An Emotional Approach to Achievement Goal Theory:
The Role of Emotion and Goal Orientation in Response to Failure and Success

by

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ABSTRACT

Goal theory research indicates mastery goal orientation (MGO) is more adaptive than performance goal orientation (PGO). This research looks at connections between goal orientation and emotion. The Emotional Stroop (ES) task gauged the interaction between goal orientation and individuals' emotional responses to a manipulated failure or success condition. University students (N=113) were assessed for level of MGO and PGO, anxiety (ANX), depression (DEP), and positive (PA) and negative affect (NA). Participants (49 female, 40 male) completed a pre-test ES task, a task to induce either success or failure emotions, and a post-task ES task. Regression analyses showed the interaction of MGO and PGO predicted ES interference for effort words. The interaction of PGO and condition predicted ES interference changes for evaluation words and positive ability words. The interaction of PGO and condition predicted ES interference changes for words related to solving the manipulation task. Correlations show that PGO correlated positively with ANX, DEP, while MGO correlated positively with PA.
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Introduction

Picture the following scenario: two students, both of whom have high GPAs and proven track records at university, are given a test for a course they are both taking. They each receive the same set of questions, and both have the same base of knowledge. Neither of them does well on the test. One student accepts the results, and simply studies harder for the next exam, including taking the time to review the questions from the failed test. The other student drops the course, and complains about the unfairness of the test, or that the student could have done better, but did not really study. What accounts for the differences in how these students responded to failure? Both students have been equally successful in school; both students appear to have the same level of ability. Why does one student give up as soon as failure occurs, while the other student seems to take it as a challenge?

This type of scenario is played out in educational settings throughout Western society (I would say across the world, but most of the data come from Western researchers). People who appear to be equal in ability and training can have completely different reactions to failure. These reactions to failure, which are emotion responses, affect academic motivation. There are several theories of academic motivation, but for this thesis academic motivation will be addressed from the achievement goal orientation theory perspective. Within achievement goal theory, the emotional aspects of motivation have been largely overlooked. In the above example it may be that the student who drops the course has a much more pronounced emotional response to failure than does the student who stays. Anger about a poor mark is an emotional response, as is feeling humiliated enough to drop a course. By overlooking these emotional components of
achievement goal orientation, researchers may be neglecting a large part of the puzzle; why do people react differently to failure?

The central hypothesis of this current study is that failure elicits an emotional response, and that motivating goals moderate the degree of that emotional response. Achievement goal theorists (Covington, 2000; Covington & Omelich, 1984; Dweck & Leggett, 1988; Elliot, 1999) have asserted that in addition to the task at hand, people are motivated by self-presentation and self-development goals. Although researchers have used a variety of terms to describe these goals, here I will use the terms mastery orientation (focusing on mastery of the task and learning for the sake of learning), and performance orientation (focusing on self, and being primarily concerned with perceived external judgments of their own competence). This study will examine these goals as continuous variables. Research supports the proposition that persons are not solely mastery oriented or solely performance oriented (Dweck & Leggett, 1988). Goals can be held simultaneously to varying degrees depending on the individual’s response to a set task; for example, a student may work hard in a course to fully understand the concepts and master the material, but also be concerned with getting a good grade. Considering each as a continuous variable may be more realistic and informative than using the traditional dichotomous distinction between mastery and performance orientations. These construct distinctions are important if we are to explicitly address emotions. The interactions of emotion and goal orientations have only just begun to be explicitly studied, although relations between anxiety, depression, and goal orientation have been revealed in academic achievement motivation research (Dweck & Leggett, 1988; Dyckman, 1998).
In the current study, I will test three hypotheses. I will test the two of these hypotheses by using an Emotional Stroop task to measure interference by words representing the following semantic groups: task strategy, task environment, effort, helplessness, positive ability, negative ability, success, failure, and evaluative. In all of these categories, longer colour-naming latency relative to matched control words indicates an emotional response to a stimulus word. A baseline control will be established using a pre-induction Emotional Stroop task, and then participants will complete a computer maze that is manipulated to be either a success or failure experience. Immediately following this, participants will complete a post-induction Emotional Stroop task, and their colour-naming latencies will be compared to the baseline established in the pre-induction Emotional Stroop.

My hypotheses are as follows: I predict that there will be significant positive correlations between higher mastery orientation and positive affect, and significant positive correlations between higher performance orientation, anxiety, depression and negative affect. The second hypothesis is that stronger performance goals will predict a stronger emotional response to failure. Specifically, higher performance goal orientation is expected to predict higher-than-baseline Emotional Stroop colour-naming latencies on words in categories related to words representing success or failure ("helplessness" words, "positive ability" words, "negative ability" words, "success" words, "failure" words, and "evaluation" words); mastery orientation will be unrelated to colour-naming latencies on these words. The third hypothesis is that higher mastery orientation is expected to predict higher-than-baseline Stroop colour-naming latencies on words in the task-strategic, task-environment, and effort categories.
The following literature review will examine achievement goal theory, and will relate goal theory to emotion. Finally I will describe the Emotional Stroop task and some of the research that has been done with that task, and will explain how achievement goal theory can be enhanced by incorporating emotional responses to failure as measured by the Emotional Stroop task.

Achievement Goal Theory

There are several theories of motivation, all of which account for some parts of the whole of what makes an individual want to complete or avoid a task. Original research on motivation focused on a behavioural approach, where pain versus reward determined whether to complete or avoid a task. In response to the narrow focus of behaviorism on external motivators, Deci, Ryan and others moved motivation research to a focus on intrinsic motivation (Deci, 1971; Deci & Ryan, 1987). In the last few decades, research on motivation has been from a more social-cognitive perspective. Current motivation research has been largely from four major theories: attribution theory (Weiner, 1995), self-efficacy theory (Bandura, 1982), self-regulation theory (Boekaerts, Pintrich, & Zeidner, 2000; Zimmerman, 1989), and achievement goal orientation theory (Dweck & Leggett, 1988; Nichols, 1984). While all of these theories are valuable in exploring motivation, this paper will focus on goal orientation theory in the context of academic motivation, and attempt to expand upon this theory by explicitly incorporating the role of emotion into the study of academic motivation from a goal orientation perspective.

Goal orientation is viewed here as a model for understanding why people behave the way they do when presented with a task to complete. Based on research coming from
several different laboratories (Anderman, 1999; Bong, 2001; Covington & Omelich, 1984; Dweck, 1986; Eccles & Midgley, 1989; Elliot, 1988; Harackiewicz, Barron, & Elliot, 1998; Hokoda & Fincham, 1995; Midgley, Kaplan, & Middleton, 2001; Stipek & Kowlaski, 1989; Wigfield & Eccles, 1994), goal orientation theory seeks to explain connections between cognition, affect, and behaviour seen in students (Dweck & Leggett, 1988). Goal theory states that the “goals individuals are pursuing create the framework within which they interpret and react to events” (Dweck & Leggett, 1988, p.256), and so these goals are what guide us and direct our behaviour. In the original conception of achievement goal theory, there are two general goal orientations: a mastery orientation, where an individual works at a task for the sake of learning, and a performance orientation, where a person works at a task in order to look good to others. Goal theory research has shown that being mastery oriented leads to better motivational and academic outcomes than does being performance oriented (Dweck & Leggett, 1988; Elliot & Dweck, 1988; Kaplan & Midgley, 1997; Midgley & Urdan, 2001; Pintrich, Roeser, & DeGroot, 1994; Ryan & Patrick, 2001; Stipek, 1997; Wentzel, 1996).

In their 1988 paper elaborating this model, Dweck and Leggett (1988) argued that the way that a person views ability is integral to their goal orientation. If a person believes that ability is malleable, and can be changed by working hard, then that person will likely develop a mastery orientation. If a person believes ability to be a fixed or unchangeable condition, that person will likely develop a performance orientation. Mastery oriented individuals believe that ability is the result of effort, and that you build on your ability by working hard at a task. On the other hand, performance oriented individuals do not look favorably on effort, either their own or another’s; in their belief
system, those who have to try hard and expend lots of effort to succeed at a task are demonstrating low ability (Dweck & Leggett, 1988). In her 1996 longitudinal study, Wentzel (1996) found that a mastery orientation in 6th grade was a significant positive predictor of effort in 8th grade. Performance orientation predicted low effort two years later (Dweck & Leggett, 1988).

There is empirical support for Dweck and Leggett’s (1988) theories about goal orientation and ability beliefs, particularly when the ability in question is intelligence. In 1994, Anderman and Young measured motivation and ability beliefs among 678 5th and 7th grade students. They found positive correlations between children reporting a learning focus and a belief in the modifiability of intelligence. There was a negative correlation between focus on ability/performance and learning focus. The authors concluded that beliefs about the modifiability of ability are inherent to the development of either a mastery orientation ("learning focus") or a performance orientation (Anderman & Maehr, 1994).

Strage (1997) also found a positive correlation (r = .40) between goal orientation and views of intelligence. Her survey of 306 college students showed that those students who held an incremental view of intelligence also showed mastery-oriented attitudes and behaviours, while those who held an entity view of intelligence showed learned-helpless attitudes and behaviours (Strage, 1997). The learned-helpless behaviours described in the study are consistent with the behaviours seen in other studies where students with a performance orientation were faced with failure.

The differences in attitudes and behaviours described in Strage’s (1997) study are classic in goal-orientation research. In addition to beliefs about ability, the ways in which
children approach tasks also differ between the two patterns of behaviour. People who are more mastery oriented relish a challenge, and look forward to trying new tasks; people who are more performance oriented will avoid any task where there is any doubt about a successful outcome (Dweck & Leggett, 1988). Mastery oriented individuals are learning for the sake of learning; their interest in challenge is as an opportunity to learn something new. Performance oriented individuals view tasks as being an opportunity to succeed as compared to others; if there is a chance that they will not succeed, they will show behaviours such as acting bored, boasting of other talents, or showing aversion to working on the task (Dweck & Leggett, 1988). These behaviours may be the result of emotional response to the failure experience. The intention of this study is to examine emotional response to failure, and determine the role of emotion in motivation.

*Goal orientation and cognition.* Students' perceptions of classroom and personal goal orientation can have implications for how students learn, not just whether they want to learn. In a study of 176 students at a high school for academically advanced students, Ames and Archer (1988) found that in classes where the emphasis was on mastery goals, students reported using more learning strategies (such as self-monitoring for comprehension, and integrating new knowledge with previously learned material), showed a preference for tasks that offered challenge, and had a more positive attitude towards their class as compared to classes where there was an emphasis on performance goals. A student-reported co-variation between effort and success was more related to a perceived mastery orientation than to a performance orientation. For those classes where a performance orientation was stressed, a low negative correlation with self-perception of ability was observed (Ames & Archer, 1988). The authors observed that the most
important factor seemed to be mastery goals. As long as mastery orientation was seen as high, positive patterns in learning strategies, task choice, and attitude followed – even when performance goals were also rated as high. But when mastery was rated as low, less positive patterns were seen in learning strategies, task choice, and attitude (Ames & Archer, 1988).

In 1995, Midgley, Anderman, and Hicks found that for 969 students, holding a mastery orientation and believing in the modifiability of school ability were the strongest predictors of student self-efficacy (β = .23, .19, respectively). The authors concluded that a mastery orientation is therefore more adaptive than a performance goal orientation in the school context, and that mastery oriented students reported trying harder and persisting longer than their more performance oriented counterparts (Midgley et al., 1995).

Young (1997) found a relationship between cognitive strategy use and goal orientation. In a study involving 316 students tested in the spring of 6th grade, then again in the spring of 7th grade, Young (1997) found that motivation and cognition were reciprocally related. Students who perceived that their classroom focused on learning, effort, and improvement reported a mastery orientation, while those students who perceived that their classrooms focused on grades, test scores, and comparison to others reported a performance orientation. The use of deep cognitive strategies was influenced by the orientations of the classrooms. In English class, a mastery orientation predicted the use of deeper cognitive strategies (Young, 1997).

It must be noted that while the above research looks separately at mastery and performance goals, the two goal orientations are not necessarily mutually exclusive.
There is a great deal of data which suggest that a performance orientation in the classroom is not a problem, as long as a mastery orientation also exists (Ames & Archer, 1988; Young, 1997).

Studies at both the college and the middle school levels have shown that both performance and mastery orientations can co-exist without negative consequences for students. At the middle school level, Ames and Archer (1988) found that positive patterns in learning strategies, task choice and attitude were seen even when perceived classroom performance orientation was high – as long as mastery orientation was high, too. When mastery orientation was rated as low, there were less positive patterns in learning strategies, task choice and attitude. So the key factor here seems to be the mastery orientation, but it is important to note that the high perceived performance orientation did not adversely affect learning strategy, task choice and attitude (Ames & Archer, 1988).

Young (1997) reported a similar finding among middle school students. In this study, the use of deep cognitive strategies was influenced by both mastery and performance orientations in the classroom. Performance orientation does not have a negative effect, as long as it is paired with a mastery orientation (Young, 1997).

At the college level, both goal orientations have been found to lead to positive outcomes (Midgley, Kaplan, & Middleton, 2001). While a mastery orientation better predicts interest in the subject matter (Jacobs & Newstead, 2000), a combination of the two orientations is a better predictor of high grades than mastery orientation alone (Ames & Archer, 1988). Some research does suggest that a performance orientation alone can lead to cheating and self-handicapping (Martin, Marsh, Williamson, & Debus, 2003;
Midgley, & Urdan, 2001), but these studies do show that a performance orientation is positive when it is paired with a mastery orientation.

