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Dark Horse Running:

The Role of Affect in Goal Pursuit and Goal Termination among Pessimists

by

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An Abstract of

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According to the goal priority hypothesis (Geers, Wellman, & Lassiter, 2009), dispositional optimists outperform dispositional pessimists when pursuing valued and important goals. Although recent studies have supported this hypothesis, the results have been limited to conscious goal pursuit. The current research argues that distinguishing between conscious and nonconscious goal pursuit is critical when considering the cognitive and behavioral engagement of optimists and pessimists. Specifically, it is proposed that this advantage of optimists over pessimists in goal pursuit is largely confined to conscious goals. Consistent with the behavioral self-regulation model (Carver & Scheier, 1998), it is argued that negative affect arising from pursuit of difficult conscious goals leads one to reassess the probability of goal obtainment. As pessimists anticipate a low likelihood of success, this negative affect leads to goal disengagement (a

threat response). As optimists anticipate a high likelihood of success, this negative affect leads to goal reengagement with increased effort (a challenge response). Importantly, because nonconscious goal pursuit produces affect that is not attributable to a conscious source, the negative affect generated by nonconscious goal pursuit should not lead to the same goal reassessment that leads pessimists to disengage from goals more readily than optimists.

Three studies examined the conditions under which pessimists may approach, equal, or even surpass the performance of optimists. In the Pilot Study, it was shown that pessimists pursuing a nonconscious goal outperformed pessimists not pursuing a nonconscious goal, as well as outperforming optimists. In Study 1, it was predicted that optimists would outperform pessimists when pursuing a conscious goal, but not when pursuing a nonconscious goal. It was also predicted that, in the conscious goal condition, negative affect would relate to increased performance for optimists and decreased performance for pessimists. These Study 1 predictions were not supported, however. In Study 2, it was predicted that pessimists who could misattribute their negative affect experienced during conscious pursuit would outperform pessimists who could not misattribute their negative affect. This misattribution effect was predicted to hold for participants pursuing a difficult task, but not those pursuing an easier task. These Study 2 predictions were supported.

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Chapter I

Introduction

> *The first favourite was never heard of, the second favourite was never seen after the distance post, all the ten-to-oners were in the rear, and a dark horse, which had never been thought of, and which the careless St. James had never even observed in the list, rushed past the grand stand in sweeping triumph* (Disraeli, 1831/1853, p. 67).

Benjamin Disraeli's description of the *dark horse*—now taken as a metaphor for an unexpected performer who challenges conventional wisdom and succeeds—is an apt metaphor for the role of the pessimist in personality and social psychology. No one (including the pessimist) expects this "dark horse" to do well. The common view is that a high level of *dispositional optimism*—defined as a generalized positive outcome expectancy (Scheier & Carver, 1985)—is a beneficial and adaptive quality for an organism to possess, with very few exceptions. In the following paper I will present a theoretical explanation for why a "dark horse" advantage may exist for pessimists who are pursuing goals outside of conscious awareness. Ironically, I will draw on the same cybernetic model of self-regulation (Scheier & Carver, 1988)—which has been used to explain positive outcomes for optimists—to predict the circumstances under which

pessimists may outperform optimists, and the domains in which they may do so. The affective consequences of successful and unsuccessful self-regulation (Carver, 2003; Carver & Scheier, 1990) will play a key role in explaining these outcomes, as will theory on nonconscious goals (Chartrand & Bargh, 2002) and attribution research (e.g., Eyal & Fishbach, under review; Zanna & Cooper, 1974).

The thrust of this paper is to examine those both high and low on the variable of *dispositional* optimism, and it will avoid overlong discussion of more transient and situation-specific expectation-related constructs. Such constructs include the so-called optimistic bias and defensive pessimism. As mentioned earlier, dispositional optimism is characterized as a generalized positive outcome expectancy (Scheier & Carver, 1985). It can be thought of as seeing the world through rose-colored glasses. Radcliffe and Klein (2002) argue that dispositional optimism should not be characterized as accurate or inaccurate because there is no firm criterion to which it can be compared. For this reason, it should not be considered to be a bias. Conversely, an optimistic bias refers to an event-specific future prediction. Because of its specificity, it does have an accuracy component and can be characterized as a bias. Interestingly, there is often no correlation between dispositional optimism instruments and optimistic bias ratings and the two have different predictive abilities (e.g., Fournier, de Ridder, & Bensing, 1999; Radcliffe & Klein, 2002). These findings suggest the two are tapping into separate underlying constructs (cf. Armor & Taylor, 1998). Defensive pessimism, on the other hand, is a self-protective strategy where individuals set a low expectation regarding a specific upcoming performance (Norem, 2001; Norem & Cantor, 1986). Again, there are only modest correlations between dispositional optimism and defensive pessimism (Norem, 2001), with both

dispositional optimists and dispositional pessimists sometimes using this self-protective strategy. Throughout this paper, use of the term ―optimists" and ―pessimists" will refer to those individuals who score high and low on self-reported dispositional optimism instruments, respectively.

Dispositional Optimism: Pleasures and Perils

There has been considerable evidence that dispositional optimists have better outcomes than dispositional pessimists in many domains of health and health-related behavior. Qualitative and quantitative reviews of the optimism and health literatures consistently find that there is a reliable positive relationship between dispositional optimism and a wide variety of beneficial health outcomes (for reviews, see Carver & Scheier, 2002; Scheier & Carver, 2003). For example, a higher level of dispositional optimism has been shown to be related to better physical health, mental health and other indices of general well-being, even after controlling for socioeconomic status, social support, and access to healthcare (Smith, Young, & Lee, 2004). Likewise, optimists undergoing coronary artery bypass surgery are more likely than their pessimistic counterparts to eat low-fat foods and to take part in a cardiac rehabilitation program (see Carver & Scheier, 2002; Shepperd, Maroto, & Pbert, 1996). Optimists were also less likely than pessimists to be readmitted to the hospital following coronary artery bypass surgery (Scheier et al., 1999).

One explanation offered for the better health outcomes of optimists is the way in which they cope. A large meta-analysis of fifty studies examining optimism and coping showed that when optimists were exposed to health threats, they coped in an active and engaged manner. This in turn led to better outcomes for these optimists. These results

were found on multiple measures of optimism, and on all five measures of coping that were included in the meta-analysis. The meta-analysis also showed evidence for coping flexibility among optimists (Solberg Nes & Segerstrom, 2006). Indeed, some studies examining uncontrollable events and tasks have shown that optimists were faster to disengage than were pessimists (Aspinwall & Richter, 1999; Scheier, Weintraub, & Carver, 1986).

Although having an optimistic orientation is beneficial in many health domains—particularly in patient samples dealing with an active health threat—there is not unanimous agreement on the role that optimism has in other situations, and not all research supports the link between optimism and active coping. For example, there are some domains where the role of optimism is much less clear. A variety of studies have shown conflicting relationships between optimism and variables including safe sex practices (e.g., Carvajal, Garner, & Evans, 1998; Goodman, Chesney, & Tipton, 1995), exercise behavior (e.g., Norlander & Archer, 2002; Seligman, Nolen-Hoeksema, Thornton, & Thornton, 1990), and academic performance (Eid, Mathews, Meland, & Johnsen, 2005; Peterson & Barrett, 1987). Clearly, resolution is needed in the optimism literature. Before moving on to a possible resolution of these disparities, however, it is worth examining the self-regulatory theory that has been used to clarify the differences in how optimists and pessimists pursue goals. This model is the cybernetic model of self-regulation (Carver & Scheier, 1998). Because expectations have an important function in behavior regulation, dispositional differences in expectations have a valuable role in this model. It is important, however, to first consider the basic mechanisms of these self-regulatory processes.

Processes of Self-Regulation

Self-regulation is the process through which individuals pursue their goals (for example, the goal to overcome an illness), and this is a process that can occur consciously or nonconsciously (Fitzsimmons & Bargh, 2004). Models of goal pursuit often incorporate some sort of negative feedback loop that allows individuals to constantly reassess and self-regulate their progress towards any given goal (for a review, see Carver & Scheier, 2000). For example, an early model of self-regulation, Test – Operate – Test Exit Theory (TOTE; Miller, Galanter, & Pribram, 1960), suggests that individuals test their progress towards a goal, perform some operation to move closer to that goal, test their progress again, and finally exit from the feedback loop if and when their goal is achieved. A more complex model of self-regulation that has been applied to the goal pursuit of optimists and pessimists is the cybernetic model of self-regulation (Carver & Scheier, 1981; 1998; Scheier & Carver, 1988).

The cybernetic model of self-regulation. Like many other self-regulatory models, Carver and Scheier's (1981; 1998) cybernetic model of self-regulation is cyclical in nature—constantly moving through cycles of behavior, assessment, adjustment, and further behavior. The model suggests that behavior and outside influences have a joint effect on an individual's environment. The effects of this behavior (and other environmental influences) are perceived by the individual. These effects are then compared to some standard the individual wishes to achieve. The result of this comparison will lead to some degree of further behavior, thus restarting the loop. The authors (Carver & Scheier, 1998) use the analogy of a thermostat. The furnace changes the temperature (behavior), which in turn affects the temperature in the room (which may

be influenced by other environmental factors such as a cold draft from an open door). The thermostat then measures the temperature (perception), and compares it to a pre-set temperature (the standard). Based on this comparison, the thermostat then initiates further regulation of the furnace (behavior), and the cycle continues (see Carver & Scheier, 1998, for an illustration of a self-regulatory feedback loop).

An important feature of the cybernetic model of self-regulation is how negative and positive affect are integrated as cues in the pursuit of goals (Carver & Scheier, 1990; 1998). Affect is defined here as ~~"a~~ neurophysiological state that is consciously accessible as a simple, nonreflective feeling that is an integral blend of hedonic (pleasure–displeasure) and arousal (sleepy–activated) values" (Russell, 2003, p. 147). Positive affect refers to affect on the pleasure end of the hedonic axis, whereas negative affect refers to affect on the displeasure end of the hedonic axis. Affect should be distinguished from emotion, in that emotion contains a much greater component of cognitive labeling, whereas affect can be experienced without such labels. As it is a neurophysiologic state, affect can be measured by the use of either self-reports or psychophysiological instruments such as facial electromyography (e.g., Blascovich, 2000).

According to the cybernetic model of self-regulation (Carver & Scheier, 1990; 1998), affect indicates the rate at which an individual is progressing towards any given goal. Positive affect results when an individual is progressing towards a goal at a faster velocity than was predicted. For example, one is likely to feel positive affect if he or she has written in a few days more than half of a term paper that he or she was expecting to take weeks. Negative affect results when an individual is progressing towards a goal at a slower velocity than was predicted (or when an individual is not progressing towards a

goal at all). For example, one is likely to feel negative affect if he or she has only written a very compelling abstract the day before a paper is due. Finally, neutral affect results when the individual is progressing towards a goal at the expected velocity—in other words, everything is normal and progressing as expected. These affective cues can serve to motivate further discrepancy reductions in the feedback loops of the cybernetic model of self-regulation. In other words, they tell the individual if he or she can relax, or if he or she needs to work harder.

The notion that affect can be a signal for the velocity of goal pursuit is not unique to this model, and is consistent, in fact, with many other theories that relate to the informational role of affect. For example, transient affect (and especially transient negative affect) has been shown to influence the degree to which individuals report their own life satisfaction—but when individuals are informed of the true source of this transient affect, their evaluations of life satisfaction become noncontingent with their transient affect (Schwarz & Clore, 1983). Similarly, other theories suggest that affect can have important effects on self-regulation, depending on the types of goals that individuals have (L. L. Martin, Ward, Achee, & Wyer, 1993). The broader implication of these perspectives is to demonstrate an overarching theoretical agreement that an individual's affect level is functional, and that it provides an individual with a source of information about him or herself and his or her environment (Schwarz, 2002; Schwarz & Clore, 1996).

If affect signals velocity towards goal completion (as various self-regulation models would suggest), the source that affect is (or is not) attributed to should influence the evaluation of various goal pursuits. For example, some researchers have recently

shown that negative affect generally spurs goal-pursuit when attributed to a goal, but inhibits goal pursuit when it is attributed to an external source (Eyal & Fishbach, under review). This is based on the self-regulatory notion that negative affect is generally a signal that goal pursuit is occurring at an insufficient velocity (Carver & Scheier, 1990). Similarly, several studies reveal that individuals in a negative affective state engage in greater information processing when that processing has the potential to eliminate the negative affect, but this increase does not occur when the information processing is irrelevant (Lassiter, Koenig, & Apple, 1996). In other words, the perceived relevance of negative affect has an effect on the degree to which negative affect increases goal pursuit and/or information processing. This could help explain why individuals in sad moods do not always increase their information processing (e.g., Conway & Giannopoulos, 1993). In other words, if the negative affect is perceived to be irrelevant to the information processing or goal pursuit, an individual could not reasonably conclude that increasing information processing or goal pursuit would alleviate the negative mood.

Optimism and self-regulation. Because goal-related negative affect signals a lower-than-expected velocity towards a goal (Carver & Scheier, 1990), the experience of negative affect can be a strong cue that there is an obstacle or difficulty that hinders or blocks the goal pursuit. When an individual encounters an obstacle in his or her path, the decision must be made whether to persist in the goal pursuit or to instead disengage. Scheier and Carver (1985; 1992) contend that at this juncture, individuals assess the situation, and that this assessment produces an outcome expectancy. This outcome expectancy is a subjective impression, or probability estimate, as to the likelihood of successfully reducing the apparent discrepancy (between one's current state and the

desired end state). This outcome expectancy is said to be an important determinant of subsequent goal-related behavior. The outcome expectancy determines whether or not the individual continues to pursue the goal, or instead terminates the goal pursuit. Along with situation-specific expectations, dispositional optimism is said to affect this outcome expectancy. Specifically, higher levels of dispositional optimism are said to lead to the belief that the goal can be obtained and, therefore, optimists persevere toward goal attainment. Lower levels of optimism (i.e. greater levels of pessimism) are said to lead to reduced effort and disengagement from the goal. Thus, Scheier and Carver (1985) argue that an individual's level of global optimism plays an important role in determining how he or she will respond when facing challenges to goal obtainment. Specifically, Scheier and Carver argue that optimists try to handle problems head on, taking active and constructive steps to improve their situations, whereas pessimists are more likely to give up on efforts to accomplish their goals (for a graphical representation of the cybernetic self regulatory process and the role of expectations therein, see Carver & Scheier, 1998).

The goal priority hypothesis. Because the positive expectations associated with optimism are so intimately involved in the negative feedback loops of self-regulatory theory (Carver & Scheier, 1998), this raises the question of whether optimism always leads to better performance. As previously discussed, the evidence on that count is mixed, with most studies showing favorable outcomes for optimists (for reviews, see Carver & Scheier, 2002; Scheier & Carver, 2003; Solberg Nes & Segerstrom, 2006), but some other studies showing no difference between optimists and pessimists or even better performance for pessimists (e.g., Carvajal et al., 1998; Eid et al., 2005; Goodman et al., 1995; Norlander & Archer, 2002; Peterson & Barrett, 1987; Seligman et al., 1990). Given

the diversity of responses, the search for a moderating variable would be a cogent and worthwhile endeavor.

A recent hypothesis that has sought to explain when optimists outperform pessimists is the goal priority hypothesis (Geers, Wellman, & Lassiter, 2009). The theoretical underpinning of this hypothesis stems from an expectancy × value approach (for a review, see Feather, 1982). In expectancy × value formulations, one's tendency to execute a particular response is the product of an expectancy for success and the value placed on performing an activity or achieving the outcome in question. In general, expectancy × value models predict that a goal-relevant response is most likely when both value and expectancy for success are high. It should be noted that, although the goal priority hypothesis is similar to many expectancy × value formulations, there are some differences. Most notably, goal priority subsumes not only goal value/importance, but also other factors such as prior goal commitment, which may also lead a goal to be high in priority (Geers et al., 2009).

