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# Does A Sense Of Control Moderate Self-Regulation Strategies And Performance? When Feedback Lingers

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**DOES A SENSE OF CONTROL MODERATE  
SELF-REGULATION STRATEGIES AND PERFORMANCE?  
WHEN FEEDBACK LINGERS**

by

**ANNETTE FERA VICH**

**DISSERTATION**

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

**DOCTOR OF PHILOSOPHY**

2010

MAJOR: PSYCHOLOGY (Cognitive and Social  
Psychology across the Lifespan.)

Approved by:

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Advisor

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Date

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## **DEDICATION**

To my entire family, especially

Stuart, Saxon, Travis, mama, daddy, Toni Marie, Janiece, and Binkey.

## ACKNOWLEDGEMENTS

I want to acknowledge all those who made this dissertation possible and without whom I would be unable to pursue my lifelong goals.

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Dr. Alan Hoffman, Department of Theoretical and Behavior Foundations

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Your willingness to do so inspires me.

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## **CHAPTER 1: DOES A SENSE OF CONTROL MODERATE SELF-REGULATION STRATEGIES AND PERFORMANCE? WHEN FEEDBACK LINGERS**

Feelings of control are influential and central to human functioning regulating input, emotions, and subsequent behaviors. Carver and Scheier (1999) describes control as a general approach to self-regulation. Individuals are continuously regulating behaviors in ways that either advance or secure their current position depending on desired outcomes. Effective self-regulation is dependent on neurological substrates associated with appetitive and inhibitory behaviors. Unique to humans, however, is their ability to shape and integrate these reciprocal affective processes as a result of learning and cognition (Cacioppo, Gardner & Berstein, 1999). Individuals who exhibit regulatory fitness respond appropriately to current conditions, feel less threatened, and are open to new experiences. When individuals feel a sense of control over their environment, they perform better (Thelwell, Lane, & Weston, 2007), are more optimistic (Peterson and Steen, 2002), active (Langer and Rodin, 1976), and healthier (Carver, 2007; Rodin & Langer, 1977; Ryff & Singer, 1998).

While some individuals regulate behaviors in ways that produce desired outcomes, others can make numerous attempts to obtain desired outcomes but remain virtually unsuccessful. These individuals tend to ruminate over negative events (Watkins, 2008), reassign responsibility for bad events to circumstances outside their own control (Peterson & Steen, 2002; Peterson & Seligman, 1987), and engage in avoidant behaviors that fail to create new opportunities for success (Eysenck, Derakshan, Santos, & Calvo, 2007). Studies on attentional control suggest that increases in processing of threat-related stimuli decrease attention to goal-related stimuli, and severely limit a person's ability to control mental processing (Kircanski, Craske, & Bjork, 2008). Persons become reliant on basic response mechanisms that are habituated and result in more frequent and uninterruptable automatic processing. When these response patterns are based



on distorted information, individuals cannot effectively pursue opportunities that facilitate desired outcomes, de-motivating the individual and further distorting abilities. In the end, behaviors contradict the individual's own best interest because chronic negative thoughts generated from repeated failures are difficult to suppress and can unconsciously lead to an inability to act in one's own best interest (Wegner, 1994; Wenzlaff & Bates, 1998). Consistent experiences of uncontrollability emanate into feelings of hopelessness, helplessness, depression, and anxiety, making it substantially more difficult to engage in appetitive behaviors that advance the individual's current position and overcome initial feelings of inadequacy and uncontrollability (Bell, McCallum, & Doucette, 2004; Carver, Blaney, & Scheier, 1979).

The purpose of this dissertation is to examine self-regulatory strategies that facilitate successful performance, and the extent to which feelings of control moderate behaviors that influence performance and mood. Individual differences are related to goal orientation with some individual more likely to attend to opportunities for advancement while others are vigilant relative to potential mistakes. While both strategies can lead to successful outcomes, ones that advance are expected to lead to increased performance and better moods that encourage more risk and result in greater advancement (Fredrickson, 2002). Although vigilant strategies can lead to desired outcomes, it is hypothesized that they will not lead to higher performance scores, particularly for those individuals who receive negative feedback as negative feelings and uncontrollability ultimately affect this individual's willingness to advance.

### Self-Regulation: Promotion and Prevention Regulatory Strategies

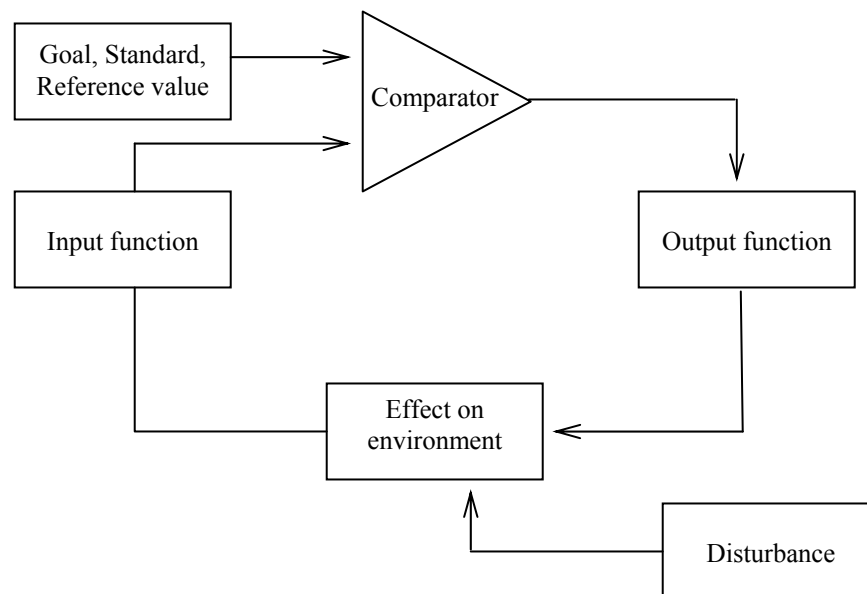
Studies in self-regulation are quite diverse and encompass research from numerous disciplines in psychology including developmental (Moretti & Higgins, 1999), motivation and emotion (Elliot, 2006; Roney, Higgins, and Shah, 1995) social (Langens, 2007) and cognition

(Carver, 2007, Carver, 20047). Regulatory strategies can be thought of as internal guides that control behaviors in ways that are congruent with mental representations of the self (Higgins, 1997). These self-guides are utilized in a feedback loop that considers the self and external variables relative to the self in order to facilitate desired outcomes (Carver, 2007; Carver, & Scheier, 1990). This process, known as self-regulation, is the result of self-attention that makes salient interpreted knowledge given some “reference point”, “standard for comparison” or mental representation activated in memory, thereby guiding internal thinking using comparative means to calculate value and expectancy outcomes (Carver, 2007; Carver & Scheier, 1999; Carver et al., 1979). Individuals with greater self-awareness and control are better able to self-regulate behaviors in order to obtain desired goals and create a sense of confidence that a given outcome can be achieved.

Persons are continuously controlling behaviors in ways that move them towards or away from their desired goal based on current goal valence (Carver, 2004). Research on neurological substrates of self-regulation theorize there are two distinct feedback loops in processing that include input, reference, comparative and output values (Carver & Scheier, 1990; Carver et al., 1979; Rasmussen, Wrosch, Scheier, & Carver, 2006). When the referent or goal in the current situation is desirable, like avoiding conflict or learning something new, persons engage in a negative feedback loop comparing input or current state to the desired end-state and decreasing discrepancies between the two to obtain the desired goal. When the referent is negative or undesirable, individuals engage a positive feedback loop in order to amplify discrepancies between input and the undesirable end state. Discrepancies initiate withdrawal behaviors that increase distance between current and undesired end-states (see Figure 1). When no discrepancies between input and desired outcomes exist, behavior remains unchanged because

regulatory fitness results in positive affect. Higgins (1997) describes regulatory fitness as occurring when one's engagement in an activity is sustained by the current regulatory strategy being utilized indicating compatibility between strategies and the current situation. Additionally, an emotional component indicates to the individual that current strategies "feel right."

Figure 1: The feedback loop is a basic unit or iteration of control. Beginning with the input function, some value is compared to a reference value or standard for comparison and adjustments are made in the output function. In a discrepancy enlarging (positive) feedback loop, the output function moves the individual away from the comparator (withdrawal), while in a discrepancy reducing (negative) feedback loop, the output function moves the individual towards the comparator (approach; Carver, 2004).



Carver's studies on self-regulation emphasize what is described as regulatory reference (Higgins, 1997), whereby behavior regulation to advance or secure one's position is motivated by a referent. Most individuals will engage in avoidance behaviors to minimize threat conditions when the referent is negative. Likewise, when the referent is positive, individuals tend to engage in approach behaviors in order to maximize rewards. Persons who regularly attend to potentially positive end-states activate structures related to the presence or absence of hopes, dreams and aspirations and are described as using promotion-focused regulatory strategies. Other individuals attend to potentially negative outcomes, focusing primarily on environmental cues that signal duties, responsibilities, and potential threats or punishment. These individuals are described as using prevention-focused regulatory strategies (Crowe, & Higgins, 1997; Higgins, 1997).

Circumstances very often instigate action to advance or secure oneself, and individuals regulate according to the referent. For example, economic downturns might cause individuals to act in conservative ways that secure a stable future, while economic prosperity might encourage individuals to engage in riskier behaviors that promote advancement. Studies that examine promotion vs. prevention regulatory focus use priming techniques to activate regulatory strategies by reading episodes depicting individuals using promotion or prevention regulatory strategies, reporting on hopes and aspirations or on duties and obligations (Higgins, Roney, Crowe, & Hymes, 1994), or by framing rewards in terms of gaining or losing money (Shah, Higgins, & Friedman, 1998). Promotion-primed individuals were more likely to respond in ways that advanced their position while prevention primed individuals displayed more vigilant behaviors related to safety and security. These results suggest that, despite inclinations to advance or secure oneself, behaviors are highly dependent on situational characteristics.

Alternatively, Higgins (1997; Higgins, Bond, Klein, & Strauman, 1986; Higgins, Klein, & Strauman, 1985; Higgins et al., 1994) describes regulatory processes in terms of regulatory anticipation, the strength of one's regulatory style, determined by current attitudes and accessibility of the dominant self-guide. Higgins (1997) concludes that because most situations are neither unequivocally threatening nor explicitly incenting, persons choose different ways of obtaining desired goals to acquire unique outcomes. Discriminating aspects of one's self-concept compared to that of a significant other for actual (who we are at the moment), ideal (who we hope or aspire to be), and ought (duties and responsibilities associated with who we should be) self-constructs facilitate individually unique attempts at goal pursuit (Higgins, 1997; Higgins, 1987). In other words, concepts one has for the self as well as concepts that significant others have for the self are influential in regulating behavior.

Of particular interest for this study is the habitual nature of using promotion vs. prevention regulatory strategies. Higgins and colleagues used the Selves Questionnaire to determine strength and discrepancies of internal self-guides. Self-guide strength was determined by asking participants to list characteristics from actual, ideal, and ought perspectives and then to rate the extent to which they believed they possessed that character trait. Computer measures recorded response times for producing each attribute and extent latencies were determined from the differences in actual and ideal or ought ratings (Shah et al., 1998). Significant positive relationships were determined between ideal strength and anagram performance and significant negative relationships between ought strength and anagram performance. However, when participants matched framing condition (promotion vs. prevention) with dominant regulatory strategy determined by self-guide strength, both ideal and ought dominant strategies were significantly related to increases in performance scores on an anagram task. Unique emotional

distress was also found to be related to self-guide discrepancies, with promotion focused discrepancies related to negative emotional outcomes such as sadness and depression, and prevention focused discrepancies uniquely related to agitation and anxiety (Higgins Shah, & Friedman, 1997).

In 1994, Carver operationalized the process of identifying individuals as promotion vs. prevention focused using Gray's (1970; 1987; 1991) theory of behavioral approach and behavioral inhibition as the foundation for the measure. Gray proposed that individual tendencies to advance or secure their positions are based on two neurologically distinct dimensions of personality: anxiety and impulsivity. The behavioral inhibition system (BIS) regulates aversive motivation to withdraw, as attention to environmental cues related to anxiety, such as punishment and non-reward, increases. The second system, the behavioral approach system (BAS), regulates appetitive motivation and is activated by reward and non-punishment. Individuals identified as being approach motivated experience positive feelings such as hope and joy as a result of efforts to obtain desired outcomes.

Carver and White (1994) developed the BIS/BAS to assess inhibitory and appetitive responses to varying environmental conditions rather than as a measure of affective tone. Whereas some studies used a Promotion/Prevention Scale that was highly reliable with Cronbach alpha = .81 for promotion and .75 for prevention, this scale determined strategies based on responses to affective items that reflect hopes, dreams and desires or duties and responsibilities and are criticized as being too broadly defining (Lockwood, Jordan, & Kunda, 2002). Conversely, the BIS/BAS focuses on inhibitory or appetitive motivations based on circumstances rather than affectivity that vary in desirability. Responses reflect pleasant outcomes such as doing well on something or experiencing excitement versus unpleasant outcomes such as getting

scolded or making mistakes. Shackman, Sarinopoulos, Maxwell, Pizzafalli, Lavric, & Davidson, (2006) determined that negative emotional outcomes associated with discrepancies in the Selves Questionnaire were congruent with findings on the BIS/BAS. Participants identified as high BIS were prone to respond to ambiguous conditions with greater anxiety. Additionally, the number of mistakes on verbal and spatial measures was moderated by the level of state anxiety experienced with increases in levels on BIS scales associated with increases in mistakes as anxiety increased.

### Attributions of Control

Evidence of controllability begins to emerge around the age of two, and coincides with parental expectations that children regulate behaviors to promote family norms and values that ostensibly result in desired outcomes (Morretti & Higgins, 1999). While perceptions of control affect outcome expectancies, individuals who generally view potential outcomes as incentives rather than threats are more likely to alter expectancies in positive ways that increase the likelihood of obtaining a desired outcome. That is, some individuals interpret and manipulate environmental cues in order to increase advantages during goal pursuit, while others tend to interpret new information as threatening (Higgins, 1997). Persons who interpret conditions as threatening deplete resources and functioning is not optimum, in particular, because they are unable to advance (Shackman et al., 2006; Hodgins & Knee, 2002). Despite advantages of prevention-focused regulatory strategies, ultimately they may lead to chronic interpretations of conditions as threatening, and disrupt potential goal pursuit. Under certain conditions, a vigilant regulatory strategy may be a deficit to the individual if goal pursuit is avoided in lieu of feelings of threat or inadequacy.

The desire for control manifests itself through cognitive, emotional and behavioral functioning. Self-efficacy, for example, is described as a cognitive function that reflects the level of confidence one has in his/her ability to organize and execute actions in order to obtain desired outcomes (Bandura, Adams, & Beyer, 1977). Self-esteem reflects emotional aspects of control and arise from feelings of self-worth (Crocker, Brook, Niiya, & Villacorta, 2006). When incongruencies exist in one's personal value system, individuals experience a reduction in feelings of self-worth and self-esteem distorting perceptions of threat cues and controllability, even when situational cues do not warrant such fears. Individuals who believe they can effect desired changes are better at controlling behaviors and are more likely to secure desired goals (Bandura et al., 1977; Cervone, Mor, Orom, Shadel, & Scott, 2004; Deci & Ryan, 1987). Given the abundance of research in cognitive, affective and behavioral disciplines, it is difficult to determine which factors are operating at any given time that can potentially influence behavioral outcomes and affect.

