ABSTRACT

Title of Document:	REDUCING REPETITIVE THOUGHT IN GENERALIZED ANXIETY DISORDER
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This study evaluated two computerized interventions intended to reduce the frequency of negatively-valenced repetitive thought and negative emotions that accompany these thoughts in college students prescreened for elevated levels of anxiety. The current study also tested the moderating effects of participants' tendency toward different types of repetitive thought, specifically rumination and worry, on outcomes including the amount of time spent discussing the thought, positive affectivity and negative affectivity. The rumination intervention was created for this study and based on goal progress theory, whereas the worry intervention was adapted from Acceptance and Commitment Therapy. Findings revealed no moderating effect of the tendency to engage in a specific type of repetitive thought. Instead, participants who received the worry intervention spent less time focusing on their thought and used less negative emotion words during a post-intervention verbalization period than those who received the rumination intervention regardless of the general tendency toward rumination or worry.

REDUCING REPETITIVE THOUGHT IN GENERALIZED ANXIETY
DISORDER

By

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Chapter I

Introduction

Everyone thinks about negative aspects of their lives from time to time, but for some people negative thoughts can become uncontrollable and repetitive. Those who experience unusually high levels of repeated negative thoughts have an increased risk for debilitating forms of psychopathology that can adversely affect their close relationships, work, and ability to enjoy their day-to-day lives. *Repetitive thought* is defined as thinking attentively, repetitively or frequently about oneself and one's world (Segerstrom, 2003). In this study, repetitive thought is considered a global construct that encompasses different types of thought. Though there are a number of types of repetitive though, this study focuses on rumination and worry[1]. Rumination is defined as the process of repetitively and passively thinking about negative emotions, consequences, meanings and symptoms of distress (Nolen-Hoeksema, 1991). Worry is defined as uncontrollable thoughts and images that are negatively affect laden and represents an attempt to solve a future problem that has the possibility of one or more negative outcomes (Borkovec, Robinson, Pruzinsky, & DePree, 1983).

Repetitive thought is consistently associated with anxious and/or depressive symptoms (McLaughlin, Borkovec, & Sabrava, 2007; Muris, Roelofs, Rassin, Franken & Mayer 2005; Nolen-Hoeksema, 2000; Molina, Borkovec, Peasley, & Person, 1998). Rumination is often researched in connection with depression and worry is one of the

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[1] Worry and rumination are not the only types of repetitive thought that can be problematic. Another often-studied type of thought is obsessional thought, a central feature of Obsessive-Compulsive Disorder (OCD). However, obsessions have been shown to differ from worry (Langlois, Freeston, Ladouceur, 2008) and in reliable ways such as being egodystonic and less likely to actually happen.

primary characteristics of Generalized Anxiety Disorder (American Psychiatric

Association, DSM-IV-TR, 2000, p. 472). Figure 1 contains a diagram showing the

frequent conceptualization of relationships between repetitive thought, worry,

rumination, Generalized Anxiety Disorder (GAD) and Major Depressive Disorder

(MDD). However, the arrows in the diagram indicate the other associations that have

been found to exist between both types of repetitive thought and both disorders.

Although the repetitive thought literature is large and diverse, there are not yet

treatments or treatment components of known efficacy that reliably decrease repetitive

thought. The dearth of efficacious interventions for repetitive thought is partly due to the

lack of integration across different subfields of psychology. For instance, laboratory

studies investigating the basic science of repetitive thought have provided strong

experimental evidence regarding the causal mechanisms of various types of repetitive

thought, but have rarely pursued questions of direct interest to clinicians interested in

interventions. Conversely, applied research focuses more on the association between

worry and anxiety disorders and between rumination and depression. However, applied

studies rarely incorporate experimental designs to investigate the causal mechanisms

underlying repetitive thought or the causal effects of specific treatment components

intended to reduce specific types of repetitive thought.

Ultimately, the divide between laboratory studies that carry little direct clinical

relevance and applied studies that provide little specificity regarding the causal effects of

proposed treatment components for repetitive thought has led to a lack of effective

treatment for repetitive thought underlying anxiety and mood disorders. The purpose of

the current study was to translate the strength of experimental laboratory studies into

treatment components that reduce repetitive thought. In the following sections, the

literature on worry and rumination will be reviewed and then a developmental model for

how repetitive thought could be an important link in the development of comorbid

Generalized Anxiety Disorder and Major Depression Disorder is proposed. This is

followed by a translational study exploring novel approaches to reducing rumination and

worry.

Chapter II

Review of the Literature

Two Dimensions of Repetitive Thought

A major impediment to integrative progress between laboratory studies and applied studies of repetitive thought has been a lack of clarity regarding the structure and content of the construct of repetitive thought itself. Across a series of three experimental studies, Segerstrom, Stanton, Alden, and Shortridge (2003) attempted to empirically integrate maladaptive and adaptive repetitive thought into a dimensional framework.

The first study included measures of emotional processing, reactions to stressful events, worry, rumination, and personality in 979 undergraduate students. All of the repetitive thought and personality measures were then multidimensionally scaled and a two-dimensional model of repetitive thought was found (see Figure 2). As seen in Figure 2, the first dimension, related to *valence,* is represented on the y-axis. At the positive end were optimism, mood repair and clarity of feelings whereas at the negative end were neuroticism, self-reproach, lack of control and distractibility. The second dimension related to the *purpose* of the thought can be seen on the x-axis, with one end reflecting searching for new ideas and experiences and the other end reflecting solving problems and improving certainty. The searching end was related to openness to experience, need for cognition, reflection, and introspection. The solving end of the spectrum was related to factors such as emotional clarity, worry, rehearsal and processing. In the second study, it was found that the valence spectrum was also related to affect, controllability and helpfulness. Higher anxiety was predicted by more negative repetitive thought, depression and anxiety were related to negative repetitive thought, and more searching

thoughts were associated with higher depression. Negative repetitive thought also predicted higher self-reported cognitive problems and more negative physical symptoms. Research on characteristics of worriers lends support to this model, as it has been found that intolerance of uncertainty predicts trait levels of worry, even after anxiety has been partialled out (Dugas, Freeston & Ladouceur, 1997). In sum, both worry and rumination are negatively valenced repetitive thought, but whereas worry is located on the solving end of the purpose spectrum, rumination is located on the searching end of the purpose spectrum.

