The Interactive Effects of Achievement Goals and Task Complexity

on Effort, Mental Focus and Enjoyment

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Abstract

The popular construct of goal orientation has been widely researched by industrial and organizational psychologists in recent years. Unfortunately there are several issues with the goal orientation framework that have not been properly addressed in the literature. The present research introduced the three-dimensional achievement goal framework as a plausible and less problematic alternative to the three-dimensional goal orientation framework. Hypotheses regarding the interactive effects of each of the three achievement goals and task complexity on task enjoyment, mental focus and exerted effort, were derived and tested. The results indicated that the positive effects of mastery goals on the motivational variables are stronger for more complex tasks, the positive effects of performance-approach goals are stronger for simpler tasks, and the negative effects of performance-avoid goals are less severe for simpler tasks.

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Dedication

To my beloved grandmother, Svava Guðjónsdóttir, whose love, humor and kindness will remain with me always. Ég elska þig amma mín.

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Introduction

The construct of goal orientation, which refers to people's dispositional tendencies to adopt one or more *achievement goals* in achievement situations, has been one of the more popular research topics within Industrial/Organizational psychology over the last 5-6 years. The consequential bulk of empirical research has related goal orientation with important motivational outcome variables such as training performance (Brett & VandeWalle, 1999; Brown, 2001; Fisher & Ford, 1998; Kozlowski et al., 2001; Stevens & Gist, 1997; Towler & Dipboye, 2001), goal setting (Breland & Donovan, In Press; Phillips & Gully, 1997), goal revision (Donovan & Hafsteinsson, 2004), feedback seeking (VandeWalle, Cron, & Slocum, 2001; VandeWalle & Cummings, 1997; VandeWalle, Ganesan, Challagalla, & Brown, 2000) and behavior following feedback (Bell & Kozlowski, 2002; Mangos & Steele-Johnson, 2001), sales performance (VandeWalle, Brown, Cron, & Slocum, 1999), task performance (Kozlowski et al., 2001), and performance adaptability (Elliott & Church, 1997; Elliott & Covington, 2001; Elliott & Harackiewicz, 1996; Harackiewicz & Elliott, 1993; Pintrich, Zusho, Schiefele, & Pekrun, 2001).

Despite an undisputable intuitive appeal and some promising results, the goal orientation construct suffers from several serious construct- and measurement-related problems that have resulted in a divergent body of empirical research results that cannot easily be compiled into a meaningful theory of goal orientation. The most serious of the problems that plague the goal orientation construct are confusion about the construct's standing on the state-trait dimension, ambiguity regarding the dimensionality of goal orientation and a lack of a widely accepted definition of the construct (Carr & DeShon,

2004). Furthermore, there is some indication that the most popular measures of goal orientation (Button, Mathieu, & Zajac, 1996; VandeWalle, 1997) have deficits that may cause further problems for the accumulation of valid empirical evidence (e.g., Hafsteinsson, Donovan, & Breland, 2004; Jagacinski & Duda, 2001).

A separate group of researchers and theorists, which have operated primarily within the domains of educational and social psychology, have taken a different approach to achievement motivation and focused their efforts around the actual achievement goals, as opposed to the dispositional construct of goal orientation (e.g., Duda, 1989, 1997; Duda, Fox, Biddle, & Armstrong, 1992; Duda & Nicholls, 1992; Dweck, 1986; Dweck, 1989; Elliot & Church, 1997; Elliot & McGregor, 2001; Elliot & Thrash, 2001). At the most general level these implicit achievement goals, defined as "…cognitive representations of a competence based possibility that an individual seeks to attain" (Elliot & Thrash, 2001, pp. 144), can be divided into two categories: learning goals and performance goals. Individuals holding a learning goal when working on an achievement task are primarily concerned with gaining knowledge, enhancing their ability and increasing learning until mastery is achieved (Dweck, 1986, 1989). Individuals holding performance goals on the other hand are preoccupied with demonstrating their ability at the task in the hope of gaining positive judgment from others, and/or avoiding the demonstration of a lack of ability and consequently avoiding others' negative evaluations (Dweck, 1986, 1989). Recently, Elliot and his colleagues (Elliot, 1995; Elliot & Church, 1997; Elliot & Thrash, 2001) have argued that the performance goals should be split into two distinct categories, *approach* performance goals, where people strive to demonstrate

ability, and *avoid* performance goals, in which people strive to avoid negative evaluations and a demonstration of low ability.

In harmony with the achievement goals, the traditional view of goal orientation includes two dimensions, learning goal orientation and performance goal orientation (Button et al., 1996; Farr, Hoffman, & Ringenbach, 1993), whereas the more recent approach defines three dimensions of goal orientation: Learning goal orientation, approach performance goal orientation and avoid performance goal orientation (VandeWalle, 1997). Unlike its goal orientation counterpart, the modern approach to achievement goals does not suffer from the aforementioned construct-related problems to the same extent. The definition of the construct is clear, there is general consensus regarding the number of achievement goals, and there is no ambiguity regarding the construct's status on the state-trait dimension. The conceptualization of achievement goals is in full correspondence with modern theories of motivation, which propose that the effects of more distal dispositional constructs on motivation and performance will be mediated by state-like constructs (Kanfer, 1990). More specifically, the achievement goals are conceptualized as state-like constructs that directly influence behavioral, cognitive and affective outcome variables, but are themselves susceptible to the influence of dispositional trait-like constructs (Elliot & Church, 1997; Elliot & Thrash, 2001). Perhaps due to this conceptual clarity, there seems to be substantially more consistency in the empirical results of studies that have utilized Elliot's conceptualization of the achievement goals.

The purpose of this study is to take one of the first steps towards integrating Elliot's achievement goal conceptualization into research within the domain of I/O

psychology, and examine the effects of achievement goals on cognitive, affective and behavioral motivational outcome variables as well as task performance. Furthermore, the current study will examine the role of achievement goals by proposing and testing hypotheses that take a step towards accounting for the complex interplay between achievement goals, perceived ability, and the complexity of the task in their effects on the outcome variables of the study.

The Structure of the Introduction

This introduction is organized in two general sections. The first section takes a somewhat historical approach by describing the evolvement of Carol Dweck's classic conceptualization of performance and learning achievement goals into Elliot's modern hierarchical achievement goal framework. The section continues with a discussion on how Dweck's achievement goal framework was adopted into I/O psychology, and how that merger resulted in the dispositional goal orientation construct that I/O psychologists are familiar with. The first section of the introduction concludes with a summary, where Elliot's achievement goal framework and VandeWalle's three-dimensional goal orientation framework are contrasted and compared, and the conclusion is reached that for most practical purposes, Elliot's framework should provide a more fruitful approach to studying motivation in the workplace. In the second section of the introduction, the outcome variables of the study are introduced, the literature on goal orientation and achievement goals is reviewed and the research hypotheses of the study are proposed.

The Origins of the Modern Day Approach to Achievement Goals

Although achievement goals have been around in I/O psychology since the early 20th century (Lewin, Dembo, Festinger, & Sears, 1944; McClelland, Atkinson, Clark, & Lowell, 1953; cf. Elliot & Church, 1997), their modern day version stems from Carol Dweck's research in the late 1970's and 1980's on children's achievement motivation (e.g., Diener & Dweck, 1978; Dweck, 1975, 1989; Dweck & Reppucci, 1973). While studying children's motivational patterns in the classroom, Dweck and her colleagues noted that two distinct behavior patterns emerged in response to challenging activities and that their emergence, interestingly, seemed to be relatively independent of the children's ability (Dweck, 1975, 1989). The "mastery-oriented" response pattern was characterized by challenge-seeking and effective striving in the face of obstacles, whereas the "helpless" pattern resulted in avoidance of challenge and decreased performance when facing difficulty.

In their attempt at trying to explain these vastly different behavior patterns, Dweck and her colleagues proposed that two classes of achievement goals held by the children in the achievement setting created the framework within which they reacted to and interpreted events, and that these achievement goals determined which behavior pattern was displayed. The two classes of goals, learning goals and performance goals, emphasize vastly different aspects of the achievement situation. A learning goal involves a strong desire to increase one's competence whereas a performance goal is primarily concerned with gaining favorable judgments of one's competence (Dweck & Elliott, 1983). Other researchers made similar theoretical distinctions through slightly different

labels such as mastery vs. performance goals (Ames, 1992a, 1992b; Ames & Archer, 1988), and task involvement vs. ego involvement (Nicholls, 1984).

Dweck's theory states that holding a learning goal in an achievement situation will lead to the mastery-oriented adaptive pattern, whereas a performance goal can evoke either behavior pattern, depending on the person's perceived ability (Dweck, 1989; Dweck & Leggett, 1988; Elliott & Dweck, 1988). More specifically, Dweck's theory predicts that low perceived ability coupled with a performance goal will most likely result in the maladaptive helpless behavior pattern whereas individuals with high perceived ability and a performance goal will be able to show the mastery oriented response pattern. Despite this possible positive effect of performance goals, Dweck (1989) points out that the adoption of a performance goal (as opposed to a learning goal) can affect several motivational factors that reduce the probability of active and effective striving on challenging tasks, even in individuals with high perceived competence. The predicted consequences of each type of goal will now be discussed.

Contrasting Learning and Performance Goals

Performance goals. Individuals that adopt a performance goal in an achievement situation are primarily concerned with demonstrating their competence, gaining favorable judgments and/or avoiding negative judgments from others. As a consequence, the performance standard that defines success is likely to be based on the individual's performance relative to others in that same setting (i.e., a normative standard) instead of absolute or intrapersonal performance standards (i.e., a fixed reference point or the improvement of one's prior personal best score). The adoption of normative standards therefore creates the opportunity for failure on a task even when substantial personal

progress has been made or when the quality of the final product is outstanding (Dweck, 1989). Furthermore, by defining one's success relative to others' performance, the individual loses some control over his or her own successes, since the performance of others is not commonly controllable. As a result, a performance goal creates vulnerability for the maladaptive, helpless response pattern where the individual avoids challenging tasks, shows little persistence in the face of failure and is easily distracted from the task at hand when difficulties are encountered. Furthermore, the concern with others' judgment of one's ability that comes with the adoption of a performance goal increases the likelihood that individuals engage in self-handicapping (i.e., introducing factors that reduce the likelihood of success and might serve as an excuse for the poor performance) to avoid negative judgments of their abilities (Dweck, 1989).

In addition to affecting behavior, the adoption of a performance achievement goal is thought to have both cognitive and affect-related consequences. The ability focus that is associated with a performance goal causes instances of success to be attributed to ability or luck (if perceived ability is low) rather than effort, while failure is likely to be attributed to lack of ability and accompanied by negative affect (Diener & Dweck, 1978; Dweck, 1989). Finally, Dweck (1989) suggests that the lack of personal control that results from holding a performance goal is hypothesized to result in lower task interest.

Learning goals. Since the emphasis of a learning goal is on increasing one's knowledge and skill, the associated performance standard that determines success is likely to be one's prior performance level (i.e., an intrapersonal performance standard) or a fixed performance standard that signals mastery of the task (Dweck, 1989; Elliot & Church, 1997; Elliot & Thrash, 2001). Dweck (1989) also suggests that the adoption of a

learning goal therefore brings with it a strong sense of control, since the difference between success and failure is strongly tied to personal, controllable factors such as the amount of effort exerted, rather than external and uncontrollable factors. The sense of personal control associated with learning goals causes exerted effort to emerge as the primary mean to one's success, and consequently increases the individual's persistence when obstacles are faced. As a consequence, individuals that adopt a learning goal are more likely to see challenging tasks as opportunities for growth and learning and set challenging goals for themselves when approaching these tasks. Similarly, individuals with learning goals tend to embrace feedback as valuable information that will guide their efforts and increase their chances of success, and they perceive temporary failure as a learning experience, rather than sign of insufficient ability (Dweck, 1989; Dweck & Leggett, 1988). Finally, Dweck reports that individuals pursuing learning goals are more likely to attribute high effort success to ability than individuals pursuing performance goals, and that they tend to report greater task interest than those that hold performance goals.

The antecedents of achievement goals. When accounting for the factors that oriented individuals towards one goal or the other, Dweck (Dweck, 1989) emphasized that situational cues such as the nature of the task, the evaluator, and the potential rewards associated with the situation could strongly influence which achievement goal was chosen in that particular situation. However, Dweck also proposed that individuals would differ in their general tendencies towards the setting of performance vs. learning goals. She introduced a relatively stable individual difference variable, *theory of ability*, as the primary dispositional influence on the adoption of achievement goals across time

and situations. Theory of ability is a one-dimensional construct concerned with whether individuals perceive their intelligence as fixed or malleable. On one end of the continuum are those that believe intelligence is a fixed trait, a basic entity that you are born with and have to make the most of (entity view), whereas individuals at the other extreme believe intelligence can be increased through increased knowledge and successfully encountering challenging experiences (incremental view; Dweck, 1989). For those that believe that ability is fixed, the natural tendency is to try to demonstrate and validate that (fixed) ability and to adopt performance goals in achievement situations. On the other hand, a person with a strong incremental view would see value in striving towards task mastery and increased ability, and therefore would be more likely to adopt a learning goal in the same situation. In support of these predictions, Dweck and associates (M. Bandura & Dweck, 1981; Dweck, Tenney, & Dinces, 1982) found that children with the fixed entity view were more likely to adopt performance goals than learning goals in achievement situations, whereas children who favored an incremental view of ability were more oriented towards learning goals (cf. Dweck, 1989). This occurred whether theory of ability was measured or experimentally induced through an instructional manipulation.

Independence of the achievement goals. With regard to whether the achievement goals are mutually exclusive or independent of one another, Dweck's early work is not very conclusive. On one hand it seems as if the two types of goals are seen as opposite ends of a one-dimensional goal continuum as shown by their relations to the one-dimensional theory of ability as well as the commonness of experimental manipulation in Dweck's work (e.g., Dweck, Davidson, Nelson, & Enna, 1978; Elliott & Dweck, 1988). On the other hand, Dweck (1989) explicitly states that:

> …the various achievement goals may be held (and attained) simultaneously. In a given situation one may seek to learn, to obtain favorable competence judgments, and to avoid unfavorable judgments. However, in other situations these goals may come into conflict, and the child may feel that he or she has to choose between learning and performance goals… (pp. 97).

Based on this paragraph it seems to be Dweck's view that even though individuals were to some extent predisposed to set one type of goal through their theory of ability, their goal setting in any given situation could nevertheless be focused on learning goals, performance goals, or in some situations on both goals. In other words, it appears that Dweck makes a clear distinction between the implicit achievement goal(s) one holds in any given situation and one's dispositional tendencies to favor one type of goal over the other through one's theory of ability.

Summary of Dweck's framework. In sum, Dweck's framework consists of two types of achievement goals, learning and performance goals. These are viewed as state constructs that are under the influence of dispositions such as theory of ability, as well as situational factors. Whereas learning goals are always believed to result in the adaptive motivational pattern, the adoption of performance goals can lead to the adaptive or the maladaptive motivational pattern, depending on one's perceived ability.

Elliot's Achievement Goal Framework

Recently, the traditional achievement goal theory as proposed by Dweck (e.g., 1986, 1989) and Nicholls (1984) has undergone substantial revision, mostly through the

work of Andrew Elliot and his colleagues (e.g., Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot & McGregor, 2001; Elliott & Covington, 2001; Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002). Drawing on work from classic achievement goal theorists such as McClelland, Atkinson and Lewin, as well as the original work of Dweck and Nicholls (Dweck & Bempechat, 1983; Dweck & Elliott, 1983; Nicholls, 1984), Elliot proposed a hierarchical model of approach and avoidance achievement motivation where the strong ties between competence beliefs in any given situation and the achievement goals held in that same situation are emphasized (Elliot, 1995; Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot & McGregor, 2001; Elliot & Thrash, 2001). In their model, Elliot and his colleagues identify two dimensions on which competence can be differentiated: *definition* and *valence*. For the former, individuals can define competence in terms of absolute standards (requirements of the task itself), intrapersonal standards (where one's past attainment or maximum potential attainment defines competence), and normative standards (the performance standards of others). Elliot and McGregor (2001) argued that the absolute and intrapersonal standards were in most situations indistinguishable and should therefore be considered jointly as the foundation for a mastery approach, whereas defining competence as a normative standard would lead one to adopt a performance achievement goal. In terms of valence, competence can be defined in terms of a positive focus, where the efforts are directed towards the attainment of success (*approach* form of competence), or a negative focus, where the individual's efforts are primarily directed towards preventing negative outcomes or failure to occur (*avoid* form of competence). The crossing of the definition and valence of competence in Elliot's framework results in the proposed 2 x 2 framework

as shown in Figure 1, where the four perspectives on competence and the resulting achievement goals are: mastery-approach, mastery-avoid, performance-approach and performance-avoid.

The performance-approach goal follows a normative definition of competence, paired with an approach form of valence and focuses on the demonstration of competence by adopting normative standards of performance and attempting to outperform your peers. Similarly, the performance-avoidance goal results from a normative definition of competence, whereas the valence is now focused on failure, resulting in the performance-avoidance goal being primarily concerned with avoiding the demonstration of incompetence.

The two mastery goals differ in similar ways. The mastery-approach goal is identical to Dweck's traditional learning goal with a positive, success-oriented valence coupled with an absolute or intrapersonal definition of competence. The last of the four achievement goals, and the one that has received by far the least theoretical and empirical attention, is the mastery-avoidance goal. Mastery-avoidance goals are hypothesized to result from an absolute/interpersonal definition of competence, combined with a failure-focused valence (Elliot & McGregor, 2001) and are hypothesized to be salient when the individual is preoccupied with avoiding a loss of mastery, for example when world-class athletes in the latter stages of their careers are striving not to loose their exceptional competence. The mastery-avoid goal has received relatively little attention and support in the literature to date, and its existence is questionable. Furthermore, its application is most likely limited to specific situations in which mastery has already been attained, often among the elderly (Elliot & Thrash, 2001). Since these specific circumstances do

not apply to the current study, the mastery-avoid goal will not be considered further in this paper and the term mastery goal will hereafter refer to the mastery-approach goal.

Antecedents of achievement goals. It is very clear from Elliot's work (e.g., Elliot & Thrash, 2001) that the achievement goals are considered to be mid-level constructs, defined as "…cognitive representations of a competence based possibility that an individual seeks to attain" (p. 144) and serving as mediators between dispositional motivational constructs and behavior. In terms of antecedents of achievement goals, Elliot and Church (1997) as well as Elliot and McGregor (2001) found support for their hypotheses that *achievement motivation*, defined as a generalized desire to succeed was a positive predictor for mastery goals and performance-approach goals, *fear of failure*, defined as the generalized need to avoid failure, and people's *competency expectations* were determinants for a person's achievement goals. More specifically, Elliot and Church (1997) and Elliot and McGregor (2001) found empirical support for their prediction that mastery goals led from high achievement motivation and high competency expectations, performance-approach goals resulted from high achievement motivation, high fear of failure and high competency expectations, and that performance-avoid goals followed high fear of failure and low competency expectations. Later, Elliot and Thrash (2001) acknowledged that several (other) motivational and/or dispositional constructs, examples being self-validation concerns, need for affiliation and fear of rejection, could affect which achievement goals individuals were oriented to in each particular situation.

Independence of the achievement goals. Although not explicitly discussed in Elliot's work, it can nevertheless be inferred that the hierarchical achievement goal framework assumes that there are gradual differences in the amount to which goals are

adopted (as opposed to an all-or-none approach), and that the achievement goals are thought to be relatively independent from one another. Although the two-by-two framework of the definition and valence of competence should result in a clear preference for one type of achievement goal, Elliot and Thrash (2001) nevertheless acknowledge the possibility of adopting more than one goal at a time. They further suggest that the most likely "multiple-goal" scenario would be where an individual adopts approach and avoidance goals of the same type (i.e., performance), probably because you can avoid displaying lack of competence by the demonstration of competence (i.e., offense is the best defense).