Early research on uncontrollability and its cognitive, affective and motivational nature began with experiments by Martin Seligman and others on learned helplessness, a psychological phenomenon whereby one believes that efforts are incongruent with outcomes (Maier, Seligman, 1976). In his early and often cited experiments on learned helplessness (Overmier, & Seligman, 1967; Seligman & Maier, 1967), dogs that were allowed to escape electrical shocks by jumping a barrier were unable to determine an escape route, even after several trials, if in earlier trials they were given no means to escape shocks. Studies on learned helplessness eventually demonstrated control is critical, because it accounts for variations in all levels of healthy functioning (Peterson, & Seligman, 1987; Seligman, 1998; Sweeney, Anderson, & Bailey, 1986).



Critics of the early theory on learned helplessness argued it inadequately explained why, at times, learned helplessness did not occur despite continuous exposure to uncontrollable conditions (Abramson, Seligman, & Teasdale, 1978). The reformulated theory emphasized perceptions and feelings of control. Individuals who believe bad events are changeable, unique to the current situation and due to factors within one's personal control are identified as having making optimistic attributions in that they believe situations are within their control to change. Individuals who believe bad events are stable, pervasive in most situations, and control is external to the self, perceive events as being uncontrollable and are identified as having making pessimistic attributions. Over time, individuals acquire a habitual way of explaining why good and bad events occur, and this is referred to as one's explanatory style (Peterson, & Steen, 2002).

Seligman and colleagues developed and administered the Attribution Style Questionnaire (ASQ) to measure explanatory style in adults, and the Children's Attribution Style Questionnaire (CASQ) to measure explanatory style in children and adolescents. Both questionnaires present scenarios with half positive and half negative outcomes and incorporate responses that reflect internal, stable, and global responses to good and bad events. Subscales are formed by summing scores across the three causal dimensions for positive and negative events separately. An overall composite is calculated from the difference between total positive and negative scores. Thompson et al., (1998) developed the Children's Attributional Scale – Revised, a shortened version of the original CASQ using 24 instead of 48 scenarios and accounts for potential boredom as well as shorter attention spans characteristic of younger participants (Thompson, Kaslow, Weiss, and Nolen-Hoeksema, 1998).

People who have a high sense of personal control utilize effective coping strategies when problems solving, are less likely to appraise events as negative, and effectively remediate

stressors (Taylor, & Armor, 1996). Additionally, a sense of control has been linked to perseverance and immunological benefits that contribute to health promoting behaviors, as well as the absence of negative mood (Peterson, & Steen, 2002). People who experience a low sense of control engage in ineffective coping strategies such as denial and mental and moral disengagement (Scheier, Carver, & Bridges, 1994; Bandura, Barbaranelli, Caprara, & Rastorelli, 1996) and often experience emotional instability such as depression and anxiety.

Feelings of uncontrollability create cognitive interference and increase production of negative thoughts as a result of increased attention toward negative stimuli (Kochanska, & Aksan, 2006; Eysenck et al., 2007). Although facilitative processing of threat-related stimuli is necessary, it also obstructs rational processing of other unrelated information that might reveal alternatives inaccessible under the current threat conditions (Eysenck et al., 2007; Miller, 1985; Miller, 1985). Participants in one study (Wenzlaff et al., 1998) demonstrated individuals who tried to suppress unwanted thoughts generated more negative statements from scrambled sentences and reported greater depression on inventories as frequency of suppression increased. Thought suppression requires significant mental control and resources to successfully keep from processing unwanted thoughts; consistently failing to do so can lead to feelings of uncontrollability and reduce functioning. Impairments can be lingering in that they alter future expectancies resulting in persons who are less likely to initiate voluntary responses to facilitate desired outcomes and make accurate judgments regarding future outcome/response relationships (DeRubeis, Evans, Hollon, Garvey, Grove and Tuason, 1990; Nolen-Hoeksema et al., 1986; Peterson & Steen, 2002; Peterson & Seligman, 1987).

### Self-Regulation, Uncontrollability, and Performance: The Current Study

Higgins (1997) describes self-regulation as central to maintaining or regaining feelings of controllability. Avoidance strategies, although necessary to thwart life-threatening conditions and can work in a person's favor (Sullivan, Worth, Baldwin, & Rothman, 2006), are considered problematic at all levels of goal setting (Elliot, 2006). Lench (2008) found that participants identified as approach compared to avoidance motivated maintained more positive emotions during an anagram task with unsolvable anagrams. Avoidance compared to approach motivated persons continued to persist at unsolvable anagrams longer resulting in lower scores, depleting necessary resources, and exacerbating feelings of uncontrollability. Such persistence can be described as illusory and although some believe there are health benefits to illusions of control (Taylor and Armor., 1996; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). Langens (2007) and others, however, determined that illusions require great mental effort to maintain and deplete resources necessary to consider alternative cognitive and emotional responses (Wegner, 1994). The result is increased negative expectancies (Guenther, & Alicke, 2008; Fischer, Greitemeyer, & Frey, 2007), depleted regulatory resources necessary to advance the self in ways that lead to improved performance (Carver, 2007; Shackman et al., 2006), and compromised mental and physical health (Peterson & Seligman, 1987; Wezlaff & Bates, 1998). Furthermore, individuals who exhaust resources also experience ego depletion leading to increased pessimism and feelings of uncontrollability (Fischer et al., 2007). Participants in cognitive and emotional depletion compared to non-depletion conditions were less optimistic about obtaining desired future goals and indicated a higher probability of contracting a severe disease. Carver, 2004 suggests that there is a unique relationship between promotion-focused regulatory strategies and feelings of anxiety and agitation when efforts to advance have been maligned. Similarly,

prevention-focused individuals experience sadness and a sense of giving up when efforts to avoid are unsuccessful.

The result of ineffective self-regulation and pessimistic attitudes of uncontrollability is negative belief perseverance that occurs because people formulate causal explanations that account for outcomes which are difficult to change without experiential representations of the self as successful (Ross, Lepper, & Hubbard, 1975). Individuals who receive negative feedback are vulnerable to reassigning causal explanations to permanent, pervasive conditions of the self rather than to factors outside the self. According to research on belief perseverance, persons who receive negative feedback are more likely to experience negative effects of feedback, including feelings of uncontrollability, even if feedback has been discredited (Caciopp et al., 1999; Linnenbrink-Garcia, & Fredricks, 2008; Langens, 2007; Thelwell et al., 2007; Guenther et al., 2008). In one study on belief perseverance (Guenther et al., 2008), participants who received negative feedback were more likely to rate themselves significantly higher on mental acuity and other abilities even when they were informed that feedback was bogus. These participants made efforts to use positive causal explanations for the negative feedback they received.

Depending on representations of the self in the current task, negative experiences, it is hypothesized, can have lingering effects, and causal explanations for undesirable outcomes are made that disadvantage the individual in ways that make it difficult for them to overcome negative experiences. When efforts are not realized and individuals believe they have no control over outcomes, they disengage efforts and contribute to a pessimistic belief system that can become self-fulfilling. This study examines the moderating effect that feelings of uncontrollability have on self-regulation and eventual performance. Although numerous studies separately demonstrate the importance of self-regulation and feelings of controllability on

emotional stability, fewer have looked at their relationship to cognitive functioning and performance in a learning environment. Additionally, this study examines the effects of positive and negative feedback on individuals described as either promotion or prevention focused to determine the extent to which feelings of controllability moderate the relationship between self-regulation and cognitive functioning and cause lingering, negative effects on performance. Specifically, it is hypothesized that individuals identified as being prevention focused and utilize pessimistic explanatory styles will experience lingering negative effects of undesirable feedback.

**CHAPTER 2: HYPOTHESES**

1. Students rating higher on prevention-focused regulatory strategies (BIS) are more likely to quit the performance task after completing the first set of difficult anagrams when given the choice, while students rating higher on promotion-focused regulatory strategies (BAS) will be more likely to continue with the new set of moderate anagrams.
2. Students with higher (optimistic explanatory style) compared to lower (pessimistic explanatory style) mean ratings on measures of controllability as measured by the CASQ-R are more likely to predict higher performance scores on the anagram tasks.
3. Students receiving negative compared to positive feedback on the anagram task will experience lower levels of positive affect and higher levels of negative affect directly following feedback. Conversely, students receiving positive compared to negative feedback will experience higher levels of positive affect and lower levels of negative affect. Students are expected to return to previous affective levels once feedback is discredited.
4. A sense of control will moderate the relationship between promotion or prevention regulatory strategies and performance on the anagram task prior to, after, and after discrediting feedback. Plots of significant interactions, it is predicted, will support evidence for lingering effects of negative feedback for students identified as prevention-pessimists, compared to those identified as promotion-optimists, promotion-pessimists and prevention-optimists.

## **CHAPTER 3: METHODS**

### **Participants**

School administrators in Detroit area metropolitan high schools were contacted to participate in this web-based research study. A total of 105 students from a local suburban Catholic high school, grades 9 through 12 agreed to participate in the this experiment. Participants were male between the ages of 14 and 18 years of age. A total of 7 students were lost due to attrition and an additional 6 students were removed for missing data, dubious responses, or out of range variables. The remaining 92 students were used in the final analyses.

### **Design**

Students who agreed to participate in this study were presented with a web-based, interactive survey delimiting a single success/failure feedback manipulation. The three-phase study consisted of collecting background information on each student as well as information on mood, behavior, and performance on three separate anagram tasks described to the students as “learning tasks”. Each performance task consisted of a six minute difficult anagram task, whereby students accumulated points for any English word formed from the letters presented, followed by an option to continue with a second set of moderate anagrams. Students had three minutes to complete the second set of moderate anagrams, however, they were told that points would be tallied differently than in the first set in that points would be deducted for any wrong or skipped answers. The option to continue was designed to activate dominate promotion or prevention structures by reminding students that they have an opportunity to improve their scores but potentially risk losing points for any incorrect response.

Once time expired after the second set of moderate anagrams, students were presented with randomly assigned positive or negative feedback. They were then asked to complete a

second mood questionnaire, followed by a second opportunity to improve scores by completing another second set of anagram tasks including a difficult set of anagrams followed by an option to continue with moderate anagrams knowing the potential gain or risk points as described in the instructions. After completing the second performance task, negative and positive feedback presented to students earlier was discredited when all students were presented with an error message asking them to disregard all previous results. Students were invited back to complete a final set of anagram tasks along with a mood measure and then debriefed the following day to conceal manipulations from students participating in the study later in the day.

### **Predictor Variables**

**Promotion-Prevention Regulatory Focus.** The Behavioral Inhibition-Behavioral Activation Scale (BIS/BAS; Carver and White, 1994) was administered in order to identify student sensitivity to promotion vs. prevention regulatory strategies. The BIS, a one dimension of the BIS/BAS scale, emphasizes security needs and measures individual differences in concern and attention to negative events when they occur. Statements include, *“I worry about making mistakes,”* and *“Criticism or scolding hurts me quite a bit.”* The BAS incorporates three subscales that relate to advancement needs: 1) the *drive* scale measures the extent to which one is motivated by desired goals and includes statements such as, *“I go out of my way to get things I want”*; 2) the *fun seeking* scale measures the extent to which an individual is motivated to seek new and exciting situations including, *“When I’m doing well at something, I love to keep at it”*; and 3) the *reward* scale which measures the extent to which one is motivated by potentially rewarding situations and included statements such as, *“When I see an opportunity to get something I like, I get excited right away.”* Statements for all scales were presented to students



in unique random order with response options ranging on a scale from (1) *strong agreement* to (4) *strong disagreement*; there was no neutral response.

Original factor analysis revealed two main factors, one representing behavioral approach (BAS) made up of three sub-factors all loading above .75, and one representing behavioral inhibition (BIS) loading at .93 (Carver & White, 1994). Reports on eight week, test-retest reliabilities for all scales on the BIS/BAS demonstrate moderate alphas ranging from .59 to .69. Past research demonstrates that scales converge with the PANAS (Watson, Clark & Telgen, 1988), as expected, with negative affectivity correlated to inhibitory responses as measured by the BIS ( $r = .42$ ), and positive affectivity and advancing behaviors correlated to measures such as *drive* ( $r = .31$ ), *reward* ( $r = .28$ ), and *fun seeking* ( $r = .19$ ), as measured by the BAS. The BIS/BAS scale also correlates as appropriate with the General Temperament Survey, the Minnesota Multiphasic Personality Inventory (MMPI) and the Tridimensional Personality Questionnaire (Carver et al., 1994).

**Moderator Variable: Controllability.** The Children's Attributional Style Questionnaire – Revised (CASQ-R; Thompson et al., 1998) was used as a measure of controllability. The original 48-item CASQ (Seligman, 1991) identifies explanatory style in children as being optimistic or pessimistic relative to the amount of control one perceives to have over life events. The revised 24-item CASQ-R contains one-sentence scenarios representing possible outcomes for negative and positive events and included statements such as, “*You have a substitute teacher, and she likes you,*” and “*You try out for a sports team and do not make it.*” Students were given two responses from which to choose that assign control to personal (internal vs. external), permanent (stable vs. unstable), or pervasive (universal vs. specific) causes. Thompson, et al., reported reliability ratings ranging from .58 - .66 depending on gender and age

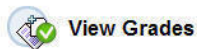
with boys and younger participants demonstrating lower but not significantly lower reliability. Cronbach alphas = .61 were considered similar for Times 1 and Times 2. Test-retest reliabilities revealed moderate stability over a six month period with  $r = .53$ .

**Feedback.** Students were randomly assigned to negative or positive feedback conditions prior to beginning Phase II of the study. After completing the first set of performance tasks, students were instructed by the Experimenter to click on the *Feedback* button in the main menu that was automatically generated after completing the first set of anagrams. Students were presented with a picture of their results indicating performance was either “excellent” or “poor” and given generic feedback on how to improve (see Figure 2).

**Discrediting Feedback.** In order to discredit feedback, students completed the second set of anagrams and were instructed to click on the main menu item, Feedback 2, for results. All students were presented with an error message that indicated calculations were incorrect and results for both “learning tasks” should be ignored (see Figure 2).

Figure 2: Links to student feedback for randomly assigned negative and positive feedback and for error messages.

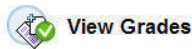
OTL2: BB ASSIGNMENT AND ASSESSMENT TOOLS (OTL TEMP 4) > TOOLS > MY GRADES



Your grades for this Course

Item Name	Details	Due Date	Last Submitted, Modified, or Graded	Grade	Points Possible	Comments
Learning Task I	<a href="#">Details</a>		March 25, 2009	poor	100	By determining more creative responses and longer words, you can improve your score.

OTL2: BB ASSIGNMENT AND ASSESSMENT TOOLS (OTL TEMP 4) > TOOLS > MY GRADES



Your grades for this Course

Item Name	Details	Due Date	Last Submitted, Modified, or Graded	Grade	Points Possible	Comments
Learning Task I	<a href="#">Details</a>		March 25, 2009	excellent	100	By determining more creative responses and longer words, you can improve your score.

## Outcome Variables

**Performance Task.** The performance task was presented in two stages, three times during the study. In the first stage, students were given six minutes to complete 30 randomly presented, very difficult anagrams containing 11 to 17 letter words (see Appendix B). Students were not expected to determine the correct word, although some did, but to create the best possible word from the anagram presented, with a student earning all available points for determining the correct word. Students earned one point for every letter used in an English word created from the letters presented and a score of zero for unanswered anagrams or for words created that were not found in an English dictionary. Credit was also given for misspelled words provided all letters of the correctly spelled word were found in the anagram. For example, one student received credit for the misspelled word “stear” because an additional “e” necessary to spell “steer” correctly was present in the anagram. Students were also given credit for proper nouns (i.e., Tim, Reese), contractions (i.e., dont), and slang or jargon (i.e., tween, meanie), provided all letters were present in the anagram. Scoring methods included means by which students were rewarded for every effort expended (see Miller, 1985).