Approach and Avoidance. In the last ten years, researchers have expanded achievement goal theory to include the concepts of approach and avoidance as finer distinctions of the original mastery and performance orientations (Elliot & Church, 1997; Elliot, 1999; Elliot & McGregor, 2001; Harackiewicz, Barron, & Pintrich, 2002; Midgley et al., 2001). This revision of goal theory suggests that, in certain situations, individuals will approach or avoid tasks depending on their goals. For example, an individual can have a performance-approach goal when that individual knows that he or she can do something well, and wants to show others. The same individual can have a performance-avoidance goal when he or she knows that the task would not be done well, and so the individual will avoid the task to prevent others from seeing how badly the individual will do (Elliot, 1999). Similarly, an individual may have a mastery-avoidance goal when faced with a task where the individual wants to avoid misunderstanding new material (Elliot & McGregor, 2001). Mastery-approach goals look like the typical mastery behaviour described above, where an individual relishes a challenge and willingly tackles new material or new skills with the goal of mastering those skills (Elliot & McGregor, 2001).

The approach-avoidance revision is an important advance in achievement goal theory, and new research is being published that gives some support for this new bifurcation of the original two goal orientations (see Eccles & Wigfield, 2001, for a review). However, for the purposes of this study, the approach-avoidance revision of achievement goal theory will not be used; rather, the original mastery/performance
orientations will be examined. There are several reasons for this: 1) the approach-avoidance revision is relatively new, and is not as empirically supported as the original two-goal theory; 2) the majority of approach-avoidance studies published to date use exploratory factor analysis to determine goal orientations of the participants involved, and focus on task- or content-specific situations, instead of goal orientation as a general approach to a potentially challenging situation (see Elliot & McGregor, 2001, as an example); 3) the validity of the instruments that are being developed to assess approach-avoidance goals is still somewhat questionable (Smith, Duda, Allen, & Hall, 2002); and 4) there is shared variance among the four goal orientations as described in the approach-avoidance revision of achievement goal theory. This study will use regression analyses; if the approach-avoidance revision was used in this particular study design, there would be a violation of the assumption of heterogeneity of variance for regression analyses.

While approach-avoidance is a valuable addition to achievement goal theory, it is a step away from the question addressed in this study: what role do emotions play in achievement goal orientation? Approach-avoid distinctions look at specific situations. The body of research supporting the original two-goal theory no longer looks only at task-specific situations; in fact, Button, Mathieu, and Zajac (1996) describe goal orientation as a “somewhat stable individual difference factor that may be influenced by situational characteristics” (p. 28). This statement suggests that individuals generally hold either a mastery or a performance orientation as, perhaps, an aspect of their personality or character. Approach-avoidance distinctions are exhibited under the “situational characteristics” mentioned by Button and colleagues (1996).
The assumption that achievement goal orientation (mastery or performance) is a somewhat stable factor is supported by many of the studies cited above; in fact, it is alluded to in Dweck and Legget’s (1988) original paper. The current most validated and reliable instrument for measuring goal orientation (Jagacinski & Duda, 2001) is the Patterns of Adaptive Learning Survey (PALS) (Midgely et al., 1997). The questions on the PALS are academic in context, but are not specific beyond using words such as “coursework”, “teacher” and “grade”. Researchers have been using the PALS as a general measure of goal orientation, making the assumption that individuals tend to have pre-existing tendencies in their general academic motivation.

If goal orientation is a pre-existing tendency for individuals, then the emotional reactions to challenging tasks discussed above form part of that individual tendency. A criticism of goal theory, and the one that will be focused on in the next portion of this literature review, is that few studies have directly addressed the role of emotion in achievement goal orientation (Linnenbrink & Pintrich, 2002). The stereotypical response to failure seen in performance oriented persons is an emotional response. They get angry (Dweck & Legget, 1988), and they appear to take the failure as a personal indictment of ability. There have been isolated findings in the goal orientation literature relating goal orientation and affect, but little research has been conducted to determine the role of emotion in achievement goal orientation. If goals are part of personality or character, then the origins of goal orientations could be tied to the origins of how individuals react emotionally to frustrating conditions.
In the next section, I will discuss emotion and achievement goal orientation, and attempt to synthesize the existing literature to establish a framework for my hypotheses about the impact of emotion on goal orientation.

Motivation and Emotion

Little research has examined the origins of goal orientation. If the role of emotion in achievement goal orientation is to be examined, then we need to understand both how goal orientations develop, and how people learn to cope with feelings of failure. I was able to find only one study that examined the possible origin of goal orientations. Hokoda and Fincham (1995) examined the effect of mothers’ influence on children’s goal orientations. Their study looked at students in the third grade, an age at which some children begin to show a transition from a mastery orientation to a performance orientation. The researchers had the children and their mothers work together on a series of tasks, some of which were solvable, and some of which were unsolvable. The goal orientation of the children was assessed beforehand, and the behaviour of the children’s mothers was observed.

Mothers of children who showed a mastery orientation responded in a sensitive manner to their own children’s statements of ability and self-worth. These mothers maintained a positive affect, and focused on the task itself, not on the result. This behaviour was especially pronounced during the unsolvable tasks. When the children of these mothers made low-ability statements (“I can’t do this”), these mothers responded by suggesting strategies for approaching the task in a new way. This shifted the focus away from an assessment of ability, and refocused the child on mastering the task. When
these children made statements about their lack of ability ("I'm not smart enough to do this"), these mothers reassured them of their high ability (Hokoda & Fincham, 1995).

By contrast, children who were rated as performance oriented had mothers who responded differently during the experiment. The mothers of these children showed less positive affect in response to failure, and did not make strategy-teaching statements. When these children made statements about their lack of ability, these mothers did not respond with high ability assertions. Instead, they suggested that their children should quit, or go on to the next puzzle. This may have the effect of implicitly reinforcing the child's feelings of low ability and modeling helpless response patterns (Hokoda & Fincham, 1995).

This research by Hokoda and Fincham (1995) suggests that achievement goal orientations may have their foundation in parental modeling of ability judgments and emotional reaction to failure. Mothers of mastery oriented children de-emphasized evaluations of performance, encouraged the trying out of new strategies, and emphasized the learning aspects of all of the tasks, even those that were unsolvable. The mothers' reaction to failure and frustration was to focus on the task itself, and not the child's ability to do the task. This allowed the children to continue to feel good about themselves, and perhaps made the failure less personal, and therefore less emotionally charged. Mothers of performance oriented children emphasized achievement and success, and did not encourage new strategies or persistence in the face of failure. These mothers' reaction to failure and frustration may have supported children's feelings that the failure was personal, and encouraged or increased the emotional reaction to the failure. These patterns of mothers' behaviours echo the behaviours that are later seen in
older children (Hokoda & Fincham, 1995). These results suggest that parenting is a piece of the puzzle that may contribute both to children's goal orientations and their emotional responses to failure.

Also supporting the importance of emotion are the findings that affect and coping skills are also influenced by goal orientation. In their study of 880 students tested in the fall and spring of grades 5 and 6 (with a transition to middle school at the end of Grade 5), Kaplan and Midgley (2000) found that the coping mechanisms students choose to use to deal with the transition are related to how a student perceives the classroom environment. When mastery goals are emphasized, adaptive coping strategies were used, and positive affect was reported. When performance goals were emphasized, maladaptive coping strategies were used, and negative affect was reported (Kaplan & Midgley, 2000). Anderman (1999) studied 444 students who transitioned to middle school at the end of Grade 5. Affect and goal orientation were measured in the spring of Grade 5 and the spring of Grade 6. Affect was found to be related to classroom practices. Positive affect was positively correlated with teachers' emphasis of effort and understanding of the material. Negative affect was correlated with classes where teachers emphasized ability and comparison to others. Mastery goal orientation was associated with positive affect, as was a sense of school belonging. Performance goal orientation was associated with negative affect, and negatively correlated with a sense of school belonging (Kaplan & Midgley, 2000).

Roeser and Eccles (1998) surveyed 1,046 students in the fall of Grade 7, then again in the spring of Grade 8. All of the students showed some depressive symptoms, and reported a decline in their valuing of education from 7th to 8th grade; boys'
educational values declined more than girls. Students were asked to rate several aspects of their classes; these values were used to determine whether the students saw their classrooms as promoting performance or mastery goals. Students who perceived that their schools were supporting performance goals reported that school was competitive, and that the school "gave up on" students who did not perform well. They saw high achievers as being favored. Students who reported these perceptions showed increased anger and depressive symptoms (Roeser & Eccles, 1998). In contrast, students who perceived their schools as promoting mastery goals reported that teachers regarded them positively, that there was an emphasis on improvement, effort, and mastering tasks. Students who perceived their schools as promoting mastery goals showed declines in depressive symptoms over time as compared to those students who saw their schools as promoting performance goals (Roeser & Eccles, 1998).

These emotional effects extend beyond middle school and into adulthood. In studying undergraduate students, Boggiano, Barrett, Silvern, and Gallo (1991) found that individuals who are performance oriented reported more depressive symptoms and had a more "maladaptive attributional style" (p. 589) than did individuals showing a mastery orientation. When these researchers set up a condition where the participants thought about failure, those individuals who were performance oriented showed a significant negative difference in their mood state; when thinking about a positive outcome, they showed no difference in mood state as compared to individuals with a mastery orientation (Boggiano et al., 1991).

Other work supports Boggiano and colleagues’ (1991) findings. Dykman (1998) also found a correlation between goal orientation and depression in adults. In his study,
he found that a performance orientation was correlated with a higher incidence of depressive symptoms, while a mastery orientation was correlated with a lower incidence of depressive symptoms (Dykman, 1998). Martinez-Pons (1997) used path analysis to show a relationship between mastery orientation and an increased likelihood of life satisfaction and a decreased likelihood of depression symptomatology (Martinez-Pons, 1997).

Correlations between self-esteem and mastery orientation have been found in sports psychology. In their survey of 105 college students, Franken and Brown (1996) found that people with a strong need to win (the performance oriented group) tend to have poor coping skills, see the world as hostile, have an entity view of their intelligence and skills, show lower self-esteem and are less hopeful compared to the mastery oriented group (Franken & Brown, 1996).

Negative behaviours such as self-handicapping appear to be related to goal orientation. Self-handicapping is a maladaptive coping strategy (Higgins, Snyder, & Berglas, 1990, cited in Midgley & Urdan, 2001) where students choose behaviours that give them excuses should they perform poorly on academic tasks. These behaviours include such things as avoiding school work and procrastinating. It is a way to avoid looking stupid – a student can say what might have been: “I would have aced the test, but I put off studying until the last minute” (Midgley & Urdan, 2001, p. 61). In a study of 484 7th grade students, a positive correlation was found between self-handicapping and perception of a classroom performance goal orientation (Midgley, & Urdan, 2001). There was a negative correlation between self-handicapping and perceived mastery goal structure in the classroom. When looking at degrees of personal mastery and personal
performance goals orientations, the analysis indicated that higher levels of performance-avoid goal orientations predicted more self-handicapping. This was moderated by the simultaneous level of mastery goal orientation (Midgley, & Urdan, 2001).

This research suggests that emotions are involved in goal orientation; it is the emotional response to the possibility of failure that is important. Emotion has previously been treated as an outcome variable in motivation (Weiner, 1985). Weiner's work looked at attributions that arise after a success or failure experience, but did not examine the role of emotions in approaching new tasks, or while engaging in a task (Weiner, 1985). Some motivation researchers are beginning to consider that emotion "may play a central role in explaining students' responses to challenging work" (Turner, Thorpe, & Meyer, 1998, p. 769). The latest research on emotion and achievement goal orientation specifically looks at emotions "generated as one works on an activity versus affect generated as the result of success or failure" (Linnenbrink & Pintrich, 2002, p.69). The research being published by the labs of Linnenbrink and Turner so far has focused on developing models to explain the role of emotions in achievement motivation; Linnenbrink and Pintrich in particular have developed a model of emotion and goal orientation. However, this model remains to be tested empirically.

The role of emotion in goal orientation specifically is not entirely new. Seifert (1995) used structural equation modeling to determine whether goal orientation predicted emotion, or whether emotions predicted goal orientation. In a longitudinal study of 79 middle school students, he found that emotions predicted goal orientation, but that goal orientation did not predict emotion. Seifert postulated that feelings of confidence and competency predispose an individual to a mastery orientation, whereas a need for
belonging – looking good to teachers and classmates – and a tendency to feel “frustrated and stupid” was associated with a performance orientation (Seifert, 1995). Seifert concludes that emotions may be what determine goal orientation for an individual. Unfortunately, the sample size of this study was quite small, which may bring into question the reliability of the results, and this experiment was not followed up. Siefert’s results do suggest that there needs to be more research on the role of emotion in goal orientation specifically.

Emotion needs to be more explicitly studied in exploring goal orientation. The desire to feel good is a basic human drive – most individuals will seek out situations that will allow them to feel good about themselves. In challenging situations, emotions warn us of threats (even to our self-esteem), and prime us for action (LeDoux, 1996). Researchers have been looking at emotion and goal orientation as related but separate concepts. As Ford (1992) stated:

“Although the relevance of emotional experience to motivation has long been recognized, the tendency has been to view emotions as a separate source of motivational energy rather than as an integrated part of motivation patterns” (p.8).