The relationship between rumination and searching has also been explored in studies that looked at differences between maladaptive and adaptive forms of rumination. Two subtypes of rumination have been identified: "reflective pondering," which is focused on how to improve one's depressive symptoms, and "brooding," which is focused on the negative aspects of one's situation (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). When these concepts are mapped onto Segerstrom et al.'s model, both types of rumination would be located on the searching end of the purpose spectrum, but on opposite ends of the valence spectrum, with brooding on the negative side and pondering on the positive side. A longitudinal study measuring these two types of rumination separately showed that a year after completing measures of rumination, participants who rated higher on the reflective pondering scale scored lower on measures of depression than those who had scored highly on brooding (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Segerstrom et al.'s framework was used to conceptualize worry and rumination in this study. Because this study is concerned with maladaptive repetitive thought, the focus was on negatively valenced ruminative thought and worry.

This framework highlights some of the differences between types of repetitive thought. There have also been reliable differences found between people that have a general tendency to worry and those that have a general tendency to ruminate.

How are Ruminators and Worriers Different?

Everyone worries and ruminates at one time or another. Who hasn't worried about the outcome of an upcoming event or alternatively, ruminated about something said or done in the past? Even though most people have these experiences, there seem to be clear differences in a variety of domains between those that have a general tendency toward rumination and those that tend to worry.

Cognitive and Behavioral Differences. Worriers and ruminators have been found to differ in their cognitive appraisals of and behavioral responses toward unwanted thoughts. In a recent pair of studies that explored these differences (Watkins, 2004), participants chose one worry and one rumination from a list of common worries and a list of common ruminations and then answered a number of questions regarding their appraisals and strategies for dealing with each of their chosen unwanted thoughts using the Cognitive Intrusions Questionnaire (CIQ; Freeston, Ladouceur, Thibodeau, & Gagnon, 1991). The study also included a measure of the tendency to worry (PSWQ; Meyer, Miller, Metzger & Borkovec, 1990) and a measure of the tendency to ruminate (RSQ; Nolen-Hoeksema & Morrow, 1991). People with a higher tendency to ruminate were more likely to endorse having a great need to understand a situation and also tended to rate the situation they were thinking about as more personally important. Those who had a higher tendency to worry reported greater disapproval of their intrusive thoughts and were more likely to replace a worrisome intrusion with an unpleasant thought as a

way of dealing with the intrusive thought (Watkins, 2004). A different study using the

same sample compared the differences in the appraisals and strategies used to handle

worries with those used for rumination. The results showed no significant differences in

appraisals and strategies between worries and ruminations, but did show that worry

tended to be future-oriented. The combination of these two studies show that although an

individual person may react similarly to something classified as a rumination and

something classified as a worry, they may approach these thoughts in ways that are

characteristic of their general tendency. In another study that explored response

tendencies to intrusive thoughts participants described and evaluated hypothetical

reactions and responsese to seven unwanted thoughts. Using cluster and factor analyses

the authors found three broad categories of responses, two of which they labeled effortful

and one non-effortful (Freeston, et al., 1991). The non-effortful responses involved a lack

of action taken in response to the thought and were related to the participant's self-

reassurance and acceptance of the thought's presence. The two effortful responses were

labeled escape/avoidance and attentive thinking. Participants in the escape/avoidance

category tried to suppress their unwanted thoughts, to escape or avoid them using

thought-stopping or distracting or by replacing the disturbing thought with another

thought. The participants in the attentive thinking category gave the thought persistent

attention, focused on thinking about why the thought existed and were more likely to

seek reassurance. The participants in both of the effortful conditions were more anxious

and had more difficulty removing the thought.

It is possible that the tendency to cognitively avoid unwanted thoughts could lead

to the behavior of worrying, and the tendency to focus on unwanted thoughts could lead

to the behavior of ruminating. If this is the case, even though worry and rumination share many similar characteristics and are both representative of negatively valenced repetitive thought, people may engage in these processes for different reasons and it may follow that different interventions may be more effective for different people.

Physiological Differences. Both worry and rumination have been tied to physiological measures of stress, but in different ways. Worry has been shown to have a dampening influence on physiological symptoms, whereas rumination has been found to have the opposite effect.

According to the cognitive-avoidance theory of worry, worriers avoid the distress caused by unwanted thoughts by thinking about them in a verbal way rather than using imagery, which reduces physiological reactivity. Worry has been associated with a higher ratio of thought to imagery when compared to rumination (McLaughlin, Borkovec, & Sibrava, 2007), and verbal statements about feared situations or material have been shown to elicit very low cardiovascular response whereas visual imagination of that scene results in an increase in heart rate (Vrana, Cuthbert & Lang, 1986). Another study found that speech-anxious participants who either engaged in worrying or a relaxation exercise before seeing images of their feared situation showed a strong heart rate reaction if they had relaxed beforehand, but almost no reaction if they had worried beforehand (Borkovec & Hu, 1990). This may be somewhat counterintuitive because worry is a primary characteristic of GAD and anxiety is often associated with an overall elevated physiological state. However, psychophysiological studies have often failed to find evidence of increased autonomic arousal in GAD (Andor, Gerlach, & Rist, 2008). In fact, muscle tension is often the only measure of tension that is consistently elevated in those

with GAD. It has recently been shown that those with GAD have a heightened awareness of physiological reactivity and this may be responsible for the reported elevations in physiological symptoms. Worry seems to be a way to prevent emotional processing and therefore prevent physiological responses that normally accompany feared situations (Andor et al., 2008). In this way it seems to be a maladaptive protective mechanism that protects one from emotional distress. Supporting this idea are studies that have found a negative relationship between levels of physiological arousal and GAD (Brown, Chorpita, & Barlow, 1998). It has also been found that worry is associated with suppression of amygdala activation, the part of the brain involved in emotional processing (Hoehn-Saric, Lee, McLeod, & Yong, 2005).