Completing the second set of anagrams was optional. Instructions were designed to activate both promotion and prevention structures by encouraging students to earn additional points while warning them of the potential risk of losing points. By activating both systems, students were expected to demonstrate predicted preferences to approach or avoid the option to continue based on ratings on the BIS/BAS. Students were instructed to click on *yes* to continue or *no* to quit the task. Those who did not opt to continue were given a short story to read online. Those who opted to complete the second set of anagrams were instructed to determine the one and only correct word from the letters presented in order to earn points, and erroneously

informed that points would be deducted for incorrect or skipped responses, resulting in potentially fewer points than prior to attempting the second set of anagrams. Students were then given three minutes to earn as many points as possible for correctly completing each anagram presented. Words were easy to moderate containing from four to seven letters each (see Appendix B). In actuality, scores were calculated so that students received one point for each letter in a word that was correctly unscrambled and 0 points for incorrect or skipped responses. No points were deducted from student responses, despite efforts made to encourage them to believe otherwise.

**Mood Scale.** A 20-item mood scale derived from the PANAS (Watson, et al., 1988) was used to measure mood. Participants in this study were asked to rate on a scale ranging from 1 (never) to 5 (always), the extent to which they experienced 20 different emotions during the past week (see Appendix C). Students were asked to complete the scale at three different times during the study: before receiving feedback, after the feedback condition, and after feedback was discredited. The PANAS demonstrates high internal consistency with Cronbach's alpha coefficients ranging from .86 to .90 for positive affective traits and from .84 to .87 for negative affective traits depending on phrasing relative to emotions experienced in the moment, recently, or over longer periods of time. Test-retest reliabilities demonstrated significant temporal stability across conditions (.54 and .45 for positive and negative affect respectively). When using more general temporal measures of affectivity, stability rose to .68 and .71 for positive and negative affective measures respectively.

**Option to continue.** Students indicated their choice to continue with the second set of easy to moderate anagram tasks by answering *yes* or *no* to the question, *Would you like to complete the second learning task for a chance to earn additional points?* Instructions included

both a warning that students risk losing points as well as a reminder that the second set of anagrams were much easier and students could easily increase their score (see instructions in Appendix E).

**Prediction.** Immediately after completing the first set of very difficult anagrams, students were asked to predict their performance by answering the following two questions: 1) On a scale from 0 to 100, how well do you believe that the *average student* performed in your class on the anagram task, and 2) If this last set of anagrams was worth 100 points, how many points do you believe you earned? Final prediction ratings were calculated by dividing the predicted self rating by the predicted average for other students.

### **Procedures**

Principals at private Detroit Metropolitan area Catholic schools were sent a letter via email asking their participation in a psychological study that examined the relationship between feedback and performance on school-related tasks. Schools were chosen on the basis of prior experience and logistics regarding permissions. All parents of students from schools agreeing to participate received an Information Sheet via email and U.S Postal mail explaining the purpose, procedures, risks and benefits of the study (see Appendix A). Those parents who wished to exclude their child from the study were given several options to indicate their choice by contacting the Experimenter via phone, fax, or email; by contacting the computer teacher via email or phone; or by contacting the school either by phone or by returning a form attached to the Information Sheet. Only students registered in computer courses were considered because the study could be conveniently administered using a web-based computer program during regularly scheduled computer classes.

Once a school agreed to participate in the study, the Experimenter scheduled an appointment with the computer teacher to explain the details of the study, give the school necessary forms and information that would be available to parents, and schedule the three-phase study. Teachers received a description of each phase of the study including information sheets, student directions, survey questions, and anagrams listed on the performance task. The study was scheduled across three days over two consecutive weeks with one week between each phase of the study. Class periods were 45 minutes in length with six computer courses scheduled throughout the school day beginning at 8:00 a.m. and ending at 2:45 p.m.

On the first day of the scheduled study, the classroom teacher explained to the students that they were being asked to participate in a study that would take place across three class periods, once per week. The teacher, as instructed by the Experimenter prior to the first scheduled session, explained that students were being asked to participate in a “learning study”, and that outcomes were important in determining future success. The teacher also explained that students did not have to participate in the study and that their grade would not be impacted in any way by their choice to participate. Students who opted out of the study were given an additional assignment during class.

The teacher then introduced the Experimenter who told students they would be given an opportunity to participate in a computer-based learning study that examined verbal intelligence, an important factor in getting good grades in school, getting into desired colleges, making money and having future success, and that students should take the results seriously. Information and instructions for the study were projected onto a screen as the Experimenter went through each aspect of the first phase. Students were shown an Adolescent Behavioral Assent Form (see Appendix D) detailing the study and explicitly stating that even though students agreed to

participate in the study, they were free at any time to refuse to answer questions or to quit the study altogether. Students who agreed to participate in the study received a random user ID and password distributed by the classroom teacher and set up in advance of the study.

### **Phase I: Background Data**

Surveys and performance tasks were set up in Blackboard (Bb) prior to the first phase of the study along with user identifications (ID) consisting of anonymous alpha-numeric user names and passwords. The classroom teacher distributed printed user IDs and passwords randomly to students, who then wrote their names in the space provided, logged into the Bb *Attitudes and Learning Study* using their ID and password, and returned the printed copy to the computer teacher who secured them for use in follow-up phases of the study.

Once students were logged into the web-based Bb course, they were presented with instructions to click on the title, *Attitudes and Learning Study*. A folder entitled Phase I was generated followed by instructions to click on it. An onscreen PowerPoint presentation automatically opened that informed students of efforts to maintain anonymity and confidentiality; the Experimenter went through the slide presentation with the student using the classroom-mounted, LCD projector and Microsoft PowerPoint software uploaded to Bb, as well. See Appendix E for all instructions included for each phase of the study as well as onscreen instructions for each task. After completing the introduction, students were asked to rate on two separate scales from one (1), *not at all*, to seven (7), *completely*, the extent to which they believed information would remain anonymous and confidential.

After entering their choices, new instructions were computer generated that indicated students should click on the new title presented, *Background Information*. Here students were asked to choose from the options listed by clicking on the radial next to their preferred answer

for questions regarding gender, grade, and age. When finished, students were prompted to click *Submit*, generating the next title, *Attitudes I*, automatically. Students were presented with the mood measure and asked to complete it. Upon submitting their answers, students were immediately presented with the second attitudes survey, *Attitudes II*, and instructed to click on the title. Onscreen instructions were presented for completing the CASQ-R and can be found in Appendix E. After clicking *Submit*, students were presented with the third attitudes survey, the BIS/BAS, and asked to complete the 20-item scale. When students were finished with the final module, they logged out of Blackboard and the Experimenter indicated that Phase I of the study was complete.

## **Phase II: Feedback Manipulation**

Students were invited back the following week to complete Phase II of the study. Prior to the second phase of the study, students were randomly assigned to receive either negative or positive feedback and placed in one of two new Bb courses made to look and function identical to the first course and to each other so students were unable to detect they were logging into two separate courses designed to deliver different feedback. Once students were assembled for the second phase of the study, the computer teacher distributed user IDs and passwords so students could again log into the *Attitudes and Learning Survey*. The computer teacher then collected IDs and passwords, locked them away, and the Experimenter proceeded with the second phase.

Students were reminded that answers would remain anonymous and confidential. Instructions for Phase II were displayed via a PowerPoint presentation slide presentation that described the upcoming tasks as “learning tasks”. Students were told they would be asked to complete two sets of anagrams, one difficult and the other easy to moderate. Instructions indicated that students would be given six minutes to complete the first set of difficult anagrams



and to earn as many points as possible by determining the best word that could be generated from the anagram. Instructions indicated that during the first set of difficult anagrams, students would not be penalized for wrong answers and, in fact, were encouraged to be creative in their responses. In a sample anagram, students were shown how an incorrect response on a difficult anagram such as T L L A B I A G I N O O Z (globalization) can earn points for a response such as *global* or even more points for a creative but also incorrect response, such as *abolition*. Promotion focused individuals were encouraged to take advantage of the motivating opportunity to earn as many points as possible by determining longer, more creative words, while prevention-focused individuals could behave more vigilantly and secure an easier answer in order to swiftly move on to the next anagram.

Students were also informed initially they would be given an option to complete a second set of easy to moderate anagrams after completing the first set. Students would be given only three minutes to complete the second set and were erroneously led to believe that the second set of anagrams would be scored differently than the first in that students would lose points for any wrong or skipped answers. Students could decide to opt out of the second set of anagrams if they wanted to and maintain their current score. Students were informed that if they opted out of completing the second set of anagrams, they would be given a reading online. See Appendix E for complete instructions for Phase II of the study.

After going through the instructions, students were prompted to click on the title, *Practice Anagrams*, and then presented with three practice anagrams for which they received no feedback. The Experimenter waited until all students finished the practice anagrams before setting the on-screen stop-watch for six minutes. Students were asked to click on the title, *Learning Task I*, where the first difficult anagram was presented, followed by a text-box

prompting students to type in their answer. Anagrams were presented one-at-a-time with no option for backtracking. After time expired, students ended the anagram task and were prompted to make a prediction on their performance by answering two questions: 1) If the first set of anagrams was worth 100 points, how many points do you believe you earned? and 2) On a scale from 0 to 100, how well do you believe that the *average student* performed the anagram task? Students then were presented with an option to continue with the second set of moderate anagrams, at which time they were reminded that they may earn additional points but risk losing points as well (see Appendix E for instructions). The Experimenter set the onscreen stop-watch for three minutes. After time expired, students were instructed to close either the anagram task or their online reading assignment.

A new link entitled, *Feedback 1*, was programmed to automatically generate in the main menu after exiting from the previous task, and students were instructed by the Experimenter to click on it. Feedback was randomized with half the students receiving positive feedback stating their performance was “Excellent”, and the other half receiving negative feedback stating their performance was “Poor”. Students were given generic advice on how to increase their scores and then told that they will have another opportunity to improve their scores by completing an additional set of anagrams. Figure 3 depicts the picture displayed for both feedback conditions.

After viewing feedback, students were prompted to complete the mood scale. Instructions stated that moods can change periodically and continuous measures throughout the study were required. Once students completed the second mood scale, they were asked to complete another set of anagram tasks. Time allowed for completing only the first set of difficult anagrams.

Figure 3: Error message discrediting feedback

**Error!**

A database error occurred. Scores for both Learning Task I and II are invalid.

For reference, the Error ID is 006e958a-4668-45e4-98f1-6e7eab1e31e4.

**Phase III: Discrediting Feedback**

Students returned for Phase III of the study one week after Phase II, and logged into Bb as in previous phases of the study. The folder *Phase III* was visible on the computer screen after entering the Attitudes and Learning Survey, and students were prompted to enter the final phase of the study. Students were prompted to click on the option to continue with the second set of anagrams, after which, they completed a set of easy to moderate anagrams in three minutes or read the online reading. All students then were prompted to click on *Feedback 2* which appeared in the main menu and were presented with an erroneous message stating there was a database error and all scores for “Learning Task I” and Learning Task II” should be ignored, the intent of which was to discredit prior performance feedback (see Figure 3).

Students were presented once again with the mood scale and then instructed to complete the anagram task a final time, as outlined in Phase II of the study, including a set of difficult anagrams followed by predictions on their scores, and the option to earn additional points by completing the moderate set of anagrams.

Once students completed the final set of anagrams, they were presented asked to complete five questions regarding the effectiveness of the deception (see Appendix F). Students were thanked for their participation, excused from the study for the day, and then fully debriefed the following day, once all students completed the final phase of the study.

## CHAPTER 4: RESULTS

Data was collected using Blackboard, the online content management system, and automatically uploaded into the Blackboard Grade Center as students completed each module. When the study was complete, data was downloaded from the Bb Grade Center into Microsoft Excel where appropriate variables were reversed, and then uploaded into SPSS for statistical analysis. All major variables, including performance scores on the three sets of anagram tasks (prior to feedback, after feedback, and after feedback had been discredited); the BIS/BAS; the CASQ-R; and affective ratings from the mood scales, were examined for expected inter-item correlations, frequencies, and out of range variables. Univariate statistics with separate means on self-regulatory measures, control, and positive and negative affective measures and performance measures for all three temporal conditions in the study are summarized in Table 1.

Bivariate correlations were computed to examine the strength of the relationship among self-regulatory strategy, controllability, and performance on the anagram tasks. Significant positive correlations on performance on the anagram tasks were moderate for all temporal measures including task 1 and task 2 ( $r = .39, p = .00$ ), task 1 and task 3 ( $r = .50, p = .00$ ), and task 2 and task 3 ( $r = .58, p = .00$ ). Additionally, higher ratings on controllability were significantly and positively correlated with performance on anagram tasks at time 1 ( $r = .23, p = .02$ ) and time 3 ( $r = .20, p = .05$ ). Lower ratings on the BIS scale were significantly correlated with higher performance on task 1 ( $r = -.18, p = .05$ ). Table 2 contains a correlation matrix for all predictor, criterion, and moderator variables contained in the study.

Table 1: Univariate Statistics for All Major Variables in Analyses

Variable	Time 1		Time 2		Time 3	
	N	Mean	N	Mean	N	Mean
Positive Affect	89	36.68 (5.24)	84	35.20 (7.07)	78	35.18 (7.73)
Negative Affect	89	23.12 (5.94)	84	21.58 (6.84)	78	23.26 (7.32)
Performance	90	70.04 (28.14)	90	77.54 (42.24)	76	86.37 (37.82)
BAS Reward	88	16.73 (1.75)				
BAS Drive	88	11.37 (1.89)				
BAS Fun Seeking	88	12.28 (1.85)				
Total BAS	88	40.38 (4.32)				
Total BIS	86	20.79 (3.47)				
Control	83	5.75 (2.52)				

*Note:* Time 1 = prior to feedback; Time 2 = after feedback and Time 3 = after feedback was discredited. Standard deviations are in parentheses. BIS/BAS = Behavioral Inhibition/Behavioral Activation Systems (Carver et al., 1994).

Table 2: Inter-item Correlations for all Main Variables Including BIS/BAS, CASQ-R, and Performance Tasks

		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9
Total BIS	r	-----								
	Sig.									
	N	86								
Total BAS	r	.13	-----							
	Sig.	.12								
	N	86	88							
BAS Reward	r	.25*	.83**	-----						
	Sig.	.01	.00							
	N	86	88	88						
BAS Drive	r	.06	.81**	.58**	-----					
	Sig.	.30	.00	.00						
	N	86	88	88	88					
BAS Fun Seeking	r	.01	.73**	.40**	.32**	-----				
	Sig.	.46	.00	.00	.00					
	N	86	88	88	88	88				
Controllability	r	-.13	-.07	-.06	.18	-.17	-----			
	Sig.	.13	.44	.30	.06	.07				
	N	77	79	79	79	79	83			
Performance Task 1	r	-.18*	-.07	-.06	.03	-.13	.23*	-----		
	Sig.	.05	.26	.29	.40	.11	.02			
	N	84	86	86	86	86	82	90		
Performance Task 2	r	.07	.10	.03	.11	.08	.04	.39**	-----	
	Sig.	.26	.19	.38	.16	.22	.36	.00		
	N	84	86	86	86	86	82	89	90	
Performance Task 3	r	-.07	-.05	-.10	-.05	.02	.20	.50**	.59**	-----
	Sig.	.28	.34	.22	.34	.45	.05	.00	.00	
	N	72	73	73	73	73	69	75	75	76

\* $p < .05$

\*\* $p < .01$

*Note:* The BIS/BAS is the Behavioral Inhibition/Activation Scale (Carver et al., 1994); the CASQ-R is the Children's Attributional Style Questionnaire – Revised (Thompson et al., 2006); the performance tasks were three sets of anagram tasks including a set of difficult and a set of moderate anagrams recorded before, during and after discrediting feedback.