Empirical and factor analytic evidence from studies done on Elliot's achievement goal framework provide additional evidence for the relative independence of the three achievement goals. Elliot and Church (1997) and Elliot and McGregor (2001) found a relatively clean factor structure for the three achievement goals, where each item loaded on its intended factor and secondary loadings were low. On the other hand it should be noted that the intercorrelations between the achievement goal composites are not necessarily trivial. It is not uncommon for the performance-approach and performance-avoid goal to correlate from .30 to .40 (Elliot & McGregor, 2001; Elliot, McGregor, & Gable, 1999; McGregor & Elliot, 2002), whereas other intercorrelations range from practically zero (e.g., Lee, Sheldon, & Turban, 2003) to $r = .29$ (performance-approach and mastery; McGregor & Elliot, 2002). As a conclusion, the empirical evidence seems to suggest that the three achievement goals are relatively independent from each other, although there are weak to moderate relations between the two performance goals, and the two approach goals (mastery and performance-approach).

Summary of the Hierarchical Achievement Goal Framework. The hierarchical achievement goal framework enhances Dweck's framework in several important ways. First, it provides a clear definition of the achievement goal construct and explicitly specifies the construct as a mid-level construct and a direct antecedent of behavior, affect and cognitions. Second, it provides a parsimonious and coherent conceptual foundation for the three achievement goals by linking them to people's ideas about the definitions and valence of competence. Third, Elliot's framework identifies a wider range of dispositional antecedents of achievement goals than does Dweck's classic achievement goal framework. Fourth, it incorporates the classic distinction between the orthogonal avoid and approach motivations, incorporated in most other psychological literatures (Elliot, 1995). In conclusion, while drawing heavily from the fundamental concepts of Dweck's traditional achievement goal framework, Elliot's work sharpens and clarifies several ambiguities present in Dweck's work, while laying a broader and more coherent conceptual foundation (Elliot, 1995).

Related Approaches

Although Elliot expanded the classic achievement goal framework by introducing the approach-avoidance distinction in the 1990's, this distinction between approach and avoidance is by no means novel and has been applied to the achievement motivation domain since early 20th century. Classical achievement motivation theorists such as Lewin (Lewin et al., 1944), McClelland (McClelland et al., 1953) and Atkinson (1957; cf. Elliot, 1995) incorporated the approach and avoidance tendencies into their theoretical models. Atkinson's *need achievement theory*, for example, conceptualized achievement motivation as the difference between strivings toward success, T_s, and strivings to avoid

failure, T_{af}. In instances where $T_s > T_{af}$,the motivated achievement behavior was characterized as approach oriented, and avoidance oriented if $T_s < T_{af}$ (Atkinson, 1957). The *need for achievement* construct, described as the level to which individuals' aspire to accomplish difficult tasks and maintain high standards (Jackson, 1974), seems to overlap to some extent with mastery goals (e.g., Elliot & McGregor, 2001; Phillips & Gully, 1997) with regard to their focus on challenging tasks and continuous improvement, and to a lesser extent with performance-approach goals. This, of course, is consistent with Elliot's framework where need for achievement is an antecedent of mastery goals and performance-approach goals. There are however obvious differences between the constructs. First, need for achievement is considered a global, generalized motive where an individual responds to an inherent need (Dweck, 1989). As such it is very dispositional in its nature, as opposed to the more cognitive and situational mastery goal and is therefore probably better conceptualized as an antecedent of achievement goals. Second, although need for achievement and mastery goals may predict certain outcome variables such as challenge seeking, goal setting, and goal revision similarly, it seems that the underlying motives for these behavior is somewhat different. An individual that has a strong need for achievement is primarily focused on achievement for achievements sake, whereas the individual with a strong mastery goal is primarily focused on gaining knowledge, either for a specific task (i.e., a task specific mastery achievement goal) or in general (i.e., a strong learning goal orientation), and this desire to master leads to the self-imposed challenges and upward goal revision. Similarly, performance-approach goals place a primary interest on gaining favorable judgments about one's ability and not on achievement as such.

An example of a more modern motivational approach that incorporates the approach-avoidance distinction and overlaps to some extent with the achievement goal and goal orientation frameworks is Higgins' model of self-regulatory focus (e.g., Brockner, Paruchuri, Idson & Higgins, 2002; Brockner & Higgins, 2001; Higgins, 1997; 2000). The framework proposes that individuals are guided by two regulatory systems, one that has a promotion focus and one that focuses on prevention. The promotion focus is analogous to the approach orientation, with an emphasis on the attainment of positive outcomes, whereas the prevention focus consists of avoiding negative outcomes. In addition to outcomes, Higgins (1997) pointed towards people's *needs* and *standards* as two factors that differentiated a prevention focus from a promotion focus. Going back to Maslow's need hierarchy, Higgins and colleagues suggest that needs that relate to safety, security and protection are at work when people are prevention focused, whereas the promotion focus results from the growth, development and nurturance needs (Brockner et al., 2002). With regard to standards, the model distinguishes between standards that represents hopes, wishes and aspirations, referred to as *ideal* selves (i.e., how one wants to be), and standards that represent duties, obligations and responsibilities, referred to as *ought* selves (i.e., how one should be). Keeping in mind that the exclusive focus on competence inherent in the achievement goal framework is more narrow in nature than that of self-regulatory focus, goal orientation and achievement goals nevertheless map nicely onto the model of self-regulatory focus as pointed out by Horvath, Scheu and DeShon (2001). Mastery goals and performance-approach goals both fall under the promotion focus, as the individual is striving to attain a positive outcome (i.e., mastering the task or outperforming ones peers), whereas the adoption of a performance-avoid goal

is purely prevention focused (i.e., avoiding a low percentile rank score on an exam). In addition, the mastery achievement goal seems to fit well to serving the growth needs and striving towards matching the actual self to the ideal self. Similarly, it makes intuitive sense that the performance-avoid goal serves the safety and security needs and bringing the actual self closer to the *ought* self by avoiding negative outcomes. However, the self-regulatory framework struggles when it comes to fitting the performance-approach goal. On one hand, the performance-approach goal is an approach goal, and as such it fits well to the promotion focus as noted above. On the other hand performance-approach goals are rooted in fear of failure, which seems to contradict the emphasis on growth needs and the striving towards the ideal self, and be more in line with a prevention focus. Furthermore, one can argue that there is no room in Higgins' framework to account for the distinction between mastery and normative performance focus, hence limiting ones capabilities to completely integrate the achievement goal framework into the self-regulatory focus framework. Nonetheless, it is clear from this brief review that the concepts of achievement motivation and regulatory focus are closely related to achievement goals, especially with regard to the approach-avoid distinction.

Achievement Goals/Goal Orientation in I/O Psychology

In the early 1990's, I/O psychologists started to integrate Dweck's achievement goal theory into I/O psychology and point out its potential applications in domains such as training and work motivation. Quite early in the adoption process the I/O literature departed significantly from Dweck's conceptualization, most notably regarding the construct's standing on the state-trait dimension as well as on its dimensionality. As an example, Farr et al., (1993) reviewed Dweck's work in some detail and introduced *goal*

orientation to I/O psychologists as a promising individual difference construct that could possibly help theories of self-regulation better explain individual differences in the relations between goal setting and performance. In their writing, Farr et al. (1993) treated goal orientation for the most part as a trait although they acknowledged that an individual's goal orientation may be susceptible to situational influences. With regard to dimensionality, Farr et al., (1993) suggested in their review that performance goal orientation and learning goal orientation might be separate and independent dimensions, as opposed to different ends of a single continuum as sometimes implied by Dweck in her writing (e.g., 1989). Finally, Farr et al. (1993), drawing from Kanfer (1990), suggested that goal orientation might exert its influence on goals and performance through the mediating effects of a person's self-efficacy. The idea of self-efficacy being partly caused by goal orientation signals a serious departure from both Dweck's ideas, where perceived competence (which conceptually overlaps to a large extent with self-efficacy) interacts with the performance goal, as well as Elliot's framework, where competency expectations (again a related although not identical construct) are treated as antecedents of achievement goals.

Farr et al.'s (1993) article seems to have laid the groundwork for the next big milestone in goal orientation research within I/O psychology. In a widely cited study, Button et al. (1996) followed up on many of Farr et al.'s (1993) suggestions when publishing their popular measure of general two-dimensional dispositional goal orientation. Although Button et al. (1996), in line with Dweck (1989) and Farr et al. (1993), conceptualized goal orientation as "…a somewhat stable individual difference variable that may be influenced by situational characteristics" (pp. 28), their measure was

very dispositional in its nature. In fact, Button et al. (1996) claimed that the measure captured an individual's *general* goal orientation, the dispositional component of goal orientation that could be expected to generalize across performance domains, situations and time.

By the time Button et al., (1996) had published their paper, the departure from Dweck's original theory was somewhat radical. The construct of goal orientation had been given a life of its own as a trait-like dispositional construct, intended to predict and explain people's behavioral patterns across multiple achievement situations, as opposed to a more state-like achievement goal tied to a certain time and situation. Furthermore, as opposed to the one-dimensional theory of ability and in line with Farr et al's (1993) suggestions, goal orientation was now defined as a two-dimensional construct where performance goal orientation and learning goal orientation were separated into two distinct and orthogonal dimensions.

Button et al.'s (1996) support for their conceptualization of goal orientation was based on factor analytic evidence and discriminant/convergent validity analyses. The separation of learning goal orientation and performance goal orientation into orthogonal dimensions was supported by the data of the four studies conducted by Button et al., (1996), since the 16 items that comprise their scale consistently loaded on two (approximately) uncorrelated factors. When tying the goal orientation construct into a nomological network, Button et al. (1996) found some support for differential relations between each of the goal orientation dimensions and related outcome variables. However, since the publication of Button et al.'s (1996) paper, some weaknesses in the two-dimensional goal orientation framework have been noted.

First, the confirmatory factor analyses done by Button et al., (1996) resulted in no more than marginal fit of the items to a two-factor model. Later replications (e.g., Jagacinski & Duda, 2001) have obtained even weaker results, with the two-factor model fitting poorly. Furthermore, the orthogonality of the two goal orientation dimensions does not always replicate, since later studies frequently report a correlations in the .30-.40 range between the two dimensions (e.g., Hafsteinsson et al., 2004; Jagacinski & Duda, 2001). Another cause for concern was found in the relations between goal orientation and theory of ability in Button et al.'s (1996) studies. They, in line with Dweck (1989), introduced theory of ability as the primary influence for an individual's goal orientation. The data, however, only partially supported this conceptualization. Learning goal orientation was strongly correlated with theory of ability (r = .419 to r = .529) in the predicted direction, such that those that tended to believe that ability was malleable had a strong learning goal orientation (i.e., an incremental view of ability). Although statistically significant, the correlations between performance goal orientation and theory of ability were much weaker (r = -.148 to r = -.171), casting doubt on the construct as the primary dispositional determinant for performance goal orientation.

Although these problems with Button et al.'s (1996) measure cast some doubt on the appropriateness of the goal orientation construct, the major issue relates to fundamental questions regarding the construct itself. Goal orientation researchers have put almost no effort into clarifying what the construct of goal orientation is, how one acquires one goal orientation or the other, what processes allow goal orientation to have its effect on outcome variables, and how stable an individual's goal orientation is across

time and situations (see Carr & DeShon [2004] for an initial attempt to tackle these issues).

A year after Button et al. (1996) published their instrument, Don VandeWalle (VandeWalle, 1997) integrated Elliot's (Elliot, 1995; Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot & Thrash, 2001) achievement goal framework into the I/O conceptualization of goal orientation, and published his goal orientation measure and the results of three construct validity studies. VandeWalle's approach to developing his instrument differed substantially from Button et al's (1996) in two aspects. First, VandeWalle (1997) argued that Button et al's (1996) treatment of goal orientation might be too general and that individuals might well have different goal orientations in different major domains of life (e.g., work, school, sports). Accordingly he defined and operationalized goal orientation as a domain-specific dispositional construct and focused his initial measure on *work* goal orientation. Unfortunately, VandeWalle's (1997) discussion on the conceptual issues of goal orientation was sparse, and thus added little clarity to the fundamental, construct-related issues of goal orientation.

VandeWalle's (1997) second major divergence from and Button et al's (1996) work was the conceptualization of goal orientation as a three-dimensional construct in line with Elliot's work (e.g., Elliot & Church, 1997; Elliot & Harackiewicz, 1996). Accordingly, performance goal orientation was split up into *prove* and *avoid* performance goal dimensions while leaving the learning goal orientation dimension intact. Analogous to the performance-approach/avoid achievement goals, prove performance goal orientation refers to one's desire to demonstrate, or prove, one's competence to others,

while avoid performance goal orientation refers to one's tendency to avoid disproving once competence (or demonstrating incompetence).

In general, VandeWalle's (1997) validation studies supported the factor structure of the 13-item, 3-dimensional goal orientation measure. Somewhat interestingly, and apparently against his own rationalization for the separation of performance goal orientation into prove and avoid dimensions, VandeWalle hypothesized the exact same relationships for the two types of performance goals and various related outcome variables. However, VandeWalle's hypotheses were not all supported, resulting in the performance-approach and performance-avoid goal orientation dimensions showing differential empirical relationship with some of the tested constructs, such as feedback seeking (r_{prove} = .06, ns; r_{avoid} = -.33, p<.001). To his credit, VandeWalle assessed the stability of the domain-specific goal orientation construct with a three month test-retest study on 53 participants. Although the obtained test-retest correlations of $r_{learning}$ = .66, r_{prove} = .60, r_{avoid} = .57 were not overly impressive, VandeWalle (1997) claimed strong support for the construct validity of his measure.

Since Button et al's (1996) and VandeWalle's (1997) measures were published, goal orientation has been an enormously popular research topic among I/O psychologists. The majority of the studies published in the major I/O journals have treated goal orientation as a disposition that nevertheless is susceptible to situational influences. The most common practice has been to measure the general or work-domain specific goal orientation with Button et al.'s (1996) or VandeWalle's (1997) instruments (Bell & Kozlowski, 2002; Brett & Atwater, 2001; Brett & VandeWalle, 1999; Brown, 2001; Chen, Gully, Whiteman, & Kilcullen, 2000; Colquitt & Simmering, 1998; Ford, Smith,

Weissbein, Gully, & Salas, 1998; Kozlowski et al., 2001; Phillips & Gully, 1997; Potosky & Ramakrishna, 2002; VandeWalle et al., 2001; VandeWalle & Cummings, 1997; VandeWalle et al., 2000), although some researchers have emphasized the "malleability of goal orientation to situational influences" and experimentally manipulated goal orientation in their studies (Mangos & Steele-Johnson, 2001; Roberson & Alsua, 2002; Steele-Johnson, Beauregard, Hoover, & Schmidt, 2000; Stevens & Gist, 1997). Finally, a small number of recently published studies have taken a more situational/state-oriented approach to goal orientation, either by emphasizing the distinction between dispositional and situational goal orientation (Breland, 2004; Breland & Donovan, In Press; Jagacinski, Madden, & Reider, 2001) or through the use of achievement goals (Lee et al., 2003).

In spite of the bulk of empirical research on goal orientation, little or no effort has been put into clearing up fundamental issues regarding the construct itself. As reviewed above, the achievement goal construct seems to have gone through a conceptual wormhole as it was incorporated into I/O psychology, emerging as the dispositional construct of goal orientation. Unfortunately, it seems like this conceptual transformation has not been fully dealt with by I/O psychologists, resulting in somewhat of a theoretical mess where the construct is sometimes treated as a disposition and sometimes as a malleable state, sometimes operationalized as two-dimensional and sometimes three-dimensional, sometimes treated as domain-specific and sometimes as domain-general. Finally, the simple and fundamental questions regarding the basic definition of the construct has been largely overlooked (Carr & DeShon, 2004), with researchers defining the construct in whichever way fits the purposes of the study in question.

In sum, the traditional achievement goals as defined by Dweck (1986, 1989) and Elliot (Elliot & Church, 1997; Elliot & Thrash, 2001) took on the role of a disposition when they entered the field of I/O psychology. The theoretical foundation for this transition is somewhat vague, and as indicated by Carr and DeShon (2004), the accumulated research results on goal orientation are undermined by the many and severe problems associated with the construct of goal orientation.

Achievement Goals / Goal Orientation Summary

Despite the obvious and close correspondence between the achievement goal framework of Dweck and Elliot and the goal orientation framework of Button et al., (1996) and VandeWalle (1997), there are, as has been discussed above, several important distinctions.

First, goal orientation is characterized as a disposition and therefore takes a more distal role in its effect on behavior, cognition and affect related outcome variables than the more state like and proximal achievement goals. This distinction is especially clear in the proposed role of perceived ability. The goal orientation literature uses task specific self-efficacy as an indicator for people's perceptions of ability and places it as a consequence of goal orientation, whereas the hierarchical achievement goal framework places the similar, although slightly more distal construct of competency expectations as an antecedent of achievement goals. Finally, Dweck believes that perceived ability is best placed as a moderator, determining whether performance goals lead to the adaptive or the maladaptive motivational pattern. Second, whereas Elliot proposes a clear and unambiguous definition of the achievement goal construct, an unambiguous and widely accepted definition of goal orientation is yet to be found. Third, a convincing case has

been made for splitting the performance goal into two distinct approach- and avoidance performance goals (Elliot & Church, 1997; Elliot & Harackiewicz, 1996). In addition to being derived from a solid conceptual framework, measures of the three achievement goals have demonstrated a clear factor structure and have been shown to be relatively independent from another (Elliot & Church, 1997; Elliot & McGregor, 2001). In addition, the two performance achievement goals have shown very different and stable empirical relations with important outcome variables (Harackiewicz et al., 2002). Finally, it appears that achievement goal researchers within the field of educational psychology have for the most part accepted Elliot's hierarchical framework of achievement goals (Grant & Dweck, 2003; Harackiewicz et al., 2002)

In somewhat stark contrast, it must be noted that the three-dimensional goal orientation framework lacks a solid conceptual foundation. There is little justification in the goal orientation literature for the two-dimensional performance goal orientation split at the dispositional level. It is not clarified in the literature what a 'domain-specific personality construct' refers to, and the little evidence there is on the stability of the goal orientation construct over time (VandeWalle, 1997) fails to provide unambiguous support for the assumptions of stability. Finally, the number of published studies favoring the two- vs. three-dimensional goal orientation indicates that there is substantial conflict among I/O psychologists regarding the most appropriate conceptualization of goal orientation.

Given the numerous aforementioned problems that plague the goal orientation construct, it can be argued that the achievement goal framework is better suited to examine people's motivation and performance in most achievement settings, with the

possible exception of research situations where predictions are made across a variety of achievement situations and/or across time. When the goal is to predict behavior and affect in one specific situation however, as is the case in the current study, the more clearly defined and more proximal achievement goals are better suited to the task. The current study utilizes Elliot's (Elliot & Church, 1997; Elliot & Harackiewicz, 1996) achievement goal framework to examine the interactive effects of mastery achievement goals, task complexity and self-efficacy on three important motivational variables, task enjoyment, mental focus and exerted effort, as well as task performance.

Literature Review and Hypotheses

Although there are important conceptual distinctions between the goal orientation construct and achievement goals, the close correspondence between the two (i.e., goal orientation usually referring to a general tendency to adopt certain achievement goals across situations and time) nevertheless justifies using empirical results obtained for goal orientation to support hypotheses for achievement goals. This is especially true for mastery goals / learning goal orientation, which tend to be conceptually similar whether the goal orientation (or achievement goals) framework involves the performance-approach/avoid separation or not (e.g., Ames & Archer, 1988; Elliot, 1995). Consistent with that argument is the relatively strong convergence of empirical results obtained for mastery goals and learning goal orientation.

Whereas the literature and conceptualization of mastery goals and learning goal orientation is relatively consistent across the two- and three dimensional conceptualizations of achievement goals / goal orientation, the same can not be said for the performance achievement goals and the corresponding performance goal orientations.