The goal priority hypothesis contends that optimists will outperform pessimists, but only when the optimist is pursuing a valued or an important goal—in other words, when the goal is of high priority to that individual. Optimistic individuals are said to invest more in highly prioritized goals due to their expectations for success. Optimists' inclination to expect success leads them to take on goals that, in their estimation, will maximize their attainment of positive outcomes and avoidance of negative outcomes (cf. Brehm, Wright, Solomon, Silka, & Greenberg, 1983; Crisson, Seta, & Seta, 1995). Because failure is deemed unlikely, high priority goals are opportunities for maximum gains. It was theorized that optimists advance on these opportunities actively, by

generating thoughts and behaviors directed at goal completion. This willingness to expend mental and behavioral resources on important goals should result in relatively greater levels of both goal engagement and attainment if the goal-relevant tasks are sensitive to effort expenditures (Seta, Seta, & Donaldson, 1991). For example, if you are an optimist who is applying to graduate school—and the goal is particularly high priority—you may be more likely to study harder for the GRE than a pessimist, or an optimist who views the graduate school application process as less important.

As an initial test of the goal priority hypothesis, one study showed that optimists who valued exercise during an initial screening session were the most likely to later report engaging in higher amounts and greater variety of aerobic exercise over a subsequent three-week period (Geers et al., 2009; Study 1). This study showed that goal priority interacted with dispositional optimism, and optimists pursuing a high-priority goal had the highest levels of performance. In a second study examining the importance of friendship and GPA goals, optimists who placed a high priority on the goal of friendship formation at the beginning of a semester were more likely to achieve their goal of friendship formation at the end of the semester than optimists who placed a low priority on friendship formation, and were also more likely to achieve their goal than pessimists. A similar effect was found on the variables of GPA importance and GPA performance (Geers et al., 2009, Study 2). Study two generalized goal priority effect findings with more outcome variables, and did so over a longer time period. It also used more objective measures—corroborating GPA scores reported by the participants with the GPA scores that the participants actually achieved. It is also important to note that

neither domain's priority ratings (GPA priority or friendship priority) predicted performance on the other domain's outcome measures.

Other studies have shown that an individual's goal priority level can be manipulated as well as being measured (Geers et al., 2009). In one study, for example, half of participants in an online class were provided with information stressing the importance of taking an online practice test, while half of participants were not provided with this information. After this manipulation, participants were given an opportunity to take this online practice test as many times as they wanted, and for as long as they wanted. Results showed that optimists who received information on the importance of the practice test spent a greater amount of time on the practice test and took the practice test a higher number of times than optimists who had not received information on the importance of the practice test. Furthermore, optimists receiving importance information again outperformed pessimists receiving importance information. These findings provide yet more support for the reliability of the goal priority hypothesis, and they do so in an experimental context (Geers et al., 2009, Study 3).

There have been inconsistencies in the treatment adherence literature regarding the role played by optimism. For example, some research has shown that optimists are more likely to complete alcohol treatment programs than are pessimists (Strack, Carver, & Blaney, 1987), and following cardiac surgery, optimists were more likely than pessimists to be healthy and still enrolled in a rehabilitation program (Scheier & Carver, 1992). Other research, however, showed that optimism was not related to the number of walk-in visits at a university counseling center, nor did dispositional optimism predict the number of counseling sessions that participants attended (Hatchett & Park, 2004). To

untangle these different results, a series of studies was conducted to examine treatment interest and attendance in the context of the goal priority hypothesis (Geers, Wellman, Seligman, Wuyek, & Neff, in press). In the first study, participants were provided with information regarding the importance of proper diet and nutrition or were not provided with such information. Results showed that optimists who were told that nutrition was important were the most likely to be interested in attending a later session on nutrition, and were the most likely to provide contact information to the experimenter to receive further information regarding the sessions (Geers et al., in press, Study 1).

Participants in the second study rated the importance of their therapy goals during a preliminary therapy session. Results indicated that optimists who gave high importance ratings to their psychotherapy goals also had the highest rate of attendance for the psychotherapy sessions. Similarly, the researchers also reported finding that optimists who had a high importance rating for their psychotherapy goals also rated their psychotherapy sessions with the most positive appraisals (Geers et al., in press, Study 2) These findings help explain the inconsistencies in the optimism and therapy literatures. It seems as though optimists only outperform pessimists when they are pursuing a goal that is highly prioritized. It is not surprising then, that there are more consistent benefits to optimism in the domain of health, as there may be little difference between optimists in terms of how highly they prioritize health outcomes (Geers et al., 2009).

To examine the mechanism behind the goal priority effect, another study was conducted. In this study, half of participants in a psychology class were randomly assigned to receive information stressing the importance of classroom attendance for success, while the other half of participants were randomly assigned to receive a

description of the researcher's intent to study classroom attendance. After this manipulation, participants' conscious behavioral intentions to attend class were assessed. This was done because of literature highlighting the importance of conscious behavioral intentions in predicting behavior (e.g., Ajzen & Fishbein, 1980). It was predicted that conscious behavioral intentions would produce the same pattern of results, and that these intentions would mediate the impact of optimism and goal priority on behavior. Replicating the previously discussed goal-priority findings, results indicated that optimists who received the attendance importance information attended the highest number of classes over the next five class periods. Furthermore, when behavioral intentions were measured, the same pattern of results was shown. Optimists who received the attendance importance information displayed the highest intention to attend class. Finally, mediation analyses showed that participants' conscious behavioral intentions did indeed mediate the effect of this interaction between optimism and goal priority on classroom attendance (Geers et al., 2009; Study 4; cf. Ajzen & Fishbein, 1980).

If conscious intentions are an important mediator for the goal priority effect, one would expect that the act of *consciously setting a goal* would have similar benefits for optimists. In addition to the prediction that conscious goal setting will improve performance among optimists, optimists should also have the highest level of performance when there is a stressor that makes their high goal consciously salient and pressing on them. To test these hypotheses, a separate study was conducted. In this study, half of participants were randomly assigned to set a high goal for performance on a word search task, whereas half of participants set no goal. Orthogonal to this manipulation, half of participants were assigned to perform the word search task under conditions of stress

(caused by an obnoxious noise), whereas half of participants heard no such noise. Results showed that optimists who consciously set a goal for high performance on a word search task found the highest number of words and reported expending the most effort on the word search task. This was particularly true when the goal was made salient due to the stressor (Smithmyer, Wellman, & Geers, 2008). This should lead the goal set to be more consciously available for the participants.

The idea that the superior performance of optimists pursuing a high-priority goal relies on conscious goals and conscious behavioral intentions was also found in a study examining responses to prejudice. This study manipulated the salience of participants' chronic egalitarian motives. Participants were randomly assigned to witness a confrontation over a racist joke, or to witness the racist joke without the accompanying confrontation. Results showed that optimists whose chronic egalitarian motives were made salient by witnessing a prior confrontation were the most likely to confront a later act of prejudice, thereby pursuing their egalitarian goals through confrontation of a prejudiced remark. The same was not true among participants who did not have chronic egalitarian motives, however (Wellman, Czopp, & Geers, 2009).

The studies described here may help explain the discrepant findings in the literature regarding the role of optimism in task performance. Specifically, optimism only seems to predict better performance when a conscious, high-priority goal is being pursued. The goal priority effect has been found across many different domains, including exercise, academics, task performance, and interpersonal relationships. It has been demonstrated in field settings, as well as in the laboratory, and it has been demonstrated using both correlational and experimental methodologies.

Optimism and Conscious vs. Nonconscious Goals

The fact that conscious goals and intentions are important for the goal priority effect (Geers et al., 2009) raises an interesting question: What is the effect of dispositional optimism on goal pursuit when that goal pursuit is nonconscious? Conscious goals and intentions were shown to be a key mediating factor in the goal priority hypothesis. Having an important, conscious goal is of clear benefit to the performance of an optimist, but not so for a pessimist. The role of expectations in the cybernetic model of self-regulation provides a clear theoretical rationale for the superior performance of dispositional optimists. Across the previously discussed studies presented by Geers and colleagues, optimists consistently outperformed pessimists (and other optimists) when they had a goal that was high in priority. Importantly, not only were the goals high in priority, but they were also conscious goals that participants were pursuing. In some studies, participants self-reported the value or importance of the goal. In other studies, the goals were made salient by an overt experimental manipulation. Further, subsidiary data from these studies converge in connecting conscious processing to this goal-priority effect. For example, this effect was more likely to occur when the conscious goal was made salient by situational factors and when conscious intentions mediated the influence of the Optimism × Goal Priority effect on behavior (Geers et al., 2009; Smithmyer et al., 2008; Wellman et al., 2009).

In addition to the aforementioned studies, there is also evidence from other research implicating an important role for conscious processing in effects regarding dispositional optimism. For example, Chang (1998) found that optimists and pessimists do not differ in their initial appraisal of a stressor but did begin to diverge during a

secondary stage—a more elaborative stage—of the appraisal process. Many other studies find optimists to report giving thought to salient problems, whereas pessimists report distancing themselves from such problems (e.g., Nicholls, Polman, Levy, & Backhouse, 2008). Similarly, Parks and colleagues (Park, Moore, Turner, & Adler, 1997) found that constructive thinking—thinking that includes the revising and manipulation of information to cope with problems in everyday life—mediated the relationship between optimism and behavioral adjustment during pregnancy.

In summary, it can be surmised from the optimism literature that optimists more actively engage conscious goals. However, what happens when optimists and pessimists pursue nonconscious goals? No non-conscious goal manipulations were performed in the aforementioned studies, so it is difficult to infer their performance from the existing optimism literature. Nevertheless, nonconscious goals are ubiquitous throughout human behavior, so their presence should not be ignored (Bargh, 1990; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001; Chartrand & Bargh, 1996). To answer the question of how nonconscious goals will influence the performance of optimists and pessimists, it is important to first review the qualities of nonconscious goals and examine how they are both similar to, and different from, conscious goals.

Nonconscious Processes

Theoreticians in psychology have long proposed that many of our mental processes go on without our conscious awareness (Freud, 1901/1965). Current perspectives in social psychology do not, however, rest on the Freudian (1901/1965) assumption that there is a separate, distinct, and mysterious unconscious. Instead, they follow the rationale that nonconscious processes are simply involved in the

proceduralization of thoughts and behaviors (e.g., Jastrow, 1906; Shiffrin & Schneider, 1977) as well as in the preconscious processing of information (e.g., Deutsch & Deutsch, 1963; Posner & Snyder; 1975; Treisman, 1960). Wegner and Bargh (1998) contend that nonconscious and conscious processes can operate simultaneously and that each can launch, override, or be transformed into the other. Research has shown that many constructs can be activated outside of conscious awareness, and that this activation could have profound effects on human behavior (Higgins & King, 1981). For example, researchers have demonstrated that priming individuals with information about an outgroup can cause individuals to activate stereotypes of that outgroup (Devine, 1989) and can also cause individuals to behave in a manner consistent with stereotypes (Bargh, Chen, & Burrows, 1996). Nonconscious processes are also efficient, and a growing body of research indicates that they can be better than conscious processes for making certain types of decisions (Dijksterhuis, 2004).

Goal automaticity. Is it possible that goals could be activated and pursued in a nonconscious manner as well? If so, do individual differences exist in the effectiveness of nonconscious goal pursuit (particularly in relation to optimism and pessimism)? The term automaticity refers to psychological processes which are typically characterized by four distinct qualities: a lack of awareness regarding the operation of the process; a lack of intention for initiation and conclusion of the process; efficiency in the operation of the process; and a lack of conscious controllability (Bargh, 1994). Research has shown that the nonconscious activation of various constructs (such as stereotypes) can automatically affect behavior without the awareness of the participant (e.g. Bargh et al., 1996). A large

amount of theory and empirical evidence suggest that goals may be nonconscious or conscious (Bargh, 1990; Bargh et al., 2001; Chartrand & Bargh, 1996).

An important step for social psychologists in conceptualizing nonconscious goals was made in the auto-motive model of goals and motivation proposed by Bargh (1990). In the auto-motive model, it is theorized that goal activation and goal pursuit often occurs at a nonconscious level. This theory rests on the assumption that ~~in~~tentions and goals are represented in memory in the same way that social attitudes, constructs, stereotypes and schemas are represented…[and that these goals] are capable of being automatically activated by relevant environmental stimuli" (Chartrand & Bargh, 2002, p. 15). The point is also made that goals in the auto-motive model should be pursued in similar ways to conscious goals (Chartrand & Bargh, 2002). For example, like conscious goals, nonconscious goal-directed behaviors should resume if they are interrupted and should increase in strength over time. The ability for goals and motivation to be nonconscious is important because conscious self-regulation is a very limited resource (e.g. Baumeister, Bratslavsky, Muraven, & Tice, 1998). From the perspective of the auto-motive model, the automaticity of goals allows us to conserve self-regulatory energy for when we really need it (Chartrand & Bargh, 2002). From this perspective, automatic processes are seen as generally positive and adaptive phenomena because they allow for self-regulation that does not deplete cognitive resources. This is due to its automatic nature (Fitzsimons & Bargh, 2004).

Tests of the auto-motive model. A number of studies have tested the assumption that goals can be activated and pursued nonconsciously. To test this model of automatic and nonconscious goals, Chartrand and Bargh (1996) attempted to replicate a previous

study that explicitly manipulated goals for an information processing task (Hamilton, Katz, & Leirer, 1980). In this original study (Hamilton et al., 1980), participants were presented with either explicit memory instructions or explicit impression formation instructions. After this manipulation, half of the participants were presented with fifteen sentences describing mundane behaviors. The other half of the participants were presented with fifteen sentences, fourteen of which were mundane, and one of which was distinctive. Results showed that in both the distinctive and nondistinctive conditions, those presented with an explicit impression-formation goal had better recall of the sentences than those presented with the explicit memory instructions; these predictions were based in large part on earlier research on impression formation (Hastie & Kumar, 1979). Subsequent studies have also found this to be a reliable phenomenon (Lassiter, Geers, Apple, & Beers, 2000).

If goals can be activated nonconsciously, researchers should be able to demonstrate better memory for those nonconsciously primed with impression-formation goals. In the follow-up study designed to assess these same goals nonconsciously (Chartrand & Bargh, 1996; Study 1), participants read a series of vignettes and were later asked to recall details from what they had previously read. This differed from previous research (e.g., Hamilton et al., 1980), in that the goals that participants were following were not explicit, but were instead covertly primed through a scrambled sentence task (Srull & Wyer, 1979). A scrambled sentence task is a series of five-word puzzles that contain embedded words related to the concept that the experimenter wishes to prime. This task asks participants to make a grammatically correct four-word sentence out of the five available words. The task is a *supraliminal* priming task—a method of priming

where participants are aware of the priming materials, but unaware of the specific nonconscious goals that are being activated by the priming materials (e.g., Bargh & Chartrand, 2000).

The scrambled sentence task utilized by Chartrand and Bargh (1996) contained embedded words related either to the goal of impression formation or the goal of memorization. Of 15 scrambled sentences, 13 contained words that differed depending on experimental condition. For example, in the impression formation condition, the priming words included such words as ~~–e~~valuate" and ~~–i~~mpression." Results showed a similar pattern of results to the past research (Hamilton et al., 1980), in that the nonconscious goal had the same effect on recall as an explicit goal. With both explicit and nonconscious goals of impression formation, recall performance was better. Furthermore, participants showed no awareness that they had possessed any goal when they were questioned during a thorough debriefing.