### **BIS/BAS Factor Analysis**

Two items on the BIS scale, determining whether students rarely experienced *fear or nervousness* and *felt few fears compared to friends*, were reverse coded so that responses reflected inhibitory strategies. Reliabilities were calculated for the BIS scale with Cronbach's alpha coefficient = .76, reflecting similar reliabilities as determined by Carver and White (1994;  $\alpha = .74$ ). Reliabilities for the individual BAS scales Reward ( $\alpha = .62$ ), Drive ( $\alpha = .60$ ) and Fun Seeking ( $\alpha = .57$ ) were less than demonstrated by Carver and White (1994; (Cronbach's alpha coefficient = .73, .76, and .66 respectively). However, reliabilities for the total BAS scale were high ( $\alpha = .77$ ).

A Principal components factor analysis was conducted on both BIS and BAS scales using oblique rotation on Eigenvalues greater than 1.00. Six factors best represented the data. Factors were limited to two in a second factor analysis with resulting coefficients clearly depicting the expected two factor structure with 7 items combining on the BIS scale to form one factor representing behavioral inhibitory responses, and 13 items related to the BAS scale including reward, drive, and fun-seeking constructs representing behavioral approach responses. Results of the factor analysis for the BIS/BAS are presented in Table 3. The seven items on the BIS scale were combined to form one construct representing inhibitory responses. Individual items for *reward*, *drive*, and *fun seeking* scales were combined for each of the three constructs and these ratings were then combined for an overall total BAS rating representing behavioral approach responses.

Table 3: Principal Component Factor Analysis Using Oblique Rotation Forcing Two Factors for the BIS/BAS

BIS/BAS Item	Factor 1	Factor 2
If I think something unpleasant is going to happen I usually get pretty “worked up.”	.57	.51
I worry about making mistakes.	.45	.68
Criticism or scolding hurts me quite a bit.	.29	.56
I feel pretty worried or upset when I think or know somebody is angry at me.	.53	.44
Even if something bad is about to happen to me, I rarely experience fear or nervousness.	.16	.58
I feel worried when I think I have done poorly at something.	.53	.52
I have very few fears compared to my friends.	-.17	.35
When I get something I want, I feel excited and energized.	.57	-.06
When I’m doing well at something, I love to keep at it.	.42	-.27
When good things happen to me, it affects me strongly.	.58	-.11
It would excite me to win a contest.	.45	.10
When I see an opportunity for something I like, I get excited right away.	.63	-.30
When I want something, I usually go all-out to get it.	.48	-.26
I go out of my way to get things I want.	.44	-.40
If I see a chance to get something I want, I move on it right away.	.61	-.29
When I go after something I use a “no holds barred” approach.	.37	-.18
I will often do things for no other reason than that they might be fun.	.30	-.30
I crave excitement and new sensations.	.36	-.41
I’m always willing to try something new if I think it will be fun.	.33	-.27
I often act on the spur of the moment.	.42	-.18

*Note:* Extraction Method: Principal Component Analysis; Rotation Method: Oblim with Kaiser Normalization; 2 components extracted



### Option to Continue

To determine if behavioral tendencies on options to continue with the performance task were consistent with results on the BIS/BAS scales, a one-way ANOVA was conducted for each time students were presented with an option to continue: prior to feedback, after feedback and after feedback was discredited. The prediction was that students rating higher on the BAS would opt to continue the performance task by completing the second set of moderate anagrams while higher ratings on the BIS would reflect a more vigilant approach with students opting to quit more often. Results were examined on totals of the BIS and BAS measure as well as for separate scales on the BAS for *reward*, *drive*, and *fun seeking* (see Table 4). Additionally, results were considered separately for negative and positive feedback after feedback was given (see Table 5) and after feedback was discredited (see Table 6).

Significant differences were determined between those who decided to continue with the performance task rather than quit on *drive* [ $F(1,85) = 5.84, p = .02$ ], *fun seeking* [ $F(1,85) = 6.21, p = .01$ ] and *Total BAS* [ $F(1,83) = 5.68, p = .02$ ], but not for *reward*. However, results were not in predicted directions. Those students who decided to quit the task rated significantly higher on BAS constructs of *drive* ( $M = 12.17, SD = 1.92$ ) and *fun seeking* ( $M = 13.10, SD = 1.81$ ) than those who opted to continue with the second set of anagrams [*drive* ( $M = 11.09, SD = 1.82$ ); *fun seeking* ( $M = 12.01, SD = 1.80$ )]. Similarly, significant mean differences in ratings on the BIS between those who opted to continue compared to those students who decided to quit were found,  $F(1,83) = 4.50, p = .04$ , but not in the predicted direction. Students deciding to continue with the performance task demonstrated significantly higher inhibitory ratings ( $M = 21.25, SD = 3.36$ ) on the BIS than those deciding to quit the task ( $M = 19.45, SD = 3.60$ ).

Table 4: ANOVA Results for All Students Opting to Continue or Quit the Performance Task Prior to, After and After Discrediting

Feedback as a Function of Ratings on the BIS/BAS

All Students	Prior to Feedback					After Feedback					After Discrediting Feedback						
	Option to Continue	N	M	SD	$F_{(3,36)}$	N	M	SD	$F_{(3,36)}$	N	M	SD	$F_{(3,36)}$	N	M	SD	$F_{(3,36)}$
BIS/BAS with Subscales	Total BIS	No	22	19.45	3.60	1.83	4.50*	15	20.47	2.88	1.70	.19	29	19.79	3.26	1.73	4.22*
	Yes	63	21.25	3.36		57	20.88	3.37		46	21.39	3.30					
Total BAS	No	23	42.22	4.22	1.85	5.68*	16	40.12	5.08	1.71	.12	29	41.56	4.69	1.74	2.93	
	Yes	64	39.77	4.21		57	40.56	4.26		47	39.82	4.09					
BAS Reward	No	23	16.94	1.82	1.85	.39	16	16.48	1.86	1.71	.24	29	16.93	1.79	1.74	.89	
	Yes	64	16.68	1.74		57	16.72	1.72		47	16.55	1.69					
BAS Drive	No	23	12.17	1.92	1.85	5.84*	16	11.25	1.98	1.71	.24	29	11.94	1.97	1.74	2.76	
	Yes	64	11.09	1.82		57	11.52	1.95		47	11.20	1.85					
BAS Fun Seeking	No	23	13.10	1.81	1.85	6.21*	16	12.40	2.59	1.71	.02	29	12.69	2.07	1.74	1.88	
	Yes	64	12.01	1.80		57	12.32	1.70		47	12.07	1.80					

\* $p < .05$

Table 5: ANOVA Results for Students Opting to Continue or Quit the Performance Task as a Function of Ratings on the BIS/BAS After Receiving Positive or Negative Feedback

Students After Receiving: BIS/BAS with Subscales	Option to Continue	Positive Feedback					Negative Feedback				
		N	M	SD	df	F	N	M	SD	df	F
Total BIS	No	7	20.29	2.14	1,31	.12	8	20.63	3.54	1,37	.08
	Yes	26	20.69	2.91			31	21.03	3.75		
Total BAS	No	7	38.57	3.56	1,31	4.08*	9	41.33	5.94	1,38	1.10
	Yes	26	41.86	3.89			31	39.46	4.31		
BAS Reward	No	7	15.86	1.86	1,31	2.14	9	16.96	1.81	1,38	.38
	Yes	26	16.92	1.67			31	16.55	1.77		
BAS Drive	No	7	10.43	1.27	1,31	5.58*	9	11.89	2.26	1,38	1.82
	Yes	26	12.24	1.91			31	10.91	1.80		
BAS Fun Seeking	No	7	12.29	2.98	1,31	.26	9	12.48	2.42	1,38	.42
	Yes	26	12.69	1.52			31	12.00	1.81		

\* $p < .05$

Table 6: ANOVA Results for Students Opting to Continue or Quit the Performance Task as a Function of Ratings on the BIS/BAS After Discrediting Positive or Negative Feedback

BIS/BAS with Subscales	After Discrediting Option to Continue	Positive Feedback					Negative Feedback				
		N	M	SD	df	F	N	M	SD	df	F
Total BIS	No	16	19.94	2.46	1,34	1.06	13	19.62	4.13	1,37	2.91
	Yes	20	20.90	3.02			26	21.77	3.50		
Total BAS	No	16	41.52	4.10	1,34	.33	13	41.61	5.52	1,38	2.55
	Yes	20	40.75	3.91			27	39.12	4.15		
BAS Reward	No	16	16.81	1.91	1, 34	.04	13	17.08	1.71	1,38	1.18
	Yes	20	16.70	1.59			27	16.43	1.78		
BAS Drive	No	16	12.08	1.93	1, 34	.48	13	11.77	2.08	1,38	1.94
	Yes	20	11.65	1.81			27	10.86	1.84		
BAS Fun Seeking	No	16	12.63	1.89	1,34	.12	13	12.77	2.35	1,38	2.16
	Yes	20	12.40	1.98			27	11.83	1.65		

*Note:* No significant mean differences were found between students opting to continue or quit the performance task based on measures of the BIS/BAS.

Ratings on the BIS/BAS were also examined for all students after feedback and after discrediting feedback. There were no significant differences between students on measures of

the BIS/BAS for those opting to or not to continue with the second set of moderate anagrams after feedback. However, after feedback was discredited, there were significant differences between groups opting to or not to continue with the moderate anagrams,  $F(1,73) = 4.22, p = .04$ , with those rating higher on BIS opting to continue with the anagram task ( $M = 19.79, SD = 3.26$ ) and those rating lower on the BIS opting to quit ( $M = 19.79, SD = 3.26$ ). Although significant, these results are not in the predicted direction.

To further examine if student choices on options to continue were congruent with either promotion or prevention regulatory strategies as determined by the BIS/BAS, negative and positive feedback conditions were examined separately. A One-way ANOVA was used to determine if higher BAS ratings equated to options to continue for those that received positive feedback and higher BIS ratings equated to options to quit for those that received negative feedback. There were no significant differences between students opting to continue or quit after receiving negative feedback on measures of either the BIS or BAS. However, for students receiving positive feedback, ratings on BAS *drive* were significantly different opting to continue,  $F(1,31) = 5.58, p = .02$ , with students opting to complete the second set rating higher on *drive* ( $M = 12.24, SD = 1.91$ ) compared to those who chose to quit ( $M = 10.43, SD = 1.27$ ), as predicted.

Options to continue relative to ratings on BIS/BAS measures were examined after feedback was discredited for both negative and positive conditions separately. There were no significant differences in means on the BIS or BAS for students opting to continue compared to those deciding to quit the performance task after feedback was discredited for students receiving either positive or negative feedback. See Tables 4, 5 and 6 for complete ANOVA results.

### **Predictions on Performance Task**

Responses on the CASQ-R were coded with a 0 or a 1 indicating the described attribute was present or not for each of the three constructs measuring explanatory style: *personal*, *permanent*, and *pervasive*. Frequencies on the CASQ-R were examined for extreme scores and reliability. Reliability on the 24 item was low to moderate with Cronbach's alpha = .40. Because cultural changes can influence the likelihood that students will experience an event as either positive or negative, two variables that reflected low inter-item correlations and contributed to lower reliability scores were eliminated including, *You have a messy room*; and, *You have a substitute teacher and she likes you*. Both items represent measures of stability and reflect one positive and one negative attribute. Final measures of the CASQ-R included twenty-two descriptive scenarios relative to personal (2 internal, 3 external), permanent (3 global, 3 specific), and pervasive (6 stable, 5 unstable) attributions. New reliability scores were moderate for the remaining items  $\alpha = .48$ , and similar to that demonstrated on the ASQ ( $\alpha = .42$ ; Seligman, 1984) but lower than that demonstrated on the CASQ-R for younger aged boys ( $\alpha = .58$ ; Thompson et al., 2006). Scores were combined on items for each of the three attributional constructs based on undesirable (bad) or desirable (good) outcomes; final scores on "bad" outcome items were subtracted from scores on "good" outcome items with the sum representing two ends of one continuum indicating individual differences in feelings of controllability.

Predictions on performance on the anagram tasks across the three temporal conditions were examined relative to scores on the CASQ-R to determine if higher predictions on performance were related to optimism and pessimism. A median split was used to designate two dichotomous groups delineating high and low controllability and a One-way ANOVA was used for the analysis. Statistical analyses were performed on scores for all students prior to feedback

conditions, and then separately for negative and positive feedback conditions after feedback and after feedback was discredited. There were no significant results, suggesting that ratings on controllability were unrelated to predictions on the performance task. Results can be found in Table 7.

Table 7: Comparing Predictions of Scores on Performance Tasks for Students Rating High and Low on Controllability

Prediction	Controllability	N	Mean	SD	df	<i>F</i>
Prior to Feedback	High	46	.95	1.66	1,76	.40
	Low	32	1.12	.46		
After Negative Feedback	High	23	.88	.68	1,32	1.12
	Low	11	1.10	.22		
After Positive Feedback	High	18	2.22	3.95	1,34	1.21
	Low	18	1.18	.64		
After Discrediting Negative Feedback	High	22	1.20	.88	1,33	2.36
	Low	13	2.11	2.59		
After Discrediting Positive Feedback	High	18	.75	.44	1,32	1.93
	Low	16	1.38	1.85		

*Note:* No significant mean differences were found between students rating high or low on controllability.

### **The Effect of Feedback on Mood**

To examine the effects of positive and negative feedback on mood, ratings were totaled separately for each of the two mood constructs representing positive and negative affect (PA; NA). Both combined scales demonstrated high reliability across all temporal conditions with Cronbach's alpha  $\alpha = .83$  and  $.86$  for positive and negative affective scales respectively prior to feedback, Cronbach's alpha  $\alpha = .91$  and  $.89$  for positive and negative affective scales respectively after feedback, and Cronbach's alpha  $\alpha = .94$  and  $.90$  for positive and negative affective scales respectively after feedback was discredited.

A Repeated Measures ANOVA was used to examine the hypothesis that positive and negative feedback on the performance task will affect mood ratings across the three temporal conditions. Means and standard deviations can be found in Table 8. It was predicted that those receiving positive feedback would experience increases in positive affect and decreases in negative affect while those receiving negative feedback were expected to experience decreases in positive affect and increases in negative affect.

Table 8: Descriptive Statistics for Measures of Positive and Negative Affect for Students Receiving Positive or Negative Feedback

	Feedback	Positive Affect			Negative Affect		
		N	Mean	SD	N	Mean	SD
Before Feedback	Positive	30	35.63	4.70	30	22.63	4.16
	Negative	38	36.93	5.68	38	24.16	6.98
	Total (GM)	68	36.28	5.28	68	23.40	5.91
After Feedback	Positive	30	34.78	7.72	30	22.39	6.91
	Negative	38	34.76	7.04	38	22.13	6.94
	Total (GM)	68	34.77	7.29	68	22.26	6.87
After Discrediting Feedback	Positive	30	34.07	5.80	30	24.70	7.34
	Negative	38	35.87	8.35	38	22.26	7.14
	Total (GM)	68	34.97	7.34	68	23.48	7.27

Multivariate assumptions of normal distribution for kurtosis but not skewness were violated for negative affective measures at time 1, positive affective measures at time 2, and negative affective measures at time 2. Because the ANOVA is a robust, no changes in statistical analyses were made. The assumption of equal error variance was tested using Levene's Test of Equality of Error Variances and was not significant at any of the three times during the study for positive affect,  $F(1,66) = 1.78, ns$ ;  $F(1,66) = .55, ns$ ; and  $F(1,66) = 2.34, ns$ , or for negative affect,  $F(1,66) = 2.18, ns$ ;  $F(1,66) = .98, ns$ ; and  $F(1,66) = .009, ns$ , respectively. Mauchly's Test of Sphericity, used to determine violations of high within subjects correlations, was not

found to be significant for measures of positive affect,  $\chi^2 (2, N=68) = 3.95, ns$ ; however, violations of sphericity were determined for negative affective items,  $\chi^2 (2, N=68) = 8.94, p = .01$ , and therefore, the Greenhouse-Geisser statistic was used to determine significant within subjects effects of negative feedback.