The majority of the early work on achievement goals (e.g., Ames & Archer, 1988; Dweck, 1989; Nicholls, 1984) and goal orientation (e.g., Button et al., 1996; Farr et al., 1993) focused on a performance-learning dichotomy, where it is to a large extent unclear whether the performance goal is analogous to the performance-approach goal, or a hybrid of performance-approach and performance-avoid achievement goals. Furthermore, Grant and Dweck (2003) pointed out that at least three classes of performance-approach goals have been used somewhat interchangeably in the goal orientation/achievement goal literature. The first one, labeled *outcome goals*, focuses on achieving high performance levels such as good grades without any reference to ability or normative comparisons. The second class of performance-approach goals and the one that most closely corresponds to Dweck's original conceptualization, is primarily concerned with validating and demonstrating ability and intellect. The third class, and the one adopted by Elliot, is normative performance approach goals, where the focus of the individuals is to perform better than their peers and/or confirm that they are smarter than other students. Grant and Dweck (2003) wrote questionnaire items to reflect each type of goal and found support for the relative independence of the three performance-approach goal types through principal components analysis and confirmatory factor analyses. In their study, all of the items loaded higher than .40 on their intended factor and none of the items had cross-loadings that exceeded .40.

Due to this lack of correspondence between the two- and three-dimensional conceptualizations of achievement goals / goal orientation and the mixture of operationalzations for performance-approach goals, the relevance of research results obtained for performance goal orientation and performance achievement goals is limited

for the derivation of hypotheses for the approach/avoid performance goals in this study. The closest correspondence to Elliots and Church's (1997) operationalization of normative performance-approach and performance-avoid goals is VandeWalle's (1997) goal orientation framework. Despite its aforementioned shortcomings and dispositional nature, research results obtained through VaneWalle's (1997) framework will be included in the derivation of the research hypotheses for the performance-approach and performance-avoid achievement goals.

Overview of Outcome Variables

The focus of the current study is on how the achievement goals, alone and in association with task complexity and self-efficacy, influence three important motivational variables, task enjoyment, mental focus and exerted effort, representing the affective, cognitive and behavioral domains respectively. An overview of the tested model is depicted in Figure 2.

Task enjoyment is frequently considered a component of intrinsic motivation (Barron & Harackiewicz, 2001; Elliot & Church, 1997; Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000), and refers to the extent to which participants find the task interesting, enjoying and fun. Although task enjoyment is not necessarily related to task performance (e.g., Barron & Harackiewicz, 2001; Harackiewicz, 1984) it is considered an important motivational component in predicting sustained interest in a task (e.g., Bandura, 1986). An individual's *mental focus* while working on a performance task refers to the level of concentration and the extent to which a person becomes absorbed in the activity. Lee et al., (2003) conducted a classroom study and found that mental focus was positively related to enjoyment with class as well as performance on a class exam.

Finally, there are strong and obvious ties between a person's exerted effort on a task and the resulting task performance (e.g., Sujan, Weitz & Kumar, 1994; VandeWalle et al., 1999; VandeWalle et al., 2001) suggesting that exerted effort is one of the key motivational factors in performing successfully on a task.

Mastery Goals.

In general, it is safe to say that the effects of learning goal orientation and mastery goals on motivation have shown to be positive. Beaubien and Payne (1999) examined the relations between goal orientation and self-efficacy and level of self-set goal in a meta-analysis. They reported positive relations between learning goal orientation and level of self-set goal ($r = .24$) and self-efficacy ($r = .47$). Harackiewicz et al., (2002) provided an overview of the associations between mastery goals and intrinsic motivation. Among the 18 effects reported from 9 studies, 16 showed a positive relationship between a mastery goal and some form of intrinsic motivation (i.e., time spent on task, free time spent on task, interest in the task etc.).

In addition, research has found that learning goal orientation is related to feedback seeking (VandeWalle & Cummings, 1997; VandeWalle et al., 2000), exerted effort (VandeWalle et al., 2001), and metacognitive activity (Ford et al., 1998). Mastery goals have also been positively associated with cognitive variables, such as deep processing (Elliot et al., 1999), construed challenge (McGregor & Elliot, 2002) and mental focus (Lee et al., 2003), suggesting that a mastery goal plays an important and positive role in people's motivation during performance on an achievement task.

Main effects. It is strongly expected that mastery goals will be positively associated with all three motivational outcome variables (task enjoyment, mental focus,

and effort exerted). The fact that mastery goals emphasize the gain of knowledge and increase in one's skill suggests that individuals with a strong mastery goal will be more likely to concentrate on the task at hand and become absorbed in the activity. This prediction was indeed made and supported by the findings of Lee et al. (2003).

The positive effects of mastery goals on task enjoyment are among the best documented within the hierarchical achievement goal framework (e.g., Barron & Harackiewicz, 2001; Harackiewicz et al., 2000). Finally, the strong ties between a mastery goal, where the individual defines competence as an intrapersonal or absolute performance standard, and seeing effort as the path to success, strongly suggests that the level of mastery goal will be positively associated with exerted effort on the task. This has been supported by empirical evidence (e.g., VandeWalle et al., 1999; VandeWalle et al., 2001).

> Level of mastery goal will be positively related to an individual's task enjoyment (Hypothesis 1a).

> Level of mastery goal will be positively related to an individual's mental focus (Hypothesis 1b).

> Level of mastery goal will be positively related to an individual's exerted effort (Hypothesis 1c).

Review of studies where the effects of mastery goals/ learning goal orientation are less than optimal. Despite the strong positive perception of mastery goals and their relations to important motivational outcome variables in the literature, there are some largely ignored studies that provide noteworthy empirical and theoretical exceptions to the prevailing pattern. The results of these studies suggest that the relations between mastery goals and motivational outcome variables may be more complex than universal main effects. These studies will now be discussed in some detail.

Stevens and Gist (1997) studied the effects of a manipulated goal orientation intervention and participants' self-efficacy on their negotiation skills maintenance utilizing a sample of 60 full-time MBA students. Within a week of the initial salary negotiation training session, the participants took part in a post-training intervention where their goal orientation was manipulated. Mastery-orientation was induced by advising trainees to look at the session as an opportunity to improve their skills, whereas the performance goal orientation manipulation focused trainees on achieving their best outcome. Stevens and Gist (1997) hypothesized four self-efficacy x post-training condition interaction effects, using *performance* (as assessed by a salary negotiation session held seven weeks later), *cognitive withdrawal*, *analytical task strategies* and *worry* as their dependent variables. Interestingly they found that among participants in the learning goal condition, individuals high on self-efficacy reported more cognitive withdrawal than those with low self-efficacy, suggesting that the combination of a learning goal and high self-efficacy led to more cognitive withdrawal than when the learning oriented goal was combined with low levels of self-efficacy. Stevens and Gist (1997) suggested as a possible explanation for this effect that skill improvement might

not be an attractive goal for high self-efficacy trainees who already perceive their skills as strong.

Sujan et al., (1994), utilizing a sample of sales-people, tested a model examining the effect of feedback, self-efficacy, learning goal orientation, and performance goal orientation on performance through mediating constructs they labeled "working smart" and "working hard". They defined working smart as "behaviors directed toward developing knowledge about sales situations and utilizing this knowledge in sales situations" (p. 40), while working hard was "the overall amount of effort salespeople devote to their work" (p. 40). Contrary to their expectations, Sujan et al. (1994) found that self-efficacy and learning goal orientation interacted in their effect on 'working hard' such that learning goal orientation had a positive relationship with working hard for individuals when coupled with low self-efficacy, whereas a non-significant relationship between learning goal orientation and 'working hard' was found for individuals high on self-efficacy. In their attempt to explain this unexpected finding, the authors suggested that low self-efficacious sales-people believed they had to work hard in addition to working smart to develop their ability, while highly self-efficacious sales people believed they could do so by smart work only (hence the non-significant relationship between learning goal orientation and 'working hard' for highly self-efficacious sales-people).

Steele-Johnson et al. (2000) tested the effects of manipulated goal orientation and task demands on motivation, affect and performance in two studies. Their task was a computerized class-scheduling task where the number of task rules (5 or 7) provided a manipulation for task demands (simple vs. complex). Of interest here are the results of their second study, where they manipulated task demands by varying task consistency

(consistent vs. inconsistent) and found that goal orientation interacted with task demands in their relations with intrinsic motivation. More specifically, participants in the learning goal orientation condition were intrinsically motivated and reported higher self-efficacy when doing the inconsistent and supposedly more challenging task rather than the consistent (and less challenging) task, whereas the opposite was true of participants in the performance goal orientation condition. It qualifies the results of Steele-Johnson et al., (2000) that they manipulated goal orientation by inducing beliefs of the stability vs. malleability of cognitive ability. However, since theory of ability is rather strongly correlated with learning goal orientation (e.g., Button et al., 1996) it is warranted (albeit with some caution) to use Steele-Johnson et al.'s results to derive hypotheses regarding mastery goals.

Finally, Donovan & Hafsteinsson (2004) examined the effects of goal attainment and goal orientation on upward goal revision (i.e., the amount to which the level of a goal is increased on a subsequent trial), utilizing a simple arithmetic test as their performance task. Among their results was a significant interaction between the goal-performance discrepancy (i.e., the amount by which performance surpassed the previous goal) and learning goal orientation on the amount of upward goal revision, such that individuals with a strong learning goal orientation increased their goal level more than individuals with a weak learning goal orientation when their performance exceeded their goal by a small amount, but less when they greatly surpassed their goal. In other words, the interaction indicated that a strong learning goal orientation was more beneficial when people's performance did not surpass their earlier goal by much, but that a weak learning goal orientation was more beneficial when people substantially surpassed their earlier

goal. In their attempt to explain these rather surprising results, Donovan and Hafsteinsson (2004) suggested that the attainment of a goal by a large margin on a relatively simple task may have resulted in high perceived ability. Furthermore, they suggested that this may have caused individuals' with a strong learning goal orientation to perceive that they had already mastered the task at hand, ultimately resulting in a lower increase in the goal level as compared to the individuals with a weaker learning goal orientation.

To sum up, Stevens and Gist (1997) as well as Sujan et al., (1994) found that the effects of a learning goal were more positive in situations where participants' self-efficacy was low as opposed to high. Steele-Johnson et al., (2000) found less beneficial effects of learning goal orientation on intrinsic motivation on a consistent and less demanding task as opposed an inconsistent and more demanding task. Finally, Donovan and Hafsteinsson (2004) found that for high goal performance discrepancy, a strong learning goal orientation resulted in lower upward goal revision than a weak learning goal orientation.

Mastery goal x Self-efficacy x Task complexity interaction. Several things are noteworthy from the studies reviewed above. First, Steele-Johnson et al.'s (2000) findings that the effects of learning goal orientation on intrinsic motivation are stronger for a more demanding task are interesting and consistent with the conceptualization of mastery goals being associated with challenge seeking (e.g., Dweck, 1986; Dweck, 1989). In fact, Dweck (1989) reported that children that were assigned learning goals and achieved low-effort mastery of a task were more likely to describe their affective reactions as "bored" or "disappointed" rather than "proud" or "relieved". Assuming that these observations generalize to other populations, it follows that task complexity should

interact with the level of the mastery goal in their effect on task enjoyment. Since the overall association between mastery goals and task enjoyment tends to be strongly positive (e.g., Harackiewicz et al., 2002), it is expected that mastery goals will have a positive effect for both the simple as well as the more complex task. However, the tendency of individuals with a strong mastery goal to seek and enjoy challenging tasks will likely result in the level of mastery goal having a stronger effect on task enjoyment when the task is complex as opposed to simple.

> The positive relations between a mastery achievement goal and task enjoyment are moderated by task complexity, such that the relations are stronger for a complex task than for a simple task (Hypothesis 2a).

It is reasonable to suggest that the demotivating effects of low-effort mastery would not only result in lower affect, but similarly would result in lower exerted effort and weaker mental focus. Since mastery can be more easily attained on a task that is simple as opposed to complex, one would expect a similar interaction between the level of mastery goal and task complexity in their effects on exerted effort and mental focus.

> The positive relations between a mastery achievement goal and mental focus are moderated by task complexity, such that the relations are stronger for a complex task than for a simple task (Hypothesis 2b).

The positive relations between a mastery achievement goal and exerted effort are moderated by task complexity, such that the relations are stronger for a complex task than for a simple task (Hypothesis 2c).

The results of three of the studies reviewed above seem to have in common that the combination of a strong learning goal orientation and high self-efficacy leads to motivational outcomes that are less than optimal (more cognitive withdrawal, less hard work and lower upward goal revision). Needless to say, these results strongly contradict common views in the literatures on goal orientation, achievement goals and self-efficacy. Not only are the effects of mastery goals / learning goal orientation believed to be almost uniformly positive as reviewed before, but the strong and positive effects of self-efficacy on motivation and performance have been extensively documented (e.g., Bandura & Locke, 2003; see Vancouver, Thompson, & Williams, 2001 for an alternative point of view). However, when the results of the three studies are analyzed closely, an interesting pattern emerges. In the studies of Stevens and Gist (1997), Sujan et al., (2004) and Donovan and Hafsteinsson (2004), the surprising and less than optimal outcomes occur for a combination of a strong learning goal orientation and high self-efficacy, or a strong learning goal orientation and performance that exceeded prior goal level by a large amount (possibly causing high perceptions of ability).

A strong self-efficacy generally indicates that the individual believes that he or she is highly capable of organizing and executing courses of action in order to attain high task performances (Bandura, 1986, 1991). In other words, the individual perceives herself to have high ability at the task. Keeping in mind that the primary concern of an individual

that holds a strong mastery goal is to achieve task mastery, it is tempting to suggest that a strong mastery goal combined with high task-specific self-efficacy can create a perception within the individual that the task is already mastered and undermine the individual's motivation at the task. This effect would be more likely to occur on a simple task, where the perception of task mastery is easily attained, as opposed to a complex task that offers more opportunities for strategy adoption and improvement. Although no empirical studies have tested this three-way interaction between mastery goals, self-efficacy and task complexity, indirect support can nevertheless be inferred from the study of Donovan and Hafsteinsson (2004). While utilizing a very simple and repetitive arithmetic task, they found that the combination of high learning goal orientation and presumably high self-efficacy (as inferred by the large amount to which task performance exceeded the performance goal) resulted in lower upward goal revision than a similar condition in which learning goal orientation was weak. Based on this argument, it is hypothesized that the combination of high self-efficacy and a strong mastery goal while working on a simple performance task will lead to motivational outcomes that are less than optimal. The expected interaction is identical for all three outcome variables and is depicted in Figure 3.

> Level of mastery goal, self-efficacy, and task complexity will interact in their effect on task enjoyment (Hypothesis 3a), mental focus (Hypothesis 3b), and exerted effort (Hypothesis 3c). For a complex task, it is expected that there will be main effects of self-efficacy and mastery goal on motivational variables. For a simple task, it is expected that there will be

positive relations between level of mastery goal and motivational outcomes when self-efficacy is low, but weak negative relations for high levels of self-efficacy.

Performance Approach Achievement Goals

As indicated by Harackiewicz et al. (2002), the performance-approach goals can represent a motivational hybrid, since they stem from both approach-oriented motivational concerns such as need for achievement, and avoidance-oriented motivational concerns such as fear of failure (Elliot & Church, 1997; Elliot & McGregor, 2001). This is apparent in the empirical evidence, which shows a mixture of positive and negative motivational outcomes of performance-approach goals.

On the positive side, performance-approach goals have been positively related to effort expenditure (Elliot et al., 1999), mental focus (Lee et al., 2003); level of goal (Lee et al., 2003; McGregor & Elliot, 2002) and performance attainment (Barron & Harackiewicz, 2001; Elliot & Church, 1997; Elliot & McGregor, 2001; Elliot et al., 1999). On the less optimal side, performance-approach goals have been shown to be associated with surface processing of information (Elliot et al., 1999; McGregor & Elliot, 2002) and the experience of threat-related emotions associated with an upcoming exam (McGregor & Elliot, 2002). With regard to deep processing of information, task interest and task enjoyment, performance-approach goals typically yield null results (Barron & Harackiewicz, 2001; Elliot & Church, 1997; Harackiewicz et al., 2000; Harackiewicz, Barron, Tauer, & Elliot, 2002; Lee et al., 2003). In accordance with the empirical

evidence the following main effects are proposed for mental focus and exerted effort (no effects are expected for task enjoyment):

> Level of performance-approach goal will be positively related to an individual's mental focus (Hypothesis 4a).

> Level of performance-approach goal will be positively related to an individual's exerted effort (Hypothesis 4b).

The mixed motivational foundations for performance-approach goals suggest that a strong performance-approach goal may to some extent make the individual vulnerable for more maladaptive motivational patterns. More specifically, one can speculate that under circumstances where the individual faces challenges, obstacles and other clues that signal potential problems and highlight the possibility of failure, the grounding of performance-approach goals in fear of failure would be more likely to kick in and negatively affect the individual's motivational pattern. Since people experience more performance related obstacles and have more opportunities to fail on a complex task as opposed to a simple task, it is probable that task complexity interacts with performance-approach goals in their effects on motivational outcome variables.

To the best of my knowledge, only one study has tested the interaction effects of task complexity and level of performance-approach goal while utilizing achievement goal framework. Barron & Harackiewicz (2001) conducted a study where participants (college students) were taught a novel multiplication method and then required to use the new

method to solve several multiplication problems that each consisted of multiplying two two-digit numbers together. Barron and Harackiewicz's (2001) performance variable was the number of problems participants solved correctly on each trial and their manipulation of task complexity consisted of varying the number of mental carries required for solving the problems. Interestingly, Barron and Harackiewicz (2001) found that the performance-approach goal and task complexity interacted in their effect on task performance, such that the relations between the strength of the performance-approach goal and performance were positive when the task was simple, but no relationship was observed when the task was complex. The primary limitation to Barron and Harckiewicz's (2001) study is that the only motivational outcome variable used in their study was intrinsic motivation, a variable which tends not to be associated with performance-approach goals (Harackiewicz et al., 2001). Nevertheless, their results suggest that the effects of performance-approach goals do vary with task complexity, such that the effects are stronger for simpler tasks. Since mental focus and exerted effort are both significant contributors to task performance, the results of Barron and Harackiewicz (2001) provide a tentative foundation for hypothesizing that the level of performance-approach goal will interact with task complexity in their effects on exerted effort and mental focus.

> The positive relations between performance-approach goal and mental focus will be moderated by task complexity, such that the relations will be stronger for a simple task than a complex task (Hypothesis 5a).

> The positive relations between performance-approach goal and exerted effort will be moderated by task complexity, such that the relations will be stronger for a simple task than a complex task (Hypothesis 5b).

Consistent with the empirical results on the relations between performance-approach goals and intrinsic motivation, no relationship is expected between the level of performance-approach goal and task enjoyment.

Performance-avoid goals.

The literature offers little doubt about the negative influence of performance-avoid goals on motivation and performance related outcome variables. Performance-avoid goals have been shown to have negative relations to intrinsic motivation, including enjoyment (Elliot & Church, 1997), mental focus (Lee et al., 2003), level of goal (Lee et al., 2003; McGregor & Elliot, 2002), study strategies (Elliot & McGregor, 2001), exam performance (Elliot & McGregor, 2001; Elliot et al., 1999), and hours spent studying for a test (McGregor & Elliot, 2002), to name a few. Furthermore, performance-avoid goals are positively related to several undesirable motivational and behavioral variables such as surface processing (Elliot & McGregor, 2001; Elliot et al., 1999), health center visits (Elliot & McGregor, 2001), disorganization (Elliot & McGregor, 2001; Elliot et al., 1999) and threat construal (McGregor & Elliot, 2002).

Given these strongly converging results, as well as the fact that the primary antecedent of performance-avoid goals is a person's fear of failure (e.g., Elliot & Church,

1997; Elliot & McGregor, 2001), there is little reason to doubt that prior results will replicate in the current study.

> Performance-avoid goals will be negatively related to task enjoyment (Hypothesis 6a).

> Performance-avoid goals will be negatively related to mental focus (Hypothesis 6b).

> Performance-avoid goals will be negatively related to exerted effort (Hypothesis 6c).