Rumination seems to have a different impact on physiological responses than worry. One method used to gauge physiological stress is measuring levels of cortisol, a hormone released from the adrenal cortex into the bloodstream in times of psychological stress that is related to the "fight or flight" response to threats A recent study that looked at the possible physiological impact of rumination took measures of salivary cortisol from 115 undergraduates who had experienced some kind of interpersonal transgression (such as arguments with a romantic partner, romantic infidelity or an insult by a family member) within the past week (Mccullough, Brandon, Orsulak, & Akers, 2007). Cortisol levels were then measured every two weeks for as many as five more times. On occasions that participants reported ruminating more than usual they had higher levels of salivary cortisol than they normally did. How fearful the participant was of the transgressor was directly related to the cortisol level, and the authors suggested that like fear, rumination was an adaptive strategy intended to alert us and keep us from previously experienced

threats (McCullough et al., 2007). This finding fits in well with research that has shown that one primary difference between the content of worry and rumination is that rumination tends to be focused on the past (Watkins, Moulds, & Mackintosh, 2005). The release of cortisol can be adaptive in dealing with short-term challenging situations, but prolonged release of cortisol has been shown to have predict negative health outcomes such as the onset of diabetes and high blood pressure (Andrews, Wadiwalla, Juster, Lord et al., 2007), so although rumination may have been an adaptive strategy at one point, persistent and uncontrollable rumination may have consequences to physical as well as mental health.

Basic Science Laboratory Studies of Repetitive Thought: What Causes and Maintains Repetitive Thought?

Basic science studies of repetitive thought have for the most part focused on understanding its causal mechanisms with little intention to generate interventions to reduce repetitive thought. These studies have mostly occurred in a laboratory setting and are characterized by strong internal validity. Early research on repetitive thought often focused on the intentional suppression of unwanted intrusive thoughts, and tended not to differentiate between different types of intrusive or repetitive thoughts such as worry or rumination.

Thought Suppression. A technique once used in cognitive behavioral therapy called thought-stopping involved actively suppressing unwanted thoughts (Wolpe & Lazarus, 1966). However, research on active thought suppression has shown it tends to have paradoxical effects (Wegner, Schneider, Carter & White, 1987; Abramowitz, Tolin, & Street, 2001). Early research on repetitive thought focused on the effects of

suppression of intrusive thoughts. In one of the earliest examples of suppression research, participants were asked to speak aloud about any thoughts that came into their minds after being instructed not to think about a white bear (Wegner et al., 1987). Half of the participants were asked to speak aloud about anything that came to mind for five minutes while experimenters recorded what they said. After this was a suppression period in which participants were instructed specifically not to think of a white bear while speaking aloud for five more minutes. After the suppression period was an expression period in which participants were again asked to speak aloud for five minutes, but this time they were asked to *try* to think of a white bear. The rest of the participants went through the same process except the instructions were reversed so that the suppression period followed the expression period. Both groups were unable to suppress thoughts of a white bear. The group that initially experienced the suppression period expressed the target thoughts (thoughts of the white bear) at a significantly higher frequency during the expression period than those who were initially asked to think of a white bear, an outcome the authors termed the rebound effect (Wegner et al., 1987).

Wegner initially explained the rebound effect with the association hypothesis. The association hypothesis holds that the rebound effect is due to negative cuing. During the suppression period, when one is attempting to distract from the unwanted thought, the items that serve as distracters come to be associated with the unwanted thought. For example, if a person is attempting to suppress thoughts of a white bear and looking around the room in an effort to distract themselves from the unwanted thought, their thought process might look something like this: *don't think of a white bear, think of that table*. The table then becomes associated with the effort of attempting not to think of a

white bear and in that way actually becomes a cue for the initial unwanted thought. Although the association hypothesis can account for the rebound effect, it is unable to account for another side effect sometimes associated with depression, the enhancement effect.

The enhancement effect occurs when the frequency of unwanted thoughts that occur *during* a suppression period exceed that of a non-suppression period. The Ironic Process Theory (Wegner, 1992) holds that during and after suppression periods, the to-be-avoided thought is more accessible than other thoughts due to the operation of two mechanisms of mental control at work during suppression, one conscious and one unconscious. During suppression, the conscious operating process searches for distracters from the unwanted thought. The unconscious process is a relatively effortless monitoring process that searches for the presence of the unwanted thought and alerts the operating process that more effort is needed (Wegner & Zanakos, 1994). The combination of these processes can be effective, but when a person is under duress (e.g. emotional stress) or needing to concentrate on something else (e.g. one's work), the conscious operating process becomes distracted from its goal of finding distracter thoughts (Wegner & Erber, 1992). The monitoring process is unconscious, requires little mental effort, and is less likely to be impacted by the need to focus on multiple details. Because of the two processes' differing responses to cognitive and emotional distractions, when one is under duress or distracted by the need to concentrate on something else the thoughts are no longer provided by the operating process, but instead by the monitoring process, which is searching for unwanted thoughts, leading to an enhancement effect. In a study that looked at cognitive accessibility of suppressed thoughts participants were asked on two separate

occasions to imagine past events (Wegner, Erber, & Zanakos, 1993). On one occasion they were asked to think of a personal failure, and on another they were asked to think of a success. Following this, they completed a computer task. One condition was told not to think of the event whereas the other condition was asked to continue thinking of the event. The computer task involved a Stroop task in which target words were either relevant or irrelevant to their corresponding success or failure. Participants who were attempting to suppress their thoughts showed increased color-naming response times for target words, whereas participants who were trying not to think about a personal success or failure had more difficulty perceiving the colors of words related to that event showing higher accessibility to the thought. Conversely, participants instructed to continue to think about their success or failure showed less interference with naming the color, indicating less accessibility to the thought (Wegner et al., 1993). These results support the Ironic Process Theory.