The main effects of mood and the interaction effects of mood x time were examined using the RM-ANOVA for combined positive and negative affect across the three temporal feedback conditions. Main effects,  $F (2,132) = 2.11, ns$ , and interaction effects of positive affect x feedback,  $F (2,132) = .70, ns$ , were not significant. Additionally, there were no main effects of time,  $F (1.77,116.97) = 1.39, ns$  or interaction effect for time x feedback for negative affect,  $F (1,77,116.97) = 2.94, ns$  (see Table 9).

Table 9: Repeated Measures ANOVA for Positive and Negative Affect as a Function of Time

Source	Positive Affect					Negative Affect				
	SS	df	MS	<i>F</i>	$\eta^2$	SS	df	MS	<i>F</i>	$\eta^2$
Time	90.40	2	45.20	2.12	.03	62.36	1.77	35.19	1.39	.02
Time x Feedback	29.88	2	14.94	.70	.01	121.99	1.77	74.47	2.94	.02
Error	2818.60	132	21.35			2960.92	116.97	35.31		

*Note:* There was no significant main effect for time or significant interaction effect for time x feedback. Effects for time include before, after, and after discrediting feedback.

Because these results do not examine significant differences separately for negative and positive affect as a function of feedback, results were plotted separately and a RM-ANOVA was calculated separately for negative and positive affect after splitting the file into negative and positive feedback groups. Figures 4 and 5 depict changes in affect across the three feedback conditions for students receiving positive and negative feedback separately. No significant differences were determined in positive affect as a function of feedback and feedback conditions.



Figure 4: Line graph represents positive affective mood ratings for positive and negative feedback conditions. Higher ratings indicate higher levels of positive affect and lower numbers represent lower levels of positive affect.

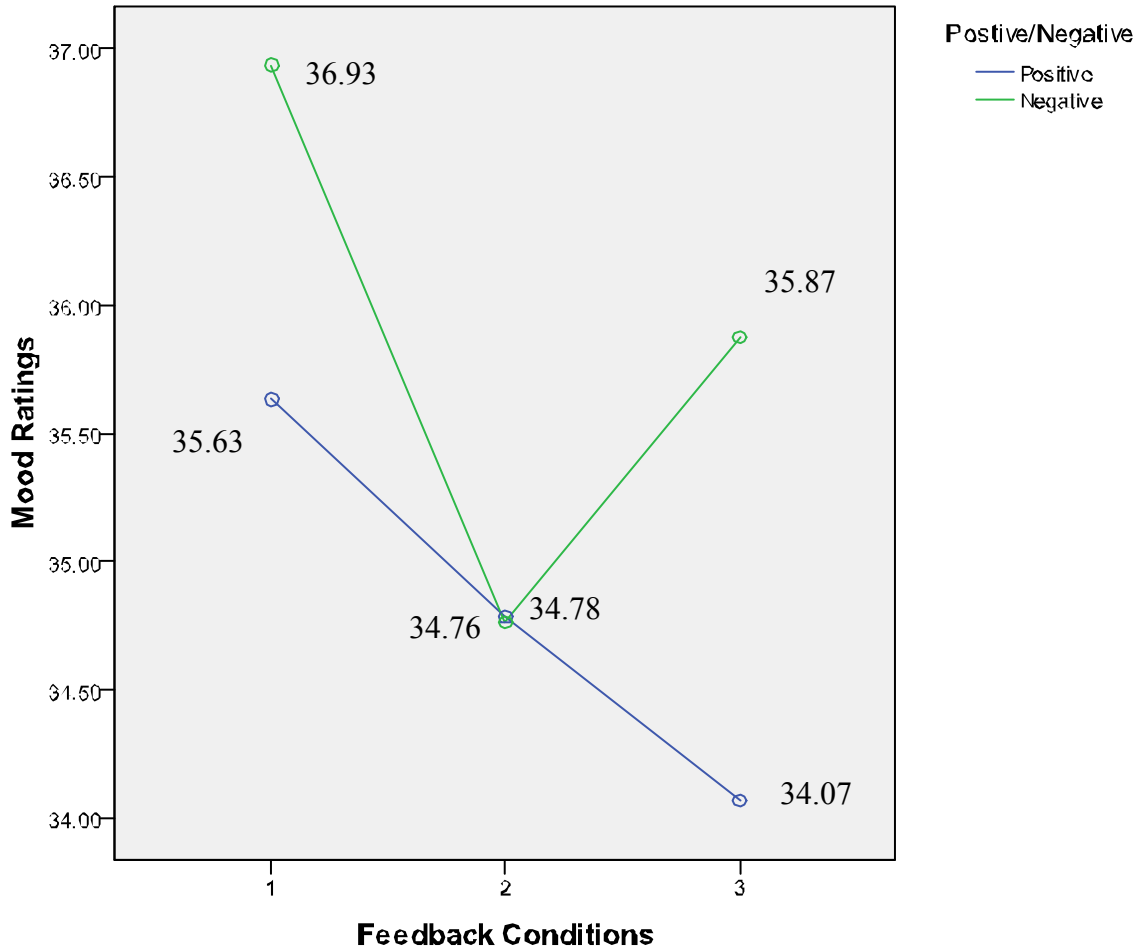
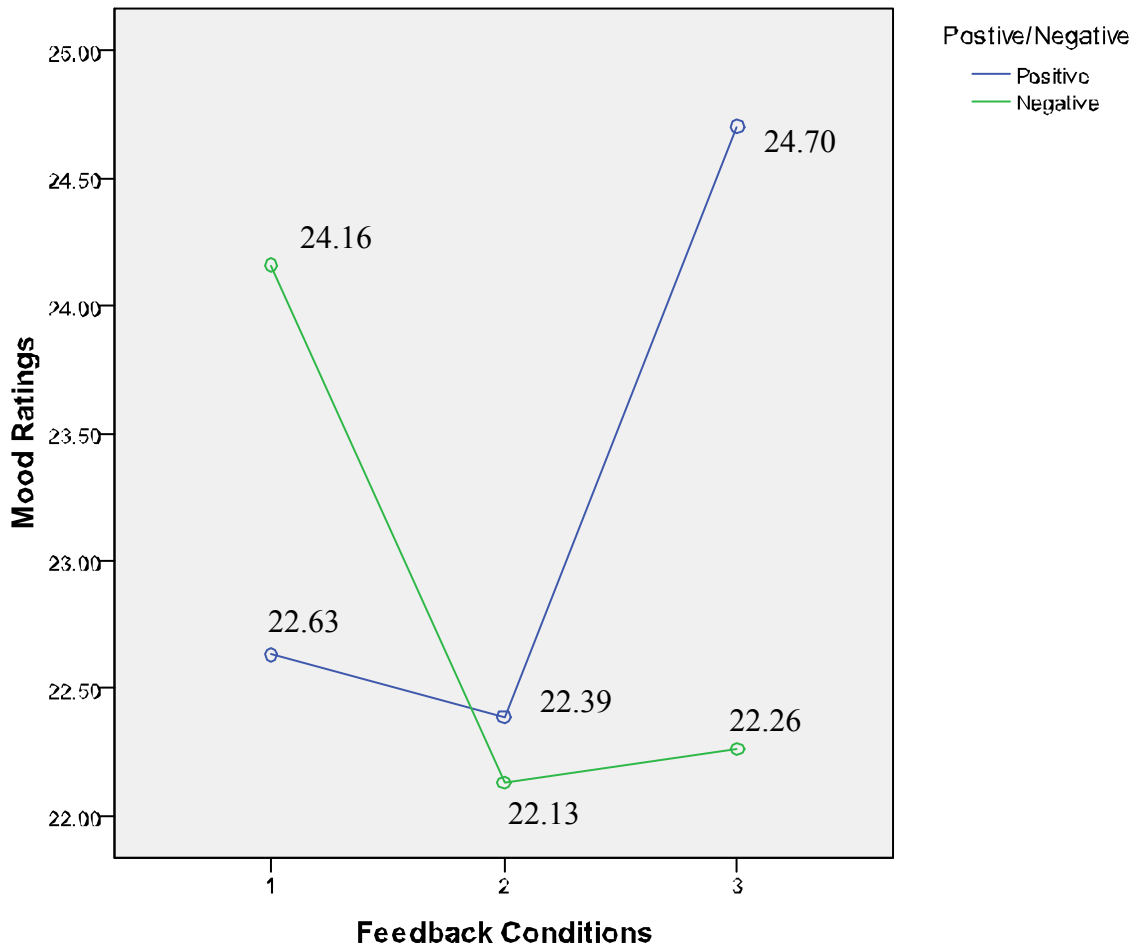


Figure 5: Line graph represents negative affective mood ratings for positive and negative feedback conditions. Higher ratings indicate higher levels of negative affect and lower numbers represent lower levels of negative affect.



### Moderator Effects of Control

Linear multiple regression was used to determine the effects of the moderator (control) on a linear relationship (regulatory focus and performance) (Frazier, Tix and Barron, 2004) in order to account for changes in performance scores relative to ratings on regulatory focus (predictor) and control (moderator). All main variables in the study first were centered by subtracting the mean from each score to reduce problems of multicollinearity (Aiken & West, 1991; Cohen & Cohen, 1983). Centered scores from the first set of anagram tasks were entered

in a multiple regression equation as the dependent variable. Total ratings on the BIS and BAS were entered together along with ratings on the CASQ-R, the predictor variable, and the interaction terms for BIS x CASQ-R and BAS x CASQ-R to determine the extent that a sense of control moderates the relationship between promotion and prevention strategies and performance. Centered scores on anagram task 2 and 3 were analyzed individually as dependent variables in the same manner.

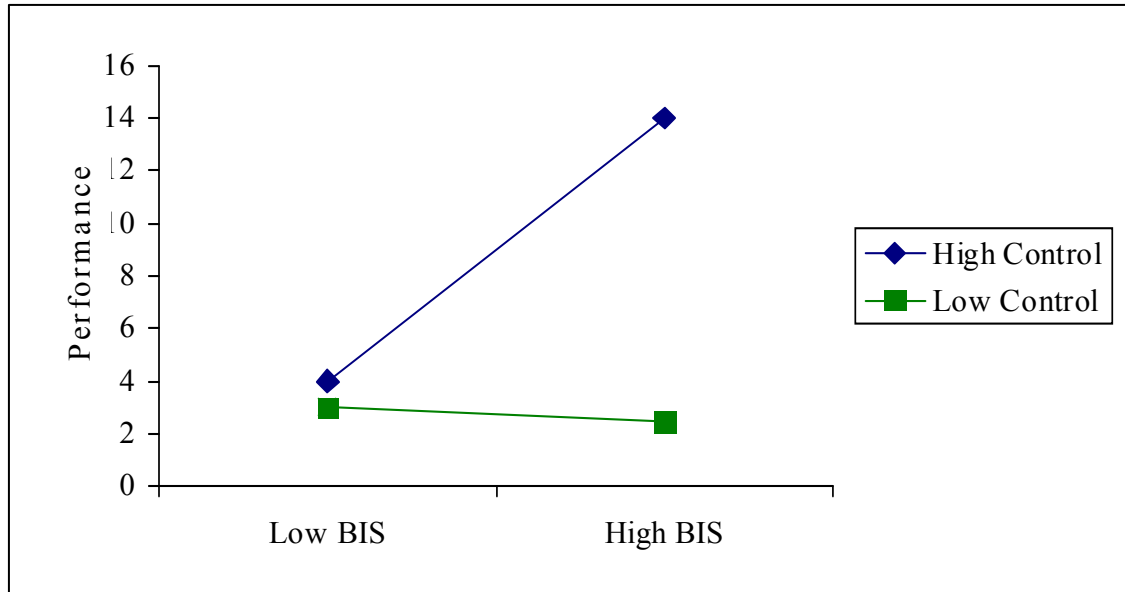
Student performance scores were examined first for all students in each of the three feedback conditions, and then separately for students after receiving negative or positive feedback and after discrediting feedback, to determine the moderating effects of an individual's higher or lower sense of control on regulatory strategy and performance. Prior to feedback, only ratings on the BIS were identified as significant predictors of scores on the anagrams task,  $\beta = -.26$ ,  $t(75) = -2.14$ ,  $p < .05$ , with greater levels of inhibition indicated by higher ratings on the BIS observed for students with lower scores on the anagram task. At this time, no other predictor variables were significant. The model accounted for approximately 12% of the variance in performance scores.

After students received negative or positive feedback, none of the three predictor variables, the BIS, BAS or the CASQ-Q, were found to be significant predictors of performance on the anagram task. However, the interaction between scores on the BIS and on the CASQ-Q was significant,  $\beta = .29$ ,  $t(75) = 2.42$ ,  $p < .05$ , indicating that a sense of control moderates the relationship between inhibitory strategies and performance scores, as predicted. Additionally, the initial model containing all students explained approximately 10% of the variance in performance scores, but was not significant,  $R^2 = .10$ ,  $F(5,70) = 1.56$ , *ns*.

The model was examined separately for students receiving positive or negative feedback, to better determine the effects of feedback on changes in predictor and moderator variables on performance. Again, the interaction effect between measures on the BIS and a sense of control was significant,  $\beta = .43$ ,  $t(36) = 2.40$ ,  $p < .05$ , indicating a moderator effect as predicted, but for those students receiving positive feedback only. This interaction was not significant for students who received negative feedback,  $\beta = .14$ ,  $t(38) = .81$ , *ns*. Results indicate that the model is more predictive when students receive feedback that is positive. Furthermore, the model, although insignificant,  $R^2 = .23$ ,  $F(5,31) = 1.82$ , *ns*, accounted for 23% of the variance in performance scores for students receiving positive feedback compared to only 7% of variance for students receiving negative feedback,  $R^2 = .07$ ,  $F(5,33) = .51$ , *ns*. None of the predictor variables for students who received negative feedback were significant.

In order to more fully examine the significant moderator effects of control on performance and inhibitory strategies in positive feedback conditions (e.g., Aiken & West, 1996), Microsoft Excel was used to plot the interaction using regression coefficients. Figure 6 depicts the significant interaction found in the positive feedback condition relative to control moderating the relationship between performance and regulatory strategies. Students rated low on control experienced little change in performance as a function of low or high prevention-focused strategies. However, students with a higher sense of control and who more often engaged in prevention-focused strategies and described as prevention-pessimists demonstrated significantly higher performance scores and benefited the most from positive feedback.

Figure 6: Interaction Effects of BIS x Control on Performance for Anagram Task 2 after Receiving Positive Feedback.



The final analysis examined performance on the anagram task after feedback was discredited. When students were examined together as well as separately for positive or negative feedback, there were no significant predictors. BIS, BAS or CASQ-R scores did not significantly predict performance on the anagram task. Additionally, interactions between BIS and CASQ-R scores, and BAS and CASQ-R scores were insignificant. In conditions after feedback was discredited, the hypothesis that a sense of control moderates the relationship between promotion or prevention regulatory strategy was unsupported. Similarly, when examining scores separately for students receiving negative or positive feedback, none of the variables significantly predicted performance on the anagram task for students in either condition.

Variance explained by the model after discrediting feedback was examined for all students and then separately for students receiving negative and positive feedback. Variance

explained by the model for all students was 8%,  $R^2 = .08$ ,  $F(5,59) = .98$ , *ns*. When examined separately, the model explained only 5% of the variance  $R^2 = .05$ ,  $F(5,26) = .28$ , *ns*, for students receiving positive feedback, but 27% of the variance for students receiving negative feedback  $R^2 = .27$ ,  $F(5,27) = 1.97$ , *ns*. All results for the main analysis determining predictor and moderating effects can be found in Table 10.