A second study (Chartrand & Bargh, 1996, Study 2) demonstrated similar effects by priming participants with a parafoveal vigilance priming task (where participants are subliminally presented with brief exposures to priming stimuli outside of the center of their visual field). In this study, participants were randomly assigned to be primed with either no goal or a goal of impression formation. For the parafoveal vigilance priming, participants attended to a central fixation point on a computer screen while stimulus words—followed by masking strings—were presented for approximately 60 ms (an importance aspect of this manipulation was that the stimulus presentation was truly *subliminal* in nature). Following the priming manipulation, examples were given of dishonest and honest behaviors. Then, participants were given a surprise free recall test,

which served as the primary dependent variable. At the end of the study, participants took part in a thorough funnel debriefing. As in Study 1, the funnel debriefing revealed that participants were not aware of the goal priming. Furthermore, participants presented with a nonconscious goal of impression formation performed better on the recall task than those who were not primed with any goal during the parafoveal vigilance task. In sum, these studies support the view that goal effects found with explicit goal manipulations can be replicated with nonconscious goal manipulations. Subsequent studies comparing conscious and nonconscious goals have also shown them to have similar effects (e.g., Custers & Aarts, 2005, Study 3; Geers, Weiland, Kosbab, Landry, & Helfer, 2005, Study 2).

Although the previously mentioned studies showed that nonconscious goals influence cognition, they do not answer the question as to whether nonconscious goals alter behavior. To answer this question, a study was conducted looking at the effect of nonconscious goals on conformity behavior (Epley & Gilovich, 1999; Study 1). This study used a scrambled sentence task to prime either a conformity or nonconformity goal in participants. Participants then entered a room with confederates and were told that the experiment was a pilot test and that the experimenter wanted their feedback. Confederates were asked in turn to rate how much they enjoyed the experiment. The last person to respond was the participant, and their rating of enjoyment was the main dependent variable of conformity behavior. Results indicated that participants conformed significantly more in the conformity goal condition than in the nonconformity goal condition.

The prior studies indicate that nonconscious goal primes can have effects similar to those of consciously held goals. However, an alternative view of these results is that they are due to the activation of mental constructs other than goals. That is, it is unclear from the previously described studies if goals are really responsible for these results, or if the results are due to the priming of some other mental construct. To distinguish goal priming effects from other priming effects, some have suggested possible criteria that characterize nonconscious goals, as well as conscious goals. For example, they theorize that goal-priming effects involve factors such as postattainment declines in motivation, monitoring of progress towards a goal, expectancy and value, and other self-regulatory processes (e.g., Förster, Liberman, & Friedman, 2007). Researchers have used these and other criteria (Bargh et al., 2001; Wellman & Geers, 2009) to test if nonconscious goals have indeed been activated.

To determine if a goal had been primed in the aforementioned studies (e.g., Chartrand & Bargh, 1996), a series of studies was conducted to see if the nonconscious goal effects demonstrated qualities that are characteristic of conscious goals, but not other forms of perceptual or concept priming effects. Another classic attribute of goal pursuit is that the strength of responding increases over a period of time (assuming the goal has not yet been attained; Atkinson & Birch, 1970). This can be compared to the priming of semantic associations, which decay in strength over time (e.g. Anderson, 1983; Higgins, Bargh, & Lombardi, 1985). Researchers (Bargh et al., 2001; Study 3) orthogonally manipulated goal priming (high performance goal or no goal) as well as the length of a delay (5-min or none) between priming and opportunity for goal pursuit. The priming manipulation consists of a word search task containing words related to the goal to be

primed. In the high performance condition, words related to the goal of high performance (e.g., win, succeed, strive) were included along with neutral words. In the no goal condition, all the words were neutral. For the 5-minute delay, participants were asked to draw a diagram of their family tree—something not likely to satisfy a goal of high performance. When participants were primed with a goal of high performance, they performed better on a scrabble-like word game following a 5-min delay than they did without the delay. There was no difference when they received a neutral prime however. This illustrates that nonconscious goals possess the quality of increasing strength over time—similar to conscious goals (Atkinson & Birch, 1970). The results and conclusions would be quite different if the nonconscious priming merely activated perceptual (or other) constructs that decrease in strength as time passes (e.g. Anderson, 1983; Higgins et al., 1985).

Persistence in the face of obstacles is another quality of goal pursuit (Gollwitzer & Moskowitz, 1996). That is, during goal pursuit, individuals are more likely to persevere even when obstacles are encountered. To see if this quality appeared due to nonconscious goal primes, a study was conducted in which participants were primed with a goal for achievement (Bargh et al., 2001; Study 4). Participants were randomly assigned to complete a word search task with either achievement-related words or neutral words. These participants were then interrupted while performing a later scrabble-like word task and told to stop before goal completion could occur. Results of this study indicated that those primed with an achievement goal spent more time "cheating" later to complete the task than those who were not primed with a goal of achievement. This provides further

indication that goals can be activated and pursued outside of conscious awareness, as predicted by the auto-motive model (Bargh, 1990).

Affective Consequences of Self-Regulation: Conscious vs. Nonconscious

One of the strong predictions of the cybernetic model is that goal pursuit and goal completion have affective consequences (Carver & Scheier, 1998). These affective consequences serve as cues for individuals, indicating if they are proceeding towards a goal at an acceptable velocity, and indicating if they have completed their target goal or not (Carver, 2003; Carver & Scheier, 1990). One interesting question that has been raised is whether nonconsious goal pursuit shares these same affective consequences of self-regulation (Chartrand & Bargh, 2002). Some researchers have hypothesized that the pursuit of nonconscious goals can result in unattributed affect (Leander, Moore, & Chartrand, 2009). Unattributed affect is comparable to attributed affect—which stems from conscious pursuit—and the qualitative nature of both affect types remains the same. The velocity and consequences of conscious goal pursuit are a common antecedent cause of positive and negative affect that is conscious and attributed in nature (Bandura, 1997; Carver & Scheier, 1998). Unattributed affect, on the other hand, is a general affective state in which the experiencing individual cannot attribute the affect to its particular antecedent cause. It is hypothesized that one likely cause of unattributed affect is nonconscious goal pursuit (Leander et al., 2009).

To more closely examine the phenomenon of unattributed affect, Chartrand (under revision) tested to see if the positive affect that results from successful goal pursuit applied to nonconscious goal pursuit as well as conscious goal pursuit. Some participants were subliminally primed to receive a goal for impression formation, while other

participants received a conscious goal of impression formation or a neutral prime. The researchers orthogonally manipulated goal difficulty by presenting participants with either a consistent or an inconsistent target to evaluate. Results indicated that individuals who were given a conscious or nonconscious goal had similar positive affect when a consistent target was presented (indicating that goal pursuit was successful), and negative affect when an inconsistent target was presented (indicating that goal pursuit was unsuccessful). Those participants who were subliminally primed reported no conscious goal, which indicates that it was unlikely that they were aware of the source of their mood. If individuals are unaware of the source of this unattributed affect when pursuing a nonconscious goal, these individuals may not be able to properly reference their particular affective cues while self-regulating.

Optimists and Pessimists Pursuing Nonconscious Goals

Given the early evidence, instances of unattributed negative affect seem unlikely to induce pessimists to re-evaluate their goal pursuit and disengage, as they do when pursuing conscious goals. If this is true, pessimists pursuing a nonconscious goal may outperform pessimists pursuing a conscious goal. Also, what would happen when pessimists pursuing a nonconscious goal were compared to optimists pursuing a nonconscious goal? Based on the previously discussed research, there is little evidence that optimists would outperform pessimists when pursuing a nonconscious goal. In the pursuit of a nonconscious goal, pessimists are not encountering the *attributed* negative affect that causes them to re-evaluate their goal pursuit, pessimistically assess that goal pursuit, and then disengage (Carver & Scheier, 1998). Similarly, optimists would not be

encountering attributed negative affect that causes them reassess their goal pursuit and reengage with increased effort (Carver & Scheier, 1998; Smithmyer et al., 2008).

Is it also possible, however, that pessimists may actually take the role of the *dark horse* and outperform optimists when they are pursuing a nonconscious goal? We present a potential explanation for why this might be the case. Pessimists and optimists may not respond to unattributed affect in the same ways, as they have different experiences with affect in their everyday life. Perhaps pessimists have a higher threshold for tolerating unattributed negative affect (they are, after all, not known for maintaining a positive outlook). Indeed, there is much evidence showing that pessimists experience more negative affect than do optimists (e.g., Raikkonen, Matthews, Flory, Owens, & Gump, 1999; Scheier et al., 1989; Segerstrom, Taylor, Kemeny, & Fahey, 1998). If optimists and pessimists do differ in their responses to unattributed affect, this affect could have downstream consequences for their performance. For example, misattributed negative affect has been shown in one study to be generally inhibitory to goal pursuit when individual differences are not considered (Eyal & Fishbach, under review).

Attention to positive and negative information. One possible explanation for superior nonconscious performance in pessimists revolves around attention to positive and negative information. Will pessimists pursuing a nonconscious goal actually be less aware of unattributed negative affect signaling difficult nonconscious goal pursuit? What effect will unattributed negative affect have on the performance of optimists? There is some research that could be helpful in predicting answers to these questions. Some research has produced the counterintuitive finding, that, under many circumstances, optimists actually attend more to negative information than pessimists. For example,

Aspinwall and Brunhart (1996) showed that optimists paid more attention to negative information when that information was self-relevant to the participants. Likewise, other researchers have shown that optimists attended more to negative health information (Solberg Nes, Segerstrom, & Sephton, 2005). There are, however, many cases when optimists do attend more to positive information and less to negative information. For example, Segerstrom (2001) found that optimists were more attentive to positively valenced words during an emotional Stroop task. However, this optimism-positive affect relationship appears confined to external information or information that is low in self-relevance. For negative affect that is high in self-relevance, optimists may be more likely to attend to it. This effect may emerge for several reasons. First, it may be that, as optimists expect to overcome problems, they are drawn to their signals (negative affect), even if their source is not attributable and not easily fixable without further information on the proper attribution. Secondly, individuals have been shown to be more likely to remember expectation-inconsistent information (particularly when the relative amount of expectation-inconsistent information is small; Hastie & Kumar, 1979), and also to engage in more detailed evaluative thought when they encounter and notice expectation-inconsistent information (Geers & Lassiter, 2005). What is more expectation-inconsistent for the optimist than negative information?

We argue that any source of information emanating from the self (e.g., affect) is likely to be self-relevant. If optimists are more likely to notice the unattributed negative affect stemming from the self-regulation of their nonconscious goal pursuit, the optimists' attempt to ascertain the source of the unattributed affect is likely to consume additional cognitive resources and interfere with the performance of their goal. This

would be consistent with the argument that when negative outcomes affect optimists, they may occur due to self-regulatory depletion (Segerstrom, 2006). In other words, they will expend some of their much-needed mental resources in a difficult or futile search for the source of their negative affect. These mental resources will, in turn, be unavailable for the goal pursuit itself. A similar argument has been made regarding hope (a construct similar to optimism). It has been argued that individuals high in hope may attempt to overanalyze the source of their unattributed negative affect (Chartrand & Cheng, 2002).

Positive affect and task difficulty. Although less important for the predictions in the current study, it is worth discussing the occurrence of positive affect (both attributed and unattributed) as well. One might also argue that pessimists' lower sensitivity to negative affect in a nonconscious goal pursuit than optimists would be counterbalanced by an increased sensitivity to positive affect. Positive affect might then be a sign for pessimists to coast and disengage from active nonconscious goal pursuit (Carver, 2003). Although this is possible, it is worth noting that affective effects such as this are not always symmetrical. Research by Brickman, Coates, and Janoff-Bulman (1978), for example, shows that those who experience dramatically positive life events experience less positive affect from common life events, but those who experience dramatically negative life events do not have any change in the affect that they experience from common life events. Other research suggests that people are generally more attentive to negative information (Hansen & Hansen, 1988), and that negative information is generally more powerful than positive information (see Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Rozin & Royzman, 2001). Clearly, affect must be considered contextually, and it may have different effects on motivation and performance depending

on both situational and individual difference variables (Aspinwall & Leaf, 2002)—for example, goal type and optimism.

Task difficulty is also important to consider. Individuals pursuing easy goals should be unlikely to experience negative affect; the paths to their targets are likely to be free of the obstacles that trigger negative affect (Carver & Scheier, 1990). In the pursuit of an easy goal, goal attainment will likely occur quickly, without challenge, and consequently without the negative affect that results from task difficulty and lower-than-expected velocity towards the goal. Positive or neutral affect would be a more likely consequence of an easy goal's pursuit than would negative affect.

Misattribution

One way to produce evidence that negative affect is the signal causing pessimists to reassess (and then disengage from) their goal pursuit would be to utilize a nonconscious goal manipulation (e.g., Bargh & Chartrand, 2000; Srull & Wyer, 1979), as has been previously discussed. If pessimists do not attribute the affective signals that result from the self-regulation of a nonconscious goal—and thus do not disengage—the improved performance of pessimists would provide evidence for the important role that *correctly attributed* negative affect serves in the inferior performance of pessimists pursuing conscious goals.

Another way to produce such evidence would be to utilize a misattribution paradigm. A misattribution paradigm gives participants an alternative target to attribute some affective or somatosensory stimulus to—as opposed to the actual source of the stimulus. Misattribution studies have a long and productive history in social psychology (e.g. Girodo, 1973; Spencer, Zanna & Fong, 2005; Storms & Nisbett, 1970; Zanna &

Cooper, 1974). Schachter and Singer (1962), for example, led participants to misattribute their arousal to the social situation as opposed to an injection of epinephrine they had received earlier—thus supporting the notion that emotions stem from the cognitive labeling (and mislabeling) of physiological arousal states. More relevant to the current research, however, is misattribution research where participants were induced to attribute a pre-existing physiological or affective state to a placebo. One such study examining the underlying causes of cognitive dissonance showed that participants misattributed their dissonance arousal to a placebo, which they were told was a drug that would increase their physiological arousal. These participants experienced the least attitude change because they attributed their dissonance arousal to the pill and not to their counter-attitudinal behavior. On the other hand, participants who expected an arousal decreasing pill experienced the most attitude change—being unable to attribute the unpleasant arousal to the pill (Zanna & Cooper, 1974).

Research has shown that the way in which individuals attribute (and misattribute) their affective state can indeed alter goal pursuit. For example, some researchers have shown that misattributed negative affect inhibits active goal pursuit overall (Eyal & Fishbach, under review). If pessimists are given the opportunity to misattribute their negative mood to some other source (e.g., ambiguous music) while they are pursuing a difficult goal, however, they should not attribute their negative mood to that difficult goal. Consequently, the pessimists should no longer disengage from the difficult goal, because they will have mislabeled the affective cue that might otherwise have been seen as a signal of their imagined imminent failure. If there is a suitable misattribution target

for their negative mood, pessimists may be able to perform well even if the goal they are pursuing is on a conscious level.

Summary and Purpose of the Present Research

Past research has shown that optimists and pessimists differ in the degree to which they pursue goals that are conscious and important. Optimists perform best when they are pursuing an important and conscious goal (Geers et al., 2009). It is theorized that one reason for this difference between optimists and pessimists has to do with the negative feedback loops that individuals use to self-regulate their goal pursuit. When optimists encounter a barrier to goal pursuit, they are likely to have positive expectations for goal attainment and to see the impediment as being surmountable. For this reason, optimists are more likely to persist on a difficult task. Pessimists, however, are more likely to have negative expectations. Consequently, they may see the impediment as being insurmountable and are therefore more likely to disengage from goal pursuit when the goal pursuit becomes difficult.

This prediction draws directly from the cybernetic model of self-regulation (Carver & Scheier, 1981; 1998). The cybernetic model of self-regulation also predicts that affect is an important cue, which an individual uses to judge the rate at which he or she is progressing towards a goal. Negative affect serves as the cue to alert optimists and pessimists to the obstacles described above. When they encounter these obstacles, optimists reengage with increased effort because they expect success, and pessimists disengage because they expect failure. Recent research has also suggested that the pursuit of nonconscious goals has the same affective self-regulatory signals that the pursuit of a conscious goal possesses (Chartrand, under revision). Because the goal is nonconscious,

however, it is not always clear to what the resulting affect should be attributed. We predict that unattributed affect will influence optimists and pessimists differently in their nonconscious goal pursuit than attributed affect influences their conscious goal pursuit. When pursuing a difficult nonconscious goal, pessimists should no longer underperform optimists (and perhaps even outperform them), because of optimists' greater attention to the unattributed negative affect (e.g., Aspinwall & Brunhart, 1996). The negative affect that pessimists encounter during difficult *nonconscious goal pursuit* will likely be attributed to some other source or ignored (cf. Eyal & Fishbach, under review), and will thus not be a signal that causes pessimists to pessimistically reevaluate their chances of success. Consequently, these misattributing or non-attributing pessimists will be less likely to terminate their goal pursuit than if they were pursuing a conscious goal.