Results from studies of suppression have been somewhat inconsistent when it comes to enhancement effects, whereas rebound effects have been more reliably demonstrated. A meta-analysis that included the outcomes of 28 articles that included 60 comparisons between thought suppression and control groups found the weighted rebound effect size to be positive and small to moderate, according to Cohen's guidelines (d_+=.30; Abramowitz, Tolin, & Street, 2001). The results showed no significant initial enhancement effects (d_+= -.35). However, two of the studies included in the analysis that had longer suppression periods did find enhancement effects. Both studies measured thought frequency using a diary method over the course of four days, and both studies showed a significant, positive initial enhancement effect (Trinder & Salkovskis, 1994;

Rassum, Merkelbach, & Muris, 1997) and a correlational analysis done by the authors found that longer suppression periods showed larger initial enhancement effects. Another factor that the authors mention is that they did not consider cognitive load, and note that immediate enhancement effects were found when participants were given cognitive tasks to complete while suppressing the thought (Abramowitz et al., 2001).

Distress after Suppression. Rebound effects have also been found in emotional and affective responses. Although studies of unwanted thoughts using personally relevant thoughts are uncommon, a study in 1995 used thoughts of former romantic partners (Wegner & Gold, 1995). Experimenters instructed participants to think of their former romantic partners, and measured their skin conductance level as a measure of distress. Participants who suppressed thoughts of former loves for whom they still had feelings showed a resurgence in distress after suppression. Wegner and Gold termed this response an emotional rebound effect and determined that this effect may occur when people suppress thoughts that are personally relevant. The suppression of emotional thoughts seems to prevent the person from habituating to the thoughts and thus reduce their upsetting nature. It's possible that suppression of these thoughts even elevates one's emotional response to the thought (Wegner & Zanakos, 1994). It is also possible that the suppression itself may strengthen the anxious associations of whatever is being avoided. For example, a study that looked at the effects of suppression on neutral and distressing situations found that suppression led to an increase in reported anxiety associated with both the neutral and the distressing thought (Roemer & Borkovec, 1994).

The research just reviewed explored the causes and maintenance of repetitive and intrusive though in general and for the most part did not distinguish between what might

cause worry as opposed to rumination. The following section describes two theoretical explanations, one for worry and one for rumination.

Theoretical Integration of Empirical Findings

The Cognitive Avoidance Theory of Worry. Worry, like suppression, can be conceptualized as a type of cognitive avoidance (Borkovec, 2004). Much of Borkovec's cognitive avoidance theory of worry is theoretically rooted in Mowrer's (1947) two-stage theory of fear, which holds that fear is acquired with classical conditioning and maintained with operant conditioning. By avoiding feared situations, fear of those situations is maintained by preventing unreinforced exposure to them, which would be necessary for extinction of the fear. In classical conditioning, in order for extinction to occur the conditioned stimulus has to repeatedly occur without the unconditioned stimulus (Pavlov, 1927). As described earlier, worrying seems to prevent physiological symptoms and most likely deeper emotional processing (Andor, Gerlach, & Rist, 2008). By dampening the physiological reactions to unpleasant thoughts worry allows one to cognitively avoid the thought, thereby maintaining the anxious reaction to the thought and reinforcing the avoidance through worry. This reduces distress in the short term but also prevents habituation to the feared situation. Because of this, worrying is initially reinforcing but serves to maintain the anxiety and also prevent solving the problem, since the thoughts during worry are often vague and make it difficult to prevent a feared situation or come up with a reasonable plan to deal with it (Borkovec, 2003). By preventing one from emotionally processing a situation or thinking about it specifically or thoroughly to solve it worry becomes a self-reinforcing process that leaves little room for clinicians to intervene. When someone fears something external a technique like graded

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exposure can work because the stimulus can be presented a little at a time at manageable levels until the person habituates to its presence (Borkovec, 2003). When the fear is of a certain thought because of the anxiety that thought causes, the exposure is more difficult. Worrying is not actually processing the thought it is avoiding it. Because of this, someone suffering from excessive worry needs to somehow be exposed to the presence of the thought without responding by actively worrying about it in order to extinguish his or her fear response. In this way, a person must accept the presence of the thought and be comfortable in its presence in order for extinction to occur. In sum, worry is a form of cognitive avoidance that prevents one from habituating to a feared situation. If a person is unable to tolerate the presence of an upsetting thought actual and specific problem-solving is unlikely to occur (Borkovec, 2003).

The Goal-Progress Theory of Rumination. One of the prominent theories regarding the basis of rumination is Martin and Tesser's (1996) goal progress theory. This explanation has more to do with the content of the thought than the experience of the thought, in that it hypothesizes that rumination begins when one recognizes a discrepancy between what their current situation and their ideal situation, or a blocked goal. The initial response of dwelling on these blocked goals can sometimes be helpful with short-term problem solving, but unhelpful when it is continued for an extended period of time. Klinger (1977) characterized actions (and thoughts and emotions) as being part of organized action systems, which are part of lower order and higher order life goals. When an organized action system is not completed, one sees it as blocking a higher order goal, and what will follow are more and more attempts to achieve that goal, or complete that action system by repeating familiar strategies. Mandler's (1975) framework of emotion

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defines emotion as requiring an autonomic nervous system response (ANS). The degree of emotional intensity of a situation will be directly related to the amount of ANS arousal present. In order for ANS arousal to be present, interruption of an organized action system is considered sufficient and possibly necessary. Mandler characterizes the strategy people use to deal with these interruptions with the familiar phrase "if at first you don't succeed, try again" (Mandler, 1975, p.156).