To the best of my knowledge, no empirical studies have tested for a possible interaction between task complexity and level of performance-avoid goal. Using the same logic as the one applied to the performance-approach goals before, one can argue that the strength of the negative effects of fearing failure may magnify as a function of the encountered problems when solving the performance task. In other words, it is possible that the negative effects of performance-avoid goals will be more severe for a complex task than for a simple task, due to the additional challenge and increased opportunities to experience failure on the more complex task.

> The negative relationship between performance-avoid goals and task enjoyment will be moderated by task complexity, such that the

relations will be more negative for a complex task than for an easy task (Hypothesis 7a).

The negative relationship between performance-avoid goals and mental focus will be moderated by task complexity, such that the relations will be more negative for a complex task than for an easy task (Hypothesis 7b).

The negative relationship between performance-avoid goals and exerted effort will be moderated by task difficulty, such that the relations will be more negative for a complex task than for a simple task (Hypothesis 7c).

The Effects of Mental Focus and Exerted Effort on Task Performance

It is relatively well established in the literature that both exerted effort and mental focus are positively related to task performance (e.g., Lee et al., 2003, VandeWalle et al, 1999; VandeWalle et al., 2001), whereas the relations between task enjoyment and performance have typically failed to yield significant results (e.g., Lee et al., 2003). In harmony with these empirical results the following hypotheses were derived.

Mental focus will be positively related to task performance (Hypothesis 8a).

Exerted effort will be positively related to task performance (Hypothesis 8b).

Method

Participants

Participants in the study were 353 college students of which 347 provided useful data. The remaining six participants either quit the study or needed help on one of the performance puzzles and were therefore removed from the data set. The participants, recruited from psychology classes at Virginia Tech, volunteered to participate in the study in exchange for credit towards their class grades.

Task

The performance task selected for this study was a computer based puzzle game, designed specifically to serve as a performance task in studies on work motivation. In this game, participants are required to reconstruct an image presented on the computer screen, from its individual relocated pieces. At the beginning of each trial, participants view a picture that has been divided into a grid for 10 seconds, after which the software randomly relocates the pieces of the grid to different locations within the grid. The participants' task is to reconstruct the original picture as quickly as possible by swapping two pieces at a time, until the original picture reappears. Performance is measured with the time it takes participants to complete each picture. Data from subjects in pilot studies that have worked on the puzzle task indicate that the task is enjoyable and engaging for the participants.

Puzzle tasks of all sorts have been frequently and successfully used in a variety of studies on work motivation (e.g., Breland, 2004; Elliot & Harackiewicz, 1996; Locke & Latham, 1990). Furthermore, preliminary data obtained with the puzzle task utilized in this study indicates that it is a useful performance measure in studies on achievement goals and goal orientation (Breland, 2004).

Task Complexity Manipulation

In the current study, the complexity of the task was manipulated by varying the number of pieces in the picture grid. In the complex condition, the pictures were divided into a grid of six rows and six columns resulting in a picture with 36 pieces. In the simple condition each picture was divided into a grid with 4 rows and 4 columns, resulting in a 16 piece puzzle. Pilot subjects were used to determine the appropriate number of rows and columns for the complex condition so that the time required to solve the complex puzzles was approximately 7-9 times that of the simple puzzles.

Procedure

The data was collected from the participants in one session, ranging in length from approximately 45 to 90 minutes, depending on how quickly they solved the puzzles. The data collection session took place in a 12 workstation computer laboratory. Computer software, especially designed to collect data with the performance task utilized in the current study, ran participants through the data collection session with the assistance of a research assistant. Half of the 12 workstations were set up for the simple condition and grouped at the right side of the computer lab, and the other half were set up for the complex condition. The first participant that showed up for each data collection session was randomly assigned to one of the experimental conditions and seated in front

of a workstation set up to test that experimental condition. After the first participant, every odd-numbered participant that signed in to the session was assigned to that same condition while the even numbered participants were assigned to the other experimental condition. This procedure resulted in a total of 175 (50.4%) participants in the simple condition, and 172 (49.6%) participants in the complex condition.

After the participants were seated in front of a workstation, they gave their informed consent for participation in the study and provided demographic information. Thereafter, they were given written and verbal instructions on how to complete the puzzle task after which they completed a very simple practice trial on the puzzle task to make sure they understood how the task worked. The practice trial consisted of a 3 x 3 puzzle with the digits 1 through 9 arranged in three rows and three columns. After the practice trial, participants' spatial ability was assessed using a picture manipulation task similar to the "Block Design" incorporated into the WAIS measure of cognitive functioning.

After the spatial ability measure, participants solved four practice puzzles, all arranged into a 5 x 5 grid. The purpose of these practice puzzles was to get participants more familiar with the task, and set up a contrast for the simple and complex experimental conditions later in the study. Once the participants had completed the practice puzzles, their achievement goals and self-efficacy for the upcoming performance trials were assessed. Thereafter, half of the participants completed three complex puzzles, arranged in a 6 by 6 grid, while the other half completed seven simple puzzles arranged in a 4 by 4 grid. Following the completion of the complex performance trials, participants responded to questionnaires measuring their task enjoyment, their exerted effort and their mental focus while they were working on the complex puzzle pictures. After the

completion of the questionnaires, the participants in the complex condition were debriefed and dismissed. The procedure was similar in the simple condition, with the exception that participants in the simple condition were asked to solve two of the complex (6 by 6) puzzles after they responded to the questionnaires and before they were debriefed. These complex puzzles were added to make the two conditions approximately equal in length in order to prevent perceptions of inequity on behalf of participants in the complex condition.

Measures

Achievement goals. Fifteen of the original 18 items of Elliot and Church's (1997) achievement goal measure were modified to be used with the puzzle performance task in this study. Three of the items were dropped because they could not easily be adapted to the puzzle task used in the current study. Each of the three sub-scales, mastery, performance-approach, and performance-avoid contains five items that were answered on a 5-point Likert scale. Examples of items from the mastery, performance-approach and performance-avoid scales are respectively: "I would like to completely master this puzzle task"; "I am motivated by the thought of outperforming my peers on this puzzle"; "I just want to avoid doing poorly in this puzzle". The internal consistency of the scales in this study were a = .79 (mastery), a = .91 (performance-approach) and a = .66 (performance-avoid). Principal components analyses run on each of the scales separately confirmed the unidimensionality of the three achievement goal scales.

Ability. In order to measure participants' ability at reconstructing geometric images, images adopted from the Wechsler Adult Intelligence Scale (WAIS; Wechsler, 1997) were incorporated into the puzzle task. In the WAIS, participants are shown

pictures of geometric forms and are required to construct the images from building blocks whose sides have different shapes on them. Whereas the WAIS asks participants to reconstruct images from blocks, the adopted ability measure in the current study required participants to reconstruct the scrambled geometric forms in the puzzle task. Participants reconstructed two geometric forms while viewing images of the forms on a sheet of paper. Their combined completion time on these two images served as their ability indicator.

Self-efficacy. Self-efficacy was assessed using a 10-item scale, based upon the self-efficacy scale developed by Phillips and Gully (1997). Since their scale reflects self-efficacy in the academic environment, items were adjusted to reflect participants' belief in their abilities to perform on the puzzle task used in the current study. The scale includes items such as "I feel confident in my ability to perform well on the upcoming puzzle" (Item 1), "On average, other applicants are probably not as capable of doing as well on these puzzles as I am" (Item 10). Responses were made on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total self-efficacy score is calculated as the computed average of responses to individual items. The internal consistency of the scale in this study was a = .85.

Task enjoyment. Task enjoyment was measured with seven items adopted from Ryan's (2004) intrinsic motivation inventory. Sample items are: "I enjoyed the puzzle task in this study very much" (item 1) and "While I was doing the puzzle task, I was thinking about how much I enjoyed it" (item 7). Participants responded to the statements on a 7-point Likert scale, ranging from (1) "Not at all true" to (7) "Very true". The internal consistency of the scale in this study was a = .92.

Exerted effort. Exerted effort was measured with four items adopted from Deci and Ryan's (2004) motivation inventory. Sample items are "I put a lot of effort into working on the puzzle task" (item 1) and "I tried very hard on the puzzle task in this study" (item 3). Participants responded to the statements on a 7-point Likert scale, ranging from (1) "Not at all true" to (7) "Very true". The internal consistency of the scale in this study was a = .83.

Mental focus. Mental focus was measured with a six-item measure adopted from Lee et al., (2003). Examples of items are: "When performing this task, I had good concentration" and "When performing this task, I had to work hard to keep my mind on-task". Participants responded to each statement on a 5 (or 7) point Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree". The internal consistency of the scale in this study was a = .90.

Results

Descriptive Statistics and Manipulation Check

The descriptive statistics and scale correlations are presented in Table 1, and the bivariate correlations within each experimental condition are presented in Table 1a. The minimum and maximum scale values indicated that the range of the scales was acceptable. The average values of task enjoyment, mental focus and exerted effort were approximately one standard deviation above the scale midpoint, indicating acceptable levels of motivation on behalf of the majority of participants in the study. The moderate intercorrelations between the three dependent variables ranged from $r = .21$, $(p < .01)$ to $r = .52$ ($p < .01$) with one another. The intercorrelations between the three achievement goals ranged from $r = -.14$ ($p < .01$) between mastery and performance-avoid, to a

somewhat high correlation of $r = .43$ ($p < .01$) between mastery goals and performance-approach. The correlation between mastery and performance-approach goals is a bit higher than that found in prior studies (e.g., Elliot & Church, 1997; Elliot et al., 1999; Lee et al., 2003) and confirms that there is a moderate amount of overlap between the two approach achievement goals.

The task complexity manipulation in the study was successful. Participants took almost 10 times longer on average to solve the complex puzzles ($M = 320.5$ seconds, $SD = 125.1$) than the simple puzzles ($M = 33.9$ seconds, $SD = 10.9$; *Cohen's d* = 4.2). A t-test for independent groups confirmed the statistical significance of the mean difference ($t[169.4] = 29.6$, $p < .001$). Due to a violation of a homogeneity of variance assumption the adjusted degrees of freedom were used in the t-test. Furthermore, participants in the complex condition perceived the complexity of the puzzles to be greater than participants in the simple condition ($M_{complex} = 3.71$, $SD = .55$; $M_{simple} = 2.24$, $SD = .54$; $t[345] = 25.3$, $p < .001$; *Cohen's d* = 2.7). A t-test for independent groups was conducted to rule out possible ability differences between participants in the two groups. Again the degrees of freedom were adjusted due to a violation of the homogeneity of variance assumption. No ability differences between participants in the simple and complex condition were found ($M_{complex} = 198.8$; $SD = 144.6$; $M_{simple} = 217.4$, $SD = 179.5$; $t[328.4] = 1.06$, ns; *Cohen's d* = .11).

Testing the Hypotheses

Hierarchical multiple regression analysis with task enjoyment, mental focus and exerted effort as dependent variables was used to test the hypotheses of the study. It should be noted that although the regression equations for each of the dependent

variables are run separately, the moderately strong intercorrelations between the dependent variables (ranging from $r = .21$, $p < .01$, to $r = .52$, $p < .01$) result in regression equations that are not truly independent from one another. To test for the main effects of each of the achievement goals, task complexity and self-efficacy were entered into a regression equation at step 1 as control variables, followed by the corresponding achievement goal at step 2. To test for the two-way interactions, the achievement goal – task complexity interaction was added to the equation in step 3. The three-way interaction between mastery goal, self-efficacy and task complexity was entered into the equation at step 5, after the two way interactions of mastery goal x self-efficacy and self-efficacy x task complexity were added at step 4.

Mastery Goal. Hypotheses 1a – 1c predicted positive main effects of mastery goals on task enjoyment, mental focus and exerted effort. As seen in step 2 in Tables 2, 3 and 4, all three hypotheses were supported. Mastery goals were positively associated with task enjoyment ($ß = .46$, $p < .001$, $?R^2 = .152$), mental focus ($ß = .17$, $p < .001$, $?R^2 = .020$), and exerted effort ($ß = .25$, $p < .001$, $?R^2 = .044$).

Hypothesis 2a predicted that mastery goals and task complexity would interact in their effect on task enjoyment, such that the relations between mastery goal and task enjoyment would be stronger for a complex task than for a simple task. As seen in step 3 in Table 2, the interaction term was significant ($ß = .70$, $p < .05$, $?R^2 = .01$). To examine the nature of this relationship, the procedures outlined by Jaccard, Turisi, and Wan (1990) were utilized to provide a graphical representation of this interaction. In this procedure, scores one standard deviation above and below the mean of mastery goals were entered into the regression equation for the simple and complex task, and the predicted values of

task enjoyment (or mental focus or exerted effort) were calculated for each of the four combinations of scores (low-simple, low-complex, high-simple, high-complex). The predicted values were then plotted on a mastery goal vs. task enjoyment (or mental focus or exerted effort) graph for the complex and simple task. The outcome of this plot is depicted in Figure 4, which shows that the regression line for the complex task is steeper than that for the simple task. This indicates that a given increase in mastery goals will be more beneficial for task enjoyment when the task is complex than simple, and supports Hypothesis 2a.

Hypothesis 2b predicted that mastery goals and task complexity would interact in their effect on mental focus, such that the relations between the level of mastery goal and mental focus would be stronger for a complex task than for a simple task. As seen in step 3 in Table 3, the interaction term failed to reach traditional levels of statistical significance (ß = .63, p = .06, $?R^2$ = .008). However, due to the marginal p – value the shape of the (non-significant) interaction was plotted in Figure 5. As seen in Figure 6, the shape of the interaction is consistent with the predictions of Hypothesis 2b, since the relations between level of mastery goal and mental focus were stronger for a complex task than a simple task.

Hypothesis 2c predicted that mastery goals and task complexity would interact in their effect on exerted effort, such that the relations between the level of mastery goal and exerted effort would be stronger for a complex task than for a simple task. As seen in step 2a in Table 4, this effect was not significant (ß = .00, p = .99, $?R^2$ = .000), failing to support Hypothesis 2c.

Hypotheses 3a – 3c predicted a three-way interaction between level of mastery goal, self-efficacy and task complexity in their effect on task enjoyment, mental focus and exerted effort. The three-way interaction term was entered into a regression equation containing all main effects and all three two-way interactions. As seen in step 5 in Tables 2, 3 and 4, none of the three-way interaction terms were statistically significant and Hypotheses 3a – 3c were not supported.

It was noted that the two-way interaction between mastery goal and self-efficacy on exerted effort was significant (ß =1.39, $p < .01$). When the interaction term was entered by itself into a regression equation containing task complexity, self-efficacy and mastery goals, it added 4.7% to the explained variance. This interaction is depicted in Figure 7, and shows that the relations between level of mastery goal and exerted effort were positive for high self-efficacy but zero or slightly negative for low levels of self-efficacy. This suggests that the benefits of holding a strong mastery goal on exerted effort are strongest when accompanied by strong self-efficacy, and that the influence of mastery goals on exerted effort are non-existent when self-efficacy is low.

Performance-Approach Goal. Hypotheses 4a and 4b predicted that performance-approach goals would be positively related to an individual's mental focus and exerted effort. As seen in step 2 in Table 5, the relations between the level of performance-approach goal and mental focus were not significant (ß = -.01, $p = .83$, $?R^2 = .000$), failing to support Hypothesis 4a. However, there was a significant positive relationship between level of performance-approach goal and exerted effort (ß = .25, $p < .001$, $?R^2 = .051$) as seen in step 2, Table 6, supporting Hypothesis 4b.

Hypothesis 5a predicted that performance-approach goals and task complexity would interact in their effect on mental focus, such that the relations between the level of performance-approach goal and mental focus would be stronger for a simple task than for a complex task. As seen in step 3 in Table 5, the interaction term was not significant (ß = - .15, p = .52, $?R^2$ = .000) and therefore no support was found for Hypothesis 5a.

Hypothesis 5b predicted that performance-approach goals and task complexity would interact in their effect on exerted effort, such that the relations between the level of performance-approach goal and exerted effort would be more positive for a simple task than for a complex task. As seen in step 3 in Table 6, the interaction effect was significant (ß = -.64, p < .01, $?R^2$ = .018). The interaction is depicted in Figure 7. In support of hypothesis 5b, Figure 7 shows a stronger positive relationship between level of performance-approach goals and exerted effort for the simple task than for the complex task.

Performance-Avoid Goal. Hypotheses 6a – 6c predicted that performance-avoid goals would be negatively related to an individual's task enjoyment, mental focus and exerted effort. There were no relations detected between the level of performance-avoid goal and task enjoyment, as seen in step 2 in Table 7 (ß = -.06, p = .24, $?R^2$ = .003), consequently failing to support Hypothesis 6a. Step 2 in Table 8 shows that the relations between performance-avoid goal and mental focus were negative as predicted in Hypothesis 6b, but the regression coefficient failed to reach traditional levels of statistical significance (ß = -.09, p = .089, $?R^2$ = .007). Hypothesis 6c predicted that the level of performance-avoid goal would be negatively related to exerted effort. Contrary to

expectations, a significant positive relationship was detected (ß = .15, $p < .01$, $?R^2$ = .019) as shown in step 2 in Table 9. Hence Hypothesis 6c was not supported.

Hypothesis 7a predicted that performance-avoid goals and task complexity would interact in their effect on task enjoyment, such that the relations between the level of performance-avoid goal and task enjoyment would be more negative for a complex task than for a simple task. As seen in step 3 in Table 7 the interaction effect was significant (ß = -.73, $p < .01$, $?R^2$ = .019). Figure 8 depicts the interaction, and shows that the relations between level of performance-avoid goals and task enjoyment were non-existent or slightly positive for the simple puzzles, but negative for the complex puzzles. This provides support for Hypothesis 7a.

Hypothesis 7b predicted that level of performance-avoid goals and task complexity would interact in their effect on mental focus, such that the relations between the level of performance-avoid goal and mental focus would be more negative for a complex task than for a simple task. As seen in step 3 in Table 8, the interaction effect was significant (ß = -.58, $p < .05$, $?R^2$ = .012), and the interaction is depicted in Figure 9. Consistent with Hypothesis 7b, the relationship between performance-avoid goal and mental focus was negative for the complex task, but neutral or even slightly positive for the simple task.

Hypothesis 7c predicted that the level of performance-avoid goals and task complexity would interact in their effect on exerted effort, such that the relations between the level of performance-approach goal and mental focus would be more negative for a complex task than for a simple task. As seen in step 3 in Table 9, the interaction term was not significant (ß = - .20, $p = .47$, $?R^2$ = .001), failing to support Hypothesis 7c.

Main effects on performance. Hypothesis 8a and 8b predicted that mental focus and exerted effort, respectively, would be positively related to participants' performance. Since performance was measured as the average time it took participants to complete the puzzles, lower time indicates better performance, and consequently a negative regression coefficient represents positive relations between the motivational variable and performance. To assess the effects that mental focus and exerted effort had on performance beyond participants' ability beliefs and task characteristics, participants' self-efficacy and the task complexity were entered into the regression equations before mental focus and exerted effort. Table 10 shows that task complexity and self-efficacy explained more than 75% of the variance in task performance.

As seen in Table 10, step 2, only mental focus had significant relations with performance when task complexity and self-efficacy had been controlled for, supporting Hypothesis 8a. Mental focus was negatively related to average completion time of the puzzles, indicating that the more mentally focused participants were, the quicker they completed the puzzles (ß = - .065, $p < .05$, $?R^2 = .003$). However, the effect was very weak, explaining only .3% of additional variance in performance. Somewhat surprisingly, there were no relations detected between exerted effort and performance when task complexity and self-efficacy were controlled for (ß = .038, ns). Consequently, Hypothesis 8b was not supported.