To see if the pattern of results among optimists and pessimists was different using a nonconscious goal than the results reported when examining conscious goals (Geers et al., in press; 2009; Smithmyer et al., 2008; Wellman, et al., 2009), we conducted a Pilot Study to examine this possibility. A secondary goal of the Pilot Study was to determine the suitability of the priming manipulation that would be used in the present research.

Chapter II

Pilot Study

The objective of the current Pilot Study was to examine how optimists and pessimists respond when given a nonconscious goal. In the study, participants were either exposed to a nonconscious goal prime used to activate the goal of achievement or they were not exposed to this priming material. After the priming task, participants had the opportunity to perform several difficult tasks. It was predicted in the current study that a supraliminal priming methodology would be able to activate such a goal (see Bargh & Chartrand, 2000). It was further predicted that, contrary to the results of studies using conscious goals, optimists would not outperform pessimists on the difficult tasks when given the nonconscious goal of achievement. Rather, it was predicted that pessimists would outperform optimists on the difficult tasks after they were exposed to the nonconscious goal. When there was no such goal, however, it was predicted that there would be no significant difference between optimists and pessimists.

Participants and Design

Ninety introductory psychology students (64 females and 26 males) attended individual sessions for partial fulfillment of a course requirement. Participants were

randomly assigned to a nonconscious achievement prime or a neutral prime condition. Dispositional optimism scores were recorded in a prescreening session and were used in data analysis as a continuous predictor variable. Informed consent was obtained from all participants prior to participation (for descriptive statistics of the main dependent variables sorted by condition, see Table 1).

Procedure

Prescreening. Participants were prescreened for dispositional optimism at the beginning of the semester using the Life Orientation Test – Revised (LOT-R; Scheier, Carver & Bridges, 1994). The LOT-R consists of six self-report items (plus four filler items), each rated on a five-point scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). The three negatively worded items (e.g., I hardly ever expect things to go my way) were reverse-scored and then averaged with the three positively worded items (e.g., I'm always optimistic about my future), so higher scores indicate higher levels of dispositional optimism ($M = 15.79$, $SD = 3.88$). The LOT-R demonstrated an acceptable level of internal consistency ($\alpha = .78$).

Main session. Upon arriving at the lab and signing the consent form, participants were asked to take their watches off and put them away (if they were wearing any), as well as turning off any cell phones. Participants then completed a brief demographics questionnaire. Included in the demographics questionnaire was a place for participants to self-report their GPA and a variety of other academic variables.

Scrambled sentence task. When the participant had completed the demographics questionnaire, the experimenter returned to the room and gave them a 20-item scrambled sentence task to complete. For participants in the achievement goal condition, 16 of the

20 items included a word related to achievement (e.g. attain, succeed, prosper). In the control condition, participants completed a scrambled sentence task where these achievement words were replaced with neutral words (e.g. like, guess, often). Participants were told to move quickly and not spend too long on any one item. The experimenter provided participants with an example before leaving the room and allowing participants to complete the scrambled sentence task. The experimenter was blind to scrambled sentence task condition. Past research has successfully used scrambled sentence tasks to manipulate nonconscious goals for achievement (e.g., Bargh et al., 2001; see also Bargh & Chartrand, 2000).

Cross-out task. After participants completed the scrambled sentence task, the experimenter returned and told the participants that they would now be performing a cross-out task. The task was provided to participants at this time to give them an opportunity to achieve. In past research, the particular cross-out task used was shown to be relatively difficult for undergraduate students to perform and also successfully served as a measure of performance (Weiland, Okdie, Geers, Podracky, & Sharkey, 2006; cf. Wellman & Geers, 2009). For this cross-out task, the experimenter provided participants with an example sheet and instructed them to cross out instances of the letter ~~"e~~" on the search page. Participants were further instructed to only cross out instances of the letter ~~"e~~" that were not next to, nor one extra letter away from another vowel. After providing participants with the example sheet and verifying that participants understood the search rule, the experimenter gave participants the actual search task page. The search task page consisted of a page of text on interpreting analyses of covariance from an advanced text on statistics (Howell, 2002, pp. 636-637). After the participant completed the search task

for two, six, or ten minutes, the experimenter returned and took the search task sheet (because there were no significant effects or interactions for the time variable, *p*s > .10, we collapsed across it in following analyses and it is not discussed further).

Tracing puzzles task. The experimenter then provided the participant with a tracing puzzles task. The experimenter instructed the participant that he or she should complete the tracing puzzle by tracing a geometric figure without retracing lines or lifting the pen. The experimenter gave the participant a pair of simple and solvable practice puzzles and walked the participant through how they should be completed. After the participant and experimenter completed the practice puzzles, the experimenter provided the participant with a large supply of tracing paper and the two main test puzzles and left the room (see Baumeister et al., 1998). Although the participant was unaware of this, the two main test puzzles were, in fact, impossible to complete. Once the participant gave up on the task (or once 30 min had elapsed), the experimenter noted the time spent on the puzzle task and returned to the room. The experimenter then provided the participant with a final questionnaire that assessed his or her thoughts and feelings regarding the performance on the tracing puzzles task.

After the participant completed the final questionnaire, the experimenter returned and administered a funnel debriefing to the participant (see Bargh & Chartrand, 2000). The goal of a funnel debriefing is to ask progressively narrower questions, probing for suspicion or knowledge of the material in a priming task. In this Pilot Study, no participant correctly indentified the theme of the scrambled sentence task, nor did they report that it influenced their performance on the later tasks.

Results

Search task performance. To determine how dispositional optimism and nonconscious goal condition interacted to influence participants' performance on the cross-out task, task performance data was submitted to a hierarchical linear regression. The dependent variable of interest was the ratio of omission-errors committed per line to the total number of possible omission errors per line. In other words, this was the average rate at which participants missed ~~"e~~"s that should have been crossed out according to the search rule. The fact that this was a rate measure (and not an absolute count of omission errors) also corrected for the fact that participants were allowed a different amount of time on the search task depending on condition. Six participants were dropped from the search task analyses because they failed to follow the instructions provided by the experimenter (e.g., instead of crossing out instances of the letter ~~"e~~" that were not next to, nor one extra letter away from another vowel, these participants crossed out all vowels, crossed out random letters, or used some other stratagem indicating that they did not understand, or ignored the instructions provided by the experimenter). These participants were included in the puzzle task effort analyses, however. All continuous predictors and dependent variables were also checked for normality and none were found to violate the statistical assumptions of a multiple regression analysis. Scatterplots were also examined for the presence of multivariate outliers. One suspected multivariate outlier was discovered by visual identification on the dependent variable of cross-out task performance and results were re-run with this case removed. As the results were substantively the same with the case excluded, we present the analyses with this case retained in the analyses below.

Student grade point average (standardized) was included on the first step of the regression equation in an attempt to control for individual differences in intellectual ability (cf. Tangney, Baumeister, & Boone, 2004). Optimism (standardized) and prime condition (dummy coded; 0 = neutral prime, 1 = achievement prime) were entered into the second step of the regression equation. The two-way interaction term between prime condition and dispositional optimism was entered on the third step of the equation. Results indicated that the first step of the regression equation was marginally significant and that grade point average was a predictor of error ratio, $\Delta R^2 = .046$, $F(1,82) = 3.93$, $\beta = -.214$, $p = .051$, with higher GPAs predicting lower error ratios (i.e., more accurate performance). There was no significant change from the first to the second step of the equation, $\Delta R^2 = .032$, $F(2,80) = 1.38$, $p = .256$. There was, however, a marginally significant change from the second to the third step of the regression equation, $\Delta R^2 = .035$, $F(1,79) = 3.15$, $\beta = .245$, $p = .080$, with the interaction between optimism and prime condition predicting error ratio (see Figure 1).

To examine more precisely our hypotheses, we conducted a series of simple slope analyses. Following the procedures outlined by Aiken and West (1991), we centered dispositional optimism scores at 1 standard deviation above and below the mean. Simple slope analyses indicated that there was a significant positive relationship between dispositional optimism and error ratios. This was only true in the nonconscious achievement goal condition, however—such that pessimists committed *fewer* errors on the cross-out task than did optimists ($\beta = .413$, $p = .017$). No other simple slopes were significant (all $|\beta s| < .25$, all $ps > .13$). This indicates that when pursuing a nonconscious goal, the relationship uncovered between optimism and performance was the opposite of

the relationship between optimism and performance when individuals pursue a conscious goal (Geers et al., 2009). These results support the hypothesis that pessimists can outperform optimists when pursuing a conscious goal.

Puzzle task effort. As a measure of task effort, we measured how long participants spent on the impossible puzzle task before giving up (or until 30 minutes were complete). The order of predictors in the regression equation was the same as is described above, with GPA being entered on the first step, optimism and prime condition being entered on the second step, and the interaction between optimism and prime condition being entered on the third step of the regression equation. Results indicated that the first step of the regression equation was not significant, $\Delta R^2 = .021$, $F(1,88) = 1.92$, $p = .170$. There was also no significant change from the first to the second step of the equation, $\Delta R^2 = .013$, $F(2,86) = 0.56$, $p = .572$. There was, however, a significant change from the second to the third step of the regression equation, $\Delta R^2 = .074$, $F(1,85) = 7.01$, $\beta = -.402$, $p = .010$, with the interaction between optimism and prime condition being a significant predictor of the time spent on the puzzle task (see Figure 2).

To clarify this interaction, we again conducted a series of simple slope analyses. Simple slope analyses indicated that there was a significant negative relationship between dispositional optimism and persistence on the puzzle task. This was only true in the nonconscious achievement goal condition, however—such that pessimists persisted longer on the puzzle task than did optimists ($\beta = -.352$, $p = .014$). There was also a significant simple slope indicating that optimists receiving a nonconscious goal for achievement spent less time on the puzzle task than optimists who received a neutral prime ($\beta = -.324$, $p = .028$). No other simple slopes were significant (all $|\beta s| < .21$, all $ps >$

.15). These data indicate that when pursuing a nonconscious goal for achievement, pessimists expended more effort on a puzzle task than did optimists. Optimists also spent less effort when primed for a nonconscious goal for achievement than when they were given a neutral prime.

In sum, the Pilot Study provides preliminary evidence that nonconscious priming can influence the performance of pessimists in such a way that they outperform optimists. Importantly, this is opposite of the relationship demonstrated by past research examining conscious goals (Geers et al., 2009; Smithmyer et al., 2008; Wellman et al., 2009).

Pilot Study Discussion

The preceding Pilot Study indicates that the typical positive relationship between optimism and performance can be reversed when individuals are pursuing a nonconscious goal. The results reveal that pessimists primed with a nonconscious goal for achievement outperformed optimists who were also primed with a nonconscious goal. There was no such relationship, however, when participants were primed with a neutral goal. This result was replicated across a measure of task performance (the cross-out task) and effort (the unsolvable puzzle task).

These pilot findings are preliminary, however, and the proposed research is directed at both replicating the aforementioned findings, and demonstrating the mechanisms through which they operate. The two following studies will examine the role of affect in the goal pursuit of pessimists and optimists.

Chapter III

Study 1

Hypotheses and Predicted Results

The first proposed study aimed to provide further evidence that pessimists would have the highest level of performance when pursuing a nonconscious goal, thus replicating the effects of the Pilot Study using a different dependent measure. A conscious goal was also added to the design in an effort to capture the high-performance conditions of both optimists and pessimists in the context of one study (cf. Chartrand & Bargh, 1996). Furthermore, the first study provides an initial test of the hypothesis that the attribution of negative affect is important in the goal pursuit of pessimists. In this experiment, one third of the participants were given a nonconscious goal for achievement, one third of participants were given a conscious goal for achievement, and one third of participants were given no goal. Participants were also examined on the dimensional variable of dispositional optimism. Following the goal manipulation, participants' performance on a word search task was the primary measure of goal pursuit.

Physiological measures were also taken to assess the affective consequences that result from the self-regulation of the goal pursuit using facial electromyography (EMG), which measures the electrical potentials from muscle contractions at the site of the

electrode. Based on past research (e.g., Epstein, 1990; Fridlund & Cacioppo, 1986), we selected the zygomaticus majori (active primarily in smiling) and corrugator supercilii (active primarily in frowning) muscle groups as our primary physiological measures of positive and negative affect respectively. The reason for the inclusion of physiological measures is twofold. First, it allows for the measurement of affect on-line while participants are actually completing the task. This is the affect that should be most important for influencing participants' performance on the task. Second, physiological measurement was obtained as a surreptitious measure to avoid any possible demand characteristics in the situation.

The following hypotheses were tested in this study: First, it was predicted that there would be a significant interaction between goal condition and dispositional optimism on the dependent measure of task performance on a difficult word search task. Second, and more specifically, it was predicted that there would be a positive relationship between optimism and goal pursuit in the conscious goal condition because pessimists would encounter negative affect, attribute it to the task, and disengage because they expected failure, while optimists would reengage because they expected success. Conversely, it was predicted that there would be a negative relationship between optimism and goal pursuit in the nonconscious goal condition because pessimists would be unable to attribute their negative affect to the task (thereby reassessing their expectations for success and potentially disengaging their goal pursuit), while optimists would be more attentive to negative information in general and search for its source (thereby consuming cognitive resources in the process of this search). Consistent with past research, it was predicted that there would be no relationship between optimism and

goal pursuit in the no goal condition (cf., Geers et al., 2009). Third, it was anticipated that there would be a relationship between affect and performance in the conscious goal condition—specifically a positive relationship among pessimists and a negative relationship among optimists. This is because negative affect would spur optimists onwards because they believe they can succeed, while it would cause pessimists to disengage because they expect failure. These relationships should be opposite or non-existent among participants in the nonconscious or no goal condition (for a flow-chart describing the predicted outcomes of conscious versus nonconscious goal pursuit among optimists and pessimists, see Figure 3).

Participants and Design

One hundred forty participants from the introduction to psychology subject pool at the University of Toledo volunteered to participate in exchange for partial course credit. This includes those participants who completed all pre-screening measures. Participants signed up using the psychology department online subject pool system. Participants were randomly assigned to one of three conditions (goal condition: conscious goal, nonconscious goal, no goal). Dispositional optimism scores were recorded in an online prescreening questionnaire and were used in data analyses as continuous predictor variables. Informed consent was obtained prior to participation (for descriptive statistics of the main dependent variables sorted by condition, see Table 2).

Procedure

Prescreening. Participants were prescreened for dispositional optimism at the start of the semester in exchange for partial course credit. Dispositional optimism was measured using the LOT-R ($\alpha = .66$) as in the Pilot Study.

Main session. Participants were greeted by an experimenter and were informed that the study was examining how a variety of tasks interact with various somatosensory processes. Participants were then seated at a desk. After completing a consent form, and following a thorough site-cleaning with an alcohol swab, the experimenter placed adhesive EMG surface electrodes on the right corrugator supercilii (above and medial to the eye) and the right zygomaticus majori (above and lateral to the corner of the mouth) facial muscles of the participant (Fridlund & Cacioppo, 1986). One ground electrode was placed on the right ear of the participant and this electrode served as the ground for both the corrugator supercilii and zygomaticus majori recordings. Facial EMG activity was measured using bipolarly attached, shielded and grounded Ag/AgCl electrodes filled with electroconductive gel. Electrodes were attached with 4mm radius, double-sided adhesive disks to the respective muscle regions of the face. Electrodes were connected to amplifiers manufactured by BIOPAC systems (BIOPAC Systems, Inc., Santa Barbara, CA), where signals were amplified 1,000x. Signals were then digitized using a sampling frequency of 500 Hz, and saved on a laboratory computer using *AcqKnowledge* software (BIOPAC Systems, 2007). Participants were told that the electrodes would be measuring skin temperature. After the electrode placement, and before continuing on with the experiment, the experimenter verified that appropriate facial EMG readings are being received and recorded by the *AcqKnowledge* software. The experimenter then informed the participant that a brief set of baseline measurements would be taken.