An example of the above would be young man who wants to go out on a date with young woman. His lower order goal in this situation may be to have a successful date with an attractive woman, but his higher order goal may be to have a close relationship, to be understood, or maybe just to be loved in general. When she turns down his offer for dinner, he may recognize this as blocking his lower order goal, but his emotional reaction may be heightened by the fact that his lower order goal of a nice date is actually a step on a ladder to his higher-order goal of being loved. According to Klinger and Mandler's theories, his initial reaction would probably be to become somewhat preoccupied with how he can get this particular girl to go on a date with him. If he continues to think about this particular woman without success this could have dire consequences for him (and her) and ultimately more likely keep him from reaching his goal than help him. Research that supports this account has shown that rumination has been linked to stalking behavior.

In a recent study that looked at this connection, undergraduate students completed a questionnaire that included how often they had engaged in certain behaviors when pursuing either a romantic interest or a former romantic partner (Dennison & Stewart, 2006). All of these behaviors were potentially intrusive and fell into four subscales; direct communication, covert pursuit, self-harm, and other harm. One of the main findings of

the study was a strong correlation between covert pursuit and rumination, which included things like following the person, spying, spreading false rumors, and changing classes or offices to be closer to a person. Applying these results to the example of the young man, rather than moving on and finding someone else, the man in question would be caught up in thoughts of his failure, and this would prevent him from having new, healthy social interactions that would help him move on from his loss. In this way, rumination has an element of avoidance in it as well, but whereas anxiety is characterized by cognitive avoidance, rumination can be seen as a kind of behavioral avoidance, with the ruminative thoughts serving to remind the person that they are a failure and should probably not attempt something new because they would probably fail at it. Pessimism is one of the symptoms of depression making thoughts like these more likely (DSM-IVR, 2000). Supporting this was a study that looked at self-reports of depression, anxiety, rumination and avoidance in college students. Results showed that rumination and behavioral avoidance remained correlated when anxiety was controlled, and cognitive avoidance and rumination disappeared when anxiety was partialled out (Moulds, Kandris, Starr, & Wong, 2007).

To our knowledge there have been no experimental tests of Goal Progress Theory. Although there are a large number of strong experimental studies on suppression, they are for the most part laboratory studies looking for basic science explanations of the mechanisms that cause and maintain repetitive thought, and most of them focus on the comparison of suppression to acceptance or suppression and a monitor-only group. The theory and experimental research in this area is abundant, but there is a gap in the research that includes direct application of interventions based on the explanations and

the consideration of individual differences and how they may impact treatment success. In the next section, the need for new and effective treatment components for GAD will be highlighted and the clinical literature's extensive research on the links between repetitive thought and internalizing disorders will be reviewed.

Prevalence and Current Treatment Rates for GAD.

Generalized Anxiety Disorder affects an average of 5% of people over the course of their lives and up to 25% of those presenting in anxiety disorder clinics have the disorder (American Psychiatric Association, DSM-IV-TR, 2000, p. 473). Recent work has also specifically examined the prevalence of GAD symptoms in college students specifically. A longitudinal study that looked at the presenting problems of an average of 1,020 students a year in counseling centers across 13 years found that the number of students experiencing problems due to stress and anxiety increased from 36% in 1988 to 63% in 2001 (Benton, Robertson, Tseng, Newton & Benton, 2003). Though there are relatively high rates of successful treatment for GAD it is still the least successfully treated anxiety disorder (Brown, Barlow, & Liebowitz, 1994). GAD is associated with twice the amount of primary care visits and rarely spontaneously remits. The most frequent cormorbid diagnosis is that of Major Depressive Disorder. Results from clinical trials suggest that psychotherapy can be effective for treating anxiety, in fact a meta-analysis looking at effectiveness of manualized therapies found that the median effect size at termination was large for GAD (.9; Westen & Morrison, 2001). However, when considering the intent-to treat group (including those who did and did not complete treatment), improvement rate was 44%. For those that did complete treatment 52 % of those with GAD were considered improved. This leaves a large number (48%) of people

seeking treatment who are *not* considered improved, pointing to an opportunity for researchers to explore new treatment components that can be of use to clinicians.

Comorbidity. The National Comorbidity Study found that 57% of a lifetime sample of depressed patients had a comorbid anxiety disorder (Kessler, 1997) and association of GAD with dysthymia and MDD were .64 and .59, respectively (Kruger, 1999). In a confirmatory factor analysis of NCS data, GAD fit better with major depression and dysthymia than the rest of the anxiety disorders (Krueger, 1999). These disorders have been referred to as "distress disorders" due to their large underlying component of negative affectivity (Watson, 2005). It's difficult to disentangle the direction of influence between anxiety and depression but comorbidity seems to be associated with increased severity of the primary disorder, length of disorder and lower recovery rates and in general, suicide risk is higher in   patients with both anxiety and depression than those with pure depression (Bronisch & Wittchen, 1994).

Clinical Perspectives: Repetitive Thought and Internalizing Disorders

The goal of clinical and other applied studies of repetitive thought has generally been to clarify the direction between various psychopathologies such as anxiety and depression and the tendency to engage in repetitive thought. There are significantly fewer studies that investigate specific causal mechanisms or causal effects of specific treatment components for particular types of repetitive thought.