Supplemental Analyses

To determine the relative importance of self-efficacy vs. mastery goals in explaining variance in the outcome variables supplemental analyses were run where self-efficacy was entered into the regression equation after the achievement goal x task

complexity interaction term. The mid-column in Table 11 shows the incremental variance accounted for by self-efficacy when added into a regression equation that contains task complexity, one of the three achievement goals, and the task complexity x achievement goals interaction. In six of the eight analyses, the regression coefficient associated with self-efficacy was significant, and the incremental explained variance in these cases ranged from 4.6% to 23.4%. This strongly suggests that the predictive utility is improved in most cases by adding self-efficacy to the regression equations. Interestingly however, there are three cases where the incremental variance accounted for by adding self-efficacy at step 4 is less than when the corresponding achievement goal is added to a regression equation containing only task complexity and self-efficacy (see steps 3 in tables 2-9). This happens for the effects of mastery goals on task enjoyment (self-efficacy adds 4.8%, level of mastery goal adds 15.2% to the explained variance) and exerted effort (self-efficacy adds .1%, level of mastery goal adds 4.4%), and performance-approach goals on exerted effort (self-efficacy adds .5%, level of performance-goal adds 5.1%). These three cases demonstrate two things. First, that self-efficacy does not always increase the explained variance in the three motivational outcome variables used in the current study, and second, even if the added explained variance of self-efficacy is significant, self-efficacy is not always a stronger contributor than achievement goals.

Discussion

In the current study, Andrew Elliot's achievement goal framework (e.g., Elliot, 1995; Elliot & Church, 1997; Elliot & Harackiewicz, 1996) was introduced as a plausible replacement for the problematic construct of goal orientation that has been widely popular among I/O researchers in the last several years. The primary purpose of this

study was to hypothesize and test interactions between achievement goals, self-efficacy and task complexity in their effects on three motivational variables: task enjoyment, mental focus and exerted effort. Prior research, both within the goal orientation domain as well as Elliot's and colleagues research on achievement goals, has paid relatively little attention to possible moderating effects of situational variables on the relations between achievement goal/goal orientation and outcome variables, although preliminary evidence supports the idea of situational moderators (e.g., Barron & Harackiewicz, 2001; Mangos & Steele-Johnson, 2001; Steele-Johnson et al., 2000). In the current study self-efficacy and task complexity were examined as possible moderators of the relations between the achievement goals and the outcome variables.

Mastery Achievement Goals

As expected, the level of mastery goal was positively related to task enjoyment, mental focus and an individuals exerted effort. These findings replicate prior findings (e.g., Harackiewicz et al., 2002; Lee et al., 2003) and underline the positive effects of a strong mastery goal on motivation. A more interesting question regarding the effects of mastery goals on motivation is whether their effects on motivation depend on situational factors, such as characteristics of the task. In the current study, it was predicted that task complexity would moderate the relations between level of mastery goals and the three motivational variables. As noted earlier, individuals with strong mastery goals seek challenge and carry a strong desire for mastering the task at hand, generally resulting in more enjoyment, a stronger mental focus, and more exerted effort than observed with individuals that hold weak mastery goals. However, these positive effects are likely to be weaker in situations where the simplicity of the task puts an upper limit on the learning

that can take place, and limits the perceived challenge. In other words, one would expect less benefits of a strong mastery goal in simple situations than in complex situations. Accordingly, Hypothesis 2a, 2b and 2c predicted a more positive relationship between level of mastery goals and task enjoyment, mental focus, and exerted effort, respectively, for complex tasks than for simple tasks.

Support was found for Hypothesis 2a, marginal support was found for Hypothesis 2b, but no support was found for Hypothesis 2c. As seen in Figure 4, mastery goals were positively related to task enjoyment in both the simple and the complex experimental conditions. However, as predicted by Hypothesis 2a, the slope of the regression line for the complex condition was more positive than that of the regression line for the simple condition, indicating that the positive effects of mastery goals were stronger for participants working on the complex puzzles as opposed to the simple puzzles. A similar pattern was observed for participants' mental focus, as shown in Figure 5, indicating that the level of mastery goal has a stronger effect on people's mental focus when the task is complex, as opposed to simple. Since the statistical support for Hypothesis 2b was only marginal (p = .061) and the strength of this relationship was rather weak, caution should be used when interpreting the interaction effect of mastery goals and task complexity on mental focus. Finally, contrary to task enjoyment and mental focus, no interaction effects between mastery goals and task complexity on exerted effort were detected.

In addition to the two-way interactions between mastery goals and task complexity, predictions about a possible three-way interaction between mastery goals, task complexity and self-efficacy on task enjoyment, mental focus and exerted effort were made in Hypotheses 3a, 3b and 3c respectively. The combined results of a limited

number of studies in the goal orientation literature (e.g., Donovan & Hafsteinsson, 2004; Steele-Johnson et al., 2000; Stevens & Gist, 1997; Sujan et al., 1993) have indicated that the combination of a strong mastery goal and high self-efficacy results might result in less than optimal motivational outcomes. In an attempt to explain these findings, the suggestions have been made that in certain performance conditions where the performance task is simple, repetitive and does not offer challenge, participants that hold strong mastery goals (i.e., strive to master the task) and have high perceptions of their efficacy at the task may become bored and uninterested, resulting in low levels of observed motivation. Based on these suggestions, it was predicted that the relations between level of mastery goal and each of the three motivational variables would depend on the self-efficacy strength and task complexity. More specifically it was expected that mastery goal would have weak or even negative relations with motivation in conditions where the task was simple and participants' self-efficacy was high, but that the relations would be strong and positive in all other conditions. No support was found for hypotheses 3a, 3b and 3c. Both mastery goals and self-efficacy had strong main effects on all three motivational variables and these main effects seemed to hold across the simple and complex task conditions. However, when testing for the three-way interaction it was found that self-efficacy and mastery goals interacted in their effect on exerted effort. The interaction, depicted in Figure 6, reveals a positive relationship between level of mastery goal and exerted effort for individuals with high self-efficacy, but a weak negative or non-significant relationship for individuals with low self-efficacy. In other words, the interaction suggests that holding a strong desire to master the task is not beneficial for exerted effort unless it is accompanied with a strong sense of

efficaciousness. This finding contradicts the predictions of Hypothesis 3c, which assumed that the combination of a strong mastery goal and high self-efficacy might lead to less than optimal results, at least in situations where there is little to learn.

There are two primary explanations for the lack of three-way interactions in the current study. The first and most straight-forward explanation suggests that self-efficacy, level of mastery goal and task complexity do not interact in their effect on motivational variables. A second category of explanations assumes that there is a true there-way interaction but some methodological issues such as low power, properties of the task, or unknown sources of error prevented the three-way interaction from being detected. One should of course be cautious in ruling out the possibility of a three-way interaction based on the results of one study. Therefore, the final verdict should not be given until future replications have tested these hypotheses under different performance conditions using different performance tasks. Nevertheless, the detection of the incompatible two-way interaction between self-efficacy and level of mastery goal on exerted effort in the current study, as well as the strong main effects of both self-efficacy and mastery goals on all three motivational variables provide tentative support for the conclusion that there is no true three-way interaction between self-efficacy, level of mastery goals and task complexity on motivation.

In summary, the results for mastery goals supported the predicted main effects of mastery goals on task enjoyment, mental focus and exerted effort. The predicted two-way interaction between level of mastery goal and task complexity in their effect on exerted effort, as well as all three-way interactions were not supported. However, level of mastery goal and task complexity interacted in the predicted way in their effect on task

enjoyment and mental focus, although the latter failed to reach traditional levels of statistical significance. These interactions between mastery goals and task complexity are novel in both the I/O literature as well as the literature on achievement goals. Until now, the overwhelming majority of studies on learning goal orientation and mastery achievement goals have focused on the simple main effects of these constructs, often resulting in an oversimplified picture. The exceptions to this simple main effect approach have not dealt with the level of mastery goals (or goal orientation) but instead examined the interactions between manipulated performance and learning goal orientations and task complexity (e.g., Steele-Johnson et al., 2000). The results of the current study suggest that the reality is more complex than that of simple main effects, and that properties of the task should be taken into account when the effects of mastery goals on motivation are assessed.

Performance-Approach Achievement Goals

The essence of a strong performance-approach goal is wanting to outperform one's peers, which implies a positive, "approach" orientation towards performance that should have a positive effect on mental focus and exerted effort, as observed in prior studies (e.g., Elliot et al., 1999; Lee et al., 2003). Contrary to expectations performance-approach goals did not have a statistically significant effect on mental focus in the presence of self-efficacy and task complexity. Therefore, Hypothesis 4a was not supported in this study. Consistent with the results of Elliot et al. (1999) however, it was found that performance-approach goals were positively related to exerted effort, in support of Hypothesis 4b. The relations indicate that the stronger one's performance-approach goal, the more effort one will tend to exert on the task. In other words, those

individuals that are preoccupied with performing better than their peers tend to try harder at the task than individuals to whom it is less important to outperform their peers. This result confirms the positive effect a performance approach goal can have on one's motivation.

Although existing studies suggest that the effects of a performance-approach goal on mental focus and exerted effort tend to be predominantly positive, the emphasis on normative comparison (i.e., wanting to outperform your peers) leaves individuals with a strong performance-approach goal vulnerable to more maladaptive motivational patterns. When one's performance standards are primarily dependent on how well other's perform, the control over one's success or failure is to some extent diminished, since one cannot frequently control the performance of one's peers. This may lead individuals with strong performance-approach goals to be more vulnerable to challenges, obstacles and temporary failures since they all signal that someone else might be getting ahead of them, indicating a possible failure to reach their goal. Consistent with this rationale, it was predicted that performance-approach goals would interact with task-complexity in their effect on mental focus and exerted effort, such that the positive relations would be stronger for the simpler task where little or no obstacles are met, than for the more complex task where the chances of running into temporary problems are greater.

Similar to the main effects, no support was found for the interaction effects of performance-approach goals and task complexity on mental focus, failing to support Hypothesis 5a. On the other hand, performance-approach goals and task complexity interacted in their effect on exerted effort. As seen in Figure 7, the interaction is consistent with the predictions made in Hypothesis 5b. The slope of the regression line

that represents the relations between performance-approach goals and exerted effort is steeper for the simple task than for the complex task, indicating that the positive effects of performance-approach goals on exerted effort increase with the increased simplicity of the task. With the exception of Barron and Harackiewicz (2001), the interaction between level of performance-approach goal and task complexity has not been tested. Barron and Harackiewicz (2001) found that the positive relations between the level of performance-approach goal and task performance were stronger when the task was simple as opposed to complex. The results of the current study replicate the findings of Barron and Harackiewicz (2001) using exerted effort as an outcome variable as opposed to task performance. When combined, the two studies strongly suggest that the benefits of holding a strong performance-approach goal are limited, and that one cannot necessarily expect performance-approach goals to have a strong positive effect on motivation nor performance in workplace situations where the task is complex and offers ample opportunities for failure. Nevertheless, it is reasonable to conclude that performance-approach goals can serve as a powerful motivator as long as the individual does not run into too many obstacles while working on the task and perceives his involvement in the task as being favorable as compared to that of his or her peers.

Performance-Avoid Achievement Goals

In accordance with the conceptualizations of performance-avoid goals as primarily rooted in fear of failure, and in harmony with prior empirical results (e.g., Elliot & Church, 1997; Lee et al., 2003; McGregor & Elliot, 2002), it was expected that performance-avoid goals would be negatively related to task enjoyment, mental focus and exerted effort. Somewhat surprisingly, and despite a moderate negative bivariate

correlation (r = -.27, p < .01), the regression coefficient for the relations between performance-avoid goals and task enjoyment was not significant, failing to provide support for Hypothesis 6a. However, performance-avoid goals and task complexity interacted in their effect on task enjoyment as predicted by Hypothesis 7a. As seen in Figure 8, there was a negative relationship between level of performance-avoid goals and task enjoyment in the complex condition, presumably because the obstacles encountered by the participants when solving the complex puzzle induced a fear of failure that negatively affected task enjoyment. In the (presumably) non-threatening simple condition on the other hand, there was a non-significant or slightly positive relationship between level of performance-avoid goal and task enjoyment, indicating that a stronger performance-avoid goal did not negatively affect task enjoyment when the task was simple.

Although at best tentative support was found for the simple main effects of performance-avoid goals on mental focus, the two-way interaction between task complexity and level of performance-avoid goal on mental focus was statistically significant. This interaction, depicted in Figure 9, supports Hypothesis 7b. Little relations between level of performance-avoid goal and mental focus were detected in the simple condition, indicating that a stronger performance-avoid goal did not undermine people's mental focus when the task was simple and straight-forward. In the complex condition however, the relations between level of performance-avoid goal and mental focus were negative, indicating that a strong performance-avoid goal had a disruptive influence on participants' mental focus when the task was more demanding. As with task enjoyment, a plausible interpretation of this effect assumes that the complex performance condition

was somewhat threat-inducing to participants with a strong performance-avoid goal, amplifying their fear of failure and ultimately causing them to lose their mental focus to a greater extent than those participants in the complex condition that did not hold a strong performance-avoid goal. The flat regression line for the simple condition on the other hand suggests that the simplicity of the 4 x 4 puzzles did not have the same disrupting effect on the mental focus of participants with a strong performance-avoid goal.

Contrary to the predictions of Hypothesis 6c, level of performance-avoid goal was *positively* related to exerted effort, indicating that a stronger performance-avoid goal served a positive motivational purpose, resulting in more exertion of effort than a weak performance-avoid goal. There are two ways of explaining this surprising finding. First, it is possible that a strong performance-avoid goal and its associated fear of failure serves as a motivator that actually increases the amount of effort exerted at the task. Second, it is possible that individuals with a strong performance-avoid goal *perceive* themselves to strive more when solving the puzzles than their counterparts with weak performance-avoid goals, possibly because of the extra effort they need to exert to stay focused on the task due to their tendencies to process information on the surface (Elliot & McGregor, 2001), their inclination to be disorganized (Elliot & McGregor, 2001) and lose focus (e.g., Lee et al,. 2003). Finally, no signs of an interaction between level of performance-avoid goal and task complexity on exerted effort were detected, failing to support Hypothesis 7c.

In summary, the results for the performance-avoid goals suggest that the effects of performance-avoid goals on task enjoyment and mental focus are not uniformly negative but are to some extent qualified by the complexity of the task. When the task was very

simple and straightforward and participants' self-efficacy was controlled for, there were no detectable negative consequences of holding a strong performance-avoid goal. When the task was made more complex and demanding, the level of performance-avoid goals was negatively related to both task enjoyment and mental focus. The dominant view on performance-avoid goals in the literature is that they have a uniformly undesirable effect on outcome variables. Although the results of the current study do not necessarily dispute the negative view on performance-avoid goals, they nevertheless identify situations where the consequences of holding a strong performance-avoid goal are not as serious as commonly assumed. Despite these qualifications it should be noted that these results do not justify any conclusions regarding a possible positive effect of performance-avoid goal on motivation, although it is open to speculation whether performance-avoid goals can have a positive motivational effect in situations where the task reaches ultimate simplicity and is also enjoyable and engaging.

The Effects of Motivation on Performance

Hypotheses 8a and 8b predicted that mental focus and exerted effort would be positively related to task performance. As expected, mental focus was positively related to performance, such that individuals with a stronger mental focus took shorter time to complete the puzzles than individuals with a weak mental focus. However, this effect was rather weak, adding only a small amount to the variance in task performance explained by task complexity and self-efficacy.

Somewhat surprisingly, no relations between exerted effort and task performance were found. Straightforward common sense, as well as empirical evidence (see Kanfer, 1987, and Locke & Latham, 1990 for a discussion of this work) suggests that the more

effort people put into their work , the better they will perform on the task, assuming all other things are equal. Therefore, it seems counterintuitive that these relations were not observed in the current study. However, this situation can be understood by considering the nature of exerted effort and the performance task utilized in the current study. Exerted effort can refer to one of two things. First, it can refer to the accumulated mental and physical energy spent working on the task. In such situations, the accumulated time one spends working on a project can then be used as a proximal indicator for the exerted effort. The second way one can define effort is to assess the amount of energy one puts in *per time unit* while working on the task (i.e., how hard you work while you are working on the task). In most situations both definitions of exerted effort would result in a positive correlation with task performance. In the current study, however, a performance task was utilized that has somewhat different characteristics than more traditional, open-ended tasks. A puzzle, unlike for example open-ended tasks such as class projects, exams or work projects where more time spent at the task typically results in better performance or produce, has a common end state for everyone that attempts to solve the puzzles (i.e., when all the pieces have been put in their correct location within the grid and the puzzle is solved). In other words, every participant in the current study had to continue working on each puzzle until it was solved (or withdraw from the study). Therefore, by definition, poor performers had to spend more time working on solving the puzzles. It is possible that a substantial proportion of the participants in the current study looked at the time they spent at solving the puzzles as the primary indicator of their exerted effort, creating a negative effort-performance relationship for a subset of participants, whereas other participants assessed their exerted effort as effort per time unit, resulting in the traditional

positive relations between effort and performance. The weak positive (recall that a positive correlation indicates a negative relationship between effort and performance) bivariate correlations between exerted effort and performance ($r = .15$, $p < .01$) supports the suspicion that at least a portion of participants used total time as their primary indicator of exerted effort in the current study, and this may have prevented the typical positive relationship between exerted effort and performance from emerging.

Implications and Future Research Direction

Although researchers within I/O psychology have shown a substantial amount of interest in the construct of goal orientation, there remain several unresolved issues regarding the construct and its applications. The most problematic of these are the lack of a common definition of the construct, ambiguity regarding whether to treat goal orientation as a state or a trait, the number of goal orientation dimensions and a lack of solid and commonly accepted measures of goal orientation (e.g., Carr & DeShon, 2004). The current study introduced Elliot's achievement goal framework (e.g., Elliot, 1995; Elliot & Harackiewicz, 1996; Elliot & Church, 1997) as an alternative perspective to studying the effects of learning vs. performance goal orientation.

The primary benefit of the achievement goal framework over the goal orientation approach is that Elliot and colleagues' approach is better grounded in theory, thus removing many of the existing issues with goal orientation research such as lack of definitions and ambiguity regarding standing on the state-trait dimension. Furthermore, the achievement goal framework takes a more situational approach to defining learning and performance goals than the goal orientation literature does. In general, situational and more proximal predictors tend to better predict performance in a specific setting than do

more distal and dispositional variables. Preliminary evidence suggests that the situational achievement goals improve significantly on the predictive utility of general and domain-specific goal orientation (e.g., Breland, 2004; Breland & Donovan, in press), supporting the idea that a "here-and-now" approach to achievement goals is a stronger tool to utilize in organizational interventions than the more trait-like goal orientations. With the possible exception of personnel selection, where a dispositional test is administered for the purpose of predicting overall job performance over a long period of time, the more situational approach should be the preferred method when it comes to explaining how people's implicit situational goals affect motivation and performance in more specific settings. In addition, the demonstrated malleability of achievement goals and goal orientation (e.g., Elliot & Harackiewicz, 1996; Elliott & Dweck, 1988; Steele-Johnson et al., 2000; Stevens & Gist, 1997) suggests that organizational interventions can be used to facilitate a different climate for different components of one's work. In concordance with the results of the current study, one could for example suggest that an emphasis on normative comparison and inter-employee competition should be salient when employees are working on simple and repetitive tasks, whereas a focus on sharing and gaining mastery would be preferable in the early stages of the work of a design team working on the design of a novel product. By placing the spotlight on achievement goals, as opposed to dispositional goal orientations, organizational researchers are likely to gain more understanding on the complex relations between the interplay between the various aspects of motivation (performance vs. mastery, approach vs. avoidance) and important motivation and performance-related outcomes of interest. In addition, future research should make an effort to systematically examine the extent to which achievement goals

can be manipulated, as well as how they can most effectively be influenced through various organizational interventions.

A primary weakness in the achievement goal framework regards the temporal and situational stability of achievement goals. This shortcoming has not to my knowledge not been properly addressed by the proponents of the achievement goal framework. Although it is explicit that presumably stable dispositions such as need for achievement and fear of failure impact achievement goals in any given situation (providing at least partial stability to the achievement goals), it is unclear how malleable these goals are across time and situations. Future research would do well to examine the stability of achievement goals across various different tasks that individuals take on, as well as the stability within a given long-term task. Once it is established how (un)stable the achievement goals are across time and situations, future work in this area can expand on the work of Breland and Donovan (in press) and examine how the predictive utility of goal orientation vs. achievement goals compare across time in longitudinal studies.