Goal orientation appears to be linked to emotional response to challenge. The emotional reaction that a person feels in the face of the possibility of failure appears to determine their reaction to that situation. The emotional reaction may then affect the cognitive process. A person’s reaction to the failure situation is impacted by how the failure situation will affect the person emotionally. Findings thus far indicate that failure evokes different emotional responses in persons with a mastery orientation than it does in
persons with a performance orientation (Dweck & Leggett, 1988; Elliot, 1999; Jacobs & Newstead, 2000; Linnenbrink, 2002).

The difficulty in measuring emotions that are not consciously processed has stymied research into the interaction of emotion and goal orientation. Standard self-report measures cannot entirely capture unconscious processes – if a person is unaware of certain feelings or emotions, they are not likely to report feeling them when asked. But recently, research using a modified version of the Stroop task has made it possible to objectively measure indicators of emotional responses.

*The Emotional Stroop*

In 1935, J. R. Stroop published his dissertation research on attention and interference. In his study, he had participants read words printed on an index card. There were 100 words, arranged in a 10 X 10 format. Five colour-name words were used in Experiment 1, and the inks used to print the words were the same colours as named by the words: red, blue, green, brown, purple. Participants had to read the words, which were printed in an incongruent ink colour. The reading of the word was not affected by the incongruent ink colour, and the reading time for the whole card was not significantly different from reading a black-ink printed control card (Stroop, 1935).

In Experiment 2, Stroop asked participants to name the colour of the ink in which each word appeared, not to read the words. The control for this experiment was a series of solid-coloured squares. Stroop (1935) found that participants took 74% longer to name the colour of the ink in the incongruent word condition over the solid-colour block condition. This significant difference in colour naming is called the Stroop effect, and Stroop’s experiment has been replicated and extended for nearly 70 years. Variations on
Stroop’s (1935) original experiment are numerous; this review will focus on the impact of semantic meaning on the Stroop effect.

In 1964, Klein explored whether word meaning had an effect on the interference seen in the Stroop effect. Klein (1964) found that meaning did have an effect: the more meaningful a word, the more interference it caused. There was a hierarchy of word meaning and interference: 1) the greatest interference was found when the printed words used were the same as the colours of ink used (so if red, green and blue inks were used, then the printed words for the incongruent print colour-word combinations would be drawn from RED, GREEN, or BLUE), as described in Stroop’s (1935) original experiment; 2) less interference was found when other colour words (such as tan, mauve, etc.) were used; 3) still less interference was found when common non-colour words were used; and 4) the least amount of interference was found when nonsense syllables were used (Klein, 1964).

Other research elaborated these findings further. Dalrymple-Aford (1972) showed that colour-related words (such as blood, snow, or grass) cause significant interference, though less than colour words themselves; Redding and Gerjets (1977) showed that scrambled colour words are equivalent to non-colour words, and Murray, Mastronardi and Duncan (1972) found that animal words cause less interference than colour words. Collectively, these findings suggest that semantic processing interferes with performance of the Stroop task (Dalrymple-Aford, 1972; Murray et al., 1972; Redding & Gerjets, 1977).

In the mid-1980s, researchers began to explore the question of how emotional disturbance influenced cognitive interference. Researchers adapted the Stroop task by the
use of negative affect words in place of colour words (Gotlib & McCann, 1984; Matthews & MacLeod, 1985; Williams & Braodbent, 1986). In these adapted Stroop tasks, researchers found that emotional words that are specific to the pathology of the participants being tested (such as “cheesecake” or “fat” for a person suffering from anorexia nervosa) showed a longer ink colour naming latency than non-emotional control words. In one study, patients suffering from spider phobias showed interference effects for spider words that were nearly as great as the original Stroop effect for colour words (Watts, McKenna, Sharrock, & Tresize, 1986). Similar effects were seen for post-traumatic stress disorder (PTSD), eating disorders, and anxiety and depression (see Williams, Mathews, & MacLeod, 1996, for a review).

Recent research continues to support earlier findings of the utility of the Emotional Stroop in detecting attentional bias and interference. The largest Stroop interference effects are seen in studies of PTSD. Patients with PTSD are hypervigilant to words related to their trauma, and show significantly longer colour-naming latencies than do controls (McNally, 1998). A study of Vietnam veterans found an interference of 300 ms in colour-naming latency between neutral control words and trauma related words (McNally, Kaspi, Riemann, & Zeitlin, 1990). The original Stroop effect showed an average interference of approximately 260 ms (Stroop, 1935). McNally et al.’s (1990) finding has been supported by results from other researchers (Cassiday, McNally, & Zeitlin, 1992; Foa, Feske, Murdock, Kozak, & McCarthy, 1991). Recently, McNally, Clancy, Schacter and Pitman (2000) found that severity of self-reported PTSD symptoms predicts longer colour-naming latency of trauma-related words.
Other pathologies also show significant Stroop effects. A study of anorexic patients found that they demonstrated significantly longer colour-naming latencies on Food/Eating words and Weight/Shape words than on Animal Names (Jones-Chester, Monsell, & Cooper, 1998). Anorexic patients’ latencies were also significantly longer than controls’, except for Animal Names. A recent study of clinically depressed patients found that the more severe the depression, the longer patients took to colour-name depression-related words such as “elated”, and “wretched” (Perez, Rivera, Fuster, & Rodriguez, 1999). This study was particularly interesting because it compared groups of patients suffering from different degrees of depression to each other, and to controls.

In an examination of the influence of state versus trait anxiety on emotional Stroop colour-naming interference, Egloff and Hock (2001) found no main effect for neither state nor trait anxiety. However, they found a significant interaction between state and trait anxiety using stepwise multiple regression analysis. Trait anxiety acts as a moderator of the relationship between state anxiety and attentional orientation. For individuals high in trait anxiety, state anxiety and Stroop interference were positively correlated. In contrast, for low trait anxiety individuals this association was negative … state anxiety acts as a catalyst in individuals with high trait anxiety: the more anxious they become, the more they employ a hypervigilant cognitive mode (p. 880-881).

The Egloff and Hock (2001) results are notable in that they fit well with theoretical explanations of how the Emotional Stroop works. The phenomenon seen with
the original Stroop task is the result of cognitive interference. Reading the word is an automatic task, while the instruction is to name the colour, which is not an automatic task. Automatized reading interferes with the non-automatized task demand of naming the colour (Egloff & Hock, 2001). In the Emotional Stroop, there is another layer: attention, which results from vigilance to emotionally relevant words. Egloff & Hock (2001) suggested that high state anxiety leads to hypervigilance in high trait-anxiety; this also applies to the other disorders discussed above, all of which include both anxious mental state and vigilance to words related to the pathology.

The Stroop phenomenon is the result of interference in cognitive processing. Current cognitive theory favors a connectionist explanation of cognition. Williams, Mathews and MacCleod (1996) have proposed a connectionist model of how the Emotional Stroop works. The model assumes that cognitive processing is the result of activation of different pathways in the cognitive system, and that pathways have different weightings. Processing is not a result of speed along a pathway, but of the strength of the connections forming a pathway; greater weighting of specific connections makes them stronger and more likely to interfere with lower processing strength pathways such as colour naming. Automaticity becomes a function of the combined weightings of pathways – the greater the weightings along a pathway, the more likely it is that cognitive processing will follow that pathway (Williams et al.,1996).

According to Cohen, Dunbar, and McClelland (1990), the cognitive processing system itself consists of a network of modules. Information is stored as patterns in the network, and processing of an input is accomplished by activation spreading along the connections between and within the modules of the network. New information is
integrated into the model via changes in the existing patterns, and changes in the weightings of certain pathways in the network.

When the instructions for a task are given to the cognitive processing system, a pathway is activated that incorporates one or more modules, via some or all of the units in that module. The connections between the units determine the strength of processing. If the task elicits more than one type of processing, then more than one pathway is activated. But modules and units of one pathway can also be part of another pathway, so when different pathways sharing common units are activated, these pathways may intersect at that shared unit.

When pathways intersect, two possibilities arise: mutual facilitation or interference. Facilitation is the result of two pathways having compatible activation. The processing is strengthened by the paired impetus of the pathways. Interference results when pathways have conflicting activation at the shared unit. In this instance, processing is slowed down, as the two pathways compete for activation of the shared unit (Williams et al., 1996).

In the traditional Stroop task, the pathway for "reading the word" and the pathway for "colour-naming" share a common unit, response to the word stimulus. The "reading the word" pathway is stronger than the "colour-naming" pathway, so there is interference in processing. The interference is strongest with colour words because in this instance much of the cognitive processing involves shared pathways.

So what is happening in the Emotional Stroop? Research discussed earlier indicates that non-colour words cause less interference than colour words – yet Emotional Stroop data from various pathologies (particularly PTSD) shows interference effects as
strong as or stronger than those caused by colour words, even though non-colour words are used. MacCleod (1991) argues that attentional bias explains the Emotional Stroop effect. Persons with certain pathologies are hypervigilant to words concerned with their pathology. These words are strongly associated with emotional response pathways, which interfere with the “colour-naming” pathway (MacLeod, 1991).

The value of the Emotional Stroop for the current study lies in the fact that vigilance to emotionally relevant words is an unconscious process. This allows researchers to probe for unconscious emotional responses to situations. Part of the difficulty in examining the role of emotion in goal orientation is that the emotion behind a motivational goal is often something that a person is less aware of. In this study I will use the Emotional Stroop to assess the emotional strength of processing associated with words representing the following semantic domains: task-strategic, effort, helplessness, positive ability, negative ability, success, failure, and evaluative.

I will use the Emotional Stroop in a different way than have the researchers mentioned above. Traditionally, the design used by Emotional Stroop researchers is as follows: a group suffering from a pathology and a control group are each given an Emotional Stroop task, and then the colour-naming latencies on emotionally charged words are compared between groups. As well, the colour-naming latencies on non-emotional words are compared to the colour-naming latencies on emotionally charged words are compared within groups. In many studies, a third group is included, comprised of individuals who have been treated for the pathology under investigation, and their colour-naming latencies on emotionally charged words are compared to those of the control and pathology groups.
Two recent studies have used a slightly different methodology. While all three of these recent studies used groups suffering from a pathology (as has been the norm for Emotional Stroop research), the Emotional Stroop task was given twice in the course of the experiment (which is a new way to investigate Emotional Stroop effects). Spinks and Dalgleish (2001) tested participants suffering from Seasonal Affective Disorder (SAD). In their study, Spinks and Dalgleish administered the Emotional Stroop at two time points: in the winter, when symptoms of SAD were manifested, and again in summer, when symptoms were in remission. They found that greater colour-naming latency on threat words in the winter was related to more improved mood in the summer (Spinks & Dalgleish, 2001). Using a similar type of experimental design, Cox, Hogan, Kristian, and Race (2002) tested 14 alcohol abusers by using the Emotional Stroop task on admission to a treatment program, and then tested the alcohol abusers again immediately before discharge from the program, 4 weeks later. A control group \((n = 16)\) was also tested at the same two times. Cox and colleagues (2002) found that those alcohol abusers who relapsed during the 3 month post-treatment follow-up period had shown increased colour-naming latencies to alcohol-related words on the second Emotional Stroop task compared to the first, which led the researchers to suggest that those participants had shown an increasing attentional bias for alcohol related words during treatment (Cox et al., 2002).

Both of these studies used two administrations of the Emotional Stroop task to determine if the task can be predictive of outcome, which is a new direction in the way the Emotional Stroop effect is researched.

In this study, the Emotional Stroop will also be completed twice, but both administrations will be in the same experimental session. The first administration of the
Emotional Stroop will be before a manipulated failure or success experience, and the second administration will be after the success or failure experience. The same words lists, in the same order, will be used in both administrations of the Emotional Stroop. The first Emotional Stroop will be used to obtain a baseline measure of colour-naming latencies; the second administration of the Emotional Stroop is expected to show the emotional response difference between the participants in the success condition and the participants in the failure condition. Research to date using the Emotional Stroop has examined existing, present, consistent pathologies; the intention of this study is to attempt to create an emotional response by manipulating the outcome of a task that the participant is asked to complete.

Hypotheses

The purpose of this study is to test relations among individuals’ performance and mastery goals and their emotional responses to failure. There are three main hypotheses in this study.

1. Convergent construct validity will be established by correlating goal orientation with well-established and well-validated measures of anxiety, depression, negative affect and positive affect. Performance orientation is expected to correlate positively with measures of anxiety, depression, and negative affect, while mastery orientation is expected to correlate positively with positive affect.

2. a) High performance goal orientation will predict longer colour-naming latencies on words representing either “success” or “failure.” Words representing success are those words in the “positive ability”, “evaluative”, and “success” domains; the words
representing failure are those words in the “negative ability”, “helpless”, and “failure” word domains (see Appendix D).

2. b) Mastery orientation will be unrelated to colour-naming latencies for “success” and “failure” type words as described above.

3. Higher mastery orientation will predict longer colour-naming latencies on non-emotional task relevant words. The non-emotional task relevant words are those in the “task-environment”, “effort”, and “task-strategic” word domains (see Appendix D).

Method

Participants

One hundred and thirteen university students participated in the study (female: n = 64; and male: n = 49). Participants were in either the Psychology or Educational Psychology programs at the University of Victoria, and received either a cash stipend or course credit after participating. The participants ranged in age between 17 and 45 years (mean age = 22.28 years).

