania State University

-I assisted Dr. Vescio in researching the following: (a) the different psychological factors that contribute to racial disparities in academic achievement, (b) the role of anger in approach motivation, and (c) attentional biases due to anger and fear. -Tasks included: conducting literature searches; writing a literature review on the theories and empirical studies on racial disparities in academic performance; aiding in the design of experiments to be used for pilot research; assisting in writing a grant proposal; and assisting in any other research tasks.

Spring, 2004 **Undergraduate Research Assistant** to Dr. Theresa K. Vescio and graduate student Matthew Callahan, Department of Psychology, The Pennsylvania State University

-Conducted experiments examining factors that exacerbated women's threat responses when they were assigned leadership roles as well as experiments examining how family values predict anti-gay prejudice. Other tasks included: collecting, entering, and analyzing data using SPSS.

Fall, 2003 **Undergraduate Research Assistant** to Dr. David A. Rosenbaum, Department of Psychology, The Pennsylvania State University

-Conducted experiments examining the cognitive processes involved in motor movement choices. Other tasks included: entering and analyzing data using MATLAB.

Spring, 2002 **Undergraduate Research Assistant** to Tammy Brill, microbiology lab instructor, The Pennsylvania State University, Hazleton Campus

-Conducted microbiological research on herbal treatments for oral bacterial infections in canines and presented research at the Penn State Hazleton Undergraduate Research Fair.

TEACHING EXPERIENCE

Fall, 2007 **Graduate Teaching Assistant**, Department of Psychology, Lehigh University
Course: Introduction to Social Psychology (1 section, 150 students).

Spring, 2006 **Graduate Teaching Assistant**, Department of Psychology, Lehigh University
Course: Experimental Research Methods (1 section, 20 students).

Fall, 2005 **Graduate Teaching Assistant**, Department of Psychology, Lehigh University
Course: Experimental Research Methods (1 section, 20 students).

Fall 2004 **Undergraduate Teaching Assistant**, Department of Psychology, The Pennsylvania State University
Course: Research Methods in Psychology (Lab recitation, roughly 20 students).

CONFERENCE PRESENTATIONS

Gelety, L. S., & Grant, H. (2008, February). *Achievement goals and responses to difficulty.* Presenting poster at the Society for Personality and Social Psychology Annual Conference, Albuquerque, NM.

Gelety, L. S., & Grant, H. (2007, May). *Achievement goals moderate the impact of obstacles on mood, motivation, and performance.* Poster presented at the Annual Meeting of the Association for Psychological Science, Washington, DC.

Gelety, L. S. & Grant, H. (2007, January). *The impact of goals on anger and performance.* Poster presented at the Society for Personality and Social Psychology Annual Conference, Memphis, TN.

Gelety, L. S. & Gallatti, N. (2005, April). *The role of agency and pathways in anger: A scale development study.* Poster presented at the Psi Chi Undergraduate Research Conference, The Pennsylvania State University, PA.

END OF TITLE