The primary empirical finding in the current study was that task complexity seems to moderate the effects of all three types of achievement goals on various components of motivation. The general pattern implied that a mastery goal is more beneficial when the task is more complex, a performance-approach goal is more beneficial for simpler tasks, and that a performance-avoid goal is less harmful for simpler tasks. In the current study, the effects of achievement goals on motivation were compared across two conditions that unambiguously varied in complexity (as shown by the strong effect sizes for perceived complexity and actual performance times). However, it is important to note that the slopes of the regression lines of the simple and complex condition in the current study

only represent those two complexity levels and not others. The fact that a 6 by 6 grid in the current study served as a complex performance task does not necessarily imply that it is complex in an absolute sense (and it is in fact easy to imagine a far more complex task than solving a 6 by 6 picture grid). If one imagines a replication of the current study where four complexity conditions, ranging from the ultimate simple task to the ultimate complex task, were employed, some of the interactions might look something like those presented in Figure 10. It is a worthy goal for future research to establish the "boundary regression slopes" (i.e., the most and least positive regression slopes for each achievement goal – motivation interaction), as well as all interesting break-points (i.e., the complexity where the regression line is zero). By establishing the complexity levels by which these boundary conditions occur, researchers and practitioners will become far more effective in determining the optimal levels of achievement goals held in each performance situation, which should ultimately strengthen organizational interventions.

Limitations

As sometimes is the case with laboratory studies that utilize student samples, the current study is limited in the extent to which the results can be generalized beyond the current setting and sample. However, since the primary purpose of this study was to answer novel theoretical questions and establish new theoretical relations, as opposed to closely simulate workplace behavior, the control of the laboratory was the preferred and appropriate setting for this study (cf., Mook, 1983).

A similar limitation concerns the puzzle game utilized in the study. When an artificial laboratory task is used to draw inferences about people's behavior at work, one must exert caution in drawing broad interpretations and conclusions based on this type of

data. The puzzle task has many desirable qualities for research on work motivation. It draws on people's spatial abilities and psychomotor skills, and its difficulty can be easily controlled through the resolution of puzzles and the particular pictures selected for each condition. Most importantly however, by selecting pictures that appeal to the interest of participants, the puzzle task is engaging to the participants of the study, a characteristic of work motivation studies we suspect is not always present (Donovan, 2001). Nevertheless, the puzzle task represents a narrow subset of actual work behavior, leaving the door open to the possibility of discovering other types of relations between achievement goals, task complexity and motivation for other types of work tasks. Whether that is the case remains an empirical question which is best answered by replicating the current study in a real-life setting with job incumbents doing work-related tasks.

A final limitation of the present study concerns the closed-ended nature of the puzzles. As was mentioned before, the puzzles have a common end state for all participants, unlike many workplace tasks. In the current study, this characteristic possibly caused the participants' understanding of their exerted effort to vary somewhat, hence creating ambiguity regarding the interpretation of the results concerning exerted effort. Future research should attempt to replicate the current study utilizing a more open-ended task whose quality better reflects participants' exerted effort.

Conclusion

Although the idea of goal orientation being a stable, trait-like goal structure is appealing and convenient, researchers have done little to establish the validity of those claims. On the contrary, numerous studies (e.g., Elliott & Dweck, 1988; Elliot & Harackiewicz, 1996; Steele-Johnson et al., 2000; Stevens & Gist, 1997) have found that

the implicit achievement goals are susceptible to situational influence, raising doubts regarding their stability and the appropriateness of labeling them as traits. The current study recommends that researchers within I/O psychology shift their focus from the vague and problematic construct of goal orientation to the analogous, but more proximal (and clearly defined) construct of achievement goals.

The primary findings of the current study were that the effects of each of the three achievement goals on various motivational variables are not uniform, but depend to some extent on situational features. By varying task complexity it was found that the positive effects of mastery goals tend to be stronger the more complex the task is, the positive effects of performance-approach goals were stronger the simpler the task is, and the negative effects of performance-avoid goals on motivation become weaker as the task gets more simple.

Focusing on the achievement goals and their malleability increases the possibility that I/O psychologists can utilize the literature on learning- and performance goals to effectively define organizational interventions where the organizational environment is fine-tuned to facilitate the adoption of the most appropriate achievement goals for the particular task being worked on at the time. The results of the current study provide ample encouragement for work motivation researchers that the light at the end of the tunnel, albeit never quite reached, will at least draw somewhat closer.

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Table 1. Descriptive statistics and Correlations.

	Min	Max	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Mastery	1.40	5.00	3.54	.62	.79								
2. Perf.-approach	1.00	5.00	3.08	.85	43**	.91							
3. Perf.-avoid	1.00	4.80	2.80	.66	-.14**	.22**	.66						
4. Self-efficacy	1.50	5.00	3.61	.55	.52**	.40**	-.43**	.85					
5. Task complexity	--	--	--	--	.10	.01	-.03	.04	--				
6. Task enjoyment	1.00	5.00	3.62	.70	.58**	.18**	-.27**	.51**	-.12*	.92			
7. Mental focus	1.67	5.00	3.93	.60	.29**	.14**	-.23**	.38**	-.09	.52**	.90		
8. Exerted effort	1.80	5.00	3.70	.62	.29**	.28**	.04	.18**	.20**	.21**	.41**	.83	
9. Performance	18.4	916.3	174.3	168.2	.02	-.02	.07	-.13*	.85**	-.27**	-.18**	.15**	--
10. Ability	38.0	1099	208.2	163.2	-.30**	-.13*	.29**	-.37**	-.06	-.25**	-.16**	-.05	.12*

*Note. ** p<.01, * p<.05.*
Perf.-approach = Performance approach goals; Perf.-avoid = Performance-avoid goals.
Internal consistency estimates (coefficient a) are presented on the matrix diagonal.
N = 343 for all correlation analyses.

Table 1a. Correlations by task complexity condition.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Mastery	--	.36**	-.26**	.61**	.66**	.39**	.30**	-.18*	-.22**
2. Performance-approach	.48**	--	.24**	.41**	.17*	.11	.18*	-.08	-.16*
3. Performance-avoid	-.05**	.22**	--	-.44**	-.39**	-.32**	.00	.24**	.26**
4. Self-efficacy	.46**	.39**	-.43**	--	.59**	.45**	.24**	-.40**	-.36**
5. Task enjoyment	.57**	.22**	-.15*	.44**	--	.55**	.21**	-.42**	-.25**
6. Mental focus	.26**	.20**	-.16*	.32**	.51**	--	.46**	-.25**	-.19*
7. Exerted effort	.26**	.38**	.09	.12	.29**	.43**	--	-.05	-.03
8. Performance	-.25**	-.04	.25**	-.40**	-.18*	-.12	.03	--	.51**
9. Ability	-.35**	-.11	.30**	-.40**	-.29**	-.15*	-.04	.53**	--

*Note. ** p<.01, * p<.05.*
Values below the diagonal correspond to correlations in the simple condition. Values above the diagonal represent correlations in the complex condition.
N = 173-175 for correlations in the simple condition
N = 166 – 172 for correlations in the complex condition.

Table 2. Hierarchical Multiple Regression: The Effects of Mastery Goals on Task Enjoyment.

Model	*B*	*SE*	ß	*t*	*p*	R^2	? R^2
Step 1							
(Constant)	1.51	0.23		6.48**	.000		
Complexity	-0.21	0.06	-0.15	-3.22**	.001		
Self-efficacy	0.67	0.06	0.52	11.43**	.000		
						.288	.288
Step 2							
Mastery	0.53	0.05	0.46	9.63**	.000	.440	.152
Step 3							
Mastery x Complexity	0.24	0.09	0.70	2.54*	.011	.450	.010
Step 4							
Mastery x Self-Efficacy	-0.09	0.06	-0.44	-1.56	.120		
Self-efficacy x Complexity	0.16	0.12	0.47	1.32	.189		
						.457	.007
Step 5							
Mastery x Self-Efficacy x Complexity	-0.14	0.11	-1.73	-1.19	.233	.459	.002

*Note. ** p<.01, * p<.05, + p<.10.*
N = 347
Complexity = Task complexity, Mastery = Mastery Achievement Goals,

Table 3. Hierarchical Multiple Regression: The Effects of Mastery Goals on Mental Focus.

Model	*B*	*SE*	ß	*t*	*p*	R^2	? R^2
Step 1							
(Constant)	2.60	0.21		12.16**	.000		
Complexity	-0.15	0.06	-0.12	-2.48*	.014		
Self-efficacy	0.43	0.05	0.39	7.95**	.000		
						.166	.166
Step 2							
Mastery	0.16	0.06	0.17	2.93**	.004	.186	.020
Step 3							
Mastery x Complexity	0.18	0.10	0.63	1.88+	.061	.194	.008
Step 4							
Mastery x Self-Efficacy	0.00	0.06	-0.02	-0.06	.950		
Self-efficacy x Complexity	0.16	0.13	0.56	1.30	.194		
						.198	.004
Step 5							
Mastery x Self-Efficacy x Complexity	-0.12	0.12	-1.82	-1.03	.303	.201	.003

*Note. ** p<.01, * p<.05, + p<.10.*
N = 347
Complexity = Task complexity, Mastery = Mastery Achievement Goals,

Table 4. Hierarchical Multiple Regression: The Effects of Mastery Goals on Exerted Effort.

Model	*B*	*SE*	ß	*t*	*p*	R^2	? R^2
Step 1							
(Constant)	2.63	0.23		11.23**	.000		
Complexity	0.24	0.06	0.19	3.73**	.000		
Self-efficacy	0.20	0.06	0.17	3.34**	.001		
						.070	.070
Step 2							
Mastery	0.25	0.06	0.25	4.13**	.000	.114	.044
Step 3							
Mastery x Complexity	0.00	0.10	0.00	0.01	.991	.114	.000
Step 4							
Mastery x Self-Efficacy	0.24	0.06	1.39	3.91**	.000		
Self-efficacy x Complexity	0.06	0.14	0.21	0.48	.631		
						.153	.039
Step 5							
Mastery x Self-Efficacy x Complexity	0.13	0.13	1.81	1.00	.319	.155	.002

*Note. ** p<.01, * p<.05, + p<.10.*
N = 347
Complexity = Task complexity, Mastery = Mastery Achievement Goals,

Table 5. Hierarchical Multiple Regression: The Effects of Performance-Approach Goals on Mental Focus.

Model	*B*	*SE*	ß	*t*	*P*	R^2	? R^2
Step 1							
(Constant)	2.60	0.21		12.16**	.000		
Complexity	-0.15	0.06	-0.12	-2.48*	.014		
Self-efficacy	0.43	0.05	0.39	7.95**	.000		
						.166	.166
Step 2							
P-Approach	-0.01	0.04	-0.01	-0.21	.833	.166	.000
Step 3							
P-Approach x Complexity	-0.04	0.07	-0.15	-0.64	.522	.167	.001

*Note. ** p<.01, * p<.05, + p<.10.*
N = 347
Complexity = Task complexity, P-Approach = Performance Achievement Goals.

Table 6. Hierarchical Multiple Regression: The Effects of Performance-Approach Goals on Exerted Effort.

Model	*B*	*SE*	ß	*t*	*p*	R^2	? R^2
Step 1							
(Constant)	2.63	0.23		11.23**	.000		
Complexity	0.24	0.06	0.19	3.73**	.000		
Self-efficacy	0.20	0.06	0.17	3.34**	.001		
						.070	.070
Step 2							
P-Approach	0.18	0.04	0.25	4.50**	.000	.121	.051
Step 3							
P-Approach x Complexity	-0.19	0.07	-0.64	-2.63**	.009	.139	.018

*Note. ** p<.01, * p<.05, + p<.10.*
N = 347
Complexity = Task complexity, P-Approach = Performance Achievement Goals.

Table 7. Hierarchical Multiple Regression: The Effects of Performance-Avoid Goals on Task Enjoyment.

Model	*B*	*SE*	ß	*t*	*p*	R^2	? R^2
Step 1							
(Constant)	1.51	0.23		6.48**	.000		
Complexity	-0.21	0.06	-0.15	-3.22**	.001		
Self-efficacy	0.67	0.06	0.52	11.43**	.000		
						.288	.288
Step 2							
P-Avoid	-0.06	0.05	-0.06	-1.19	.236	.291	.003
Step 3							
P-Avoid x Complexity	-0.30	0.10	-0.73	-3.08**	.002	.310	.019

*Note. ** p<.01, * p<.05, + p<.10.*
N = 347
Complexity = Task complexity, P-Avoid = Performance Avoid Goals.

Table 8. Hierarchical Multiple Regression: The Effects of Performance-Avoid Goals on Mental Focus.

Model	*B*	*SE*	ß	*t*	*p*	R^2	? R^2
Step 1							
(Constant)	2.60	0.21		12.16**	.000		
Complexity	-0.15	0.06	-0.12	-2.48*	.014		
Self-efficacy	0.43	0.05	0.39	7.95**	.000		
						.166	.166
Step 2							
P-Avoid	-0.08	0.05	-0.09	-1.71+	.089	.173	.007
Step 3							
P-Avoid x Complexity	-0.20	0.09	-0.58	-2.25*	.025	.185	.012

*Note. ** p<.01, * p<.05, + p<.10.*
N = 347
Complexity = Task complexity, P-Avoid = Performance Avoid Goals.

Table 9. Hierarchical Multiple Regression: The Effects of Performance-Avoid Goals on Exerted Effort.

Model	*B*	*SE*	ß	*t*	*p*	R^2	? R^2
Step 1							
(Constant)	2.63	0.23		11.23**	.000		
Complexity	0.24	0.06	0.19	3.73**	.000		
Self-efficacy	0.20	0.06	0.17	3.34**	.001		
						.070	.070
Step 2							
P-Avoid	0.15	0.05	0.15	2.68**	.008	.089	.019
Step 3							
P-Avoid x Complexity	-0.07	0.10	-0.20	-0.73	.468	.090	.001

*Note. ** p<.01, * p<.05, + p<.10.*
N = 347
Complexity = Task complexity, P-Avoid = Performance Avoid Goals.

Table 10. Multiple Regression: The Effects of Mental Focus and Exerted Effort on Task Performance.

Model	*B*	*SE*	ß	*t*	*p*	R^2	? R^2
Step 1							
(Constant)	-73.95	32.75		-2.26	.025		
Self-efficacy	-50.38	8.31	-.16	-6.06	.000		
Task complexity	288.80	9.04	.86	31.94	.000		
						.754	.754
Step 2							
Mental Focus	-18.79	9.23	-.07	-2.03	.043*		
Exerted Effort	10.34	8.21	.04	1.26	.209		
						.757	.003

*Note. ** p<.01, * p<.05, + p<.10.*
N = 347

Table 11. Supplemental Analyses: The incremental variance of self-efficacy when entered at step 4, beyond task complexity, achievement goal and task complexity x achievement goal interaction.

	R^2 at step 3	$?\ R^2$ at step 4	Total R^2
Mastery			
Task enjoyment	.402	.048**	.450
Mental focus	.136	.059**	.194
Exerted effort	.113	.001	.114
P-Approach			
Mental focus	.035	.132**	.167
Exerted effort	.134	.005	.139
P-Avoid			
Task enjoyment	.116	.194**	.310
Mental focus	.087	.098**	.185
Exerted effort	.044	.046**	.090

*Note. ** p<.01, * p<.05, $^{+}$ p<.10.*
N = 347
Mastery = Mastery Goal. P-Approach = Performance-Approach Goal. P-Avoid = Performance Avoid Goal.
R^2 at step 3 = The explained variance with task complexity, the corresponding achievement goal, and the task complexity x achievement goal interaction in the regression equation.
$?\ R^2$ at step 4 = The incremental variance explained by self-efficacy.
Total R^2 = Total explained variance after self-efficacy was added to the regression equation.

Figure Caption

Figure 1.

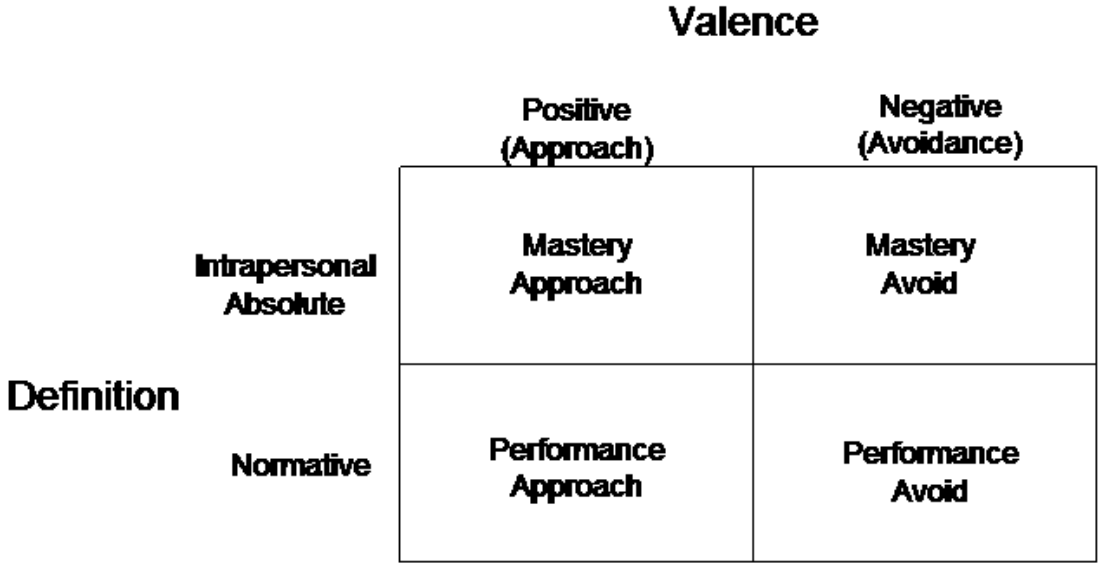

Valence
Positive (Approach)
Negative (Avoidance)
Definition
Intrapersonal Absolute
Normative
Mastery Approach
Mastery Avoid
Performance Approach
Performance Avoid

Figure 2.

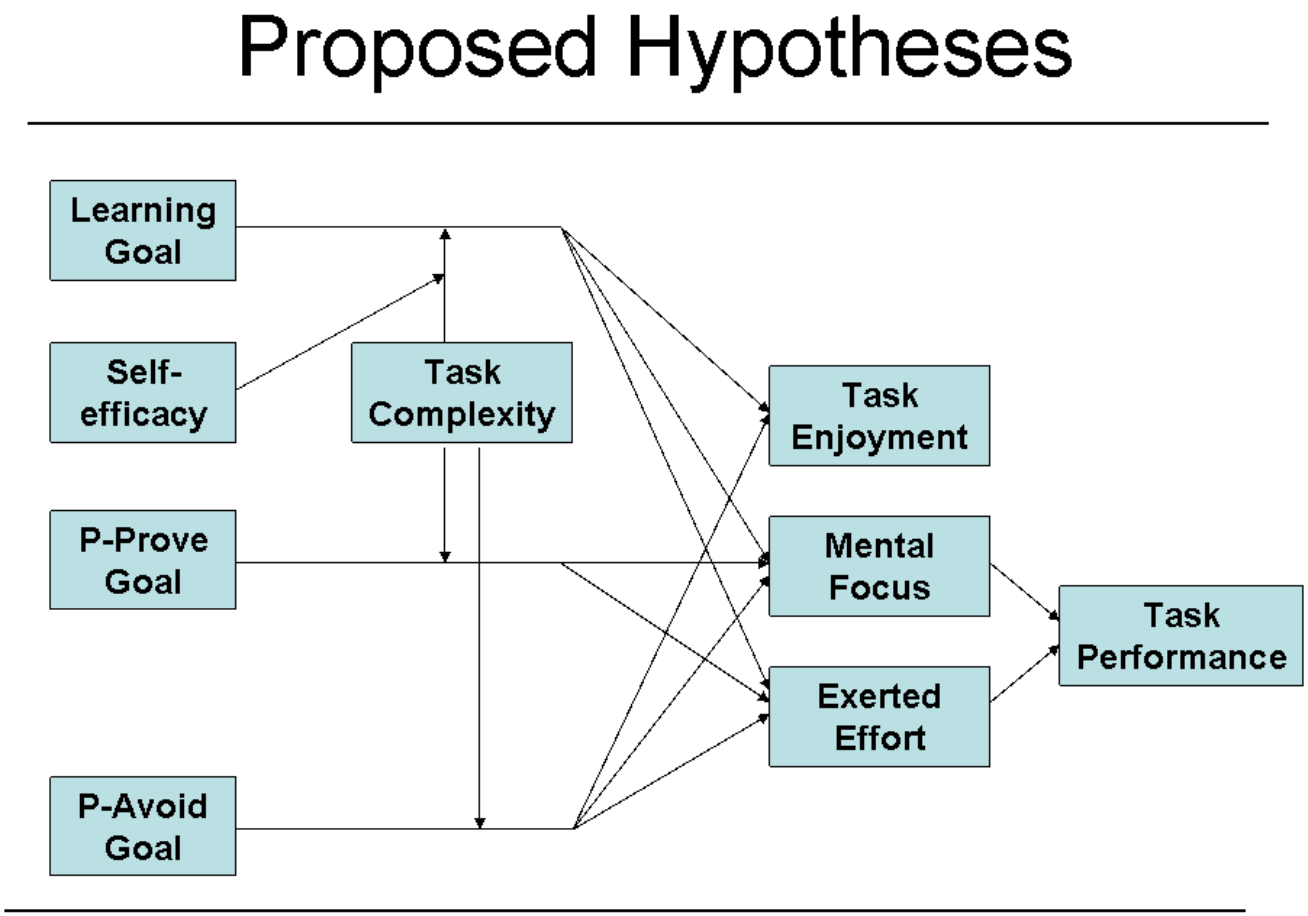

Proposed Hypotheses
Learning Goal
Self-efficacy
Task Complexity
P-Prove Goal
P-Avoid Goal
Task Enjoyment
Mental Focus
Exerted Effort
Task Performance

Figure 3.