Questionnaire data was collected from all 113 participants; however, not all participants completed the second session of the experiment. Students recruited outside the Psychology 100 Research Pool had to make appointments to complete the second session; twenty-two of these participants returned questionnaire packets, but did not make appointments for the computer session. Two participants recruited through the Psychology 100 Research Pool returned their questionnaire packets, but were unable to complete the computer session due to technical difficulties with the computer equipment.
on their test days. A total of 89 participants completed the computer portion of the experiment (female: \( n = 49 \); and male: \( n = 40 \)). The age range for this subset of participants was also 17 to 45 years of age (mean age = 21.8 years).

**Design**

The overall design of this study included both within and between group contrasts. A randomized pretest-posttest experiment with two treatment groups (manipulated failure and manipulated success) produced the between-group contrasts (Campbell & Stanley, 1963), and multiple regression was employed to predict individual differences following failure or success. The two treatment groups were balanced for sex (failure: females = 24, males = 20; success: females = 25, males = 20).

**Procedure**

**Phase 1: Questionnaires.** Each participant completed a packet of take-home questionnaires, which included the consent form, and contact information for reaching the researchers. Participants either returned their packets to the Education general office (non-Psychology 100 participants) or returned their packets on the day of the computer session (Psychology 100 participants). The experimenters protected the identities of participants by using ID numbers rather than names to keep track of their data.

**Phase 2: Computer session.** The researchers contacted participants who indicated that they wished to take part in the second part of the experiment, using the information given on the consent form, and arranged a time for those participants to take part in the computer portion of the study. Psychology 100 participants signed up for a computer session at the same time that they arranged to pick up their questionnaire packet. At the designated time, the experimenter began the session by sitting down with the participant
and discussing the consent form. The participant had the opportunity to ask questions about the experiment, and had the option of leaving without penalty.

The participant then sat in front of a computer monitor across the table from the experimenter, and put on a headset (see Apparatus section). The experimenter gave the instructions for the Emotional Stroop task (see Appendix A). The first portion of the Emotional Stroop consisted of three practice trials, to ensure both that the participant understood the instructions and that all of the equipment was working. The next portion of the Emotional Stroop consisted of words presented one at a time, centered on the computer screen. Words were presented randomly in one of four colours (red, green, blue, yellow). Words were ordered into ten randomized lists, so that only one in ten participants saw the words in the same order. The participant named the colour of the word as quickly as they could. The microphone on the headset recorded the participant’s response, and stopped the voice-activated timer in the computer. The elapsed time from presentation of the word to naming of the colour constituted the latency data. Ninety-six words, made up of control and target (emotionally relevant) words, were presented. At the end of the Emotional Stroop task, participants had the option to take a break.

Participants next heard the instructions for the Arena Search task (see Appendix B). This task is a computer-based maze created using the editing level of the UnReal® program. Two conditions were programmed: failure plus feedback and success plus feedback. The experimenter pseudorandomly assigned participants to a condition when starting the program. Participants in both conditions completed the same type of task: they had to find a green circle (the “platform”) inside a room that appeared on the computer screen. This room consisted of four walls, three of which had windows.
showing an external view, and one wall with a door. The participant “walked” around the room using a joystick (Gravis®). The bounded area, or “arena” was a large circular area taking up most of the center of the room, and surrounded by a low wall. Participants had three practice trials, where the platform was visible, then seven more trials where they explored the bounded area of the room to find the platform, which always remained in the same place, even when it was not visible. Participants had 40 seconds per trail to find the platform. When they found the platform, a distinctive sound was heard, and the platform appeared. Any participant taking longer than 40 seconds on the first trial was guided to the platform and given a few minutes to orient themselves in regards to its location. Subsequent trials ended at 40 seconds.

Participants in both the success and failure conditions began with the same three practice trials of the Arena Maze. The failure plus feedback participants’ subsequent trials were more difficult: the platform got progressively smaller and harder to find, and completely disappeared after the fourth trial. At the end of seven trials, the computer gave the failure-condition participants a message stating that they scored in the bottom 30% of all participant scores. Participants in the success plus feedback condition had seven easy trials with a large, easy to find platform, and received a message at the end stating that they scored among the top 7% of all participant scores.

The participant then again put on the headset, and completed another Emotional Stroop session. The participant was asked how they were feeling about the experiment and about their performance on the computer task. Participant’s answers were recorded, for later anecdotal reference in analyzing the data. After completing the interview, the
participant was asked to try to recall as many words as possible from the Emotional Stroop task.

Finally, the participant and researcher discussed the points on the debriefing sheet (see Appendix C), and the researcher explained the manipulations used in the experiment – and the intentions behind those manipulations. Participants were encouraged to ask any questions they wanted, and to give feedback about how they felt about the experiment as a whole. Participants were given the option of obtaining a copy of the results of the research. As a last request, the researcher asked participants to not discuss the experiment with other members of their class.

**Apparatus**

Participants were tested at the University of Victoria in an office, where they sat across the table from the experimenter. The participants faced a 12-inch computer screen, and wore a headset (Logitec C-316) for the Emotional Stroop task. They removed the headset and used a joystick (Gravis) to complete the Arena Search task, then used the headset again for the final Emotional Stroop task. Both The Personal Stroop Program (University of Notre Dame; see Measures section) and the Arena Search task were run on a 486 computer with a Pentium® processor equipped with dual video cards and monitors.

The experimenter faced a second monitor. External voice-activated timers attached to the participant’s headset recorded the latency and accuracy of colour-naming response during the Emotional Stroop task. The experimenter used a stopwatch to record the latency of each search trial during the Arena Search task to give the participant the
impression that data were being collected on how quickly the participant was able to find the platform.

Measures

Goal orientation  The Patterns of Adaptive Learning Survey (PALS) (Midgley, Maehr, Hicks, Roeser, Urdan, Anderman, Kaplan, Arunkumar, & Middleton, 1997) is an 47 question self-report survey that assesses mastery, performance-approach, and performance-avoid goal orientations; only the 18-question mastery and aggregate performance scale is used in this study, for the reasons discussed in the literature review. The PALS consists of statements about students’ reasons for doing academic work which students rate on a five-point Likert-type scale, ranging from “Not at all true of me” to “Very true of me”. The PALS has high internal consistency, particularly for the chosen scale (α = .86, Midgley et al., 1997). Confirmatory factor analyses of the scales have found high construct validity (Ross, Shannon, Salisbury-Glennon, & Guarino, 2002). The PALS has been shown to be reliable and valid for middle school populations (Anderman & Midgley, 1997; Midgley, Anderman, & Hicks, 1995; Roeser, Midgley, & Urdan, 1996), and university students (Ross et al., 2002).

Depression  The Beck Depression Inventory (Beck, Steer, & Brown, 1996) is a self-report measure of depressive symptoms and affect. The BDI manual (Beck et al., 1996) reports correlations of .68 and .71 between the BDI and two other depression-related instruments, the Revised Hamilton Psychiatric Rating Scale for Depression (Hamilton, 1960) and the Beck Hopelessness Scale (Beck & Steer, 1988). Other studies have shown that the BDI is a valid and reliable indicator of depressive affect among
Anxiety. The State-Trait Anxiety Inventory (STAI) (Spielberger, Gorusch, & Luschene, 1970) is a self-report measure of anxiety symptoms. Participants rate 40 statements about how they feel on a 4 point Likert-type scale, ranging from 1= "not at all" to 4= "Very much so". One scale asks participants to rate how they feel right now (state anxiety), and one scale asks participants to rate how they generally feel (trait anxiety). (Ramanaiah, Franzen, & Schill, 1983) found the STAI to have strong internal consistency in a test of two large samples of university students (Croenbach's $\alpha = .92$ and .90 for State anxiety, and .92 and .88 for Trait anxiety). They also found median corrected item-scale correlation coefficients for the state and trait anxiety items of .60, and .59 respectively.

Affect. The Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988) is a 20-item self-report measure of mood. Participants rate to what extent they feel certain moods (10 positive and 10 negative affect items) on a 5-point Likert-type scale, ranging from "very slightly or not at all" to "extremely". The PANAS includes such items as "interested" (positive affect) and "hostile" (negative affect). The PANAS is correlated with the STAI and the BDI (STAI-State: negative affect .51, positive affect -.35; BDI: negative affect .56, positive affect -.35) (Watson, Clark, & Tellegen, 1988). The correlation between the negative affect scale and the positive affect scale is low, ranging from -.12 to -.23; the scales share only 1%-5% of variance (Watson, Clark, & Tellegen, 1988). Reliability is also good, with a test-retest correlation of
positive affect .68, negative affect .71 when participants were tested eight weeks apart (Watson, Clark, & Tellegen, 1988).

*Emotional Stroop.* The Emotional Stroop is an adapted version of the Stroop colour-naming task in which participants name the print colour of a series of words chosen for their emotional content. Some of the words are neutral, while some of the words are chosen specifically to elicit an emotional response (such as “fat” or “cheesecake” for a person suffering from anorexia).

The present study used the Personal Stroop software developed at the University of Notre Dame by Cole, Martin, and Honkanen (2000). Participants sat facing a monitor, wearing a hands-free microphone. The microphone was connected to a voice-activated timer in the computer that recorded latency to name the colour of the word. The experimenter faced another monitor that displayed both the program information, and what is seen on the participant’s monitor. The computer program randomly assigns a different colour (red, green, blue, or yellow) each time a word is presented. The software also cues the experimenter to record the accuracy of the colour-naming and re-cue (the software adds the word to the end of the list of words being presented) any words where the colour was incorrectly named or the microphone was incorrectly triggered.

Stimulus words for the Emotional Stroop were chosen by suggestions from lab members, answers given in informal polls of friends and colleagues, and reviews of words that appeared in articles about goal orientation. This was done by reading a representative sample of articles about goal orientation, and listing which words occurred most frequently in describing attitudes and reactions of individuals with mastery or performance orientations when faced with new or challenging tasks. The articles used
were: Ames, 1988; Anderman, 1999; Dweck & Leggett, 1988; Midgley, 2001; and Stipek, 1997. Stimulus words were categorized in a two-step process. First the research team grouped the words according to their fit with the theoretical construct being targeted. Second, four graduate students not involved in the project were asked to group the stimulus words the research team had agreed on into categories (see Appendix D). Any words that were not consistently placed in the same categories by both the research team and the graduate student team were dropped.

The semantic domains used in this experiment were task-environment, task-strategic, effort, helpless, positive ability, negative ability, evaluative, success, and failure. The reasoning behind the choice of these domains was as follows: a) words specific to the task itself (task-environment: trees, mountain, island, sea) or to the actual process of finding the platform (task-strategic: finding, walking, looking), and words related to making an effort to learn a new task (effort: explore, practice, search, try again) were expected to be emotionally relevant to participants with a mastery orientation, as these words reflected the ways in which mastery oriented individuals are theorized to think and act when facing new challenges; b) the remaining words were chosen for their likely emotional relevance to participants who were more performance oriented. These words reflected the avoidance of challenge (helpless: hopeless, quit, give up), the belief that ability is stable and unchangeable (positive ability: brainy, smart, intelligent; negative ability: dumb, stupid, slow), and the concern with looking good to others rather than learning for the sake of learning (evaluative: timer, evaluation, test; success: winner, success, aced it, found it; failure: lost, failure, wrong) that research has been found to be characteristic of a performance orientation.
Control words were also found for each stimulus word (see Appendix D). These words were matched for frequency of English language usage (Carroll, Davies, & Richman, 1971), number of syllables, length, and similar phonological features. A pilot study was then conducted using 13 participants. We reduced the number of words representing each construct to 4 by excluding response times that did not discriminate between the success and failure groups in the pilot study. This process allowed us to winnow the list to 49 stimulus words and 49 matched control words (98 total). To guard against order effects, ten randomized lists were made for The Personal Stroop program to cycle through. Consequently only 10% of the participants would receive the same order of presentation.

Results

The data were analyzed in the following ways: first, I performed a set of preliminary analyses to remove out of range response times, examine and remove outliers, calculate raw and standardized means, and to check inter-item reliability on the questionnaires. Second, correlations between the questionnaire data from the PALS, the STAI, the BDI, the PANAS, and the Emotional Stroop word domains were performed. Finally, I performed a series of regression analyses in which each Stroop word domain was regressed onto manipulation group, mastery orientation scores, performance orientation scores and their respective interactions.

Preliminary Analyses. Before using the Stroop data in analyses, colour-naming latencies that were less than 300 ms or greater than 3000 ms were set to missing. This is a generally accepted range for colour-naming response times (see Segal, Gemar, Truchon,
Guirguis, & Horowitz, 1995). Mean scores for each word domain were computed for each participant.

The internal reliability was calculated for all questionnaires using Chronbach’s alpha. The results, shown in Table 1, suggest that the BDI, STAI, PALS, and PANAS had good inter-item reliabilities in the current study sample.

Table 1
Inter-item reliability of BDI, STAI, PALS, and PANAS

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Chronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALS - mastery</td>
<td>$\alpha = .80$</td>
</tr>
<tr>
<td>PALS - performance</td>
<td>$\alpha = .74$</td>
</tr>
<tr>
<td>BDI</td>
<td>$\alpha = .86$</td>
</tr>
<tr>
<td>STAI-trait</td>
<td></td>
</tr>
<tr>
<td>High anxiety items</td>
<td>$\alpha = .87$</td>
</tr>
<tr>
<td>Low anxiety items</td>
<td>$\alpha = .85$</td>
</tr>
<tr>
<td>PANAS - positive</td>
<td>$\alpha = .84$</td>
</tr>
<tr>
<td>PANAS - negative</td>
<td>$\alpha = .88$</td>
</tr>
</tbody>
</table>

N = 113

The raw means for each word domain within gender within group are given in Table 2 and Table 3. I performed all remaining analyses using standardized scores (see Table 4), for all variables.
Table 2

Mean Stroop word latencies for the Success Group males, females, and total group.