After baseline measurements were taken for a 2 min period, the experimenter returned to the room. Participants completed an initial questionnaire that included the Positive and Negative Affect Schedule (PANAS; Watson, Clarke, & Tellegen, 1988).

The PANAS contains a list of 10 descriptors of positive affect (e.g., interested and excited) and 10 descriptors of negative affect (e.g., distressed and ashamed), all rated on 5-point scales (1 = *very slightly or not at all*, to 5 = *extremely*). Responses to the 10 positive affect items were be summed for each participant to create a positive mood index ($\alpha = .80$), and responses to the 10 negative affect items were summed for each participant to create a negative mood index ($\alpha = .78$). The PANAS was included to provide a measure of baseline self-reported affect. The experimenter exited the room while participants completed this initial set of questionnaires.

Next, the experimenter informed the participant that he or she would complete several word puzzle tasks during the course of the study. Participants were told that the first word puzzle task was a practice activity. The practice task was included to make sure participants understood the main experimental task later in the study. The practice task also allowed us to control for initial individual differences in task ability. The practice task contained sixteen letters in a four by four grid, which contained approximately 180 valid words. Participants were told to find as many words as they could in the grid. Participants were told that words could be found from any letters that join horizontally, vertically or diagonally, and that no letters could be used more than once in the same word. Participants were informed that they could not use abbreviations, formal names, contractions, hyphenated words or non-English words. The experimenter then showed the participant an example sheet with several valid and non-valid words highlighted (see Appendix A for copies of the example task and the practice task). After the experimenter explained the task to the participant, the experimenter gave the participant a copy of the

practice word task and left a copy of the example sheet. Participants were given two minutes to find words in the practice task.

Nonconscious goal manipulation. When the experimenter returned to the room, the experimenter took the completed practice task and informed participants they would now be completing a different sort of word puzzle task known as a scrambled sentence task (Srull & Wyer, 1979). Participants then completed a 20-item scrambled sentence task (see Bargh et al., 2001). For participants in the nonconscious goal condition, 16 of the 20 items included a word related to achievement (e.g. attain, succeed, prosper). In the conscious goal condition and the no goal condition, participants completed a scrambled sentence task where these achievement words were replaced with neutral words (e.g. like, guess, often). These scrambled sentence tasks generally take about 5 minutes for participants to complete, and were the same as those used in the Pilot Study. The experimenter exited the room while participants worked on the scrambled sentence task and then returned when the task was completed.

Conscious goal manipulation. When the experimenter returned, participants were told that they would now be completing the main word search task for the study. They were then told that this task was similar to the practice word task that they completed earlier. Participants in the conscious goal condition were be told that performance on the main word task is a strong indicator of intelligence, and that higher performance is correlated with a large number of successful outcomes. This conscious goal manipulation has been demonstrated to be successful at altering the performance of optimists in past research (Fowler et al., 2009; for specific manipulation wording, see Appendix B).

Participants in the nonconscious goal and no goal conditions were not given any special instructions regarding their performance on the main word task.

Main word search. Participants were given a paper with twenty five letters in a five by five grid (see Appendix C). The main word search task was considerably more difficult than the practice word search task that participants completed. The main word task contained approximately 60 valid words, whereas the practice task had fewer letters but contained 180 valid words. The facial muscle movements of participants were recorded as a measure of affect, while they completed the word search task. Participants were given five minutes to complete the word search task, as this has been the standard time given to participants completing this task in past research (e.g., Fowler et al., 2009; Smithmyer et al., 2008). At the end of the word search task, the experimenter returned to the room. The experimenter then gave the participants a follow-up questionnaire which included exploratory items where they assessed their own performance (see Appendix D). The questionnaire also included another copy of the PANAS (positive affect $\alpha = .87$, negative affect $\alpha = .80$).

Following completion of the final questionnaire, the EMG electrodes were removed and a funnel debrief was administered by the experimenter. The goal of the funnel debriefing was to ask progressively narrower question which assess participant suspicion regarding the manipulations as well as any potential awareness of the theme of the priming manipulation. Based on responses to the funnel debrief, the criteria for dropping participants from the analyses was explicit awareness of the priming theme, combined with an awareness of this task's affect on goals/behaviors. These are the exclusion criteria recommended by Bargh and Chartrand (2000). No participants met

these exclusion criteria, and less than 1 percent of participants correctly identified the theme of the priming task. No participants were thus dropped from data analyses based on Bargh and Chartrand's (2000) criteria. After the funnel debriefing, participants were thanked by the experimenter, reminded not to tell others about the experiment, and told that credit would be granted by the end of the day.

Results

Task performance. To test specific predictions that we proposed regarding participants' performance on the word task, the data were analyzed using a series of hierarchical regression analyses. The dependent measure was the number of valid words that participants found on the main word search task. Dispositional optimism scores were standardized and condition was dummy coded into two separate variables: Conscious Goal (1 = conscious goal, 0 = no conscious goal) and Nonconscious Goal (1 = nonconscious goal, 0 = no nonconscious goal). GPA, age, and the number of words found on the practice word search task were entered on the first step of the regression to control for individual differences in task ability. Sex of participant (0 = female, 1 = male) was also entered on the first step of the equation to control for potential individual differences related to sex (cf. Wellman et al., 2009). The main effects of optimism and the two dummy coded condition variables were entered on the second step of the regression. Finally, a set of two interaction terms between optimism and conscious goal, and between optimism and nonconscious goal were added to the third and final step of the regression. All continuous predictors and dependent variables were checked for normality and only corrugator activation scores were found to be substantially non-normal. We repeated the analyses below with outliers removed as well as using transformations to normalize the

distribution. Neither of these methods led to any substantive change in the results. Scatterplots were also examined for the presence of multivariate outliers. No suspected multivariate outliers were discovered by visual identification.

The first step represented a significant increase in the variability accounted for by the model, $\Delta R^2 = .561$, $F(2,137) = 87.47$, $p < .0005$. Performance on the practice task was, not surprisingly, a significant individual predictor of performance on the main task, $\beta = .738$, $t = 12.96$, $p < .0005$. There was also a marginal relationship between GPA and performance on the main search, with those individuals having higher GPAs finding more words than those with lower GPAs, $\beta = .093$, $t = 1.63$, $p = .10$.

The second step of the regression indicated that there was no significant change in the variance accounted for, however, $\Delta R^2 = .016$, $F(3,134) = 1.64$, $p = .18$. There were also no significant individual predictors added to the second step of the model, ps > .10.

Finally, the third step of the regression indicated that there was, again, no significant change in the variance accounted for, $\Delta R^2 < .001$, $F(2,132) = 0.01$, $p = .99$. Again, contrary to prediction, there were no significant individual predictors added to the third step of the model, ps > .80 (see Figure 4).

Although these results are certainly not promising for our overall predictions, it is clearly important to note that the more focused set of analyses which were proposed could provide a better test of our actual hypotheses. For this reason, we continued to perform a set of simple slope analyses to ascertain the relationship between dispositional optimism, goal type, and performance. These simple slopes represented a total of seven separate comparisons. Using procedures outlined by Aiken and West (1991), we examined the following effects: the effect of optimism among individuals in the no goal

condition; the effect of optimism among individuals in the conscious goal condition; the effect of optimism among individuals in the nonconscious goal condition; the effect of conscious goal among optimists; the effect of conscious goal among pessimists; the effect of nonconscious goals among optimists; and finally the effect of nonconscious goals among pessimists. Results of these simple slopes indicated that none of the effects approached significance, all *p*s > .25.

Electromyography. In addition to our predictions about the interactive effects of dispositional optimism and goal type on task performance, we also predicted that dispositional optimism and goal type would interact to influence the affect level of participants as measured using electromyography. For this reason, we computed the same series of hierarchical regression analyses described above, using baseline EMG measurements as a covariate on the first step of the analyses. EMG data from some participants were dropped because the electrodes fell off or were not properly attached for these participants. These participants were dropped only from analyses where the specific questionable EMG site data were being analyzed (20 participants were dropped from corrugator analyses and 17 were dropped from zygomatic analyses). No performance or optimism differences were found between participants who were and who were not included in EMG data analyses.

Electromyography: Corrugator site recordings. To determine if negative affect during the main word search task was affected by the interaction of dispositional optimism and goal type, we subjected corrugator scores to the same hierarchical regression described above for performance on the word search task. The only exception

to this design was that baseline corrugator scores were entered on the first step of the regression—in place of practice word search task scores.

The first step represented a significant increase in the variability accounted for by the model, $\Delta R^2 = .786$, $F(2,117) = 214.46$, $p < .0005$. Baseline corrugators scores were, not surprisingly, a significant individual predictor of corrugator scores during the main search task, $\beta = .886$, $t = 20.71$, $p < .0005$.

The second step of the regression indicated that there was no significant change in the variance accounted for, however, $\Delta R^2 = .001$, $F(3,114) = 0.19$, $p = .904$. There were also no significant individual predictors added to the second step of the model, ps > .50.

Finally, the third step of the regression indicated that there was, again, no significant change in the variance accounted for, $\Delta R^2 < .001$, $F(2,112) = 0.22$, $p = .802$. Again, there were no significant individual predictors added to the third step of the model, ps > .45 (see Figure 5).

As described above for task performance, we continued to perform a set of simple slope analyses to ascertain the relationship between dispositional optimism, goal type, and negative affect as measured by the corrugator electrode. These simple slopes represented a total of seven separate comparisons. Using procedures outlined by Aiken and West (1991), we examined the following effects: the effect of optimism among individuals in the no goal condition; the effect of optimism among individuals in the conscious goal condition; the effect of optimism among individuals in the nonconscious goal condition; the effect of conscious goal among optimists; the effect of conscious goal among pessimists; the effect of nonconscious goals among optimists; and finally, the

effect of nonconscious goals among pessimists. Results of these simple slopes indicated that none of the effects approached significance, all *p*s > .45.

Electromyography: Zygomatic site recordings. To determine if positive affect during the main word search task was affected by the interaction of dispositional optimism and goal type, we subjected zygomatic scores to the same hierarchical regression described above for performance on the word search task and corrugator activation. Baseline zygomatic scores were entered on the first step of the regression—in place of practice word search task scores/corrugator scores.

The first step represented a significant increase in the variability accounted for by the model, $\Delta R^2 = .762$, $F(2,120) = 191.63$, $p < .0005$. Baseline zygomatic scores were, not surprisingly, a significant individual predictor of zygomatic scores during the main search task, $\beta = .873$, $t = 19.57$, $p < .0005$.

Although the second step of the regression indicated that there was no significant change in the variance accounted for, $\Delta R^2 = .010$, $F(3,117) = 1.75$, $p = .160$, there were two marginally significant individual predictors on the second step of the model. Conscious goal ($\beta = -.090$, $t = -1.74$, $p = .077$) and nonconscious goal ($\beta = -.097$, $t = -1.83$, $p = .064$) both predicted lower levels of zygomatic activation among participants.

Finally, the third step of the regression indicated that there was no significant change in the variance accounted for, $\Delta R^2 < .001$, $F(2,115) = 0.09$, $p = .915$. There were no significant individual predictors added to the third step of the model, *p*s > .65 (see Figure 6).

As described above for task performance and corrugator scores, we continued to perform a set of simple slope analyses to ascertain the relationship between dispositional

optimism, goal type, and positive affect as measured by the zygomatic electrode. These simple slopes represented a total of seven separate comparisons. Using procedures outlined by Aiken and West (1991), we examined the following effects: the effect of optimism among individuals in the no goal condition; the effect of optimism among individuals in the conscious goal condition; the effect of optimism among individuals in the nonconscious goal condition; the effect of conscious goal among optimists; the effect of conscious goal among pessimists; the effect of nonconscious goals among optimists; and finally, the effect of nonconscious goals among pessimists. Results of these simple slopes indicated that none of the effects approached significance, all *p*s > .10.

Study 1 Discussion

The initial analyses of the data from Study 1 were less than supportive of our initial hypotheses. Results indicated that dispositional optimism did not interact with goal type (conscious or nonconscious) to predict task performance. These results are puzzling, considering the many studies supporting the interaction of goal priority and optimism on task performance (Geers et al., in press; 2009; Wellman et al., 2009). Similarly, neither negative nor positive affect reflected the interaction of optimism and goal type as we would have predicted. That being said, there was some tentative evidence that there was a weak effect of the manipulations on affect, with individuals in the conscious and nonconscious goal conditions displaying less positive affect than individuals in the control condition. It is also worth noting that the internal consistency of the dispositional optimism measure was fairly low in the present study. This may have also contributed to the difficulty in uncovering the predicted effects.

Chapter IV

Study 2

Hypotheses and Predicted Results

In Study 2 we attempted to more closely examine the role that affect plays among pessimists who pursue a conscious goal. We accomplished this by utilizing a misattribution paradigm (e.g., Zanna & Cooper, 1974). In a typical misattribution paradigm, participants are given an expectation for a particular affective state. Participants given an expectation for a particular affective state are likely to misattribute the affect that results from the *actual source* to the *purported source provided in the expectation* instead. In Study 2, participants were given an expectation that a piece of music would either create positive affect or negative affect. In addition to the misattribution manipulation, participants were also presented with an easy or a difficult rule for a cross-out task (similar to the task used in the Pilot Study), based on the rationale that participants pursuing an easy task should not experience negative affect (Carver & Scheier, 1990) and thus should have no need to misattribute it. All participants in Study 2 were given a conscious goal for achievement. Thus, unlike Study 1, goals were not manipulated—all participants were given a conscious goal.

It was predicted that pessimistic participants in the negative affect misattribution condition would outperform pessimists in the positive affect misattribution condition. It was predicted that this would only be the case, however, when participants were completing a difficult word task. These predictions are important because they would show that pessimists were taking the negative affect resulting from the conscious goal pursuit and misattributing it to another plausible source. If the negative affect no longer triggers their negative expectancies to see looming failure and then disengage, it was predicted that they should persist and perform better on the task.

Participants and Design

One hundred sixty four participants from the introduction to psychology subject pool at the University of Toledo volunteered to participate in exchange for partial course credit. This includes those participants who completed all pre-screening measures. Participants signed up using the psychology department online subject pool system. Participants were randomly assigned to one of the four conditions in a 2 (misattribution: positive mood, negative mood) × 2 (task difficulty: difficult word task, easy word task) factorial design. Dispositional optimism scores were recorded in an online prescreening questionnaire and were used in data analysis as a continuous predictor variable. Informed consent was obtained prior to participation (for descriptive statistics of the main dependent variables sorted by condition, see Table 3).

Procedure

Prescreening. Participants were prescreened for dispositional optimism at the start of the semester in exchange for partial course credit in the same manner as in Study 1. Dispositional optimism was measured using the LOT-R ($\alpha = .78$).

Main session. Participants were greeted by an experimenter and were informed that the study was looking at the impact of music on mood. Participants were then seated at a desk. Participants completed an initial ―student lifestyle" questionnaire that included the PANAS (positive affect α = .88, negative affect α = .78). The PANAS was included to provide a measure of baseline self-reported affect. The experimenter exited the room while participants completed this initial student lifestyle questionnaire.

Misattribution manipulation. When the experimenter returned to the room, participants were told that they would now move on to the main task in the study. Participants were told that a piece of music would be played for them. In the positive mood attribution condition, participants were told that this music had been shown in past research to raise the mood and positive affect of participants. In the negative mood attribution condition, participants were told that this music had been shown in past research to lower the mood and increase the negative affect of participants. The instructions for the cross-out task were identical to those given to the conscious goal participants in Study 1. Participants in both conditions listened to *Hop (2)* (Lansky, 1994, track 9). This music consists of unusual electronic tones, and has been shown in past research to be an affectively neutral stimulus (Geers et al., 2005).