The association between repetitive thought and internalizing disorders has been well supported (Nolen-Hoeksema, 2000; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). Usually worry is considered to be specifically associated with anxiety and rumination with depression. Excessive worry (along with anxiety) is the central

characteristic of GAD (American Psychiatric Association, DSM-IV-TR, 2000, p. 472)

and the relationship of rumination and depression has been shown in numerous studies

(Morrow & Nolen-Hoeksema, 1990; Nolen-Hoeksema, McBride, & Larson, 1997;

Watkins & Baracaia, 2001).

Rumination and Depression. Susan Nolen-Hoeksema developed the response-

styles theory or rumination (Nolen-Hoeksema, 1991), which focuses primarily on the

links between rumination and depression. The response-styles theory proposed that

people have consistent, trait-like patterns of responses to depression, that the style of

response people have may influence the depressive episode, and that a ruminative

response style tends to lead to longer and more severe episodes of depression. A

ruminative response style is defined as one that focuses on the fact that one is depressed,

one's symptoms of depression, and why one is depressed. Results from a number of

studies support the idea that rumination is not only a trait-like pattern, but also that it can

lead to a variety of negative outcomes for both clinical and non-clinical populations

(Nolen-Hoeksema, 1991).

A study in which authors explored the relationship of rumination and recovery

after a spouse's death found that people who were more ruminative a month after their

partner's death were also more likely to be pessimistic about the future (Nolen-

Hoeksema, Parker, & Larson, 1994). Levels of rumination were assessed using a semi-

structured interview that asked explicitly how respondents were coping with the loss.

Higher levels of rumination at one month predicted levels of depression at six months

even when controlling for initial depression, social support, pessimism, gender and other

stressors (Nolen-Hoeksema et al., 1994). Another study of grief over a partner's death

found different results that nonetheless pointed to the maladaptive nature of a ruminative response style. Men whose terminally ill romantic partners had recently died were assessed for well-being and asked to describe what they were feeling, what they were thinking, what helped and what made things more difficult. Men were considered to have a more ruminative response style the more they mentioned regrets over what they hadn't done before their partner died, the more intrusive thoughts they had about the death and the more they focused on negative feelings. Men with higher scores on these measures showed higher levels of distress both 1 month and 12 months after the loss than men who engaged in less rumination. Rumination did not predict levels of depression, positive states of mind or intrusive thoughts about the loss after controlling for these measures right after the loss. However, it did predict scores on positive morale, which seemed to reflect an advanced level of adjustment supporting the idea that rumination may interfere with emotional processing (Nolen-Hoeksema, McBride, & Larson, 1997).

Results have also supported the consistency of response styles. A study in which college students kept track of their moods and their responses to those moods every day for 30 days (Nolen-Hoeksema, Morrow, & Fredickson, 1993) found that eighty-three percent of participants showed a consistent pattern of responses to their moods throughout the month of the study. Participants who described ruminative responses near the beginning of a depressed episode remained depressed for a longer time than those who did not a ruminative response style, even when controlling for the participants' initial level of depressed mood.

Experimental studies have looked at the impact of induced rumination on depressed mood. Morrow and Nolen-Hoeksema (1990) conducted an experimental study

that explored the impact of passive rumination on induced depressed mood. They assessed undergraduate students' depressive symptoms and then induced a negative mood by having participants read a depressing story and imagine that it was happening to them. Participants were then randomly assigned to one of four conditions; each condition intended to represent four different response styles to depressed moods. Participants in the ruminative-passive condition participants read sentences that involved themselves and their emotions. Participants in the distracting-passive condition read sentences that stated facts that did not involve themselves or their emotions. In the active conditions participants had these same sentences, but they were printed on large cards and the participants were asked to sort them either by relevance to themselves (ruminative-active) or alphabetically (distracting-active). After the tasks, the participants' mood was again gauged. Participants in the distracting-active condition (walking around, sorting facts alphabetically) showed the greatest reduction in overall level of sadness, and those in the ruminative-passive condition (quietly sorting emotion and self-focused statements in order of how much they applied to themselves) showed the least reduction in sadness (Morrow & Nolen-Hoeksema, 1994). Studies such as this one support the theory that one's ruminative response style to depressing events may lead to longer lasting and more severe depressive episodes.

Rumination has also been explored as a moderator for the finding that women are more prone to depression than men (Butler & Nolen-Hoeksema, 1994). In the first of this pair of studies participants were assigned to either a negative mood-induction or a control condition in which there was no mood induction. Participants were then given a choice for the next phase of the experiment; they could rank emotion-related items, or items that

were not related to emotions. In both conditions, 92% of the women and 46% of the men chose the emotion-related items. The response styles theory would suggest that this tendency to focus on emotions, even when in a depressed state, may make women more vulnerable to longer and more severe episodes of depression. In the second study, participants (125 men and 74 women) were given the Beck Depression Inventory (BDI) and the Response-Styles Questionnaire (RSQ), which gauges response styles to depressive events. Two weeks later participants again took the BDI. Initial depression levels were the largest predictor of time 2 depression levels, but this was closely followed by participants' response style. Gender was not a significant predictor of time 2 depression levels when response styles were taken into account. These results indicate that the differences in rates and vulnerability to depression between men and women may not be about gender but instead be caused by differences in tendency to ruminate (Butler & Nolen-Hoeksema, 1994).

Many studies have supported the response-styles theory, but there are also studies that have contradicted it. Lara, Klein and Kasch (2000) found that rumination did not predict the duration of a major depressive episode in college students assessed six-months later. Some show that rumination seems to predict onset but not duration of depression. Results from an 18-month longitudinal study showed that participants who tend to ruminate as measured by the Response Styles Questionnaire were more likely to experience a depressive episode than those who did not. However, rumination did not predict the duration of the depressive episode.