<table>
<thead>
<tr>
<th>Stroop Word Domain</th>
<th>Mean T1: Pre-manipulation</th>
<th>Mean T2: Post-manipulation</th>
<th>Mean Difference Score T2 – T1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>Task-Environment</td>
<td>676.07</td>
<td>669.40</td>
</tr>
<tr>
<td></td>
<td>Task – Strategic</td>
<td>665.60</td>
<td>677.50</td>
</tr>
<tr>
<td></td>
<td>Effort</td>
<td>675.94</td>
<td>690.81</td>
</tr>
<tr>
<td></td>
<td>Helplessness</td>
<td>692.27</td>
<td>677.02</td>
</tr>
<tr>
<td></td>
<td>Positive Ability</td>
<td>679.95</td>
<td>672.23</td>
</tr>
<tr>
<td></td>
<td>Negative Ability</td>
<td>666.36</td>
<td>711.12</td>
</tr>
<tr>
<td></td>
<td>Evaluative</td>
<td>674.74</td>
<td>667.82</td>
</tr>
<tr>
<td></td>
<td>Success</td>
<td>708.18</td>
<td>693.88</td>
</tr>
<tr>
<td></td>
<td>Failure</td>
<td>671.00</td>
<td>699.96</td>
</tr>
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</tr>
<tr>
<td></td>
<td>Male</td>
<td>669.40</td>
<td>677.50</td>
</tr>
<tr>
<td></td>
<td>Task – Strategic</td>
<td>646.28</td>
<td>614.66</td>
</tr>
<tr>
<td></td>
<td>Effort</td>
<td>631.94</td>
<td>641.97</td>
</tr>
<tr>
<td></td>
<td>Helplessness</td>
<td>686.72</td>
<td>675.07</td>
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<tr>
<td></td>
<td>Positive Ability</td>
<td>667.69</td>
<td>719.96</td>
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<td>Negative Ability</td>
<td>641.56</td>
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<td></td>
<td>Evaluative</td>
<td>630.09</td>
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<td>Success</td>
<td>645.56</td>
<td>656.08</td>
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<td></td>
<td>Failure</td>
<td>679.37</td>
<td>670.87</td>
</tr>
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<td></td>
<td></td>
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<td></td>
</tr>
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<td></td>
<td>Total</td>
<td>673.34</td>
<td>671.91</td>
</tr>
<tr>
<td></td>
<td>Task – Strategic</td>
<td>657.70</td>
<td>660.80</td>
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<tr>
<td></td>
<td>Effort</td>
<td>657.94</td>
<td>655.07</td>
</tr>
<tr>
<td></td>
<td>Helplessness</td>
<td>690.00</td>
<td>698.22</td>
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<td></td>
<td>Positive Ability</td>
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<td>Negative Ability</td>
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<td>656.48</td>
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<td></td>
<td>Success</td>
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<td>678.42</td>
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<tr>
<td></td>
<td>Failure</td>
<td>674.42</td>
<td>688.06</td>
</tr>
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</table>
Table 3
Mean Stroop word latencies for the Failure Group males, females, and total group.

<table>
<thead>
<tr>
<th>Stroop Word Domain</th>
<th>Mean T1: Pre-manipulation</th>
<th>Mean T2: Post-manipulation</th>
<th>Mean T2 – T1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task-Environment</td>
<td>654.43</td>
<td>673.13</td>
<td>18.70</td>
</tr>
<tr>
<td>Task – Strategic</td>
<td>666.15</td>
<td>638.40</td>
<td>-27.75</td>
</tr>
<tr>
<td>Effort</td>
<td>627.23</td>
<td>627.22</td>
<td>-0.01</td>
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<tr>
<td>Helplessness</td>
<td>667.72</td>
<td>665.77</td>
<td>-1.95</td>
</tr>
<tr>
<td>Positive Ability</td>
<td>658.47</td>
<td>687.39</td>
<td>28.92</td>
</tr>
<tr>
<td>Negative Ability</td>
<td>651.77</td>
<td>617.57</td>
<td>-34.20</td>
</tr>
<tr>
<td>Evaluative</td>
<td>637.27</td>
<td>625.63</td>
<td>-11.64</td>
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<td>Success</td>
<td>668.58</td>
<td>652.95</td>
<td>-15.63</td>
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<tr>
<td>Failure</td>
<td>649.69</td>
<td>657.01</td>
<td>7.32</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task-Environment</td>
<td>618.58</td>
<td>620.19</td>
<td>1.61</td>
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<td>Task – Strategic</td>
<td>608.03</td>
<td>616.17</td>
<td>8.13</td>
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<td>Effort</td>
<td>601.05</td>
<td>598.58</td>
<td>-2.48</td>
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<tr>
<td>Helplessness</td>
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<td>609.97</td>
<td>-8.42</td>
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<tr>
<td>Positive Ability</td>
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<td>624.55</td>
<td>.50</td>
</tr>
<tr>
<td>Negative Ability</td>
<td>610.27</td>
<td>623.55</td>
<td>13.28</td>
</tr>
<tr>
<td>Evaluative</td>
<td>635.48</td>
<td>604.70</td>
<td>-30.78</td>
</tr>
<tr>
<td>Success</td>
<td>616.39</td>
<td>627.58</td>
<td>11.19</td>
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<tr>
<td>Failure</td>
<td>609.58</td>
<td>612.58</td>
<td>3.00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task-Environment</td>
<td>638.49</td>
<td>649.60</td>
<td>11.11</td>
</tr>
<tr>
<td>Task – Strategic</td>
<td>640.32</td>
<td>628.52</td>
<td>-11.80</td>
</tr>
<tr>
<td>Effort</td>
<td>615.59</td>
<td>614.49</td>
<td>-1.11</td>
</tr>
<tr>
<td>Helplessness</td>
<td>645.79</td>
<td>640.97</td>
<td>-4.82</td>
</tr>
<tr>
<td>Positive Ability</td>
<td>643.17</td>
<td>659.46</td>
<td>16.29</td>
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<tr>
<td>Negative Ability</td>
<td>633.33</td>
<td>620.23</td>
<td>-13.10</td>
</tr>
<tr>
<td>Evaluative</td>
<td>636.47</td>
<td>616.33</td>
<td>-20.15</td>
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<tr>
<td>Success</td>
<td>645.38</td>
<td>641.67</td>
<td>-3.71</td>
</tr>
<tr>
<td>Failure</td>
<td>631.87</td>
<td>637.27</td>
<td>5.40</td>
</tr>
<tr>
<td>Measure</td>
<td>Success</td>
<td>Failure</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SE</td>
<td>Min</td>
</tr>
<tr>
<td><strong>Mastery</strong></td>
<td>.22</td>
<td>.15</td>
<td>-1.57</td>
</tr>
<tr>
<td><strong>Performance</strong></td>
<td>-.13</td>
<td>.15</td>
<td>-2.52</td>
</tr>
<tr>
<td><strong>Stroop Domain Pre-Post Difference Scores (standardized means)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control words</td>
<td>.03</td>
<td>.15</td>
<td>-3.29</td>
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<td>Task-Environment</td>
<td>-.03</td>
<td>.16</td>
<td>-2.6</td>
</tr>
<tr>
<td>Task-Strategic</td>
<td>.06</td>
<td>.18</td>
<td>-2.02</td>
</tr>
<tr>
<td>Effort</td>
<td>-.09</td>
<td>.18</td>
<td>-2.95</td>
</tr>
<tr>
<td>Helplessness</td>
<td>.04</td>
<td>.15</td>
<td>-1.86</td>
</tr>
<tr>
<td>Positive Ability</td>
<td>.14</td>
<td>.19</td>
<td>-1.85</td>
</tr>
<tr>
<td>Negative Ability</td>
<td>.19</td>
<td>.19</td>
<td>-2.6</td>
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<td>Evaluative</td>
<td>.03</td>
<td>.15</td>
<td>-1.87</td>
</tr>
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<td>Success</td>
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<td>-1.8</td>
</tr>
<tr>
<td>Failure</td>
<td>.07</td>
<td>.18</td>
<td>-3.33</td>
</tr>
</tbody>
</table>

*As not all measures used the same metric, all means were standardized to allow comparisons between items. N = 89.
Finally, I performed a check on the pre-manipulation equivalence of participants assigned to success and failure manipulations. We had assigned participants to a manipulation group using the pseudo-random method of arbitrary alternating assignment that was based solely on when they chose to sign up for the study. I found that while the difference between the group means approached significance for mastery orientation (t(83) = 1.94, p = .056), the performance orientation scores were not significantly different (t(82) = -1.15, p = .255). The relation between group and motivational orientation is important if group differences are to be attributed primarily to the success and failure manipulations.

Correlational Analyses. To test the first hypothesis, Pearson product-moment correlations were computed for all questionnaires (Table 5). As predicted, mastery orientation as measured by the PALS was significantly and positively correlated with the PANAS positive affectivity subscale (r = .37, N = 113, p < .01). Mastery orientation was not significantly correlated with the PANAS negative affectivity subscale. Also as predicted, PALS performance scores correlated significantly and positively with PANAS negative affectivity (r = .30, N = 113, p < .01), and there was no relation between performance orientation and positive affectivity.

Again as predicted, PALS performance scores correlated positively with depression as measured by the BDI (r = .24, N = 113, p < .05) and trait anxiety as measured by the STAI–trait (r = .34, N = 113, p < .01), and there was no relation between mastery orientation and depression and anxiety. The performance and mastery subscales of the PALS were negatively correlated (r = -.22, N = 113, p < .05).
Correlations were also run between the STAI and the BDI and latencies on Stroop word domains, but none were found to be significant.

Table 5
Correlations Between Questionnaires for all Participants

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PALS – mast</td>
<td></td>
<td>-.22*</td>
<td>-.20</td>
<td>-.14</td>
<td>.37**</td>
<td>-.09</td>
</tr>
<tr>
<td>2. PALS – perf</td>
<td></td>
<td></td>
<td>.24*</td>
<td>.34**</td>
<td>-.01</td>
<td>.30**</td>
</tr>
<tr>
<td>3. BDI</td>
<td></td>
<td></td>
<td></td>
<td>.74**</td>
<td>-.33**</td>
<td>.40**</td>
</tr>
<tr>
<td>4. STAI-trait</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.40**</td>
<td>.44**</td>
</tr>
<tr>
<td>5. PANAS – positive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.23*</td>
</tr>
<tr>
<td>6. PANAS – negative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. PALS - mast = Patterns of Adaptive Learning Survey, mastery score; PALS - perf = Patterns of Adaptive Learning Survey, performance score; BDI = Beck Depression Inventory; STAI-trait = State Trait Anxiety Inventory – Trait score; PANAS – positive = Positive and Negative Affect Schedule – positive affect score; PANAS – negative = Positive and Negative Affect Schedule – negative affect score.

Regression Analyses. To test the second and third hypotheses, I performed a total of 10 regression analyses: one for each of the nine word domains, and one for the control words. All regressions were performed using standardized scores and listwise deletion. Separate regressions were performed for each Stroop domain regressing difference scores (post-task Stroop minus pre-task Stroop latency) onto group (success versus failure condition), mastery and performance scores, and the two-way interactions (performance
by mastery (i1), group by mastery (i2), and group by performance (i3)). Interaction terms were created using standardized means of mastery and performance scores. Gender was initially included as a predictor variable in order to test for gender effects. There were no significant gender interactions or main effects, so gender was dropped from the remainder of the analyses.

Six of the 10 regression analyses produced significant interactions or main effects. There were no significant effects found to predict the word domains representing helplessness, negative ability, success, or the control words. Each of the significant interactions were graphed by dummy coding for group (success = 0, failure = 1) and performance orientation (-1 SD and +1 SD from the mean). The results of these regression analyses will be organized by Stroop word group (the dependent variable).

*Positive ability Stroop words.* There were significant group by performance ($\beta = .82$, $p < .05$, 1-tailed) and mastery by performance interactions ($\beta = .19$, $p < .05$, 1-tailed) when predicting change in positive ability word latencies (see Table 6).
Table 6
Regression of Standardized Mean Positive Ability Stroop Word Interference onto Group, Mastery Orientation, Performance Orientation, and Their Respective 2-Way Interactions.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE(B)</th>
<th>β</th>
<th>F</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>82.20</td>
<td>42.94</td>
<td>.366*</td>
<td>1.36</td>
<td>.11</td>
</tr>
<tr>
<td>Group</td>
<td>-.3113</td>
<td>26.70</td>
<td>-.13</td>
<td>1.36</td>
<td>.11</td>
</tr>
<tr>
<td>Mastery Orientation</td>
<td>-.5035</td>
<td>44.36</td>
<td>-.42</td>
<td>1.29</td>
<td>.11</td>
</tr>
<tr>
<td>Performance Orientation</td>
<td>-.10992</td>
<td>46.64</td>
<td>-.91</td>
<td>5.55*</td>
<td>.11</td>
</tr>
<tr>
<td>Performance x Mastery (i1)</td>
<td>24.11</td>
<td>14.33</td>
<td>.19</td>
<td>2.83*</td>
<td>.11</td>
</tr>
<tr>
<td>Group x Mastery (i2)</td>
<td>37.70</td>
<td>27.39</td>
<td>.5</td>
<td>1.89</td>
<td>.11</td>
</tr>
<tr>
<td>Group x Performance (i3)</td>
<td>61.26</td>
<td>28.41</td>
<td>.82</td>
<td>4.65*</td>
<td>.11</td>
</tr>
</tbody>
</table>

* p < .05

Graphing of the group by performance interaction (Figure 1a) suggests that the effects of performance orientation on pre-post change in positive ability words' latencies (brainy, smart, intelligent) are found predominantly in the success condition. Participants in the failure condition showed little to no change in Stroop latencies from pre- to post-manipulation assessment. Low performance orientation was predictive of an increase in Stroop interference on positive ability words following a success experience; however, if performance orientation was high, there was a pronounced decrease in the interference caused by positive ability words.
Note: Stroop interference calculated by the difference score between latencies at Time 1 and Time 2 (Time 2 latency – Time 1 latency). Positive difference scores mean longer viewing times at Time 2, and negative difference scores mean longer viewing times at Time 1. For performance, -1 is low performance, and 1 is high performance.