Task difficulty manipulation. After explaining the presence of the music to participants, the experimenter then gave participants a copy of the cross-out task used and described in the Pilot Study. Participants were randomly assigned to receive one of two sets of instructions for the cross-out task. (Weiland et al., 2006; cf. Wellman & Geers, 2009; see Appendix E). Participants in the difficult task condition received the instructions described in the Pilot Study. The experimenter provided participants with an

example sheet and instructed them to cross out instances of the letter ~~"e~~" on the search page. Participants were further instructed to only cross out instances of the letter ~~"e~~" that were not next to, nor one extra letter away from, another vowel. Participants in the easy task condition were told to only cross out all instances of the letter ~~"e~~" that were not next to another vowel (allowing cross-outs of ~~"e~~"s one-letter-away-from other vowels). This task has been used in past research as an easier version of the difficult search task described above (Wellman & Geers, 2009). After providing participants with the example sheet and verifying that participants understood the search rule, the experimenter gave participants the actual search task page. As in the Pilot Study, the cross-out task page consisted of a page of text on interpreting analyses of covariance from an advanced text on statistics. To ensure that a conscious achievement goal was activated in all participants, after giving participants the cross-out task, the experimenter informed participants that performance on the cross-out task was extremely important, being predictive of success later in life. Participants were told that they should perform accurately, while completing as many lines as possible on the task. This was a variant of the manipulation used in Study 1 (cf. Fowler et al., 2009).

When participants had completed the main word search task for 3.5 minutes (the length of *Hop [2]*; Lansky, 1994, track 9), the experimenter returned to the room and informed participants that they had completed the main search task in the study. As in Study 1, the experimenter then gave the participants a follow-up questionnaire. This questionnaire was similar to the questionnaire administered in Study 1 (see Appendix F). The questionnaire included another copy of the PANAS (positive affect $\alpha = .91$, negative affect $\alpha = .77$).

Following completion of the final questionnaire, participants were debriefed by the experimenter and were probed for suspicion regarding the misattribution manipulation. Participants were then thanked by the experimenter, reminded not to tell others about the experiment, and told that credit would be granted to them by the end of the day. No participants reported suspicion regarding the true purpose of the experiment, and thus all participants were included in the final analyses.

Results

Error ratio. To test specific predictions that we proposed regarding participants' performance on the cross-out task, the data were analyzed using a series of hierarchical regression analyses. The primary dependent measure was the ratio of omission errors committed to the number of possible omission errors. Dispositional optimism scores were standardized, misattribution condition was dummy coded (0 = positive mood, 1 = negative mood) and complexity of the task was dummy coded as well (0 = simple rule, 1 = complex rule). GPA and age were entered on the first step of the regression to control for individual differences in task ability. Sex of participant (0 = female, 1 = male) was also entered on the first step of the equation to control for possible individual differences related to sex (cf. Wellman et al., 2009). The main effects of optimism, misattribution condition, and task complexity were added to the second step of the regression. All possible two-way interaction terms were entered on the third step of the regression. Finally, a three way interaction term between optimism, misattribution condition and task complexity was added to the fourth and final step of the regression. All continuous predictors and dependent variables were checked for normality and none were found to violate the statistical assumptions of a multiple regression analysis. Scatterplots were also

examined for the presence of multivariate outliers. Two suspected multivariate outliers were discovered by visual identification and results were re-run with these cases removed. As the results were substantively the same with the cases excluded, we present the analyses with these cases retained in the analyses below.

Examination of the results indicated that the first step of the regression was not significant, $\Delta R^2 = .032$, $F(3,160) = 1.77$, $p = .155$. There was, however, a significant individual predictor on the first step of the equation. Sex of participant predicted the omission error ratio on the cross-out task, with males committing a higher ratio of errors than females, $\beta = .159$, $t = 2.04$, $p = .043$. The second step of the regression was significant, $\Delta R^2 = .095$, $F(3,157) = 5.70$, $p = .001$. Rule complexity was a significant individual predictor of the number of omission errors committed, with individuals in the complex rule condition committing a higher ratio of errors than participants in the simple rule condition, $\beta = .308$, $t = 4.10$, $p < .0005$. The third step of the regression was not significant, $\Delta R^2 = .026$, $F(3,154) = 1.57$, $p = .198$. There was, however, a significant two-way interaction. This interaction between rule complexity and misattribution condition predicted the error ratio on the cross-out task, $\beta = -.253$, $t = -2.02$, $p = .046$. Finally, the fourth step of the regression was marginally significant, $\Delta R^2 = .012$, $F(1,153) = 3.57$, $p = .061$, as was the three-way interaction term, $p = .061$ (See Figure 7).

To more precisely test our a priori hypotheses, we computed a series of separate simple slope tests for the complex and the simple rule condition. These simple slopes represented one primary and seven secondary comparisons. Using procedures outlined by Aiken and West, (1991), we examined the following effects separately in the complex and simple rule conditions: the effect of optimism among individuals in the positive

mood condition; the effect of optimism among individuals in the negative mood condition; the effect of misattribution condition among dispositional optimists; and the effect of misattribution condition among dispositional pessimists. Our primary simple slope that was most strongly predicted by our hypotheses emerged as significant. There was a relationship between misattribution condition and error ratio, but only among pessimists in the complex rule condition. Pessimists in the negative mood condition committed a lower error ratio than pessimists in the positive mood condition, $\beta = -.339$, $t = -2.02$, $p = .048$. No other secondary slopes approached significance (all ps $> .10$).

We also explored the two-way interaction between task complexity and misattribution condition by computing a series of simple slope analyses. Given that these simple slopes deal only with dichotomous conditions, they are analogous to tests of simple main effects in ANOVA. Results indicated that there was a highly significant effect of task complexity in the positive mood condition, with individuals on the complex task committing a higher ratio of errors than participants in the simple task condition, $\beta = .445$, $t = 4.43$, $p < .0005$. In the negative mood condition, however, this effect was only marginally significant, $\beta = .187$, $t = 1.75$, $p = .081$. These findings are also consistent with our predictions.

Chapter V

General Discussion

Summary of Methods and Results

Following the results of the Pilot Study—showing that pessimists perform best when pursuing nonconscious goals—we attempted to replicate this result as well as replicating the finding from previous research that optimists performed best while pursuing a conscious, important goal (e.g, Geers et al., 2009; Smithmyer et al., 2008; Wellman, et al., 2009). We also attempted to pinpoint the affective mechanisms that best explained these differences in performance. Based on self-regulatory theory (Carver & Scheier, 1998), and research on unattributed affect (Chartrand, under revision) we predicted that negative affect would interfere with pessimists' performance when pursuing a conscious goal, but not when pursuing a nonconscious goal. In Studies 1 and 2 we took two different approaches for examining the role that affect plays in the goal pursuit of optimists and pessimists. We hoped that through the use of converging methodologies we would be able to show not only when pessimists outperform optimists—taking on the role of dark horse—but also why they do.

Study 1. To briefly summarize, in Study 1, participants (prescreened for dispositional optimism) were randomly assigned to receive either no goal, a conscious

achievement goal, or a nonconscious achievement goal. Participants then completed a word search task while their affect was measured on-line using electromyography. It was predicted that pessimists in the nonconscious goal condition would have superior performance compared to optimists, while optimists in the conscious goal condition would have superior performance compared to pessimists. It was also predicted that negative affect would be related to the performance of pessimists in the conscious goal condition, but not in the nonconscious goal condition. None of these predictions were borne out, however. There were no differences between goal conditions on task performance, there was no relationship between dispositional optimism and task performance, nor were there any interactions between optimism and goal conditions on task performance.

Study 2. In Study 2, the approach used to examine the relationship between affect and performance among pessimists and optimists was different and utilized a misattribution paradigm. Participants (prescreened for dispositional optimism) were randomly assigned to a receive either a negative expectation about a piece of music or a positive expectation about a piece of music (misattribution manipulation) and were then randomly assigned to receive either a difficult letter cross-out task or an easy letter cross-out task. Participants' error rate on the cross-out task was our main dependent measure of interest. Unlike the results in Study 1, the results in Study 2 were almost perfectly in-line with our hypotheses. In the difficult task condition, pessimists performed best when they had an opportunity to misattribute negative affect. On the other hand, pessimists in the difficult task condition performed worse when they had an opportunity to misattribute positive affect. These findings provide support for the notion that negative affect during

difficult goal pursuit triggers pessimists to disengage. If pessimists can misattribute the negative affect caused by their goal pursuit to another likely source, however, their performance would not be impaired. This was precisely what was found in Study 2.

Explanations for Null Effects in Study 1

Given promising results in the Pilot Study and Study 2, it becomes more challenging to disentangle the lack of effects—either on performance or on affect—in Study 1. The null effects of goal condition on both performance and affect shall be considered jointly because their similar failure to produce the predicted results may shed some light on the reasons why the results of Study 1 did not support the hypotheses as did Study 2. Several possible alternative explanations for the null effects of Study 1 will be posed.

Weak manipulations. One possible explanation for the lack of effect in Study 1 was that the conscious and nonconscious goal conditions were simply ineffectual at producing the changes in goal activation that were expected. Although possible, this seems particularly unlikely for the nonconscious goal manipulation. This specific goal prime has been shown to be successful, not only in the Pilot Study of the present paper, but in past research on nonconscious goal pursuit as well (Bargh et al., 2001). It remains difficult, however, to definitively assess the activation of a nonconscious goal in a measure other than behavior towards achieving that goal. The attempt to manipulate a goal consciously using a task importance manipulation has similarly been successful in past research (Fowler et al., 2009), also casting doubt on this interpretation. It is possible that contextual factors in the current experiment—not present in past research using these

manipulations—prevented the goal(s) from being successfully activated and/or pursued in some way (discussed below).

Another factor speaking against arguments that the manipulations were ineffectual was the fact that the manipulations were at least marginally effective in influencing positive affect as measured by the zygomatic electrodes. Participants in both the conscious and nonconscious goal condition showed marginally lower levels of positive affect than participants in the no goal condition. This provided tentative evidence for the fact that participants may have been taking the word puzzle task more seriously while they were pursuing a goal for achievement (be it conscious or nonconscious). Self-regulatory theory (Carver & Scheier, 1990) would suggest that these changes in affect should be experienced during any goal pursuit—conscious or nonconscious. It is only the attribution of this affect that should differ depending on the level of conscious awareness of the goal in question. If it was the case that the manipulations were effective in at least activating the goals, why was the actual performance neither contingent upon this goal activation, nor contingent upon the interaction of this goal activation and dispositional optimism? Contextual factors in the situation may, again, provide some clues to answer this question.

Contextual factors. If contextual factors in the situation played a role in the fact that the hypotheses of Study 1 were not supported, the most likely contextual factors should be identified, if possible. Potential contextual factors might include any elements of the situation that were not present during past research using this word puzzle task (e.g., Fowler et al., 2009). One potential contextual factor that may have affected performance on the word search task was the presence of the electrodes on the faces of

the participants. Although every effort was made to ensure that the electrodes were comfortably attached and not distracting, it is certainly possible that they may have been an irritant for some participants. If this was the case, some of the negative affect which would have been produced by the difficulty of the word search task may have instead been inadvertently misattributed to the presence of the electrodes on the faces of the participants. It should be noted that electrodes measuring galvanic skin response were included in past research using the word puzzle task (Fowler et al., 2009), with no inhibition of the traditional goal priority effect. Although there is some parallel to this analogy, those electrodes applied in the study by Fowler and colleagues were attached to the fingers of participants, and not to the face as in the present study.

Internal consistency of optimism measures. Another possible explanation for the null results in Study 1 was the poor internal consistency (Chronbach's alpha) of the LOT-R dispositional optimism questionnaire. It is possible that the less-than-ideal internal consistency of this measure introduced an additional degree of error into the results of Study 1, which obscured any interaction of optimism and goal on performance. The internal consistency of the LOT-R was considerably better in the Pilot Study, and in Study 2, and both those studies found the predicted result. Although explanation for the null results is possible, we re-ran analyses in Study 1 using both individual LOT-R items and the separate optimism and pessimism subscales of the LOT-R. Neither of these sets of analyses produced results that were significant, or substantially different than the null results reported in Study 1. Furthermore, although the internal consistency in Study 1 is not ideal (and is noticeably lower than that reported in the Pilot Study and Study 2) , it is

certainly not low enough to suggest an assortment of items that are not correlated with one another, and are not tapping into some underlying construct.

Theoretical explanations. Although any interpretation of null results should be viewed with considerable skepticism, it is at least worth mentioning that pessimists did not underperform optimists in the nonconscious goal condition. The strong prediction of the current study was that pessimists would, in fact, outperform optimists when pursuing a nonconscious goal. The hypothesized inferior performance of optimists in this condition was predicted to be a consequence of optimists' greater attention to self-relevant negative information (Aspinwall & Brunhart, 1996; Solberg Nes et al., 2005) leading to an over-analysis of the unattributed negative affect from this nonconscious goal pursuit, which in turn would consume cognitive resources and lead to a decline in performance among the optimists. Alternatively, however, the unattributed negative affect could simply lead pessimists to perform at the same level as optimists (as opposed to a higher level of performance). It is, of course, difficult and dangerous to draw such conclusions from null results. Similarly, correlational evidence was unsupportive of this basic hypothesis. Nevertheless, the present results are more supportive than if the optimists had outperformed pessimists in the nonconscious goal condition.

Performance vs. persistence. Another issue that is worth considering is the issue of performance versus persistence. Many of the studies examined by Geers and colleagues (2009) examined variables such as exercise behavior, friendship formation, and class attendance that necessarily happened over time, requiring a great deal of persistence. A shorter term measure such as performance on a word search task may certainly have a persistence component that predicts performance, but raw skill may be a

larger component of overall performance. Although we tried to control for individual differences in raw skill, it may be the case that there was simply not enough variability in persistence in Study 1 to manifest into actual differences in performance on the word search task. If persistence was less important for performance on the word search task, it is possible that the estimate of participants needed drawn from past meta-analyses of the goal priority effect (Geers et al., 2009) may have been inappropriate. If this is true, more participants may have been warranted for the present research. That said, goal priority effects with this word search measure have been found in past research (Fowler et al., 2009; Smithmyer et al., 2008).

Effective Misattribution in Study 2

While the results of Study 1 do not support the theoretical interpretation that the attribution of affect plays a key role in the goal pursuit and performance of dispositional pessimists, this hypothesis received a considerably greater degree of support in Study 2. In Study 2, we attempted to more directly address the question of mood attribution by applying a mood misattribution paradigm. In Study 2, participants were all presented with a letter cross-out task. The importance of performance on the task was emphasized for all participants, using similar wording to the conscious goal manipulation that was utilized in Study 1 (albeit with a different dependent variable). Affectively neutral music was played during participants' performance of the letter cross-out task, and participants were given the expectation that the music would put them in a positive or a negative mood. This manipulation was aimed at providing participants the opportunity to misattribute their affect from the letter cross-out task to the music. Task difficulty was also manipulated,

with participants receiving a difficult or an easy rule for how to cross out letters on the cross-out task.

Letter cross-out task performance. In contrast to the results of Study 1, the results of Study 2 almost perfectly matched the predictions that we made. When examining the simple slope analyses of the regression analysis, the critical contrast was significant in the predicted direction. Specifically, among participants in the difficult rule condition, pessimists who were given a negative mood misattribution for the music outperformed pessimists who were given a positive mood misattribution for the music. There were no differences between optimists and no differences in the simple rule condition. In other words, misattribution was only relevant for pessimists when negative affect was likely to be present in substantial amounts—during the pursuit of a difficult goal, but not during the pursuit of an easy goal. It should be noted, however, that there is not reliable evidence suggesting superior (or inferior) performance of optimists as compared to pessimists. Although the pattern of simple regression slopes is in the direction we predicted, the simple slopes of dispositional optimism and performance were not significant in the negative misattribution condition, nor were they significant in the positive misattribution condition.