Table 10

Linear Regression Demonstrating the Extent to which Controllability Moderates the Relationship Between Regulatory Focus and Performance on Anagram Tasks for all Students, Students After Receiving Feedback, and Students After Feedback was Discredited

Predictor	Prior to Feedback			After Feedback			Discredited Feedback		
	$\beta$	$t$	$\Delta R^2$	$\beta$	$t$	$\Delta R^2$	$\beta$	$t$	$\Delta R^2$
BIS	-.26	-2.14*	.12	.09	.75	.10	-.14	-1.12	.08
BAS	.01	.06		.10	.85		-.02	-.15	
Control	.20	1.73		.09	.80		.20	1.58	
BIS x Control	.03	.28		.29	2.42*		.00	.03	
BAS x Control	.04	.31		-.12	-1.02		-.13	-.93	
<i>F</i>		2.01			1.56			.98	

Predictor	After Positive Feedback			After Negative Feedback		
	$\beta$	$t$	$\Delta R^2$	$\beta$	$t$	$\Delta R^2$
BIS	.17	.98	.23	.08	.47	.07
BAS	.26	1.55		.01	.06	
Control	.16	.91		.00	.02	
BIS x Control	.43	2.40*		.14	.81	
BAS x Control	-.02	-.12		-.25	-1.42	
<i>F</i>		1.82			.51	

Predictor	Discredited Positive Feedback			Discredited Negative Feedback		
	$\beta$	$t$	$\Delta R^2$	$\beta$	$t$	$\Delta R^2$
BIS	-.07	-.34	.05	-.28	-1.58	.13
BAS	.14	.71		-.17	-.93	
Control	.24	.98		.31	1.75	
BIS x Control	1.8	.76		-.13	-.73	
BAS x Control	-.18	-.67		-.10	-.56	
<i>F</i>		.28			1.96	

\* $p < .05$

## CHAPTER 5: DISCUSSION

Students in this study were given opportunities to improve performance on anagram tasks in order to determine use of effective regulatory strategies. In particular, student reactions to negative or positive feedback and subsequent performance on tasks after feedback was discredited were examined. Predictors included the BIS/BAS, a measure of regulatory strategies that identified a student's typical preference to approach or avoid situations, the CASQ-R, a measure of a student's sense of control, and the interaction term which measured the degree to which control moderated self-regulation and performance on anagram tasks. Tasks were set up to allow students to take advantage of chronic regulatory strategies by giving them a choice to advance their current score, a promotion-focused strategy, or employ a vigilant posture in order to avoid losing points, a prevention-focused regulatory strategy.

It was predicted that student performance as well as mood would be affected by feedback differently for those students rating higher on BIS compared to BAS and those rating higher or lower on control. Students rated higher in BIS were described as prevention focused while those rating higher in BAS were described as promotion-focused. Additionally, students rating as having a greater sense of control were described as optimists while those having a lesser sense of control were described as pessimists. The main hypothesis predicted differences among students identified as promotion-optimists, promotion-pessimists, prevention-optimists and prevention-pessimists with prevention-pessimists predicted to experience lingering negative effects of feedback. However, it was predicted that a sense of control moderates the relationship between regulatory focus and performance at each phase of the study: prior to, after, and after discrediting feedback. By activating both promotion and prevention foci within the context of the instructions, students were encouraged to choose performance options that were congruent

with chronic tendencies toward promotion or prevention strategies. Although results were not as predicted, some interesting findings are promising for future research.

The main analysis yielded some support for the hypothesis that feelings of control moderate the relationship between regulatory strategies and performance with significant moderator effects after feedback conditions, but not prior to or after discrediting feedback. Feelings of controllability were predicted to affect the relationship between regulatory strategies and performance for all temporal conditions. Prior to feedback, higher ratings on the BIS predicted lower performance scores on the anagram task and lower ratings on the BIS predicted higher scores suggesting that students who regulate according to inhibitory factors may score lower on initial performance tasks while waiting for performance feedback. Results after feedback also indicated that a sense of control did moderate the relationship between prevention regulatory strategies and performance on the anagram task, but at no other time during the study. Upon further examination, results indicated that positive feedback played a unique role in the results with performance greatly improved in high prevention-focused individuals who also rated higher in control (prevention-optimists). For these individuals, positive feedback motivated performance. Additionally, when students received positive feedback, the predictive model accounted for 23% of the variance compared to 7% of the variance explained for those receiving negative feedback. Results suggest an asymmetric relationship with positive rather than negative feedback motivating individuals to self-regulate appropriately.

Motivational factors may explain discrepancies in results on promotion and prevention regulatory strategies relative to continuing or quitting the anagram task,. Significant mean differences were found between students opting to continue and those opting to quit for *drive* and *fun seeking* constructs but not *reward*. These results, however, were not in predicted directions.



This may be because students' initial responsibility is to complete daily classroom assignments and earn grades in their regularly scheduled computer class. Knowing that they are not required to participate in the experiment and that course grades are not dependent on performance in the study, students described as *driven* may not perceive the task as oriented towards current achievement goals. Likewise, regarding *fun seeking*, high school students might perceive the anagram task as being opposite goals to engage in activities considered fun. In both cases, the option to continue and improve scores was not a motivating factor for students described as driven or fun-seeking.

Similar conclusions might be drawn regarding results on the BIS where students rating higher in inhibition were significantly more likely to continue rather than quit the second set of moderate anagrams while students rating lower on inhibition opted to quit rather than continue. Considering the previous postulation that motivated students might choose to work on school-related tasks, it may follow that students described as prevention-focused would choose to avoid classroom activities and continue with the anagram task, provided grades were in good standing, as withdrawing from school-related tasks could be a primary regulatory strategy for this type of student and considered an appropriate self-regulatory strategy. Measures that examine perceptions of classroom assignments relative to completing additional tasks unrelated to classroom requirements, as well as current classroom standings might indicate the extent to which scores on the BIS/BAS predict persistence on a task. Questionnaires used in research conducted by Nussbaum & Steele (2007) utilize scales such as the School Perceptions Questionnaire (SPQ; Osborn, 2001) to identify the importance of school or the Intellectual Engagement Inventory (IEI; see Nussbaum & Steele, 2007) to determine individual opinions of standardized achievement tests.

### **Improvements for Future Studies**

One strategy that could improve findings might include activating cognitive structures associated with promotion and prevention regulatory strategies. Instructions include promotion-focused strategies which include possibilities of increasing scores while prevention-focused strategies could include only those instructions emphasizing risks. In the current study, instructions encouraged promotion and prevention regulatory strategies rather than one over the other so that chronic tendencies to approach or avoid could be examined. Shah, et al., (1998) and others (Roney et al, 1995) demonstrated how framing instructions that favor one strategy over the other encourage related outcomes to approach or avoid. One obstacle in this study worth noting is the difficulty in acquiring high schools administrators, parents, and students to participate in a psychological study of this magnitude that requires significant classroom time. Developing mutually beneficial relationships with local high schools, particularly in the Detroit Metropolitan area with very diverse cultural backgrounds, can help increase research in areas that improve performance and learning that motivate students to act in ways that are beneficial to the self.

An examination to determine if measures used were most adequate for this type of study is appropriate. Student predictions on performance were uninfluenced by their sense of control. Results indicated that feelings of controllability had no significant effect on predictions of performance on performance tasks. Additionally, correlations among final scores on the CASQ-R and the BIS/BAS were generally low, ranging from .02 to .18, and are somewhat lower than typically predicted for these measures ( $\alpha = .22$ ; Carver & White, 1994).

Other measures similar to the CASQ were considered and included The Life Orientation Test (Scheier, et al, 1994; (Scheier & Carver, 1985) and The Optimism/Pessimism scale (Reilley,

Geers, Lindsay, Deronde, & Dember, 2005) Although these scales prove more reliable and consistent than the CASQ-R, both tend to have broader focuses either on dispositional characteristics or with other constructs that were less indicative of a sense of control, such as hope and self-esteem. The Mirowski-Ross 2 x 2 Index of the Sense of Self Control (1991) emphasizes more traditional determinants of control that are contextually dependent but highly transparent and, therefore, less appropriate for younger students. Likewise, because the BIS/BAS demonstrated the predicted two factor structure as well as high reliability, inconsistencies between results and predictions may be due less to problems with the scale and more with the ability to accurately make predictions without fully understanding student motivation.

Additional problems included limitations on class time and conditions. Students received feedback after the initial anagram task, as originally planned, but feedback was discredited in the third phase of the study rather than the second. This meant that students were cognizant of the negative or positive feedback over the course of a week, and experienced emotions associated with discrediting feedback for only a short time before completing the final anagram task. Although this change does not seem problematic, and in fact, may have positively affected the results in that students maintained the misperception for a longer period of time, allotting for extra time in conditions to ensure all facets of the study are complete within the predicted timeframe that allow for disruptions that can occur in a classroom of high school students. This includes ideally controlling for the influence of students in close proximity, who may be answering similar questions, conversing about classroom assignments if not participating, or distracting if finished with the exercise before others, as well as other extraneous variables that can influence results.

A final consideration for improving the study would be to examine individual factors that influence performance. First, students demonstrated significant improvement across the three temporal conditions indicating a learning effect. Using novel tasks for each time performance is measured would control for learning effects. Because significance was associated with behavioral inhibition and because affect decreased after receiving initial feedback for both positive and negative feedback, elements of students who are threatened may tend to disengage and subsequent negative information is less influential (Nussbaum & Steele, 2007). Examining the data in terms of whether or not threat conditions facilitate persistence could corroborate these findings. Schmeichel and Baumeister, (2004) use a variety of self-regulatory tasks to manipulate conditions and demonstrated the effect on regulating behaviors on future tasks and performance.

### **Future Research**

More research on motivating factors for developing adolescents can shed light on how performance can be improved by introducing factors that are rewarding and promote unique regulatory strategies and fitness. Additionally, research that examines specific conditions under which students experience diverse affective responses, particularly related to performance and learning, will likely increase understanding of behavioral responses aimed at obtaining unique goals. Only more recently has psychology developed unique experimental conditions that closely examine motivational factors such as a sense of belongingness or conscious and unconscious goals that help regulate behaviors.

In this study, positive feedback was critical in getting students to engage in prevention-focused regulatory strategies. In all conditions in this study, students decreased both negative and positive affect after feedback with the largest decreases in positive and negative affect after receiving negative feedback. Studies that examine how feedback, regardless of the type,

contributes to student self-knowledge and whether it results specifically in decreases in anxiety are required. Additionally, studies by Higgins and others that examine self-discrepancies suggest that depression-related and anxiety-related emotions are uniquely related to self-concept. More research conducted with adolescents should reveal self-regulatory processes and emotions involved in developing one's self-concept.

Because of the difficulty in getting high school participants, only all male high schools agreed to participate, and gender differences in the moderating effects of control on self-regulation and performance outcomes were not investigated. In particular and in light of interpretations made in this chapter regarding self-knowledge, female participants are critical in understanding developmental differences in self-regulation and internalization. Girls are more likely to feel a sense of helplessness and depression and score lower than boys on the CASQ (Seligman, 1995). These outcomes are associated with discrepancies in promotion-focused strategies. Questions regarding the likelihood that feedback will affect decisions and performance differently for teenage girls and boys could be examined in future research. Furthermore, although it is convenient to recruit students attending the university, Erikson (2008) suggests that it is in the high school years where students are developing concepts of the self. Understanding the dynamics involved in integrating information derived from current choices and feedback into one's self-concepts could be important in understanding choices regarding partners, achievement, independence, and other psychosocial variables impacted during development. Similarly, conducting research with older, university-aged students might offer some insight into developmental changes in self-concept over time.

## APPENDIX A

### Parent Information Sheet

#### (School Name) Permission/Research Informed Consent/Information Sheet

Title of Study: Do feelings of control moderate self-regulation strategies and learning?  
When feedback lingers.

#### **Purpose:**

The purpose of this study is to determine how feedback affects high school students' performance. The research is being conducted by Annette Feravich, Psychology Department from Wayne State University.

#### **Study Procedures:**

If you decide to allow your child to take part in the study, your child will be asked to complete an online study that consists of personality questions as well as three learning tasks. Students will be asked to complete an online survey in their regularly scheduled computer class over three class periods. The following is a summary of the study:

- 1 During week 1 of the study, students will be asked to complete surveys on their self-concept. Students will be presented with statements or scenarios and asked to choose the best response for them.
- 2 During week 2 and 3 of the study, students will be asked to complete a learning task that consists of moderate and difficult word scrambles.
- 3 All students have the option of not answering some or all the questions in the study.
- 4 Your computer teacher has copies of all the study materials for each of the three visits. Please feel free to contact Annette Feravich, the Experimenter, or your child's computer teacher for a copy of the questionnaires.

#### **Benefits:**

- 1 There may be no direct benefits for your child; however, information from this study may benefit other people now or in the future.
- 2 During the debriefing, teachers will have an opportunity to discuss the benefits of optimistic thinking and how it can affect learning. Additionally, information from this study may benefit others by improving learning strategies

#### **Risks:**

- 1 There are no known risks at this time to your child for participation in this study.

#### **Costs**

- 2 There are no costs to you or your child to participate in this study.

#### **Compensation:**

- 1 You or your child will not be paid for taking part in this study.

**Confidentiality:**

All information collected about your child during the course of this study will be kept confidential to the extent permitted by law.

- 1 Your child will be identified in the research records by a user ID. No information will be kept that can identify your child as being associated with any user ID. User IDs are used to ensure all data collected for any given student can be compiled across sessions. Teachers will keep a record of student names, ids and passwords; however, they cannot access any student results in the study. The Experimenter will have access to results, but not to student names, ids or passwords so they will be unable to associate results with any student.

**Voluntary Participation/Withdrawal:**

Your child's participation in this study is voluntary. You may decide that your child can take part in this study and then change your mind. You are free to withdraw your child at any time. Your decision about enrolling your child in the study will not change any present or future relationships with Wayne State University or its affiliates, Detroit Catholic Central, your child's teacher, your child's grades or other services you or your child are entitled to receive.

**Questions:**

If you have any questions about this study now or in the future, you may contact Annette Feravich at the following phone number: 313-577-0250 or email her at [ac2010@wayne.edu](mailto:ac2010@wayne.edu). If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee can be contacted at (313) 577-1628. If you are unable to contact the research staff, or if you want to talk to someone other than the research staff, you may also call (313) 577-1628 to ask questions or voice concerns or complaints.

**Participation:**

If you do not contact the Experimenter or your child's computer teacher by Friday, March 13, 2009 to state that you do not give permission for your child to be enrolled in the research trial, your child will participate in the research study. You may contact the PI by phone at 313-577-0250, by fax at 313-577-6777 or by email at [ac2010@wayne.edu](mailto:ac2010@wayne.edu), your child's teacher, (phone #) or the school at (phone number).

If you do not wish to have your child participant in the study, you may also fill out the form below and return it to your child's teacher.

I do not allow my child \_\_\_\_\_ to participate in this research study.

Name

\_\_\_\_\_

Printed Name of Parent

\_\_\_\_\_

Signature of Parent

\_\_\_\_\_

Date

Thank you for your time and consideration.