**Figure 1a.** Group by performance interaction for positive ability words.

Graphing of the mastery by performance interaction (Figure 1b) for positive ability words (briny, smart, intelligent) indicated that over both groups, students with high mastery and low performance orientations attended more to the positive ability words before their success or failure task, while students with low mastery and low performance scores attended to the positive ability words more following their success or failure experience. Students with high performance and high mastery scores also attended to the positive ability words more following their success or failure experience. In contrast, students with low mastery and high performance scores attended to the positive ability words more following their success or failure experience. This was an unexpected finding, as there was no hypothesis that the interaction of performance orientation and mastery orientation would predict colour-naming latency change.
Note: Stroop interference calculated by the difference score between latencies at Time 1 and Time 2 (Time 2 latency – Time 1 latency). Positive difference scores mean longer viewing times at Time 2, and negative difference scores mean longer viewing times at Time 1. For performance, -1 is low performance, and 1 is high performance.

Figure 1b. Mastery by performance interaction for positive ability words.

_Evaluative Stroop Words._ There were significant group by performance ($\beta = 1.25$, $p < .001$) and group by mastery interactions ($\beta = .80$, $p < .05$, 1-tailed) when predicting change in evaluative word latencies (see Table 7).
Table 7

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE(B)</th>
<th>β</th>
<th>F</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-14.44</td>
<td>35.64</td>
<td>.16</td>
<td></td>
<td>.20</td>
</tr>
<tr>
<td>Group</td>
<td>.13</td>
<td>22.16</td>
<td>.00</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Mastery Orientation</td>
<td>-73.40</td>
<td>36.81</td>
<td>-.70</td>
<td>3.97*</td>
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</tr>
<tr>
<td>Performance Orientation</td>
<td>-140.03</td>
<td>38.71</td>
<td>-1.33</td>
<td>13.08*</td>
<td></td>
</tr>
<tr>
<td>Performance x Mastery (i1)</td>
<td>-.15</td>
<td>11.89</td>
<td>.00</td>
<td>0</td>
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</tr>
<tr>
<td>Group x Mastery (i2)</td>
<td>53.05</td>
<td>22.73</td>
<td>.80</td>
<td>5.48*</td>
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</tr>
<tr>
<td>Group x Performance (i3)</td>
<td>81.74</td>
<td>23.58</td>
<td>1.25</td>
<td>12.02*</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05

Graphing of the group by performance interaction (Figure 2a) suggests that the effect of performance orientation on pre-post change in the colour-naming latencies of evaluative words (timer, evaluation, test, winner, success) is found only among participants in the success condition. Participants in the failure condition showed virtually no change in Stroop latencies from pre- to post-task Stroop trials. Low performance oriented students showed increased sensitivity to evaluative words following a success experience, and high performance oriented students showed decreased sensitivity to evaluative words following success.
Note: Stroop interference calculated by the difference score between latencies at Time 1 and Time 2 (Time 2 latency – Time 1 latency). Positive difference scores mean longer viewing times at Time 2, and negative difference scores mean longer viewing times at Time 1. For performance, -1 is low performance, and 1 is high performance.

**Figure 2a.** Performance by group interactions for evaluative words.

Graphing of the group by mastery interaction (Figure 2b) also suggests that the effect of performance orientation on pre-post change in evaluative words’ latencies is found predominantly for participants in the success condition. Participants in the failure condition showed virtually no change in Stroop latencies from pre- to post-task Stroop trials. Students with low mastery scores showed increased sensitivity to evaluative words following a success experience, and students with high mastery scores showed decreased sensitivity to evaluative words following the success manipulation. As with the positive ability words, this interaction of performance orientation by mastery orientation for evaluative words was not hypothesized.
Note: Stroop interference calculated by the difference score between latencies at Time 1 and Time 2 (Time 2 latency – Time 1 latency). Positive difference scores mean longer viewing times at Time 2, and negative difference scores mean longer viewing times at Time 1. For mastery, -1 is low mastery, and 1 is high mastery.

**Figure 2b.** Mastery by group interactions for evaluative words.

**Failure Stroop Words.** There was a significant group by mastery interaction ($\beta = .63$, $p < .05$, 1-tailed) when predicting change in failure word latencies (see Table 8).

### Table 8

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE(B)</th>
<th>$\beta$</th>
<th>$F$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
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<td>46.18</td>
<td>.70</td>
<td></td>
<td>.09</td>
</tr>
<tr>
<td>Group</td>
<td>23.21</td>
<td>28.71</td>
<td>.80</td>
<td>.65</td>
<td></td>
</tr>
<tr>
<td>Mastery Orientation</td>
<td>-67.66</td>
<td>47.71</td>
<td>-.53</td>
<td>2.01</td>
<td></td>
</tr>
<tr>
<td>Performance Orientation</td>
<td>-70.20</td>
<td>50.16</td>
<td>-.55</td>
<td>1.96</td>
<td></td>
</tr>
<tr>
<td>Performance x Mastery (i1)</td>
<td>-15.50</td>
<td>15.41</td>
<td>-.12</td>
<td>1.01</td>
<td></td>
</tr>
<tr>
<td>Group x Mastery (i2)</td>
<td>50.70</td>
<td>29.45</td>
<td>.63</td>
<td>2.96*</td>
<td></td>
</tr>
<tr>
<td>Group x Performance (i3)</td>
<td>37.92</td>
<td>30.55</td>
<td>.48</td>
<td>1.54</td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$
Graphing of the group by mastery interaction (Figure 3) suggests that the effect of mastery orientation on pre-post change in failure words’ latencies is found predominantly for participants in the success condition. Participants in the failure condition showed only a small change in Stroop latencies from pre- to post-task Stroop trials. Students with low mastery orientations showed increased sensitivity to failure words (lost, failure, wrong) following their success experience, but students with high mastery orientations showed decreased sensitivity to failure words following their success experience. The slope of the failure groups is probably not significantly different from zero to warrant interpretation. This finding does not support the hypothesis.

![Graph](image)

Note: Stroop interference calculated by the difference score between latencies at Time 1 and Time 2 (Time 2 latency – Time 1 latency). Positive difference scores mean longer viewing times at Time 2, and negative difference scores mean longer viewing times at Time 1. For mastery, -1 is low mastery, and 1 is high mastery.

**Figure 3.** Mastery by group interactions for failure words.

**Task-environment Stroop Words.** There was a weak but significant group by performance interaction in the predicted direction ($\beta = -.67$, $p < .05$, 1-tailed) when the
predicted dependent variable was change in task-environment word latencies (see Table 9).

Table 9
Regression of Standardized Mean Task-Environment Stroop Word Interference onto Group, Mastery Orientation, Performance Orientation, and Their Respective 2-Way Interactions.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE(B)</th>
<th>β</th>
<th>F</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-11.67</td>
<td>43.64</td>
<td></td>
<td></td>
<td>.07</td>
</tr>
<tr>
<td>Group</td>
<td>10.02</td>
<td>27.13</td>
<td>.04</td>
<td>.14</td>
<td></td>
</tr>
<tr>
<td>Mastery Orientation</td>
<td>54.40</td>
<td>45.07</td>
<td>.46</td>
<td>1.46</td>
<td></td>
</tr>
<tr>
<td>Performance Orientation</td>
<td>87.67</td>
<td>47.40</td>
<td>.74</td>
<td>3.42*</td>
<td></td>
</tr>
<tr>
<td>Performance x Mastery (i1)</td>
<td>-9.81</td>
<td>14.56</td>
<td>-.08</td>
<td>.45</td>
<td></td>
</tr>
<tr>
<td>Group x Mastery (i2)</td>
<td>-37.31</td>
<td>27.83</td>
<td>-.50</td>
<td>1.80</td>
<td></td>
</tr>
<tr>
<td>Group x Performance (i3)</td>
<td>-49.97</td>
<td>28.87</td>
<td>-.67</td>
<td>3.0*</td>
<td></td>
</tr>
</tbody>
</table>

* = p < .05

Graphing of the group by performance interaction (Figure 4) suggests that the effect of performance orientation on pre-post change in task-environment words' latencies is found more strongly for participants in the success condition, and less strongly for participants in the failure condition. Within the success condition, a high performance
orientation predicted an increase in Stroop interference on task-environment words (trees, mountain, island, sea, ), while a low performance orientation predicted that attention to task-environment words would be greater prior to the success manipulation. There was no significant effect for mastery orientation in this word domain.

![Diagram](image)

Note: Stroop interference calculated by the difference score between latencies at Time 1 and Time 2 (Time 2 latency – Time 1 latency). Positive difference scores mean longer viewing times at Time 2, and negative difference scores mean longer viewing times at Time 1. For performance, -1 is low performance, and 1 is high performance.

**Figure 4.** Group by performance interaction for task-environment words.

**Task-strategic Stroop Words.** There was a significant group by performance interaction ($\beta = .67, p < .05, 1$-tailed) when predicting change in task-strategic word latencies (see Table 10).
Table 10
Regression of Standardized Mean Task-Strategic Stroop Word Interference onto Group, Mastery Orientation, Performance Orientation, and Their Respective 2-Way Interactions.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE(B)</th>
<th>β</th>
<th>F</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-15.13</td>
<td>36.0</td>
<td>.18</td>
<td>.17</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>8.63</td>
<td>22.38</td>
<td>.04</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>Mastery Orientation</td>
<td>-36.67</td>
<td>37.19</td>
<td>-.35</td>
<td>.97</td>
<td></td>
</tr>
<tr>
<td>Performance Orientation</td>
<td>-93.19</td>
<td>39.1</td>
<td>-.89</td>
<td>5.68*</td>
<td></td>
</tr>
<tr>
<td>Performance x Mastery (i1)</td>
<td>-9.66</td>
<td>12.01</td>
<td>-.09</td>
<td>.65</td>
<td></td>
</tr>
<tr>
<td>Group x Mastery (i2)</td>
<td>33.13</td>
<td>22.96</td>
<td>.51</td>
<td>2.08</td>
<td></td>
</tr>
<tr>
<td>Group x Performance (i3)</td>
<td>43.45</td>
<td>23.82</td>
<td>.67</td>
<td>3.33*</td>
<td></td>
</tr>
</tbody>
</table>

* = p < .05

Graphing of the group by performance interaction (Figure 5) suggests that the effect of performance orientation on pre-post change in task-strategic words’ latencies is found more strongly for participants in the success condition, and less strongly for participants in the failure condition. The direction of the interaction is opposite to that for the task-environment word domain. Additionally, within the success group, low performance orientation predicted an increase in attention to task-strategic words (finding, walking, looking,) following the success manipulation. In contrast, those with a high performance orientation decreased their attention to task-strategic words following the success manipulation. There was no effect of mastery orientation on predicting latency differences for this domain.
Note: Stroop interference calculated by the difference score between latencies at Time 1 and Time 2 (Time 2 latency – Time 1 latency). Positive difference scores mean longer viewing times at Time 2, and negative difference scores mean longer viewing times at Time 1. For performance, -1 is low performance, and 1 is high performance.

**Figure 5.** Group by performance interactions for task-strategic words.

_Effort Stroop Words._ There was a significant performance by mastery interaction ($\beta = .20$, $p < .05$, 1-tailed) when predicting change in task-strategic word latencies (see Table 11).

Table 11
Regression of Standardized Mean Effort Stroop Word Interference onto Group, Mastery Orientation, Performance Orientation, and Their Respective 2-Way Interactions.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$B$</th>
<th>SE($B$)</th>
<th>$\beta$</th>
<th>$F$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-6.6</td>
<td>34.88</td>
<td>.04</td>
<td>.04</td>
<td>.06</td>
</tr>
<tr>
<td>Group</td>
<td>3.73</td>
<td>21.68</td>
<td>.02</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>Mastery Orientation</td>
<td>-15.42</td>
<td>36.03</td>
<td>-.16</td>
<td>.18</td>
<td></td>
</tr>
<tr>
<td>Performance Orientation</td>
<td>-44.68</td>
<td>37.88</td>
<td>-.47</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Performance x Mastery (i1)</td>
<td>19.48</td>
<td>11.64</td>
<td>.20</td>
<td>2.8*</td>
<td></td>
</tr>
<tr>
<td>Group x Mastery (i2)</td>
<td>9.13</td>
<td>22.24</td>
<td>.15</td>
<td>.17</td>
<td></td>
</tr>
<tr>
<td>Group x Performance (i3)</td>
<td>32.74</td>
<td>23.07</td>
<td>.55</td>
<td>2.01</td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$
Graphing of the interaction between mastery and performance orientations (Figure 6) indicates that whether mastery goals were high or low, if performance goals were low there was increased attentiveness to effort word latencies (practice, search, try again) following the success and failure manipulation. Similarly, whether mastery orientation was high or low, if performance orientation was high, both high and low mastery goal orientations showed a decline in responsivity to effort related words following the success/failure manipulation.