The other notable effect found in Study 2 was an interaction between task complexity and misattribution. Results indicated that there was a strong effect of task complexity within the positive misattribution condition—with those individuals pursuing the complex task committing a higher ratio of errors than participants pursuing the simple task. This is certainly not a surprising result. This effect weakens, and becomes marginally significant, however, in the negative misattribution condition. This finding is

consistent with our predictions. We believe it reflects an advantage of having positive misattribution targets while pursuing easy goals. According to the self-regulation model, the pursuit of easy goals should generally lead to more positive affect. This positive affect, however, can lead to *coasting*—or a general reduction of effort because the task is viewed as being easy (Carver, 2003). This ease would have been signaled by the positive affect. If the positive misattribution condition gives participants an opportunity to misattribute their task-related positive affect to the music instead of the task, participants should not display a reduction in effort due to coasting.

Comparison of Studies 1 and 2

To help explain the discrepant findings between the Pilot Study, Study 1, and Study 2, it is worth re-examining the common and divergent elements between these three studies. A nonconscious goal manipulation was shown to be effective at improving the performance of pessimists in one (Pilot Study) of the two studies that employed a nonconscious goal manipulation (Pilot Study and Study 1). The one conscious goal manipulation (Study 1) was shown to be ineffectual, but past research has shown similar conscious goal manipulations to be effective in improving performance among optimists (e.g., Fowler et al., 2009; Smithmyer et al., 2008). Study 1 employed a different dependent measure than the Pilot Study—namely a word search task. One of the two dependent measures in the Pilot Study, however—namely the letter cross-out task—was used in Study 2, which employed the misattribution paradigm. The effectiveness of this study was particularly interesting, considering that the error ratio on the letter cross-out task was a less sensitive dependent measure in the Pilot Study than was the impossible puzzle task—which was also used in the Pilot Study.

Performance vs. persistence measures. As we alluded to earlier, we believe that the goal priority effect of optimism (Geers et al., 2009), and the hypothesized advantage of pessimists pursuing nonsconsious goals, should be found on measures that assess both task performance and task persistence. We do think, however, that the effects of goal priority and nonconscious advantage should manifest themselves to a greater degree on measures that more strongly assess the construct of goal persistence. We believe that the impossible puzzle task in the Pilot Study taps into the goal persistence construct to a greater degree than the letter cross-out task. This would explain the relatively stronger effect on the impossible puzzle task that was found in the Pilot Study. It also may highlight the durability of the misattribution effect that was found on the letter cross-out task in Study 2, given that Study 2 employed the letter cross-out task as its main dependent measure. This still does not speak, however, to the fact that the predicted effects were not found in Study 1—unless, of course, task performance in Study 1 is due more to an individual's raw ability than due to his or her task persistence.

Although the nonconscious goal manipulation was only successful at improving the performance of pessimists in one of the two studies employing it, the misattribution manipulation was important because it provided process support to the underlying model that we have proposed. This suggests that some undetermined methodological issue may be responsible for the null results in Study 1. The use of misattribution paradigms, such as those in Study 2, are a particularly strong method for examining the causal chains that might otherwise be examined using meditational analysis (Spencer et al., 2005). These results demonstrate that affective signals are of clear importance in the goal pursuit of

pessimists. Based on the present research, the role of affect in the goal pursuit of optimists is less clear or not existent, and this warrants further research.

Future Directions

There are several possible future directions for the present research. The most pressing future direction we see for this research would be another attempt to replicate the nonconscious advantage of pessimists in the Pilot Study while using a different methodological approach from that which was used in Study 1. The addition of a conscious goal manipulation—as was done in Study 1—would be helpful in a follow-up study, although it would not be essential. Such a replication would be helpful, as the advantage of pessimists when pursuing nonconscious goals has been demonstrated in only one study thus far, using two dependent variables (the Pilot Study), with supporting evidence coming from several others (e.g., Geers et al., in press; 2009; Wellman et al., 2009). There are a wide variety of different manipulations that might be used to induce a nonconscious goal amongst participants. Such manipulations could include truly subliminal priming methods (e.g. a parafoveal vigilance task; Chartrand & Bargh, 1996), or an environmental priming method, such as those used in object-priming studies (e.g. Friedman & Elliot, 2008).

In addition to the possibility of exploring different methods of nonconscious goal manipulation, there is also the possibility of manipulating goals in domains other than achievement. Goals for cooperation have been manipulated nonconsciously in past research (Bargh et al., 2001 Geers et al., 1995), and a variety of different goal domains have been shown to demonstrate the goal-priority effect of optimism (Geers et al., in press; 2009; Wellman et al., 2009). Although we have no reason to suspect that the

advantage of pessimists when pursuing a nonconscious goal could not be generalized to a variety of different nonconscious goal domains, it still remains important to establish this external validity through research in a variety of domains.

A more theoretically meaningful future direction, however, might be an expansion of the methodologies employed in Study 2. One such approach would involve a misattribution study that examined multiple modalities of positive/negative affect and multiple modalities in goal type (i.e. approach goals and avoidance goals; Carver & Scheier, 1998). The self-discrepancy literature, for example, suggests that individuals will experience depression when falling short of their *ideal selves*, but will experience anxiety when falling short of their *ought selves* (Higgins, 1989). Although little research has explored the self-regulatory processes of avoidance goals specifically, it is possible that the affect involved in their regulation may be of a different modality than the affect involved in approach goals. Such differences could be explored using different modalities of goals, as well as different mood expectations imparted through a misattribution manipulation.

Implications of the Present Research

The present research was ultimately based on an influential body of self-regulatory theory. For example, self-regulatory theory suggests that expectations (such as dispositional optimism) are critical for reappraising the likelihood of success in an ongoing goal pursuit (e.g. Carver & Scheier, 1998). This reappraisal should only occur, however, if there is some difficulty in the ongoing goal pursuit. Past research on the goal priority effect has demonstrated that optimists excel at conscious goal pursuit (Geers et al., 2009; Wellman et al., 2009). We hypothesize that this is because optimists'

expectations lead them to see obstacles as being surmountable, whereas pessimists see obstacles as impassible. These negative expectations of pessimists could consequently lead to goal pursuit termination. It is worth considering some of the implications of the present research for these broad-reaching theories.

Although Study 1 provided little support to the central goal priority prediction—that optimists would outperform pessimists when pursuing important conscious goals—we do not believe that this is a serious challenge to the goal priority hypothesis itself, nor self-regulatory theory as a whole. The goal priority effect has been replicated in numerous previous studies, and has been shown to be reliable through meta-analysis (Geers et al., in press; 2009; Smithmyer et al., 2008; Wellman et al., 2009). A more likely explanation for the lack of conscious goal manipulation effect in Study 1 could be the presence of a faulty manipulation. Alternatively, the null result could be the result of a dependent measure (the word search task) that was insufficiently sensitive to task effort; the dependent measure may, for example, have been a measure of task ability as opposed to a measure of effort.

A more novel hypothesis in the present research revolves around the performance of pessimists. In the Pilot Study and Study 1, we suggested that pessimists would perform best when pursuing a nonconscious goal. The reason for this hypothesis was the fact that nonconscious goal pursuit produces affect which cannot easily be attributed to its source (e.g., Chartrand & Bargh, 2002). If negative affect is not attributed to a specific goal pursuit, it will not signal a potential obstacle in that particular goal pursuit. Consequently, there will be no opportunity for pessimists to apply their negative expectations for success to the ongoing goal pursuit. For this reason, pessimists are unlikely to quit while

pursuing a nonconscious goal. Support for this hypothesis was found in the Pilot Study, but not Study 1. Further research is clearly needed on nonconscious goal pursuit, but the results of Study 2 do emphasize the clear importance of negative affect. Pessimists pursuing a challenging goal performed better when they were able to misattribute their negative mood to music that was playing at the time.

Potential moderators. It is worth considering potential moderators to the effects found in the present research. Although a wide variety of moderators are possible, we believe that moderators involving the level of expectation and goal are the most theoretically meaningful. Optimism and pessimism, for example, can be considered at multiple levels of abstractness. Dispositional optimism is a generalized positive outcome expectancy (Scheier & Carver, 1985), while other forms of optimism are more domain- or situation-specific (e.g., Armor & Taylor, 1998; Radcliffe & Klein, 2002). Certain types of specific pessimistic expectations can also serve a self-protective function (Norem, 2001; Norem & Cantor, 1986). These different expectation-related constructs may have similar, divergent, or interactive effects on performance.

Implications for applied domains. For which applied domains might the present results be important? Although not definitive, there is some suggestive evidence in the psychotherapy literature that the phenomenon of pessimists pursuing nonconscious goals should be examined more closely. For example some research has shown that clients rate therapy as being less effective when therapists are more transparent in their motives towards the client (J. Martin, Martin, & Slemon, 1987). In other words, when presenting clients with a conscious goal, the clients who were likely overwhelmingly pessimistic (based on the description presented by the authors), viewed therapy as less effective.

When therapists were more covert, however (analogous to a nonconscious goal), the therapy was rated by clients as being more effective. The conscious and nonconscious nature of psychotherapy goals should therefore be carefully considered. Nonspecific treatment factors (e.g. Oei & Shuttlewood, 1996), for example, could be more important amongst pessimistic individuals. Although the use of nonconscious primes produced equivocal results in the present research, a large number of psychological disorders for which treatment is sought involve a pessimistic outlook. For this, and other reasons described above, the question of nonconscious goal pursuit amongst pessimists warrants further investigation.

Misattribution amongst pessimists also has important practical implications and applications. In a wide variety of performance domains, coaches and instructors could give pessimists non-goal sources to which to attribute their negative affect. For example, an athlete encountering negative affect because of a challenging athletic goal might be forewarned that some other factor in the environment—a hostile crowd perhaps—could produce negative affect. Such situational warnings, in this and other domains, could aid the performance of pessimists.

Concluding Remarks

The preceding three studies present a complex and ambiguous picture of the self-regulation that both optimists and pessimists engage in while pursuing a variety of goals. We predicted that pessimists would have an advantage when pursuing nonconscious goals because they would not be able to attribute their negative affect to the goal pursuit itself—thus not interrupting their self-regulatory processes in a manner harmful to that goal pursuit. We found mixed evidence for the notion that pessimists possess an

advantage when pursuing a nonconscious goal, with this effect found on two of the three dependent variables we examined. We also directly examined the process explanation for why this advantage would occur by employing a misattribution paradigm. We predicted that when pessimists were able to misattribute their negative affect to some external source (i.e. music), this negative affect would no longer interfere with their performance, and thus their performance would be enhanced. This was precisely what we found, with the actual results closely mirroring the expected results in Study 2.

Although the results in both studies were equivocal in their entire scope, we feel optimistic in our goal of eventually moving from these findings to more precisely illustrate the self-regulatory processes involved in conscious and nonconscious goal pursuit. As we are admittedly optimistic, our goal is—thankfully—a conscious one.

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Table 1

Descriptive statistics for main dependent variables in Pilot Study. SD*s are in parentheses.*

Conditions	Omission error ratio on cross-out task	Time spent on puzzle task (in sec)
Neutral prime	0.25 (0.15)	1254.52 (557.34)
	$n = 44$	$n = 44$
Achievement prime	0.25 (0.16)	1138.54 (568.29)
	$n = 46$	$n = 46$

Table 2

Descriptive statistics for main dependent variables in Study 1. SD*s are in parentheses. Corrugator and zygomatic activations are reported in millivolts (mV).*

Conditions	Valid words on main task	Corrugator activation	Zygomatic activation
No goal	9.00 (4.84)	4.08 (3.20)	3.26 (2.39)
	n = 49	*n* = 45	*n* = 45
Conscious goal	7.29 (3.89)	3.53 (3.89)	2.49 (1.81)
	n = 45	*n* = 40	*n* = 38
Nonconscious goal	8.72 (5.52)	3.76 (3.04)	2.22 (1.07)
	n = 46	*n* = 35	*n* = 40

Table 3

Descriptive statistics for omission error ratio scores on Study 2 cross-out task.

Conditions	*n*	Mean omission error ratio	Standard deviation
simple / positive	44	0.13	0.09
complex / positive	43	0.26	0.19
simple / negative	40	0.17	0.14
complex / negative	37	0.21	0.16

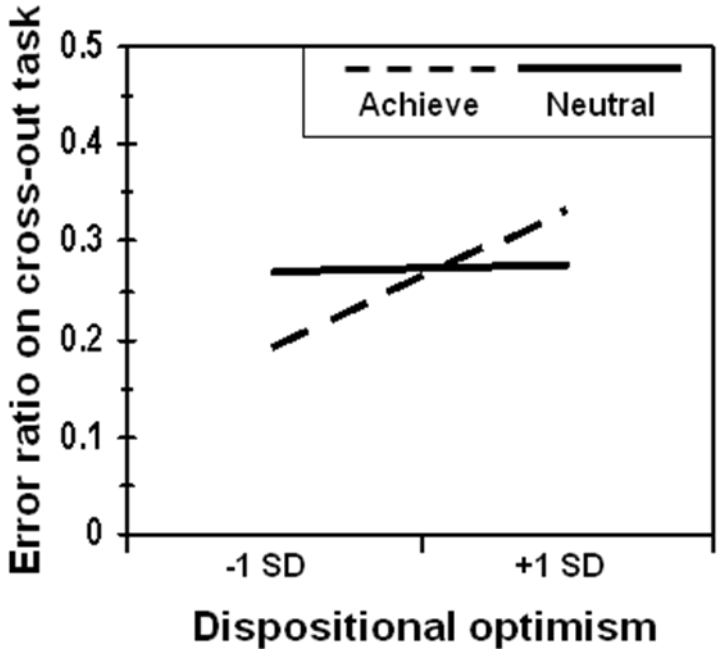

Figure 1: Predicted regression lines indicating performance (error ratio) on the letter cross-out task in the Pilot Study as a function of dispositional optimism and goal type.

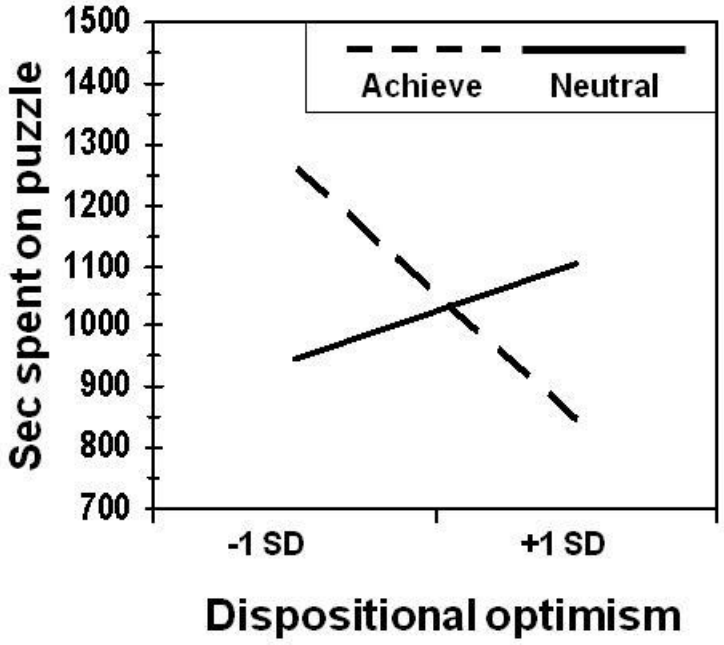

Figure 2: Predicted regression lines indicating time spent on the impossible puzzle task in the Pilot Study as a function of dispositional optimism and goal type.