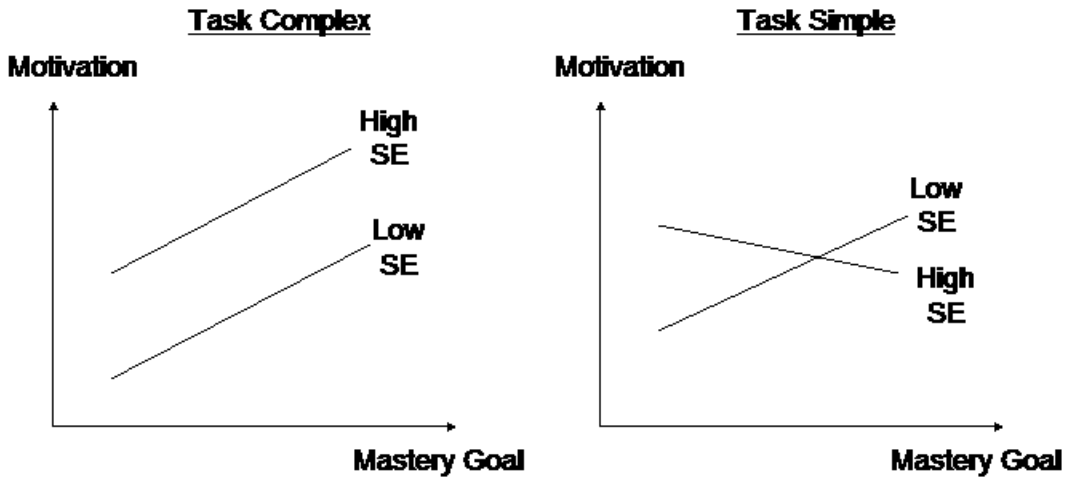

Task Complex
Motivation
High SE
Low SE
Mastery Goal
Task Simple
Motivation
Low SE
High SE
Mastery Goal

Figure 4.

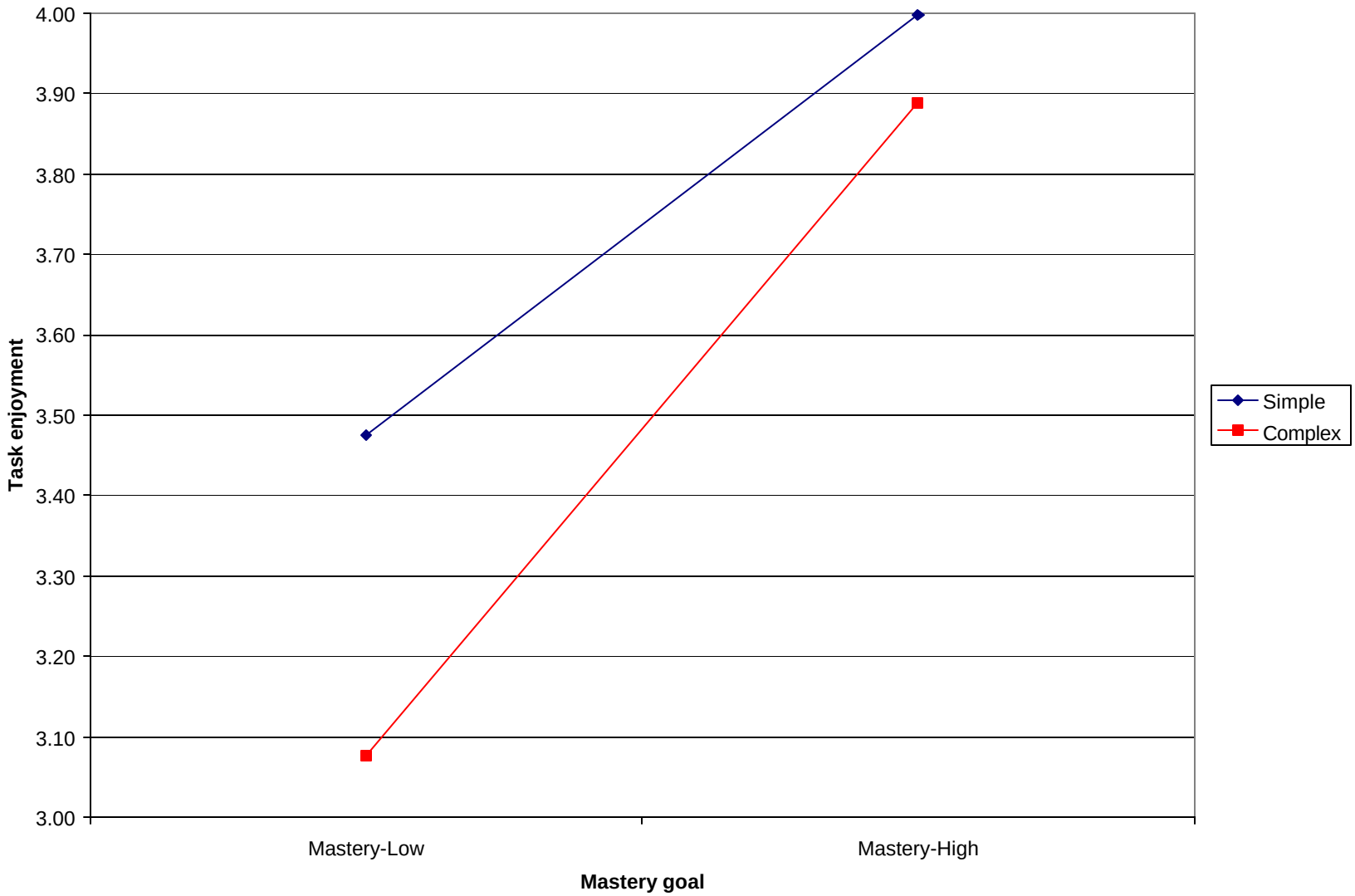

4.00
3.90
3.80
3.70
3.60
3.50
3.40
3.30
3.20
3.10
3.00
Task enjoyment
Mastery-Low
Mastery-High
Mastery goal
Simple
Complex

Figure 5.

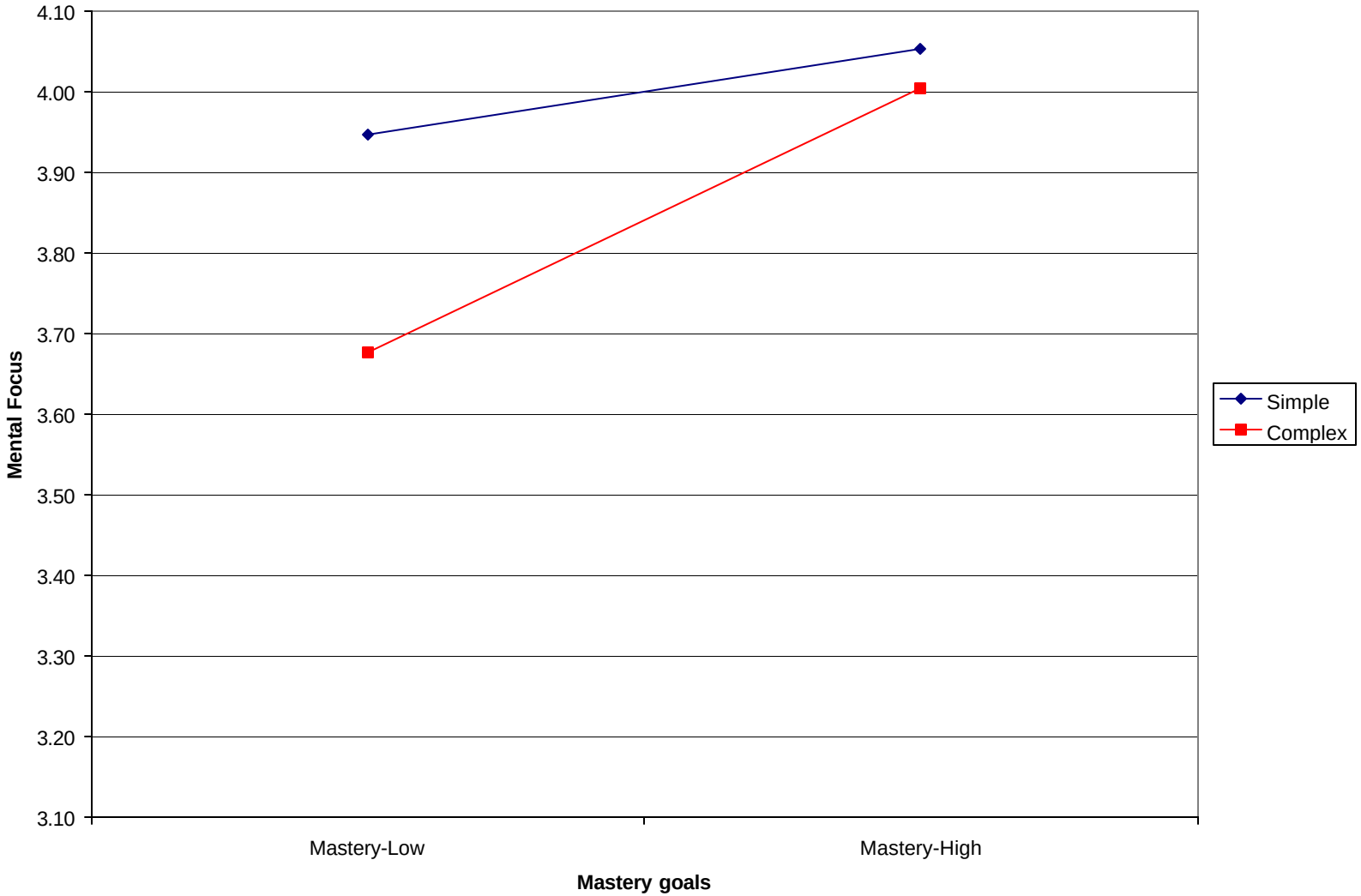

4.10
4.00
3.90
3.80
3.70
3.60
3.50
3.40
3.30
3.20
3.10
Mental Focus
Mastery-Low
Mastery-High
Mastery goals
Simple
Complex

Figure 6.

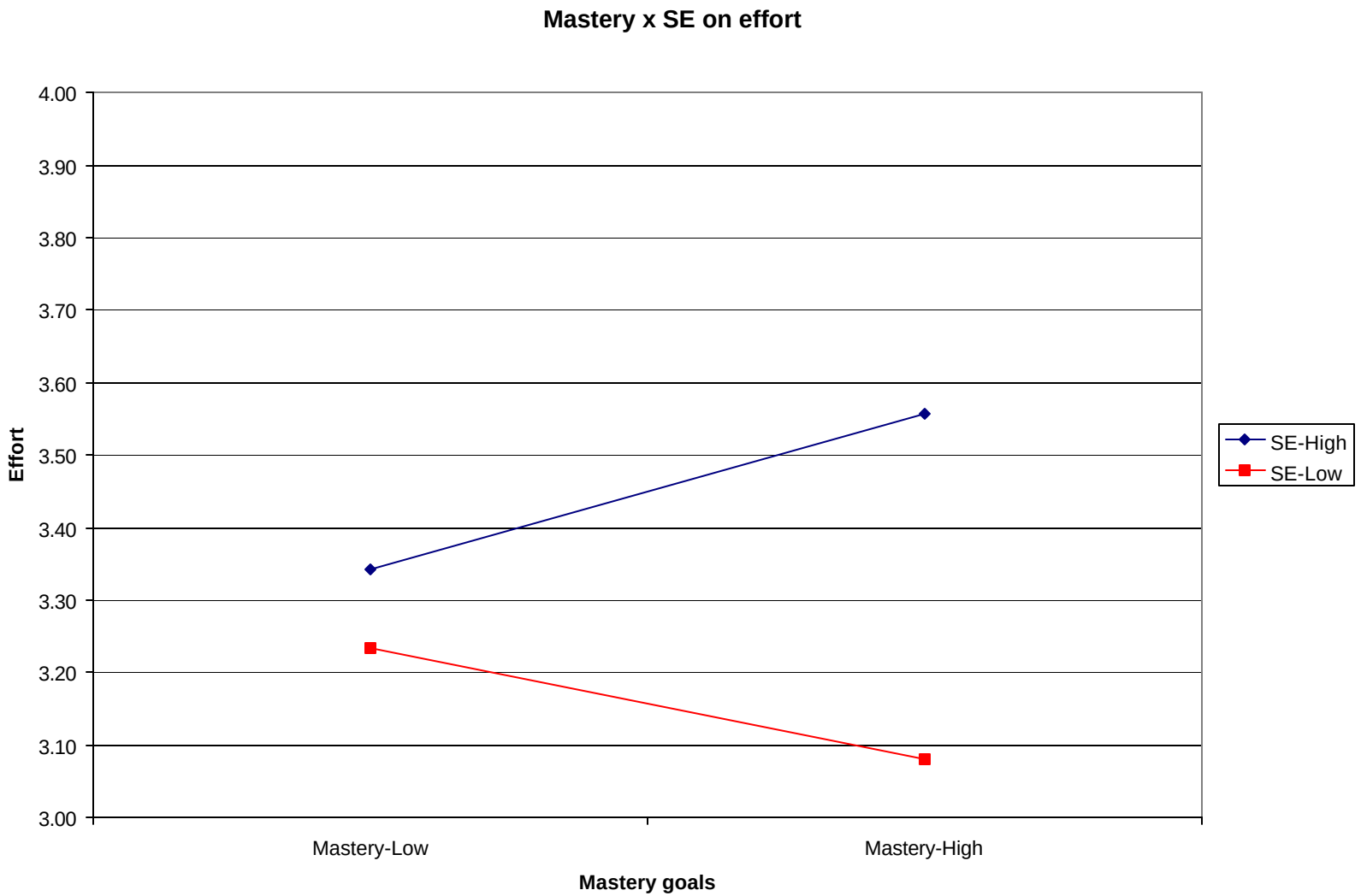

Mastery x SE on effort
4.00
3.90
3.80
3.70
3.60
3.50
3.40
3.30
3.20
3.10
3.00
Effort
Mastery-Low
Mastery-High
Mastery goals
SE-High
SE-Low

Figure 7.

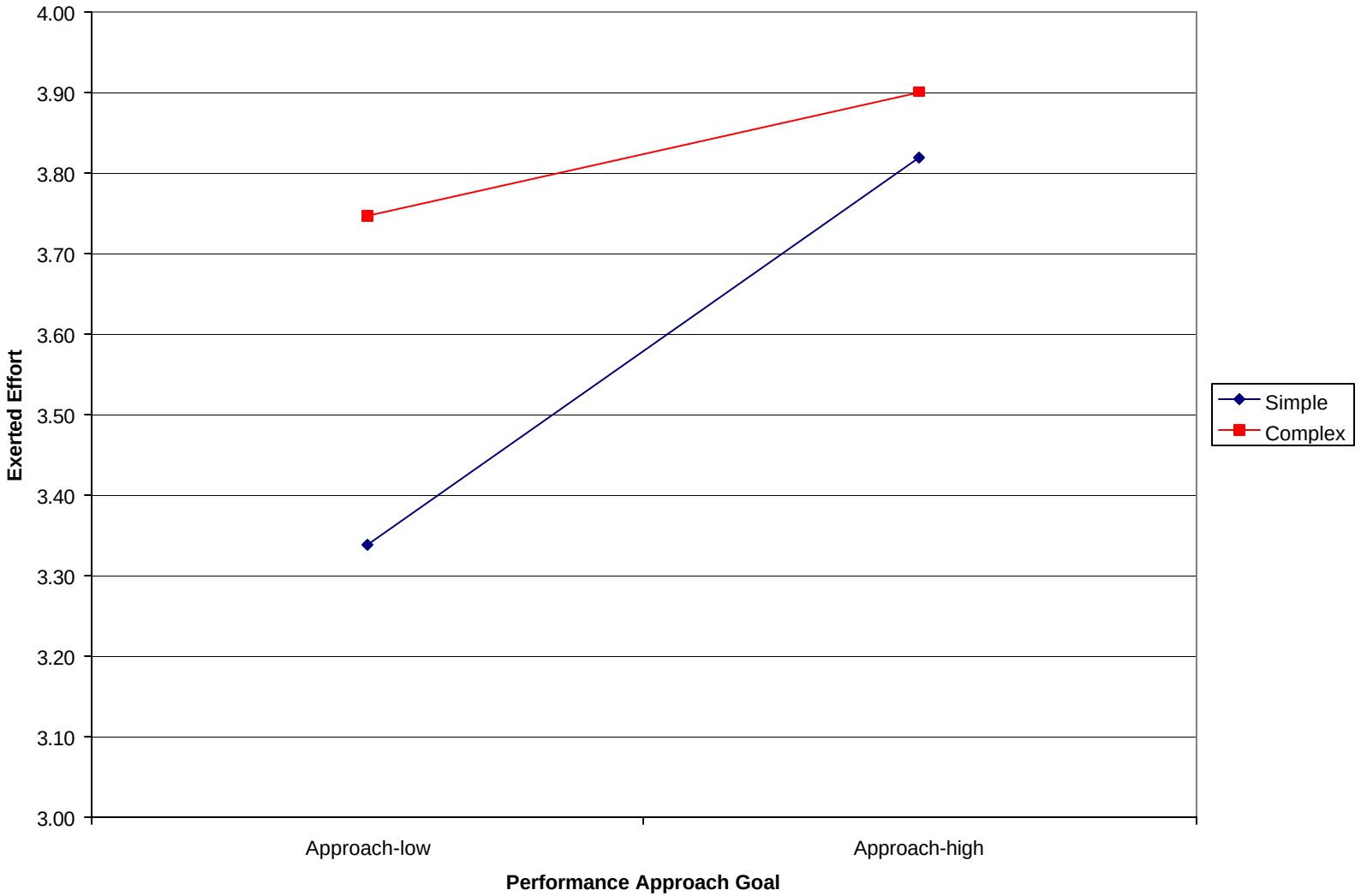

4.00
3.90
3.80
3.70
3.60
3.50
3.40
3.30
3.20
3.10
3.00
Exerted Effort
Approach-low
Approach-high
Performance Approach Goal
Simple
Complex

Figure 8.