Note: Stroop interference calculated by the difference score between latencies at Time 1 and Time 2 (Time 2 latency – Time 1 latency). Positive difference scores mean longer viewing times at Time 2, and negative difference scores mean longer viewing times at Time 1. For performance, -1 is low performance, and 1 is high performance.

**Figure 6.** Mastery by performance interaction for effort words.

*Summary of hypothesis testing results.* The findings for the word domains representing “success” and “failure” partially support the second and third hypotheses of this study, that: a) higher performance orientation would predict longer colour-naming latencies for words representing success and failure (success, failure, evaluative, positive ability, and negative ability word domains), but b) mastery orientation would not predict colour-naming latency changes for these word domains (second hypothesis); and c) that higher mastery orientation would predict pre-post-task colour-naming latencies for the
task-relevant words (third hypothesis). It must be noted here that the results of the regressions were mixed, making any strong interpretation difficult.

The results show that performance orientation by group interaction predicted colour-naming latency changes for the positive ability and evaluative domains. This was as predicted by the hypothesis. As well, mastery orientation was found to have no predictive value for latency changes in the success or negative ability word domains. These results were as expected, and supported the hypothesis.

The unexpected results were harder to interpret. Performance orientation predicted latency change differentially by mastery status for the failure domain, which is a mixed result that only partially supports the hypothesis – mastery orientation was hypothesized to have no predictive value on latency changes for words in this domain. As well, there was a significant interaction of performance orientation by mastery orientation for the prediction of positive ability words’ latencies, which again does not fully support the hypothesis. For the failure and evaluative domains, a mastery orientation by group interaction did predict colour-naming latencies, which did not support the hypothesis. Results also showed that performance orientation had no significant effect for the words in the success domain and words in the negative ability domain, which does not support the hypothesis.

Contrary to the third hypothesis, performance orientation was consistently the more influential predictor of Stroop interference. This was true for task-strategic words, task-environment words, and effort words. Mastery orientation did contribute to the prediction of Stroop interference change predictions for the effort word domain, in
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interaction with performance orientation, which partially supports the hypothesis, but is again a mixed result that is hard to interpret.

Discussion

Two important findings emerged from this study. The first major finding was that for goal orientation as measured by the PALS, performance orientation correlated positively with anxiety, depression, and negative affect, while mastery orientation correlated positively with positive affect. The second major finding was unexpected, but of major interest: performance orientation was a significant predictor of colour-naming latency changes on the Emotional Stroop, across almost all word domains. Although colour-naming latency did not always change in the predicted direction, in all but two cases, an increase in latency for stimulus words either pre- or post-manipulation was predicted by performance orientation.

The results of the correlation analyses lend further support to emotion’s involvement with goal theory. The correlations seen between performance orientation and the gold-standard measures of anxiety (STAI), depression (BDI), and negative affect (PANAS), and mastery orientation and positive affect (PANAS), while not strong, are consistent with research by Boggiano et al. (1991), Linnenbrick and Pintrich (2002) and Meyer & Turner (2002). Their studies have found that negative emotions are associated with performance orientation, and positive emotions with mastery orientation. These correlations serve to establish convergent construct validity between goal orientation as measured by the PALS and well-established measures of affect, and support the differences in emotionality between the two goal orientations as suggested by goal theory.
While there were no hypotheses about performance orientation and task-specific words (these were the task-strategic and task-environment domains, which were hypothesized to result in Stroop interference for participants with a mastery orientation), the finding that the interaction of performance orientation with group predicts changes in colour-naming latency for both of these domains suggests that a performance orientation may lead to greater attention in general to all words presented that relate to the task - either emotionally or procedurally. Overall, performance orientation was a better predictor of Stroop interference than was mastery orientation for almost all words. This observation may lend further support to the idea that a performance orientation leads to greater emotional attention to, or greater emotional investment in, a task (Linnenbrink & Pintrich, 2002; Meyer & Turner, 2002). Individuals holding a performance orientation may be more vigilant about words related to a specific task, and so may be more likely to show cognitive interference for those words - in this study, performance orientation predicted more attention to most word domains pertaining to the computer task, but not the control words.

As well, the finding that the interaction of performance orientation and group significantly predicted colour-naming latency differences for words in the evaluative domain agrees with goal theory's characterizations of individuals with performance orientation. Goal theorists generally agree that individuals who hold a performance orientation are concerned with how they will be perceived compared to others, and consequently avoid being challenged or being placed in a position where they may fail (Dweck & Leggett, 1988; Midgley & Urdan, 2001). The regression analyses results suggested that when individuals with higher performance orientations were in the success
condition, cognitive interference from evaluative words decreased substantially from pre-
to post-task Stroop. This is consistent with goal theory; in the pre-manipulation Stroop, participants did not know what would be expected of them, so evaluative words that suggested challenge (like “timer”, “evaluation”, and “test”) would carry an emotional load for individuals with a performance orientation. But after successfully completing the previously unknown and possibly feared task, and receiving positive feedback following that task, evaluative words would create less cognitive interference (i.e., the words would not be as emotionally relevant, and thus would not cause as much cognitive – Stroop – interference).

For words in the positive ability domain, a significant performance orientation by group interaction result showed that while participants in the failure condition showed little change in Stroop latencies from pre- to post-task Stroop trials, participants with low performance showed an increase in Stroop interference after a success experience. Participants with a high performance orientation showed a decrease in Stroop interference after a success experience. This may be the result of the higher initial failure “threat” perceived by individuals with a high performance orientation when faced with an unknown task (Dweck & Leggett, 1988); these individuals demonstrated cognitive interference on words that represented positive ability (brainy, smart, intelligent) when they were anticipating the unknown task, but were no longer emotionally concerned about their ability after successfully completing the task.

Mastery orientation was expected to predict colour-naming latencies for effort because research on goal theory suggests that individuals who hold a mastery orientation are more focused on learning and understanding (Dweck & Leggett, 1988; Linnenbrink
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In this study, mastery orientation did contribute towards prediction of change in colour-naming latencies, although not precisely in the way hypothesized. When mastery orientation was low, if performance orientation was low, then participants showed significantly increased Stroop interference for effort domain words, regardless of the manipulation condition. Conversely, when performance orientation was high, there was a decline in Stroop interference for effort words, regardless of either the manipulation condition or mastery orientation level. But in both these instances, latency changes were more pronounced for the low mastery group than for the high mastery group. This finding suggests that there may be some moderating effect of mastery orientation on the degree of emotional response to emotionally relevant words caused by a performance orientation, which is consistent with research by Ames & Archer, (1988), Midgley, Kaplan, & Middleton (2001), and Young (1997). However, this interpretation is cautious, as the results of the regression analyses were mixed.

As hypothesized, performance orientation did not predict colour-naming latency changes for words in the success, failure, or negative ability domains. Four possibilities for this finding are: a) Stroop interference for these words was too low to show a significant change from pre- to post-task Stroop; b) Stroop interference was so high for these words that there was no pre- to post-task Stroop change; c) the manipulation task did not have an effect sufficient to change the level of cognitive interference for these words; or d) my expectations were incorrect. Only further testing using the Emotional Stroop can determine which of these possibilities is correct.

The next finding that did not support the original hypothesis was that the interaction of mastery orientation with group membership significantly predicted latency...
changes for both the failure and evaluative word domains. In both cases, the interaction was as hypothesized for performance orientation – in fact, for evaluative words the interaction observed for mastery orientation by group looks almost identical to the performance orientation by group interaction: a large decrease in colour-naming latency for the success group, and a very negligible change for the failure group. It appears that the evaluative words chosen for this study had emotional resonance for individuals holding both mastery and performance orientations.

The final unexpected finding was that the interaction of performance with mastery predicted colour-naming latency changes for positive ability words. While performance orientation was hypothesized to predict latency changes for words in the positive ability domain, the interaction found was opposite what was expected; the combination of high performance and high mastery predicted an increase in colour-naming latency of positive ability words from pre- to post-task Stroop, while a combination of low mastery and high performance led to a smaller decrease in pre- to post-task colour-naming latency for the same words. This suggests that when success and failure’s interaction with performance is controlled (the other significant interaction in the positive ability regression model), the combination of a high mastery and a high performance orientation predicts increased attention to positive ability words. A reduction in attention to positive ability words, however, is seen when mastery orientation is low. This suggests a general positive, and perhaps protective effect of mastery orientation (Ames & Archer, 1988).

However, it must be noted that the $R^2$ values for all of the regression analyses were very low. This indicates that the regression model was incomplete, and only a small amount of the variance was accounted for. A possible covariate that could have resolved
this problem is a day-of measure of emotion. The emotions that participants were coming in with may have skewed their colour-naming latencies on the Stroop stimulus words. Depression has a large influence on Stroop colour-naming latencies (Martin & Cole, 2000). The regression analyses may have been clearly, and the $R^2$ values larger, had depression been considered as a covariate.

Theoretical Contributions.

The overall findings of this study suggest that performance orientation is a better predictor of emotional interference than is mastery orientation. This is consistent with much of the research on goal theory, because by definition individuals who hold performance orientations are more personally concerned in the outcome of their efforts (Anderman, Maehr, & Midgley, 1999; Anderman & Midgely, 1997; Dweck & Leggett, 1988), and thus may be more emotionally labile. This would follow from the idea that performance orientation is concerned with self, while mastery orientation is concerned with learning and understanding (Dweck & Leggett, 1988).

A relation between emotion as measured by the Emotional Stroop task and goal orientation as measured by the PALS is supported by the findings of this study. Previously, emotion has been treated as an adjunct or even an artifact of motivational research (see Meyer & Turner, 2002). Motivation researchers are beginning to look at emotion as an integral part of motivation, particularly of goal theory. Siefert (1995) re-examined his own data to explore whether goal orientation predicted emotions, or emotions predicted goal orientation. He found that emotions are the better predictors. Linnenbrink & Pintrich's (2002) recent article on affect and achievement goal theory describes a model they are developing to explain affect and achievement goals; they
suggest that more research is needed on “the dynamics of achievement goals and affect in classroom settings (p. 69)”. While the research conducted in the present study is not classroom based, it does contribute to an understanding of the role of emotion in achievement goals by demonstrating measurable differences in the emotional attention expressed depending on goal orientation.

This study also contributes to the Emotional Stroop literature. The methodology used here is relatively novel; a search of PsycLit using the search terms “Emotional Stroop”, “emotion AND Stroop”, and “colour-naming AND emotion” resulted in only three studies that used more than one administration of the Emotional Stroop. None of those studies have used a pre-task/post-task Stroop within the same experimental session. Using a pre-post Emotional Stroop has two important advantages. First, there is a reduction in error variance because difference scores are calculated using identical words rather than a matched, but still different, control word. Participants are their own controls. If an individual has particularly fast or slow average reaction times relative to other participants, it is controlled for by subtracting their own pre-manipulation times from their post-manipulation times. For the analyses, only the difference scores are used to make comparisons between participants. Finally, this paradigm allows for the introduction of between Stroop manipulations and the measurement of their effects.

There are many possibilities arising from the successful use of a pre-post Emotional Stroop, as seen in this study. Further Emotional Stroop research using this type of paradigm may lead to an expansion of understanding of what factors contribute to cognitive interference from emotional stimuli.

*Limitations of the Study.*
While several meaningful findings emerged from this study, some expected effects were not seen, and some unexpected effects were found. This section will briefly discuss some ways in which this study could have been improved.

*Power and effect size.* The power and effect size of this study could possibly have been improved by using a highly dichotomized participant pool; pretesting of several hundred students could have been used to find participants with extreme performance and mastery orientations. A dichotomized participant pool would have exaggerated the differences between the two goal orientations, and perhaps have lead to clearer results. There are two disadvantages, however, to this approach: a) a study such as this requires extensive resources; and b) while the effect size and power would likely be greater with extreme groups, generalizability would be limited. The focus of this research is on normative achievement motivation, not extreme groups such as are found in Emotional Stroop research with psychiatric populations.

*Meaningfulness of the manipulation.* The manipulation task for this study needed to be something that was ethically acceptable, that could be completed in a reasonable period of time, that would look outwardly exactly the same in both the success and failure conditions, that allowed for feedback, and that could immediately be followed by the post-task Stroop trial. It was for these reasons that the computer maze task was chosen. While the maze task did seem to induce feelings of success or frustration in many participants (based on self-reports during the debriefing session), there still exists the question of whether the task was meaningful enough to truly generate a measurable emotional effect in the majority of participants. It seems intuitive that the more meaningful a task is to an individual, the greater their emotional response to that task. For
example, had the manipulation been more meaningful to the participants, such as something that they believed would impact on a class grade, the emotional response may have been more pronounced.