These findings clearly show support for the direct links of rumination and depression, and anxiety and worry are clearly linked as worry is one of the primary

diagnostic indicators of anxiety. However, the relationships between certain types of repetitive thought and specific disorders are not always so clear. For instance, rumination has been found to be related with negative outcomes other than depression. A longitudinal study examined the results of four separate assessments of adolescent women given on a yearly basis (Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). Ruminative coping styles as measured by a shortened version of the Response Styles Questionnaire predicted higher levels of not only depressive symptoms, but also bulimic symptoms and substance abuse, which in turn predicted future increases in ruminative coping. The links between rumination, depression, worry and anxiety are especially intertwined, which is not surprising considering the high rate of comorbidity between anxiety and depression.

Rumination, Worry, Depression and Anxiety. Studies on the links between the general tendency toward repetitive thought and mood disorders have found meaningful links between different types of negatively valenced repetitive thought and both anxiety and depression. A longitudinal study that interviewed adults twice over the course of a year found that levels of rumination at the first interview predicted symptoms of not only depression but also anxiety at the second interview, and that people with a ruminative response style were more likely to have mixed anxiety and depressive symptoms (Nolen-Hoeksema, 2000).

Across a pair of studies intended to further clarify these relationships, participants filled out self-report measures of anxiety, depression, and rumination (Segerstrom, Tsao, Alden, & Craske, 2000). Results from the first study showed an overall association between a tendency toward repetitive thought and negative mood. In the second study

measures were filled out before midterm exams (chosen because of it was assumed this was a stressful time). Repetitive thought was found to be responsible for about half of the variance on follow up measures of anxiety. Rumination has been shown to be significantly related to depression and anxiety, and both rumination and worry have been shown to be mediators for the relationship between neuroticism and the presence of anxiety or depression (Muris, Roeleofs, Rassin, Franken & Mayer, 2005). An experimental study found that laboratory inductions of worry elicited anxious and depressive affective states in close to equal amounts (Andrews & Borkovec, 1988).

A more recent experimental study further explored the similarities and differences of worry and rumination and their interaction with depression, anxiety, positive and negative affect, and thought and imagery content in cognition (McLaughlin, Borkovec, & Sibrava, 2007). In this study half of the participants were asked to engage in worrying for five minutes followed by five minutes of ruminating, and half did this in the opposite order. In order to ensure participants could get worrisome or ruminative states they asked them to write down what they most often ruminated about and what they most often worried about and use these as cues. Worry was defined as intrusive thoughts or images about potential future events and rumination was defined as thoughts or images about past mistakes or failures. Throughout the ruminative and worrisome periods participants were asked every 60 seconds to write down what they were thinking about, when the situation they were thinking about occurred (or possibly would), and whether their mental content was mostly imagery, thought or other. Results showed that both worry and anxiety produced increases in negative affect and decreases in positive affect. Worry generated greater anxiety, and rumination greater depression. These results support the

idea that worry and rumination have an overall relationship to negative affect, but worry seems to be more related to anxiety and rumination seems to be more related to depression (McLaughlin, 2007). A correlational study in which the authors attempted to clarify the links between neuroticism, rumination, worry, anxiety and depression found significant correlations between neuroticism, rumination and worry, and all three were positively linked to both anxiety and depression. The results supported a mediational model in which neuroticism led to anxiety and depression by influencing levels of worry and rumination (Muris, Roelofs, Rassin, Franken, & Mayer, 2005).

Based on this extensive research on the links between internalizing disorders and repetitive thought, Figure 3 portrays model that builds on these findings and proposes a developmental pathway leading to comorbid depression and anxiety with repetitive thought as one of the causal factors. In the model the proposed direction of influence is represented by arrows with heavy lines, the added associations supported by theory and research are represented by arrows with dashed lines. The model begins early in life, as many personality factors are inherited, and genetic influence has been shown to account for 41% of the variance in neuroticism (Jang, Livesley, & Vernon, 1996). The next stage in the model is the predisposition to worry. A stated earlier, an excessive pattern of worry is one of the main criteria for GAD. Tendency to worry has been associated theoretically with cognitive avoidance (Borkovec, Alcaine, & Behar, 2004), and avoidance has been shown to strengthen both affective responses and frequency of intrusive thoughts (Wenzlaff, Wegner, & Klein, 1991). GAD can then result in difficulties in interpersonal functioning accentuated by an exaggerated perception of personal failures (Eng & Heimberg, 2006), which should be discrepant with the goals that person has for

themselves. These discrepancies, according to Martin and Tesser's (1996) theory will then lead to ruminative thoughts, which have been shown to be associated with behavioral avoidance and withdrawal. Both behavioral avoidance and withdrawal have been associated with depression (Moulds, Kandris, Starr, Wong, 2007). Once one is depressed the depression can influence and fuel a number of the preceding factors and

In sum, worry and rumination have been shown to have a profound, significant, negative impact on psychological well-being in both clinical and non-clinical populations. Thus, effective interventions for rumination could possibly result in the decreased severity and duration of disorders, and possibly avoid some disorders altogether. However, a lack of clear findings from the few experimental studies investigating how to reduce repetitive thought and a lack of application of knowledge of individual differences to treatment components leaves clinicians with few clues on how to effectively intervene. The purpose of the current study is to explore the effectiveness of an acceptance-based intervention and a goal-progress theory intervention on reducing worry and rumination. The next section briefly reviews some of the more recent research focusing on acceptance as an alternative to suppression as a way of treating repetitive thought.