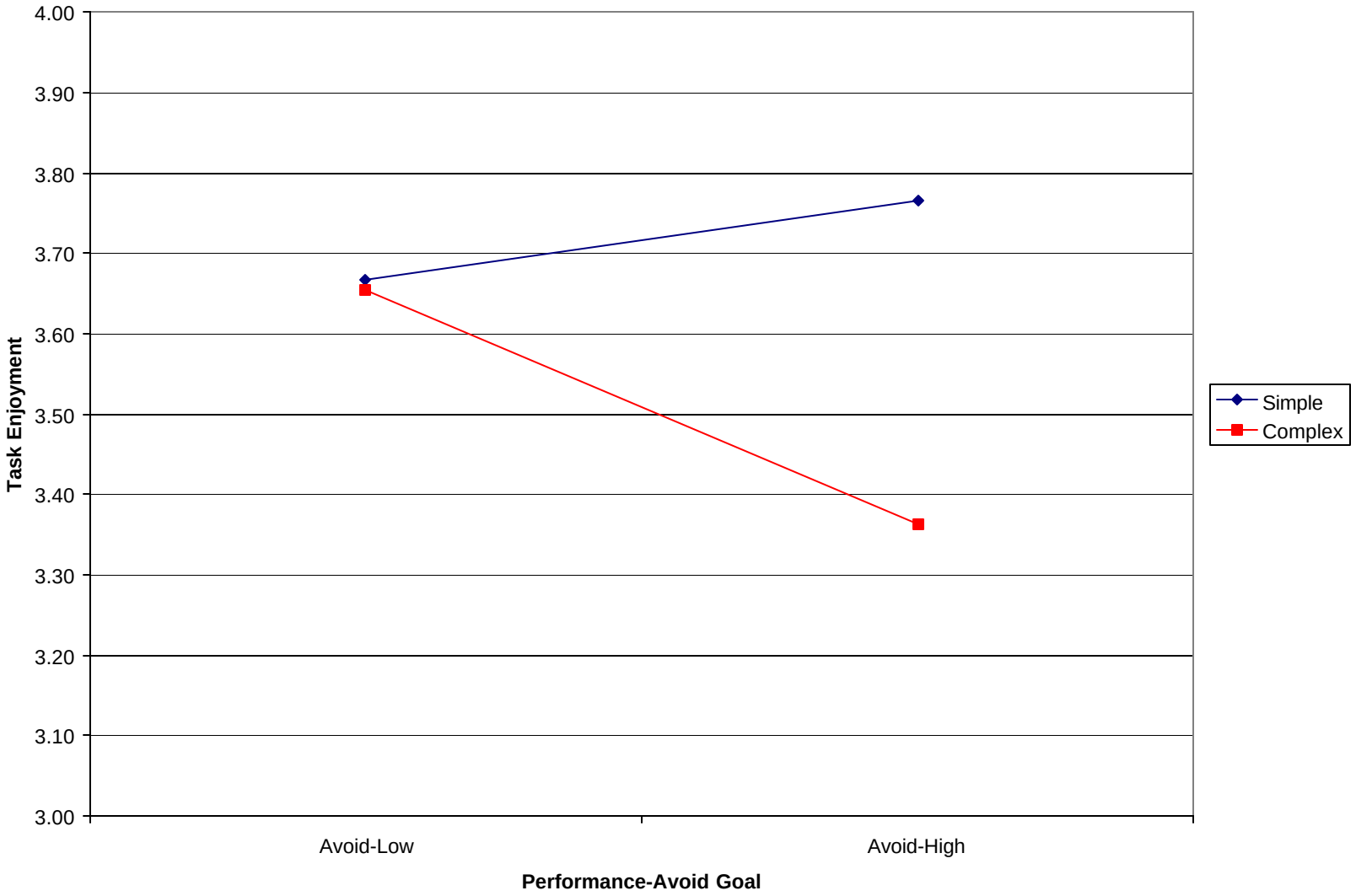

4.00
3.90
3.80
3.70
3.60
3.50
3.40
3.30
3.20
3.10
3.00
Task Enjoyment
Avoid-Low
Avoid-High
Performance-Avoid Goal
Simple
Complex

Figure 9.

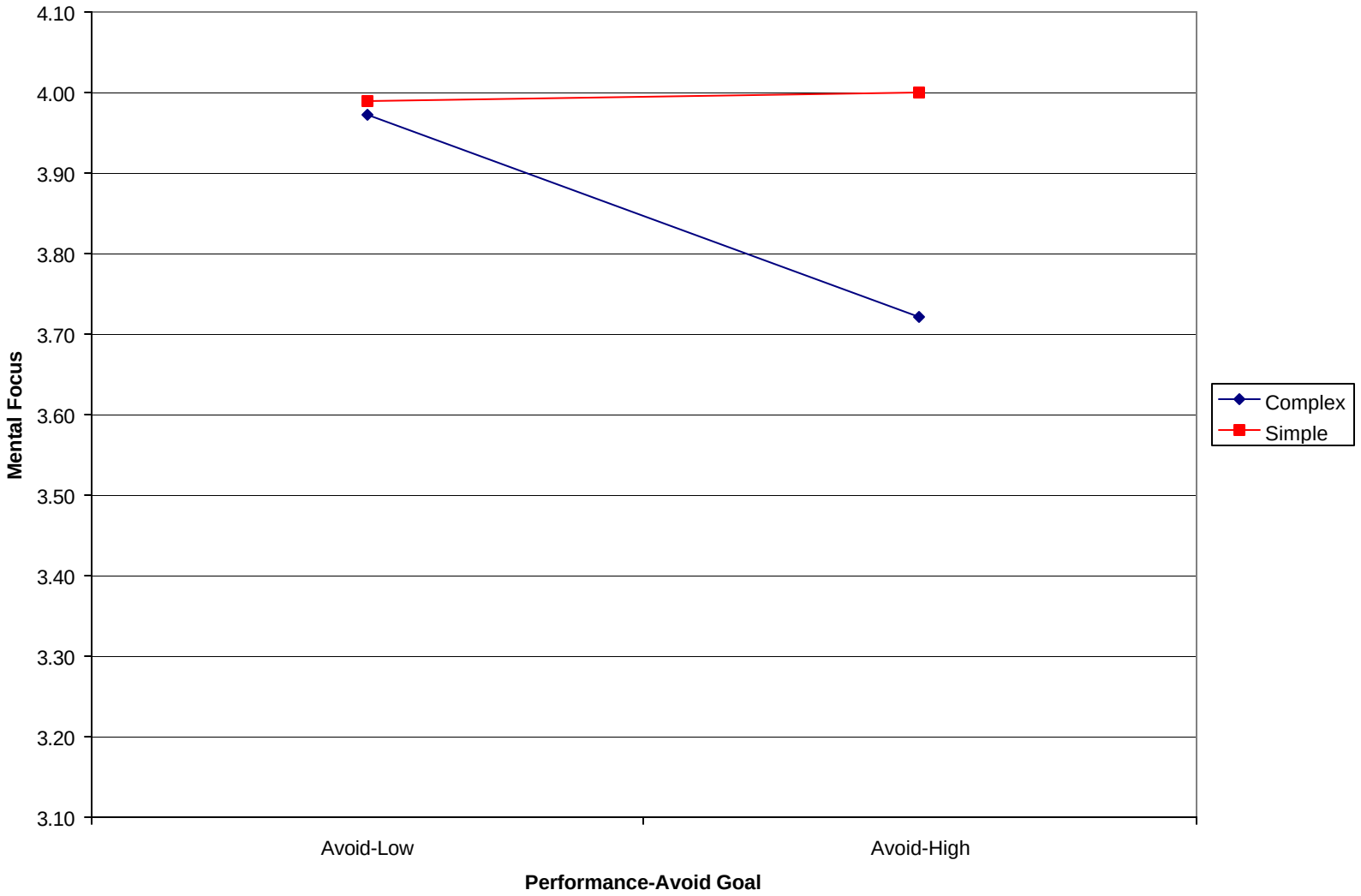
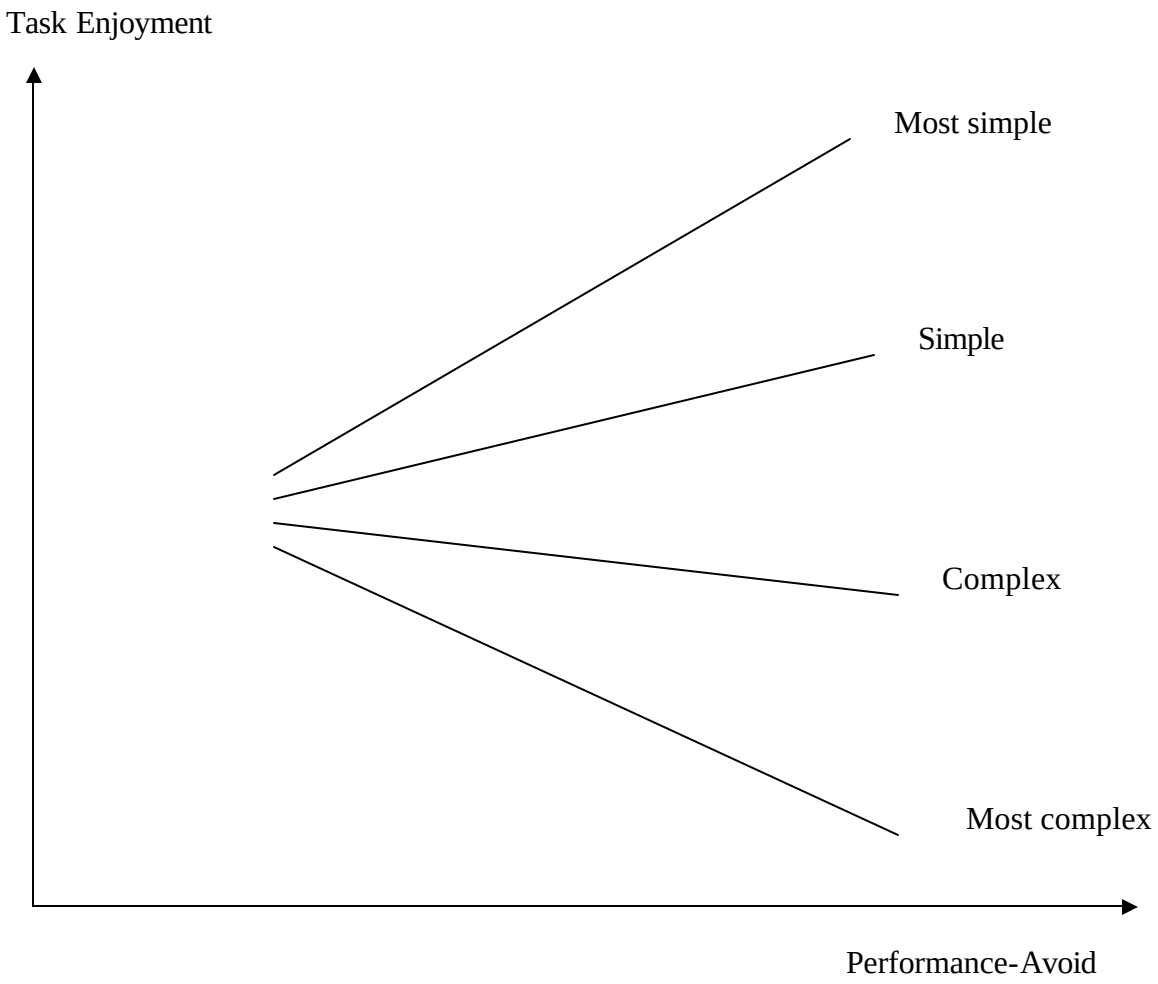

4.10
4.00
3.90
3.80
3.70
3.60
3.50
3.40
3.30
3.20
3.10
Mental Focus
Avoid-Low
Avoid-High
Performance-Avoid Goal
Complex
Simple

Figure 10.


Task Enjoyment
Most simple
Simple
Complex
Most complex
Performance-Avoid

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Education

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Professional experience

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Responsible for all elements of teaching PSYC 2094, Principles of Psychological Research.

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Aug 2002 – May 2003 — **Research Assistant with Dr. John Donovan, Virginia Tech, Blacksburg, VA**

Jul 2002 – Aug 2002 — **Instructor, Department of Psychology, Virginia Tech, Blacksburg VA.**
Responsible for all elements of teaching PSYC 2094, Principles of Psychological Research.

Aug 2001 – Jun 2002 — **Research Assistant, Institutional Research and Planning Analysis, Virginia Tech.**
- Data analysis
- Assistance in report writing
- Quality Control

Jun 2001 – Aug 2001 — **Consultant at ANZA, Reykjavik, Iceland. 300 hours**
- Managing information flow between management and employees
  Managed the work on designing a common employment contract for ANZA
- Designed and negotiated the execution of a training program preparing employees for the merger.

Dec 2000 – Jan 2001	**Consultant at Alit, Iceland, 46 hours** ▪ Reevaluated and redesigned employment contracts for Álit.
Aug 2000 – May 2001	**Recitation Instructor, Department of Psychology, Virginia Tech, Blacksburg VA.** ▪ Responsible for all elements of teaching two introductory to psychology recitations pr. semester, including lecture preparation and grading of tests and essays.
Sep 1998 – Aug 2000	**Alit ehf. Director of Human Resources.** ▪ Employee recruitment, selection and hiring. ▪ Execution of an annual performance evaluation program, supervising service quality measurement and conducting a job satisfaction measurement. ▪ Developing and implementing an ambitious in-house training program for company employees. ▪ Planning of a company training institute which designs employee training programs for Alit customers. ▪ Various assignments: Project management, the making and maintenance of the Alit web site, quality control and marketing projects.
Aug 1997 – Aug 1998	**Research assistant for Professor dr. Sigrun Adalbjarnardottir and dr. Þorlakur Karlsson, University of Iceland.** ▪ Responsibilities in the field of data processing and data analysis in addition to developing and co-authoring research articles and reports. ▪ Preparation and maintenance of Internet-based study material. ▪ Grading of computer-based and pencil & paper based tests and assignments.
Aug 1995 – Aug 1997	**Physics and Mathematics Teacher - Kvennaskólinn í Reykjavik Junior College** ▪ Mathematics: Basic calculus and trigonometry for students concentrating on natural sciences. ▪ Physics: Classical dynamics for students concentrating on natural sciences. ▪ Innovation and reorganization of physics curriculum, study material and student experiments. Organized renewal of laboratory equipment.

Publications and Manuscripts

Adalbjarnardottir, S., & Hafsteinsson, L. G. (2001). (2001). Adolescents' perceived parenting styles and their substance use: Concurrent and longitudinal analyses. *Journal of Research on Adolescence, 11(4),* 401-423.

Adalbjarnardottir, S., & Hafsteinsson, L. G. (1998). Tóbaksreykingar ungmenna: Tengsl við uppeldishætti foreldra og reykingar foreldra og vina (Adolescent tobacco smoking as related to parenting styles and the smoking of parents and peers). *Uppeldi og menntun, 7,* 83-98.

Donovan, J. J., & Hafsteinsson, L. G. (2003). The Impact of goal-performance discrepancies, self-efficacy, and goal orientation on upward goal revision. Manuscript submitted for publication.

Donovan, J. J., & Hafsteinsson, L. G. (2003). The Impact of Faking on the big five factor structure. Manuscript in progress.

Hafsteinsson, L. G., Donovan, J. J., & Breland, T.B. (2003). An IRT examination of two popular goal orientation measures. Manuscript in progress.

Hafsteinsson, L. G., & Hauenstein, N. (2003). Assessing Interrater Agreement When the Number of Raters is Small: A Cautionary Note. Manuscript submitted for publication.

Conference Presentations

Adalbjarnardottir, S., & Hafsteinsson, L.G. (1999, april). Parenting styles and adolescent substance use: Concurrent and longitudinal analysis. Poster session presented at the Biennial meeting of the Society for Research in Child Development, Albuquerque, NM, USA.

Breland, T. B., Hafsteinsson, L.G., & Donovan, J. J. (2003). An IRT Examination of VandeWalle's 3-Dimensional Goal Orientation Scale. Paper presented at the 18th annual conference of the society for Industrial and Organizational psychology, Orlando, Florida.

Donovan, J. J., & Hafsteinsson, L. G. (2003). The impact of self-efficacy and goal orientation on goal revision. Paper presented at the 18th annual conference of the society for Industrial and Organizational psychology,

Orlando, Florida.

Hafsteinsson, L. G., Donovan, J. J., & Breland, T.B. (2003). An IRT examination of Button et al.'s goal orientation measure. Paper presented at the 18th annual conference of the society for Industrial and Organizational psychology, Orlando, Florida.

Hafsteinsson, L. G., (2003). Applying Item Response Theory to Scoring Personality Measures. Paper presented at the 19th annual conference of the society for Industrial and Organizational psychology, Chicago, Illinois.

Hafsteinsson, L. G., Hauenstein, N. M. A. (2003). Assessing Interrater Agreement When the Number of Raters is small: A Cautionary Note. Paper presented at the 19th annual conference of the society for Industrial and Organizational psychology, Chicago, Illinois.

Hafsteinsson, L. G., & Donovan, J. J. (2003). The Impact of Faking on the Big Five Factor Structure. Paper presented at the 19th annual conference of the society for Industrial and Organizational psychology, Chicago, Illinois.

Hollander, E., Trippe, M. D., Hafsteinsson, L. G., Watts, A., Quintela, Y. (2003). The effects of attribution and social loafing on compliance with email requests. Paper presented at the 18th annual conference of the society for Industrial and Organizational psychology, Orlando, Florida.

Research Reports

Adalbjarnardottir, S., Rafnsson, F. D., & Hafsteinsson, L. G. (1999). Vímuefnaneysla ungmenna: Tengsl við árásargirni og andfélagslega hegðun (Adolesent substance use as related to aggression and antisocial behavior). Félagsvísindadeild, Háskóla Íslands. Research report, 40 pp.

Adalbjarnardottir, S., & Hafsteinsson, L. G. (1998). Áfengis- og fíkniefnaneysla reykvíska ungmenna: Tengsl við uppeldishætti foreldra (Adolesent alcohol and illicit drug use as related to parenting styles). Félagsvísindadeild, Háskóla Íslands. Research report, 45 pp. ISBN 9979-9357-0-7.

Adalbjarnardottir, S., & Hafsteinsson, L. G. (1998). Tóbaksreykingar unglinga: Tengsl við uppeldishætti foreldra og reykingar foreldra og vina (Adolescent tobacco smoking as related to parenting styles and the smoking of parents and peers). Félagsvísindadeild, Háskóla Íslands. Research report, 24 pp.

Rafnsson, F. D., Hafsteinsson, L. G., & Adalbjarnardottir, S. (1998). Tóbaksreykingar ungmenna: Tengsl við sjálfsmat, stjórnrót, depurð, félagslegan kvíða og streitu (Adolescent tobacco smoking as related to self-esteem, perceived control, depression, social anxiety, and stress). Félagsvísindadeild, Háskóla Íslands. Research report, 31 pp. ISBN 9979-9323-3-3.

Hafsteinsson, L. G., Rafnsson, F. D., & Adalbjarnardottir, S. (1998). Áfengis- og fíkniefnaneysla ungmenna: Tengsl við sjálfsmat, stjórnrót, depurð og streitu (Adolesent alcohol and illicit drug use as related to self-esteem, perceived control, depression, and stress). Félagsvísindadeild, Háskóla Íslands. Research report, 35 pp. ISBN 9979-9323-4-1.

Professional Affiliations

2004 – present	Society for Industrial and Organizational Psychology
2000 – 2004	Society for Industrial and Organizational Psychology (Student Member).

Language skills

Icelandic	Excellent writing and speaking abilities.
English	Excellent reading, speaking and writing abilities.
Norwegian	Good reading, good speaking, fair writing abilities.
German, Swedish, Danish	Good reading, fair speaking abilities.

Computer skills

Operating Systems	Windows 95, 98, XP
Application Software	MS Word, MS Excel, MS Power Point, MS Outlook, MS Internet Explorer.
Statistical packets	SAS, SPSS, BILOG, MULTILOG, LISREL, HLM