It could be argued that the task in this study was not an academic task, while the PALS is a measure of academic motivation. The justification for using the PALS and the Arena Search task together is as follows: The participants in this experiment were undergraduates taking courses during the time in which they were tested, so the participants were in an academic context at the time of the experiment. For all participants, the task itself was prefaced by the explanation that it was a test of their spatial ability. For all of the participants, this created a “test” situation that was intended to be similar in context to being in an academic test situation – and because all participants were attending courses at the university, it was assumed that their perception of “test” would be an academic perception. For more than half of the Emotional Stroop task participants, the experiment resulted in extra course credit for the Psychology 100 course that they were enrolled in. For these participants, the larger context was academic; even though the manipulation task itself was not an academic task, it was within the context of a task for academic gain – completing the experiment resulted in extra course credit. Finally, all participants received a debriefing explaining the psychological concepts involved in the experiment, making the overall context of the experiment academic.

Control group. This study did not include a separate control group; however, care was taken in the design of the study to control for various possible artifacts. The random ordering of the word lists controlled for order effects (i.e., since only 10% of the
participants saw exactly the same list, I can be reasonably certain that effects seen across the whole sample were not the result of always seeing certain words at the same time point in the study). Each participant performed both a pre-task and post-task Stroop, which acted as a within-subjects control, and reduced error variance as described above. Both success and failure conditions took the same length of time to complete, so that the time between pre- and post-task Stroop administration was the same for all participants.

Finally, the purpose of this study was to examine goal orientation and emotion in response to success versus failure. Participants were pseudorandomly assigned (alternating within gender as they presented themselves for participation in the study) to success or failure conditions, then responses to the manipulation were compared. The two manipulations controlled for each other.

Conclusions and Directions for Future Research

The findings presented in this paper demonstrate that there is a role for emotion in goal theory, and that the role played by emotion may be more critical than has been considered in most achievement motivation research. In the current study, emotion appeared to play a larger role in the Emotional Stroop responses of individuals who held performance orientations. It is possible that the differences in emotional attention seen in this study are the result of the very nature of performance orientation itself: there is more at stake emotionally, because individuals holding a performance orientation care what others think, and take failures and successes personally. Individuals who hold a mastery orientation may be more removed personally and emotionally from tasks that they engage in: they are focused on learning and understanding, and are not focused on self. Rather, they use success and failure feedback as a learning experience.
Further research is needed to explore emotion and goal orientation. There are already strides in this direction, in the work of Siefert (1995), Linnenbrink & Pintrich (2002), and Meyer & Turner (2002). But emotion has only just begun to be explored in achievement motivation research, and findings in this area would expand and clarify many aspects of achievement goal theory. Some of areas for further investigation are:

1) Explorations of which discrete emotions are associated with which goal orientations. This may lead to answers to the question of how goal orientations are formed, and how those orientations change. Some research suggests that goal orientations change organically with development, and there is a large body of research that shows that emotional lability and emotion control (as explored in emotion regulation research) also change with development. Is the observed developmental change in goal orientation a result of the developmental change in emotion control?

2) In the interest of parsimony, this study did not address the recently proposed avoidance and approach dimensions of goal theory. The results of this study suggest that further exploration of the role of emotion in the approach-avoidance distinctions of goal orientation is warranted. Expanding understanding of achievement goal theory necessarily requires developing experiments that do explore the role of emotion and goal orientation when individuals are faced with specific tasks, which tap into the approach and avoidance aspects of goal theory that were discussed in the literature review.

3) Given that this study demonstrates that emotion appears to be more relevant or apparent in individuals holding a performance orientation, research needs to
be conducted into why there is a difference in emotional attention between
mastery and performance orientation. Do individuals holding a mastery
orientation not experience the same emotions as those individuals holding a
performance orientation? Or do mastery-oriented individuals simply control
their emotions better?

While any one of these research directions could occupy a researcher for an entire
career, answers to these questions would help us to better understand motivation in
general, and achievement goal theory in particular. Emotion has been a neglected part of
achievement motivation research; now is the time to explore emotion’s role in goal
orientation.
References


functioning in school: the mediating role of goals and belonging. *Journal of Educational Psychology, 88*, 408-422.


Appendix A: Instructions for the Emotional Stroop Appendix
Running the Experiment – STROOP 1

1. Open volume controls to adjust mic sensitivity
2. Confirm the black plus-sign (as fixation point)
3. Confirmation of mic
   - Have participant put on microphone, explain placement and physically adjust mic on subject if necessary
   - Click [MIC TEST]
   - “I’m going to say some words that I want you to repeat. We’re just trying to adjust the microphone. Try and breathe and speak normally.”
   - Use red, blue, green, and yellow to set microphone sensitivity
   - Once volume is correctly set, Click [NEXT]
4. **SAY** the words in white; **DO** the instructions in gray; **USE** next to navigate
5. Run Practice trials
   - Complete 3 practice trials – must acknowledge this is **pretest by entering 1**
   - after 3 practice trials there is a choice offered
   - depending on participant’s readiness: click [MORE PRACTICE] or [START EXPERIMENT]
6. Run Experiment: follow directions written in gray on the computer
7. Decisions for experimenter regarding each word trial
   - Correct response given (correct colour named)
   - Correct trigger of microphone
   - If the answer to BOTH of these is YES then click [VALID]
   - If the answer to EITHER of these is NO then click [REQUEUE]
8. Take notes on participant, especially things like ummmm or uhh or
9. Reset the volume controls if necessary
10. If you need to stop the task before you reach the end, click the [X] in the upper right hand corner.
Running the Experiment – STROOP 2

1. Open the Stroop Program: steps
   - Close all programs
   - Make sure speakers are off
   - Double click the Stroop Icon – OPEN THE SAME WORD LIST AS PRETEST
   - Click FILE, then OPEN
   - Click MOTIVATION LIST, then OK
   - Use the right mouse button to open the Volume icon in the bottom right corner of the screen
   - Check off MUTE for a) Wave Balance and b) CD Audio Balance
   - Click START
   
Enter necessary data: Enter ID#, name, Date of birth, and gender

2. Open volume controls to adjust mic sensitivity

3. Confirm the black plus-sign (as fixation point)

4. Confirmation of mic
   - Have participant put on microphone, explain placement and physically adjust mic on subject if necessary
   - Click MIC TEST
   - “Again, I’m going to say some words that I want you to repeat so that we can adjust the mic. Try and breathe and speak normally.”
   - Use red, blue, green, and yellow to set microphone sensitivity
   - Once volume is correctly set, Click NEXT

5. SAY the words in white; DO the instructions in gray; USE next to navigate

6. Quickly run through the practice trials
   - After each practice must acknowledge that this is Stroop 2 (to denote post)

5. Run Experiment: follow directions written in gray on the computer

6. Decisions for experimenter regarding each word trial
   - Correct response given (correct colour named)
   - Correct trigger of microphone
   - If the answer to BOTH of these is YES then click VALID
   - If the answer to EITHER of these is NO then click REQUEUE

7. Take notes on participant, especially things like ummmm or uhh or

8. Reset the volume controls if necessary

9. If you need to stop the task before you reach the end, click the X in the upper right hand corner.
Appendix B: Instructions for the Arena Search Task
Running the Experiment – The Maze

1. Exit Stroop on your computer and Start-up the Maze (facing away from Subject)
   i) Explain that it will take just a minute to start up the next part of the experiment
   ii) UNMUTE the volume controls
   iii) Go to START, PROGRAMS, UNREAL GOLD, PLAY – wait for it to load
   iv) Check MAZE TRACKING CHART FOR CONDITION AND MARK OFF ON LIST
   v) Then use - to enter desired mode
   vi) Command: open esarena01 (or 02) – then use - again
   vii) Press W to disable the run function
   viii) Once complete turn the monitor to the right so that it faces the participant, pick up
        speakers and then turn on, give participant joy stick

2. Overview before starts maze:
   “This part of the experiment is like a computer game that allows us to measure your memory
   for spatial location. You will use this joystick to walk around the room you see on the screen.
   There will be a specific location on the floor that is marked by a spot. You will have to find and
   remember this spot. Your goal is to find the spot on the floor as fast as you can each time you
   enter the room.”

3. Script for practice room
   i) This is a practice room that looks just like the real room
   ii) I want you to walk around the room to get used to it and to the joystick
   iii) Go ahead and look around, get familiar with what is inside and outside the room – BUT
        DON’T GO THROUGH THE DOOR
   iv) Tell me what you see inside and outside the room – RECORD

~~~~~~~~~~~ Wait while the participant looks around ~~~~~~~~~~~~~~~~

4. The Arena
   i) Notice that there is a circular walled off area in the middle of the room
   ii) We call this area the arena
   iii) When you are looking for the correct location you will be inside this arena
   iv) You will still be able to see out the windows though

5. Ready?
   i) If you feel comfortable in the room you can walk towards and through the door you saw
      on the wall and then stop
   ii) The door is open at the moment, but when it is closed it will open automatically
       whenever you walk up to it
6. **Transporter**
   i) Do you see the ramp leading up to the in the center of the arena? You can go up the ramp but don’t go through the .
   ii) We call this screen the transporter and it will take you back into the room that you just explored but this time you will be inside the arena in the middle of the room.
   iii) Do you understand?

7. **The real room**
   i) In a minute I will ask you to walk up the ramp and through the transporter.
   ii) Once in the room you will see a green spot on the ground.
   iii) Please walk directly to that spot and stand on it.
   iv) Do you understand?
   v) Alright, you can walk through the transporter now.

   ~~~~~~~~~~~~~~ *Wait until participant in standing on the spot* ~~~~~~~~~~~~~~~

8. **The spot**
   i) Very good.
   ii) Each time you walk through the transporter you will need to find this location in the room.
   iii) Take a good look around the room to figure out where exactly the location is – lean the joystick around and orient yourself – take your time.
   iv) You will need to be able to find this location even when the green spot is not visible.
   v) Once you feel that you have a good sense of where the location is I would like you walk towards the door of the room.
   vi) The arena will automatically open up to let you out.

9. **Repeat**
   i) We are going to repeat this practice process 2 more times.
   ii) Once you pass through the transporter you will see the green spot on the floor again. I want you to walk there as fast as possible and stand on the spot.
   iii) The location where the green spot is never changes.
   iv) While the location of the green spot never changes, each time you walk through the transporter you enter the arena from a different direction.
   v) Any questions?
   vi) Please walk through the transporter again.

   ~~~~~~~~~~~~~~ *Wait until participant in standing on the spot* ~~~~~~~~~~~~~~~
10. Final confirmation
   i) Very good
   ii) Do you have any questions?
   iii) You can exit the arena again
   iv) Notice this time that the ________ instead of blue
   v) This means that when you enter the arena, the green spot which has been marking the location will be invisible
   vi) I still want you to find that location
   vii) When you step on the correct location the green spot that you’re used to seeing will pop up but you have to be exactly on the right location not just near it – do you understand?
   viii) Your job is to find the correct location as quickly as possible
   ix) Remember the green spot is always in the same place
   x) We will do this 7 times and you will have 30 seconds each time to find the correct spot
   xi) I need you to tell me when you pass through the transporter because while the computer will keep track of how long it takes you to find the spot it will not turn off at the 40 seconds, so just tell me when you step into the transporter
   xii) Ready? Alright go ahead

11. If the participant has problems finding the spot the first time (after 30 seconds)
   i) Time is up.
   ii) Can I help you find the spot?
   iii) Remember it is always in the same place so try and look around now and get a good idea as to where it is in the room
   iv) When you are ready, walk out the door and back into the transporter
   v) Remember you get 7 tries in all – you are on your own

12. Repeat

13. At feedback
   i) Ok just walk through the transporter one more time and we’ll find out how you did
   ii) What is the score on the screen? - RECORD
   iii) Spin the computer back to face you
   iv) Remove joystick, turn off speakers, put back on floor, turn the computer around to face experimenter Clear The Maze and start up Stroop again
   v) Give PANAS
Appendix C: Debriefing sheet
Debriefing

Goals: The participant should leave...

☑ knowing the feedback they were given on the task was bogus
☑ in a positive mood
☑ feeling competent and like they have contributed to an important area of research

Procedure:
The following semi-structured interview will be used to debrief participants. Questions should be asked using the suggested script, but information to be conveyed to the participant should be put in your own words.

1. Question: “We are done with all of the testing now. How do you feel about what you have just done?”

☑ be interested in their feelings, opinions, and ideas
☑ note any negative feelings about self or performance. Make sure these are addressed

2. Response: Cover the following points (please check off)

☑ Explain that the feedback (positive or negative) on the Maze was bogus
☑ Explain that the computer didn’t even keep track of their responses
☑ Explain that what we were really interested in was their response to a frustrating experience. Liken this experience to what kids face in school when they cannot solve a problem or do poorly on a test
☑ Explain that we were interested in how their perceptions of the difficult task changed responses on the Stroop and questionnaires

3. Question: “Do you have any more questions, comments or concerns now?”

☑ If they ask about Stroop, go ahead and explain how the task works and what it is for
☑ Reiterate the fact that the feedback was bogus
☑ Tell them that they actually seemed to do quite well on the task

3. Question: “Do you have any ideas about what we could do to improve this study or extend it in the future?”

4. Before they leave, don’t forget to do the following (please check off)

☑ Make sure they have a copy of the consent form and are aware of how to get further information (Joan)
☑ Remind them to not discuss the study with classmates or other people
☑ Remind them that everything that has gone will remain completely confidential
☑ SAY THANK YOU
Appendix D: Word and domain list for the Emotional Stroop

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