## APPENDIX B

## SAMPLE ANAGRAMS FOR DIFFICULT AND EASY TO MODERATE ANAGRAMS

## Set 1: Difficult Anagrams

1. T L L A B I A G I N O O Z
2. U R R L Y E T G A O
3. D R L I N N M P E A Y O T
4. T A N Z O O I I R A N A I L T
5. M Z M L N I R I O A A N O T C E C I
6. K E E W U E O N B N L L G A A C D
7. B G E F D B R L A S E A T
8. T G W E E F H O I O R P N A R
9. I T A I F I L N P M I S R E V O O
10. E N S H T A A D E H S R E D R
11. G L E D I R B A B S A E D O
12. D G R E R L I T C A M O C A R E O
13. A N A R A S P L P O R E S F O I
14. E D L B U E D N S I C T O N
15. I L S I I A N T P A U R I O T Z
16. P C I Z A R E E U E O N L T C
17. R N I D O O S U S R M T C N O A E T T E N
18. L N E E A R Y M V B A T I I U
19. N A E B L I R I L Y T U V
20. A T N U O K N C R E A S
21. M N O U P A I L R T C E A D E S C
22. Z R N H E T I A I A C S C T I A M O R
23. N T U T N L T I I I Z O A E E R I S
24. K G T R N E R E I E R A D N S
25. A I Z O T N H I A T L S P I O
26. Y A T U L M E A T O I I C M S A L
27. A L D N M T I E U F A S S T N
28. L T R L I N N T F E G E O U
29. S T U T I N D R L S E F S S U
30. T T U I I F I B I Y L S J A

## Set 2: Easy to Moderate Anagrams

1. S D A Y I
2. M D N A R O
3. N R G B T E I H
4. P D A E R Y R
5. M M A E H R
6. K R B I S
7. A R S W E H
8. A T L F O

9. G N I O M D K
10. K A P N N I
11. K E T A
12. L L H O E

**APPENDIX C**

**Mood Scale responses include *Never, Rarely, Sometimes, Often, and Always***

1. How often during the past week have you felt enthusiastic?
2. How often during the past week have you felt hopeful?
3. How often during the past week have you felt happy?
4. How often during the past week have you felt excited?
5. How often during the past week have you felt motivated?
6. How often during the past week have you felt alert?
7. How often during the past week have you felt active?
8. How often during the past week have you felt miserable?
9. How often during the past week have you felt guilty?
10. How often during the past week have you felt inspired?
11. How often during the past week have you felt scared?
12. How often during the past week have you felt confident?
13. How often during the past week have you felt sad?
14. How often during the past week have you felt worthless?
15. How often during the past week have you felt embarrassed?
16. How often during the past week have you felt tense?
17. How often during the past week have you felt irritable?
18. How often during the past week have you felt angry?
19. How often during the past week have you felt proud?
20. How often during the past week have you felt nervous?

**APPENDIX D****Behavioral Documentation of Adolescent Assent Form**  
(ages 13-17)

Title: Do Feelings of Control Moderate Self-Regulation Strategies and Learning? When Feedback lingers.

**Study Investigator: Annette Feravich****Why am I here?**

This is a research study. Only people who choose to take part are included in research studies. You are being asked to take part in this study because your school has agreed to participate. Please take time to make your decision. Talk to your family about it and be sure to ask questions about anything you don't understand.

**Why are they doing this study?**

You are being asked to volunteer to be in a research study that looks at different types of students and how they learn.

**What will happen to me?**

If you agree to participate in this study, you will be asked to complete a few surveys and some learning problems online. The study will take place during your computer class for three weeks.

**How long will I be in the study?**

You will be in the study during your regularly scheduled computer class for three weeks. The first week, you will be asked to fill out some surveys that will take approximately 40 minutes. The second week, you will be asked to complete some learning tasks that will take approximately 40 minutes. The third week, you will be asked to complete one more learning task that will take approximately 20 minutes.

**Will the study help me?**

There may be no direct benefits for you; however information from this study may benefit other people now or in the future because researchers will have a better understanding of how to help students learn.

**Will anything bad happen to me?**

This research study poses minimal risk in that the likelihood you will feel harm or discomfort is not greater than that which you experience regularly in the classroom during the performance of routine examinations or tests.

**Do my parents or guardians know about this? (If applicable)**

This study information has been given to your parents/guardian. You can talk this over with them before you decide.

**What about confidentiality?**

Every reasonable effort will be made to keep your records or your information confidential. But we do have to let some people look at your study records. We will keep your records private unless we are required by law to share any information. The law says we have to tell someone if you might hurt yourself or someone else. The study doctor can use the study results as long as you cannot be identified.

**What if I have any questions?**

For questions about the study please call Annette Feravich at 313/577-0250. If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee can be contacted at (313) 577-1628.

**Do I have to be in the study?**

You don't have to be in this study if you don't want to or you can stop being in the study at any time. Please discuss your decision with your parents and researcher. No one will be angry if you decide to stop being in the study.

**AGREEMENT TO BE IN THE STUDY**

Your acceptance of a User ID and password and your logging into the Blackboard course management system is indication of your agreement to participate in this study.

**APPENDIX E**

## Student PowerPoint and Blackboard Instructions

**Welcome!**

Thank you for agreeing to take this survey about student attitudes and learning.

Please click next to continue.

**NEXT** ⇨

 **Phase I**

This survey will be presented in phases. This is Phase I of the study.

Please click next to continue.

**NEXT** ⇨

**Anonymity**

All information on this survey will remain anonymous. That means that your name will not appear anywhere on this survey. Neither the experimenter nor your teacher will know which survey is yours.

If you have questions, please ask the Experimenter. Otherwise, please click next to continue.

**NEXT** ⇨

**Anonymity**

Each student recorded their user id and password on a log kept by your teacher. The experimenter will not have access to this log. In addition, your teacher is unable to access the data being collected through the internet. It is being downloaded to a computer server at Wayne State University.

If you have questions, please ask the Experimenter. Otherwise, please click next to continue.

**NEXT** ⇨

**Confidentiality**

All information on this survey will remain confidential. That means that information can be shared only with members of the research project and only for research purposes. Information regarding student surveys will not be shared with others who are not involved in the research study.

If you have questions, please ask the Experimenter. Otherwise, please click next to continue.

**NEXT** ⇨

**Exiting Instructions**

Thank you for completing the first part of this survey. The next sections will ask you to answer some questions on your background and attitudes.

Please click EXIT to end this part of the survey.

**EXIT** ⇨

Introductory instructions and questions:

During the instructions you were presented with information on keeping your survey answers anonymous and confidential. The following two questions are based on your belief that your survey answers will remain anonymous and confidential. Please click on the circle to the left of your choice to answer each question. Then click the *Save* button after each question, or click **Submit** after you've answered both questions. If you have questions, please ask the Experimenter. (Options included *Strongly Agree*, *Somewhat Agree*, *Neither Agree or Disagree*, *Somewhat Disagree*, *Strongly Disagree*.)

1. To what extent do you believe that your survey answers will remain anonymous? Use the following scale to determine the extent to which you agree or disagree that your answers will remain anonymous.
2. To what extent do you believe that your survey answers will remain confidential? Use the following scale to choose to what extent you agree that the information given will be used according to good scientific practice and will not be shared with others outside the experiment.

Background Information:

Thank you for participating in our study on students attitudes and learning. The following three questions provide background information for our study. We will be unable to identify any individual student based on this information. Please indicate your choice by clicking from the options listed. Then click the *Save* or the arrow (») at the bottom to advance. After you've answered all three questions, click **Submit**. If you have questions, ask the Experimenter.

1. Please mark if you are male or female by clicking on the circle next to your answer.
2. How old are you? (choices ranged from 14 to 18)

3. What grade are you in? (answers ranged from 9<sup>th</sup> to 12<sup>th</sup> grade)

#### Instructions for Mood Questionnaire

To better understand student attitudes, we want to ask some questions about your mood. The following are statements about how often you've experienced a variety of attitudes and emotions *over the past week*. There are no wrong answer and no time limit on this survey.

Please consider each statement and choose the best possible answer for you by clicking one of the options listed. Click the **Save** button or the arrow (») at the bottom to advance. After you've answered all the questions, click the **Submit** button. If you have questions, ask the Experimenter.

#### Instructions for the CASQ-R:

To better understand student attitudes, you will be presented with several different situations on this survey and asked why you think the situation occurred. Some of these situations will be familiar to you like, *Your parents praise something you make*. Others might be unfamiliar to you like, *A person steals money from you*. You will have to imagine yourself in situations you've never been in before. You will be given two choices. Some choices will be easy for you to make while others will be more difficult. Please try and pick the best response for you.

Remember, there are no wrong answers.

#### Instructions for the BIS/BAS:

The following are statements that may or may not be true of you. Click the answer that you think describes how true the statement is of you. Remember there are no wrong answers. Please try and answer all the questions as honestly as possible and indicate your choice by clicking on the option listed. Then click **Save** or the arrow (») at the bottom to advance. After you've answered all the questions, click **Submit**. If you have questions, ask the Experimenter.



## PowerPoint Instructions for Phase II of the study

**Welcome!**

Thank you for agreeing to participate once again in our survey. You are about to begin Phase II of the Attitudes and Learning Survey.

Please click next to continue.

**NEXT** ⇨

**Anonymity and Confidentiality**

It is important to remind you that all information on this survey will remain anonymous and confidential. Your name will not appear anywhere on this survey nor will results be discussed with people outside the research team.

Please click next to continue.

**NEXT** ⇨

**Phase II: Learning Task**

Our learning task is measuring verbal intelligence, a key consideration when taking college entrance exams and necessary for professional and personal success.

Please click NEXT to continue.

**NEXT** ⇨

**Phase II: Learning Task**

The learning task consists of two sets of anagrams. Anagrams are letters that when rearranged form a word. For example, the anagram g p i can be rearranged to form the word *pig*. Sometimes, anagrams can be formed to make more than one word. For example,

D F I O I C L N N T E A (confidential)  
can be rearranged to form *clean, dental*, or *confident*.

**NEXT** ⇨

**Phase II: Learning Task**

The first set of anagrams are difficult, however, you will receive points for any words derived from the set of letters presented. The number of points you receive is based on numerous factors including accuracy (spelling), creative solutions, number of letters used, and how well you did on your learning task compared to others your age who have also completed the task, including your classmates.

**NEXT** ⇨

**Phase II: Learning Task**

You will be allowed only one response; the better your response, the more points you will earn. Because these are difficult, you will never lose points for your answers. You will be given 5 minutes to complete as many anagrams as possible.

Please click NEXT to continue.

**NEXT** ⇨

### Phase II: Learning Task

The second set of anagrams are moderately difficult. In order to get points, you will need to get the entire anagram correct (use all the letters). Any incorrect or blank answers could result in point deductions. You will have an opportunity to decide whether or not you want to participate in the second part of the anagram learning task after you have completed the first set of difficult anagrams.

Please click NEXT to continue.

**NEXT** ⇨

### Phase II: Learning Task

Scores for each learning task will be based on the number of anagrams completed, the speed at which you complete each anagram, accuracy (spelling), creative solutions, number of letters used, and how well you did on your learning task compared to others your age who have also completed the task, including your classmates.

Please click NEXT to continue.

**NEXT** ⇨

### Phase II: Learning Task

Ready to get started? Click on the EXIT button to get started with the first survey.

Please click EXIT to continue.

**EXIT** ⇨

Practice anagram instructions.

You will have 2 minutes to complete three practice anagrams.

Anagram instructions:

The following exercise consists of difficult anagrams, scrambled letters that form a word. You will get full credit if you are able to determine the correct word from the scrambled letters.

However, if you are unable to determine the word, you will receive partial credit for any English word that you can make from the letters presented. You will only be able to type one word, so make sure that you use as many letters as possible before entering your answer. Spelling is a consideration in scoring.

You will have 6 minutes to score as many points as possible on this learning task. Remember that this is important in that it measures verbal intelligence and is key in getting into good colleges and future success.

Prediction:

Now that you have some experience with the anagrams task, we would like you to answer the following questions to predict your performance.

Option to continue:

Would you like to complete the second learning task for a chance to earn additional points?

Remember that if you do not answer these set of anagrams correctly, you risk losing points.

However, these anagrams are much easier than the first set and will give you an opportunity to boost your score.

Performance Task for moderate anagrams:

This is part two of the learning task. If you recall, these anagrams are much easier. However, in order to receive points, you must use all the letters to correctly spell a word. Any blanks or incorrect answers will result in point deductions. You have 3 minutes to complete this learning task. Good luck!

**APPENDIX F****Manipulation Check and Debriefing Script**

Please answer these last questions regarding the survey as honestly as possible.

1. How important was it to you to perform well on the learning tasks?
  - a. Very important
  - b. Important
  - c. Neither important nor unimportant
  - d. Unimportant
  - e. Very unimportant
  - f. Not Applicable
  
2. To what extent did you agree with the initial results after the first learning task that described your scores as poor, good, very good, or excellent?
  - a. Strongly agreed
  - b. Agreed
  - c. Neither agreed nor disagreed
  - d. Disagreed
  - e. Strongly disagreed
  
3. To what extent do you believe you were affected by the results you received either positive or negative after completing the learning task?
  - a. Strongly affected
  - b. Somewhat affected
  - c. Neither affected or unaffected
  - d. Somewhat unaffected
  - e. Completely unaffected
  - f. Not applicable
  
4. To what extent do you believe you ignored the results of the first set of learning tasks after you received the error message stating the results were invalid?
  - a. Complete ignored the learning task results
  - b. Somewhat ignored initial results
  - c. Neither believed or ignored the initial results
  - d. Somewhat believed the initial results, despite the error message
  - e. Completely believed the learning task results, even though the error message said they were invalid.
  
5. To what extent did you believe the error message that scores for the day were inaccurate and should be disregarded?

- a. Strongly believed
- b. Believed somewhat
- c. Neither believed nor disbelieved
- d. Somewhat did not believe
- e. Strongly did not believe

### Debriefing Script

Dear students,

I would like to thank all the students who participated in the study. The purpose of the study was to see how students your age are affected by good or bad information. At the beginning of this study, I told you that you would complete a learning task that measured verbal intelligence and is important for determining success in college and in the future. This was untrue. The word scrambles you completed were not an actual measure of learning, nor were they measures of verbal intelligence or future success. It was important that students took the study seriously and by suggesting the results were important indicators of intelligence and future success helps students take their answers more seriously.

After completing the first set of word scrambles, you were given feedback on your performance. *All* students received either *poor* or *excellent* feedback. Feedback was *untrue* and randomly assigned to each student. *Poor* and *excellent* feedback was given only to determine the affect the feedback would have on your performance on the rest of the word scrambles.

After you completed the second set of word scrambles, you received an error message that all scores for the day were invalid and should be ignored. This, too, was *untrue*. The error message was used so you would ignore the earlier results of either *poor* or *excellent*. We invited you back to complete the last set of word scrambles to see if your performance was still affected by earlier, false reports of *poor* or *excellent*, even though you were told to ignore the results.

Some students are affected by positive or negative feedback long after they receive feedback. Sometimes, students can become overly optimistic or overly pessimistic after receiving feedback. We wanted to see if some students were affected by the *poor* or *excellent* feedback even if they were told that there was an error and they should ignore the feedback.

Thank you again, students, for taking time to complete this study. It is my final project before earning my Ph.D. in Cognitive, Developmental, and Social Psychology. I could not complete this without your help.

Sincerely,

Mrs. Feravich

**REFERENCES**

- Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*(1), 49-74.
- Aiken & West, (1991). *Multiple Regression: Testing and Interpret Interactions*. Thousand Oaks, CA: SAGE Publications, Inc.
- Bandura, A., Adams, N. E., & Beyer, J. (1977). Cognitive processes mediating behavioral change. *Journal of Personality and Social Psychology, 35*(3), 125-139.
- Bandura, A., Barbaranelli, C., Caprara, G.V., & Pastorelli, C. (1996) Mechanisms of moral disengagement in the exercise of moral agency. *Journal of Personality and Social Psychology, 71*(2), 364-374.
- Bell, S. M., McCallum, R. S., & Doucette, J. A. (2004). Relationship of school-based attributions to depression. *Journal of Psychoeducational Assessment, 22*(2), 106-123.
- Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1999). The affect system has parallel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology, 76*(5), 839-855. doi:10.1111/j.1745-6916.2007.00032.x
- Carver, C. (2007). Stress, Coping, and Health. In Howard Friedman & Roxane Cohen Silver (Eds.), *Foundations of health psychology* (pp. 117-144). New York, NY: Oxford University Press.
- Carver, C. (2004). Self-Regulation of Action and Affect. In Baumeister, R.F., and Vohs, K.D., (Eds.), *Handbook of Self-Regulation*. (pp. 13-39).
- Carver, C. & Scheier, M. (1990). Principles of self-regulation: Action and emotion. In E. Higgins & Richard M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior, Vol. 2* (pp. 3-52). New York, NY: Guilford Press.