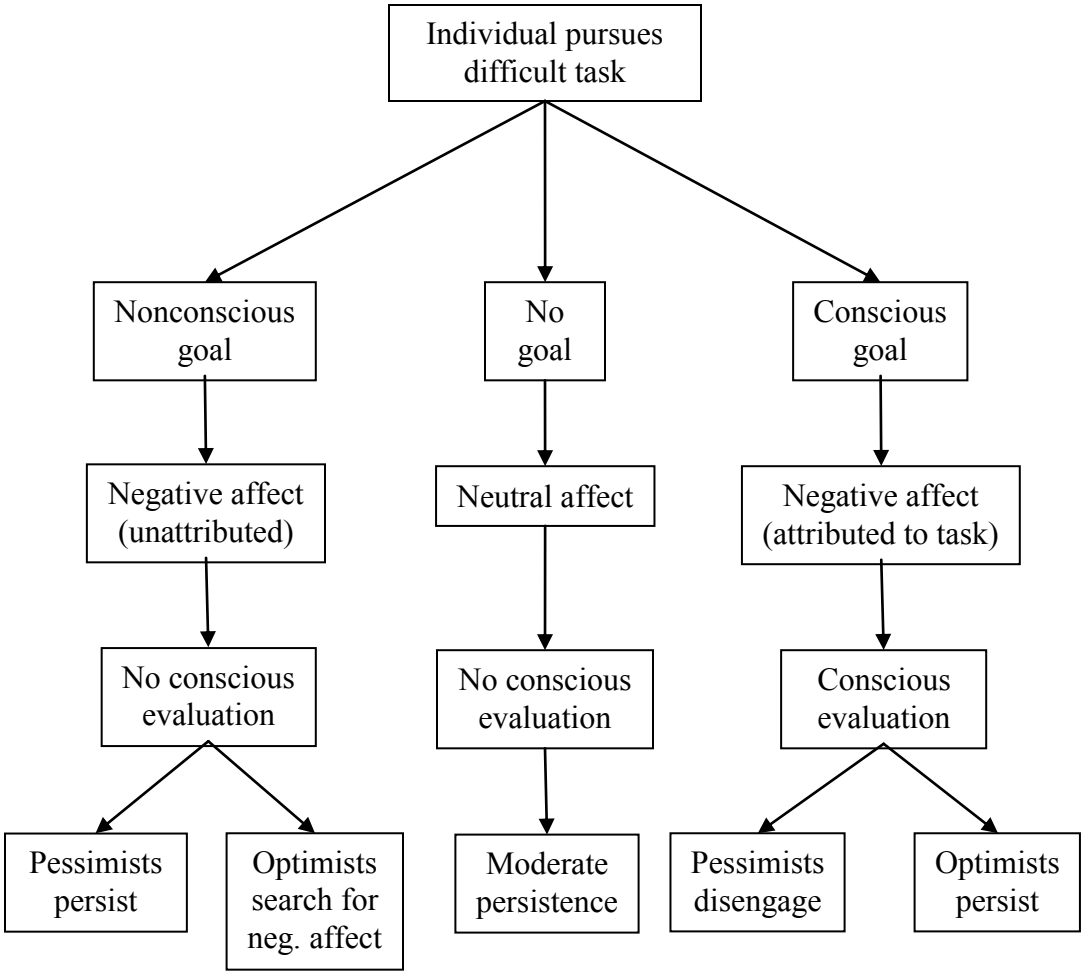

Figure 3: Flowchart detailing predicted processes in conditions of Study 1.

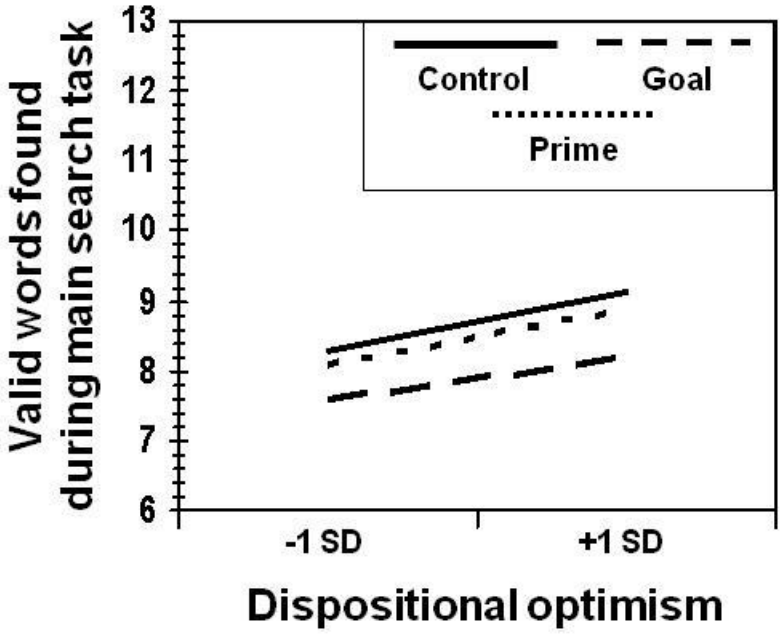

Figure 4: Predicted regression lines indicating performance on the main word search task in Study 1 as a function of dispositional optimism and goal condition.

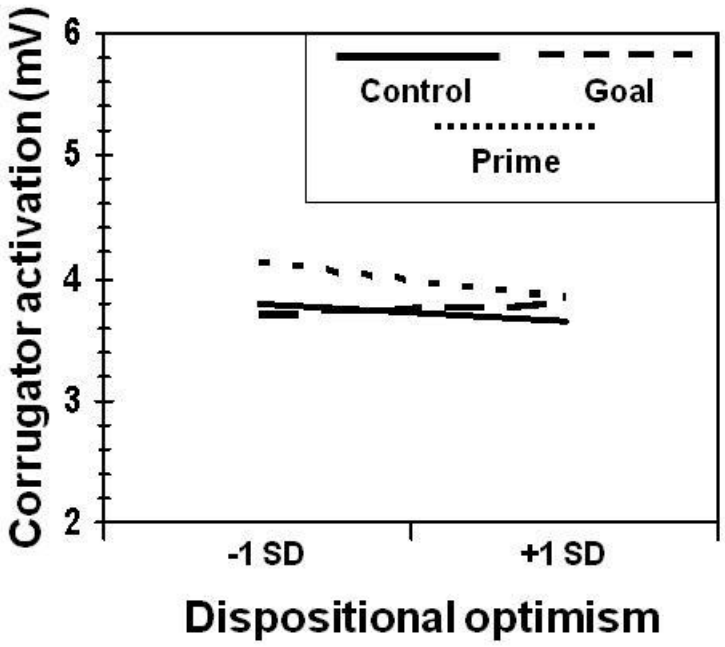

Figure 5: Predicted regression lines indicating corrugator activation in millivolts (mV) during the main word search task in Study 1 as a function of dispositional optimism and goal condition.

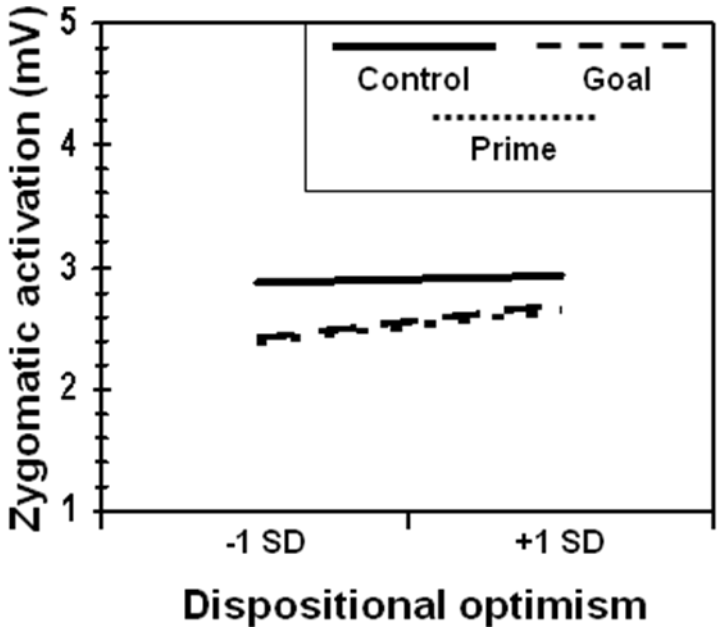

Figure 6: Predicted regression lines indicating zygomatic activation in millivolts (mV) during the main word search task in Study 1 as a function of dispositional optimism and goal condition.

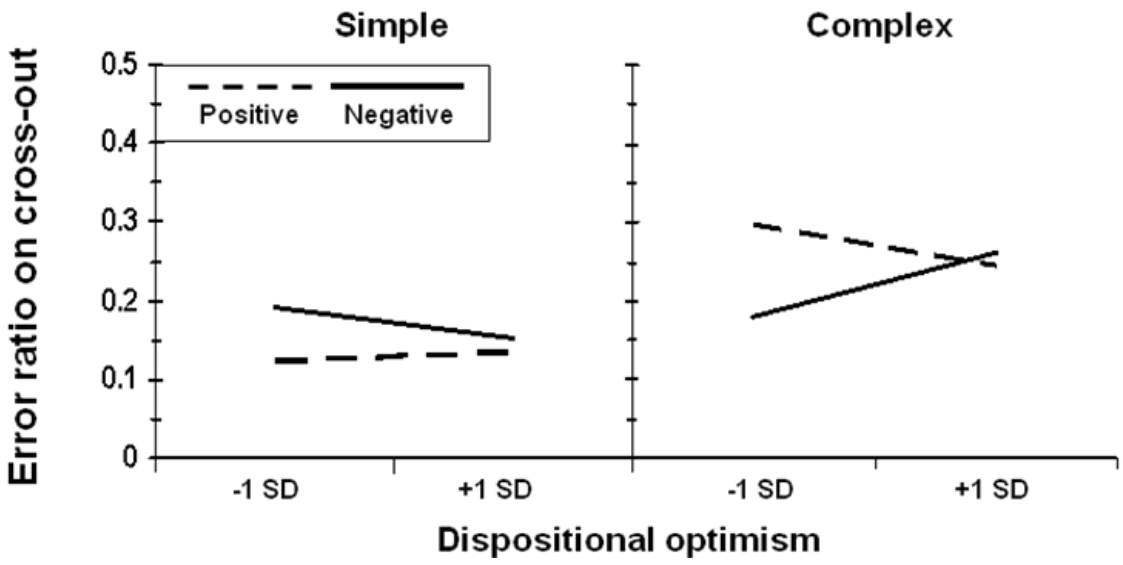

Figure 7: Predicted regression lines indicating performance on the letter cross-out task in Study 2 as a function of dispositional optimism, task complexity and expectation.

Appendix A

Example word search task

G	M	H	V
T	T	O	A
I	O	T	E
E	E	A	D

√ VOTE

~~TIME~~

~~DAD~~

Practice word search task (~180 words)

J	H	T	N
E	A	G	J
T	R	E	S
E	S	I	E

Appendix B

Manipulation for conscious goal condition in Study 1

–All right, now that you are familiar with how to form words using the letter grid, we would like you to complete the main word test. We are asking that you complete this main task because it is a psychological measure of verbal ability--a key component for general intelligence. Students who perform better on this task tend to get better grades and earn more money after college. This test will help us determine which students will be the most successful during and after college and we would like you to set a high goal for performance on this test. For this test, you will still try to find words in the same fashion as you did in the practice, but now, the letters will be in a 5x5 block and you will be given a time limit of five minutes. Do you have any questions?"

Manipulation for nonconscious and no goal conditions in Study 1

–All right, now that you are familiar with how to create words using the letter grid, we would like you to complete the main word task. For the main word task, you will still try to find words in the same fashion as the practice task, but now, the letters will be in a 5x5 block and you will be given a time limit of five minutes. Do you have any questions?"

Appendix C

Main word search task

X	H	O	T	E
M	Y	A	O	S
E	F	I	A	E
K	B	S	E	E
Y	C	R	Z	U

Appendix D

List of questions in the final questionnaire of Study 1. Anchor points are listed above applicable items in italics.

(1 = not at all, 7 = very much)
I spend my free time working on word games such as the word puzzle task I completed in this study.
I found that the word puzzle task was stressful.
I felt confident that I would do well on the word task.

(Fixed response)
The experimenter informed me that the word task was designed to measure:

(1 = not at all, 7 = very much)
I was concentrated on this task the entire time.
I was led to believe that I would do well on the word task.
I wanted to do well on this task.

(Fixed response)
I was told that I would do well on the word task.

(1 = bad, 7 = good)
Overall, I would rate my performance on the word puzzle task as:

(Open response)
What semester are you currently in at UT (e.g., entering freshman = 1st semester)?
What is your current GPA [to at least one decimal place (e.g., 2.5, 3.1, etc.)]
What is your current credit hour load?
Age?

(Fixed response)
Sex?
What is your ethnic background?

Appendix E

Experimental manipulations for Study 2: Mood manipulations are in boldface text, complex rule condition text is in italic text. Instructions for experimenter are underlined.

Now we will move on with the main task in the study. This study is interested in the effects of music on participants' mood and behavior. Specifically, recent studies have shown that the specifically designed electronic music I am about to play leads individuals to experience a **positive/negative** mood state. The music was composed using scientific audiology techniques to influence mood. Prior studies in the Stanford University affective sciences lab have found that this music makes people feel as though they are in a **good/bad** mood while they are listening to it.

While you are listening to the music, you will be performing an accuracy task for another experiment. The task will be a cross-out task. For this task you will cross out each copy of the letter ―E" from this sheet that is not next to (*COMPLEX CONDITION: nor one letter away from*) another vowel in the same word. It is important that you set a high goal for performance on the accuracy task. Research has shown that individuals who make few errors on the accuracy task are likely to be detail-oriented and maintain their social networks effectively. High levels of accurate performing are related to number and quality of social relationships later in life.

EXPERIMENTER GIVES THE PARTICIPANT AN EXAMPLE OF THE CROSS-OUT RULE AND INSTRUCTS PARTICIPANTS IN TERMS OF HOW TO COMPLETE IT.
SIMPLE CONDITION: Here is an example. The letter ―e" in ―the" would be crossed out because there are no other vowels in the word. For ―experimental", all the ―e"s would be crossed out because none are next to another vowel. In the word ―measure" the first ―e" would not be crossed out because it is next to another vowel. The second ―e" would be crossed out because it is not next to another vowel. Also, the letter ―y" does not count as a vowel for this exercise and two ―e"s that are next to each other must not be crossed out.
COMPLEX CONDITION: Here is an example: The letter "e" in "the" would be crossed out because there are no other vowels in the word. For "experimental", only the first "e" would be crossed out because the second and third "e"s in the word are one letter away from the "i" in "experimental". The second and third "e"s would not be crossed out. In the word "measure" the first "e" would not be crossed out because it is next to another vowel. The second "e" would not be crossed out because it is one letter away from another vowel. Also, the letter "y" does not count as a vowel for this exercise and two "e"s that are next to each other must not be crossed out.
FOLLOWING MANIPULATION: It is very important that you perform well on the accuracy task, so as I mentioned before, please set a high goal for performance. I will return in about 5 minutes. I will now begin playing the mood-**lowering/raising** music.

Appendix F

List of questions in the final questionnaire of Study 2. Anchor points are listed above applicable items in italics.

(1 = not at all, 7 = very much)
When I write papers for class, I spend lots of time proofreading them
I found that the cross out task was stressful
I felt I would do well on the cross out task
I concentrated on the cross out task the entire time
I believed I would do well on the cross out task
I wanted to do well on this cross out task

(1 = bad, 7 = good)
Please rate how you would rate your performance on this cross out task
I expected that the music I listened to would make me feel
The music I listened to ended up making me feel

(1 = not at all, 7 = very much)
I found the music that I listened to to be distracting

Open response
What semester are you currently in at UT (e.g., entering freshman = 1st semester)?
What is your current GPA [to at least one decimal place (e.g., 2.5, 3.1, etc.)]?
What is your current credit hour load?
Age?

Fixed response
Sex?
What is your ethnic background?