- Carver, C. & Scheier, M. (1999). Control theory: A useful conceptual framework for personality-social, clinical, and health psychology. In Roy F. Baumeister, (Ed.), *The self in social psychology. Key readings in social psychology* (pp. 1299-1316). New York, NY: Psychology Press.
- Carver, C., Blaney, P., & Scheier, M. (1979). Reassertion and giving up: The interactive role of self-directed attention and outcome expectancy. *Journal of Personality and Social Psychology*, 37(10).
- Carver, C., & White, T., (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS Scales. *Journal of Personality and Social Psychology*, 67,(2).
- Cervone, D., Mor, N., Orom, H., Shadel, W. G., & Scott, W. D. (2004). Self-efficacy beliefs on the architecture of personality: On knowledge, appraisal, and self-regulation. In Roy F. Baumeister & Kathleen D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications*. (pp. 188-210). New York, NY: Guilford Press.
- Crocker, J., Brook, A. T., Niiya, Y., & Villacorta, M. (2006). The Pursuit of Self-Esteem: Contingencies of Self-Worth and Self-Regulation. *Journal of Personality*, 74(6), 1749-1771. doi:10.1111/j.1467-6494.2006.00427.x
- Crowe, E., & Higgins, E. T. (1997). Regulatory focus and strategic inclinations: Promotion and prevention in decision-making. *Organizational Behavior and Human Decision Processes*, 69(2), 117-132.
- Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology. Special Issue: Integrating personality and social psychology*, 53(6).

- Elliot, A. (2006). The Hierarchical Model of Approach-Avoidance Motivation. *Motivation and Emotion* 30(2), 111-116. doi:10.1007/s11031-006-9028-7
- Erikson, E. (2008). Reflections on the Last Stage - and the First. In R. Diessner (Ed.), *Human Development Classic Edition Sources, 3<sup>rd</sup> Edition*, (pp. 252-256). Dubuque, IA: McGraw Hill Contemporary Learning Series.
- Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: Attentional control theory. *Emotion*, 7(2), 336-353. doi: 10.1037/1528-3542.7.2.336
- Fischer, P., Greitemeyer, T., & Frey, D. (2007). Ego depletion and positive illusions: Does the construction of positivity require regulatory resources? *Personality and Social Psychology Bulletin*, 33(9), 1306-1321. doi: 10.1177/0146167207303025
- Fredrickson, B. (2002) Positive Emotions. In C.R. Snyder & S.J. Lopez (Eds.), *Handbook of Positive Psychology* (pp. 120-134). New York, NY: Oxford University Press, Inc.
- Gray, J. (1991) Brain Systems that Mediate both Emotion and Cognition. *Cognition and Emotion*, 4(3), 269-288.
- Gray, J. (1987). Perspectives on Anxiety and Impulsivity: A Commentary. *Journal of Research in Personality*, 21, 493-509.
- Gray, J. (1970). The Psychophysiological Basis of Introversion-Extraversion. *Behavioral Research and Therapy*, 8, 249-266.
- Guenther, C. L., & Alicke, M. D. (2008). Self-enhancement and belief perseverance. *Journal of Experimental Social Psychology*, 44(3), 706-712. doi: 10.1016/j.jesp.2007.04.010
- Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review*, 94(3), 319-340.



- Higgins, E. T. (1996). The "self digest": Self-knowledge serving self-regulatory functions. *Journal of Personality and Social Psychology*, *Vol.*, 71(6), 1062-1083.
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, 52(12), 1280-1300.
- Higgins, E. T., Bond, R. N., Klein, R., & Strauman, T. (1986). Self-discrepancies and emotional vulnerability: How magnitude, accessibility, and type of discrepancy influence affect. *Journal of Personality and Social Psychology*, 51(1), 5-15.
- Higgins, E. T., Klein, R., & Strauman, T. (1985). Self-concept discrepancy theory: A psychological model for distinguishing among different aspects of depression and anxiety. *Social Cognition. Special Issue: Depression*, 3(1), 51-76.
- Higgins, E. T., Roney, C. J. R., Crowe, E., & Hymes, C. (1994). Ideal versus ought predilections for approach and avoidance distinct self-regulatory systems. *Journal of Personality and Social Psychology*, 66(2), 276-286.
- Higgins, E. T., Shah, J., & Friedman, R. (1997). Emotional responses to goal attainment: Strength of regulatory focus as moderator. *Journal of Personality and Social Psychology*, 72(3), 515-525.
- Hodgins, H. S., & Knee, C. R. (2002). The integrating self and conscious experience In Deci, Edward L. & Ryan, Richard M. (Eds.), *Handbook of self-determination research*. (pp. 87-100). Rochester, NY, US: University of Rochester Press.
- Kircanski, K., Craske, M. G., & Bjork, R. A. (2008). Thought suppression enhances memory bias for threat material. *Behaviour Research and Therapy*, 46(4), 462-476. doi: 10.1016/j.brat.2008.01.009
- Kochanska, G., & Aksan, N. (2006). Children's conscience and self-regulation. *Journal of Personality*, 74(6), 1587-1617. doi: 10.1111/j.1467-6494.2006.00421.x

- Langens, T. A. (2007). Regulatory focus and illusions of control. *Personality and Social Psychology Bulletin*, 33(2), 226-237. doi: 10.1177/0146167206293494
- Langer, E.J., and Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. *Journal of Personality and Social Psychology*, 34(2), 191-198.
- Lench, H.C. and Levine, L.J. (2008). Goals and responses to failure: Knowing when to hold them and when to fold them. *Motivation and Emotion*, 32, 127-140. doi: 10.1007/s11031-008-9085-1
- Linnenbrink-Garcia, L., & Fredricks, J. A. (2008). Developmental perspectives on achievement motivation: Personal and contextual influences *Shah, James Y.; Gardner, Wendi L. (2008). Handbook of motivation science. (pp. 448-464). New York, NY, US: Guilford Press.*
- Lockwood, P., Jordan, C. H., & Kunda, Z. (2002). Motivation by positive or negative role models: Regulatory focus determines who will best inspire us. *Journal of Personality and Social Psychology*, 83(4), 854-864. doi: 10.1037//0022-3514.83.4.854
- Maier, S. F., & Seligman, M. E. (1976). Learned helplessness: Theory and evidence. *Journal of Experimental Psychology: General*, 105(1), 3-46.
- Miller, A. (1985). A developmental study of the cognitive basis of performance impairment after failure. [Peer Reviewed]. *Journal of Personality and Social Psychology*, 49(2), 529-538.
- Miller, A. (1986). Performance Impairment after Failure: Mechanism and Sex Differences. *Journal of Educational Psychology*, 78(6), 486-491.
- Miller, N. E., & Dollard, J. (1941). *Social learning and imitation. New Haven, CT: Yale University Press.*

- Mirowsky, J. and Ross, C.E. (1991). Eliminating defence and agreement bias from measures of the sense of control: A 2 x 2 index. *Social Psychology Quarterly*, 54(2), 127-145.
- Moretti, M., & Higgins, T. (1999). Own versus other standpoints in self-regulation: Developmental antecedents and functional consequences. *Review of General Psychology*, 3, 188-223.
- Nussbaum, A. D. & Steele, C. (2007). Situational disengagement and persistence in the face of adversity. *Journal of Experimental Social Psychology*, 43, 127-134.  
doi:10.1016/j.jesp.2005.12.007
- Osborn, J.W. (2001). Testing stereotype threat: Does anxiety explain race and sex differences in achievement? *Contemporary Educational Psychology*, 26(3), 291-310.
- Overmier, J. B., & Seligman, M. E. (1967). Effects of Inescapable Shock Upon Subsequent Escape and Avoidance Responding. *Journal of Comparative and Physiological Psychology*, 63(1), 28-33.
- Peterson, C., & Seligman, M. E. (1987). Explanatory style and illness. *Journal of Personality. Special Issue: Personality and physical health*, 55(2), 237-265.
- Peterson, C., & Steen, T. A. (2002). Optimistic explanatory style. In Snyder, C & Lopez, S. J. (Eds), *Handbook of positive psychology*. (pp. 244-256). New York, NY: Oxford University Press.
- Rasmussen, H. N., Wrosch, C., Scheier, M. F., & Carver, C. S. (2006). Self-Regulation Processes and Health: The Importance of Optimism and Goal Adjustment. *Journal of Personality*, 74(6), 1721-1747. doi: 10.1111/j.1467-6494.2006.00426.x

- Reilley, S. P., Geers, A. L., Lindsay, D. L., Deronde, L., & Dember, W. N. (2005). Convergence and predictive validity in measures of optimism and pessimism: Sequential studies. *Current Psychology, 24*(1), 43-59.
- Rodin, J., & Langer, E.J. (1977). Long-term effects of a control-relevant intervention with the Institutionalized aged. *Journal of Personality and Social Psychology, 35*(12), 89-902.
- Roney, C.J.R., Higgins, E.T., & Shah, J. (1995). Goals and framing: How outcome focus influences motivation and emotion. *Personality and Social Psychology Bulletin, 21*(11), 1151-1160.
- Ross, L., Lepper, M. R., & Hubbard, M. (1975). Perseverance in self-perception and social perception: Biased attributional processes in the debriefing paradigm. *Journal of Personality and Social Psychology, 32*(5), 880-892.
- Ryff, C.D. & Singer, B. (1998). The contours of positive human health. *Psychological Inquiry, 9*, 1-28.
- Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology, 4*(3), 219-247.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 67*(6), 1063-1078.
- Schmeichel, B. J., & Baumeister, R. F. (2004). Self-Regulatory Strength. In Baumeister, R. F., & Vohs, K. D. (Eds) *Handbook of Self-Regulation*. (pp. 84-98). New York, NY: The Guilford Press.
- Seligman (1998). *Learned optimism*. New York, NY: Pocket Books.

- Seligman, M. E., & Maier, S. F. (1967). Failure to Escape Traumatic Shock. *Journal of Experimental Psychology*, 74(1), 1-9.
- Seligman, M., Reivich, K., Jaycox, L., & Gillham, J. (1995). *The optimistic child*. Boston, MA: Houghton Mifflin.
- Shackman, A. J., Sarinopoulos, I., Maxwell, J. S., Pizzagalli, D. A., Lavric, A., & Davidson, R. J. (2006). Anxiety selectively disrupts visuospatial working memory. *Emotion*, 6(1), 40-61. doi: 10.1037/1528-3542.6.1.40
- Shah, J., Higgins, T., & Friedman, R. S. (1998). Performance incentives and means: How regulatory focus influences goal attainment. *Journal of Personality and Social Psychology*, 74(2), 285-293.
- Sullivan, H. W., Worth, K. A., Baldwin, A. S., & Rothman, A. J. (2006). The effect of approach and avoidance referents on academic outcomes: A test of competing predictions. *Motivation and Emotion. Special Issue: Approach/Avoidance*, 30(2), 157-164. doi: 10.1007/s11031-006-9027-8
- Sweeney, P. D., Anderson, K., & Bailey, S. (1986). Attributional style in depression: A meta-analytic review. *Journal of Personality and Social Psychology*, 50(5), 974-991.
- Taylor, S. E., & Armor, D. A. (1996). Positive illusions and coping with adversity. *Journal of Personality*, 64(4), 873-898.
- Taylor, S. E., Kemeny, M. E., Reed, G. M., Bower, J. E., & Gruenewald, T. L. (2000). Psychological resources, positive illusions, and health. *American Psychologist*, 55(1), 99-109.

- Thelwell, R. C., Lane, A. M., & Weston, N. J. V. (2007). Mood states, self-set goals, self-efficacy and performance in academic examinations. *Personality and Individual Differences, 42*(3), 573-583. doi: 10.1016/j.paid.2006.07.024
- Thompson, M., Kaslow, N. J., Weiss, B., & Nolen-Hoeksema, S. (1998). Children's Attributional Style Questionnaire--Revised: Psychometric examination. *Psychological Assessment, 10*(2), 166-170.
- Watkins, E. R. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin, 134*(2), 163-206. doi: 10.1037/0033-2909.134.2.163
- Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070.
- Wegner, D.M. (1994). Ironic processes of mental control. *Psychological Review, 101*(1), 34-52.
- Wenzlaff, R. M., & Bates, D. E. (1998). Unmasking a cognitive vulnerability to depression: How lapses in mental control reveal depressive thinking. *Journal of Personality and Social Psychology, 75*(6), 1559-1571.

**ABSTRACT****DOES A SENSE OF CONTROL MODERATE  
SELF-REGULATION STRATEGIES AND PERFORMANCE?  
WHEN FEEDBACK LINGERS**

by

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This study examined whether a sense of control moderated the relationship between self-regulation and performance on an anagram task. High school students in a private, Detroit Metropolitan high school completed the Behavioral Inhibition/Behavioral Approach Scale (BIS/BAS) in order to determine individual promotion or prevention chronic self-regulatory strategies, as well as the revised Children's Attributional Style Questionnaire (CASQ-R) to determine a sense of control based on explanatory style. Changes in mood and performance on anagram tasks were measured at three different times during the study: prior to, after, and after discrediting randomly assigned negative or positive feedback. Performance tasks were designed to facilitate advancing (promotion) or vigilant (prevention) chronic self-regulatory strategies. Random feedback was given to students after completing the first set of anagrams and then discredited after administering a second set of anagrams to determine who was more likely to experience lingering effects of negative or positive feedback. Results indicated moderator effects after students received initial feedback, but only for those receiving positive feedback. Inhibitory behaviors were more predictive of performance with students described as prevention-

optimists most likely to demonstrate increases in performance scores after receiving positive feedback. Although results indicated no significant effects on mood, some interesting trends regarding performance and self-knowledge suggest changes in affect may be associated with feedback.

*Key words:* Attribution, Control, Optimism, Pessimism, Prevention, Promotion, Self-Regulation



## **AUTOBIOGRAPHICAL STATEMENT**

My career in psychology, although only just beginning, has been a lifelong pursuit encompassing every opportunity, decision, lesson, and interpersonal relationship, directing a path towards an understanding of positive human functioning. Over the last 100+ years psychologists such as Vygotski, Adler, Seligman and Langer have theorized on positive human functioning yet little unification among disciplines exists. To that end, my interests are focused on the intersection at which emotion, motivation, positive thinking and development, conscious awareness, and morality meet as they are central and necessary to optimal human functioning.

I began my research on misperceptions of sexual cues, but found more general interest in normative functioning focused on positive psychology and characteristics that fostered mental and physical well-being. At the time, research in Positive Psychology was just being beginning to emerge and changing direction in the middle of my academic career was risky. Today, I am teaching a course in Positive Psychology and introducing important concepts on well-being to a new and interested audience. Additionally, my research on self-regulation and associated emotional constructs offers potentially new areas for advancement in the field. This exemplar demonstrates to me how life unfolds in ways that can lead to a “goodness of fit” – a unique path that leads to full human potential.

I hope to blend research on positive human functioning that has been unduly excluded from psychological research, particularly relative to conscience, spirituality, and moral motivation with more traditional research on goal-oriented behaviors, evolutionary functions, and conscious awareness to empirically determine and examine “meta-goals” that contribute to healthier and happier lives. Additionally, it is not enough to conduct and publish research findings, but to determine practical applications for theories so that the general public might benefit from psychological findings. As a positive psychologist, it is difficult for me to disengage from reality the lessons I learn in the lab. My experience in program development and teaching and learning influence the strategies I use to inform individuals of critical knowledge pertinent to their culture and environment. Therefore, I anticipate my research will involve mainstream technology and media in order to fully represent and research individuals on personal, community, and global levels. In the end, I hope to answer important questions about positive human functioning that give rise to a greater community of mentally and physically healthier individuals, thus fulfilling one of the main goals of our profession.