New Approaches to Repetitive Thought: Acceptance

Early studies of thought suppression often compared thought suppression conditions to control conditions in which participants were told they could think of whatever they wanted, including the target thought (Merckelbach, Muris, van den Hout, & de Jong, 1991), or conditions in which participants were expressly told to think of the thought (Wegner et al., 1987), both of which can be thought of as early versions of

acceptance of thoughts. For the most part these early "acceptance" conditions were found to be more effective than suppression in a wide range of domains (Abramowitz, Tolin, & Street, 2001; Wegner, Schneider, Carter, & White, 1987; Wenzlaff & Wegner, 2000). One study that compared the impact of expressing a thought to actively suppressing a thought asked participants to provide a situation that made them feel anxious, angry or neutral (Roemer & Borkovec, 1994). Participants were then asked to speak aloud about whatever came to mind for five minutes to practice verbalizing spontaneous thoughts. Following this practice period participants were asked again to verbalize their thoughts for five minutes but in one condition they were instructed to suppress thoughts of the previously mentioned situation, and in the other condition they were instructed to keep thinking about the previously mentioned situation. After this period *all* participants were asked to attempt to think of the previously mentioned situation and speak aloud for five minutes, again mentioning the thoughts of the situation any time it came to mind. During the second period, participants who were in the suppression condition initially showed an increase in the statements about the target situation. Participants in the initial expression condition showed a decrease in the statements about the target situation (Roemer & Borkovec, 1994).

More recent studies looking at the impacts of suppression and acceptance have focused less on examining the ineffectiveness of suppression and more on the positive impact of acceptance. One correlational study exploring acceptance strategies found that people who naturally tend to accept the presence of their personally intrusive thoughts were less likely to be distressed or have a need to act on the thoughts than those who naturally tend to suppress their unwanted thoughts (Marcks & Woods, 2005). The second

study in this paper was experimental and compared the impact of a new intervention intended to increase acceptance of an unwanted thought to a suppression period. The intervention was based on Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999), and was intended to increase the participants' willingness and ability to experience uncomfortable thoughts and feelings without avoidance or struggle. This study compared frequency of unwanted thought and discomfort ratings during three sessions: a baseline session, an experimental session (in which participants were either monitoring their thoughts, suppressing their thoughts, or receiving the acceptance intervention) and another session. In order to record thought frequency, participants pressed a button on a counter whenever they experienced the thought. Results showed that participants were unable to suppress their personally relevant thoughts during the suppression period and showed increased distress after suppression. There were no differences found in frequency of the thought. However, those in the acceptance condition experienced a decrease in distress whereas those in the suppression condition did not. The authors suggested that this may be because acceptance is less about reducing frequency of a thought and more about changing one's relationship to a thought. However, it is also possible that this strategy did not reduce the frequency in thoughts because participants' tendencies toward a particular repetitive thought patterns (such as worry or rumination) were not taken into account.

Chapter III

Statement of the Problem

Repetitive thought is related to a number of clinical disorders including depression and anxiety. Although the literature related to repetitive thought is vast, there is little integration between experimental studies investigating the causal mechanisms of repetitive thought and applied studies that focus on the relationship between repetitive thought and psychopathology. There has also been little research on interventions intended to target individual differences in patterns of repetitive thought.

In order to address these gaps in the literature, in the current study the effectiveness of two different types of interventions was compared. The acceptance intervention was adapted from Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999) and, based on the cognitive avoidance theory of worry, was targeted toward those who tend to worry. The overall aim of the acceptance intervention was to reduce worry by increasing participant's comfort with their distressing thoughts, which should reduce their need to resort to cognitive verbal-linguistic activity and inhibit emotional processing, which would stop the reinforcement cycle of cognitive avoidance that is currently in place.

The second intervention was targeted toward reducing rumination by exploring alternatives to meeting unmet goals. Mandler (1975) suggests that alternative routes to completing the interrupted sequence can reduce the intensity of emotion in response to an interrupted task (or blocked goal). Ironically, recognizing these other alternatives may be difficult for those that have a tendency to ruminate, because if they are in a negative affective state, their attention tends to be narrowed, and their problem-solving less

creative (Isen, Daubman, & Nowicki, 2004). Using the earlier example of the smitten young man, he may be somewhat depressed and unable to recognize that he in fact has many avenues to being loved, through his friends, his family and other possible partners. The ultimate goal of this intervention was to increase participants' awareness of other routes to achieving their higher-order goals even though their lower order goals may remain blocked, thereby stopping their persistent attempts to solve the problem using familiar but ineffective strategies.

Because of the possibility that these interventions may change one's relationship to an unwanted thought rather than its frequency, the current study will look at not only the impact of the intervention on frequency of the thought but also negative and positive emotions associated with the thought.

By exploring the effectiveness of these interventions, this study will capitalize on the experimental methodology of laboratory studies to investigate questions of applied relevance, namely both the mechanisms behind repetitive thought and what types of interventions work best for these particular types of repetitive thought, worry and rumination.

Hypotheses

Hypothesis 1: The acceptance procedure will be more effective at reducing the amount of time spent thinking about their unwanted repetitive thought for those participants who tend to worry than those participants who tend to ruminate, whereas the intervention that is based on goal-progress theory will be more effective for participants who tend to ruminate at reducing the amount of time spent thinking about their unwanted repetitive thought than it will for those that tend to worry. As stated earlier, much research has been

done about the ineffectiveness of thought suppression at reducing the frequency of unwanted thoughts. The goal of the ACT intervention is to reduce suppression by asking the participant to accept the existence of the thought, to avoid judging the thought or trying to make the thought go away. People who tend to worry have a tendency to suppress their unwanted thoughts, and the purpose of this procedure will be to lead them to respond in a different manner, hopefully stopping their path toward Generalized Anxiety Disorder. Conversely, the ACT intervention will not address the pattern most frequently exhibited by those who tend to ruminate, for whom suppression and cognitive avoidance is not the issue. Time spent on the thought will be measured by seconds spent verbalizing about the situation or thought the participant specified. The aim of the Goal intervention is to show the participants that there are other ways of meeting their higher-order goals that do not require them to keep thinking about their current problem. If it is true that the participants are ruminating because of their tendency to focus on their inability to solve a higher-order goal, this intervention should succeed in removing their initial reason for ruminating by making it clear that there are other paths to solving this goal. This intervention is not expected to be as effective for the worriers because it does not have the same focus on reducing suppression and cognitive avoidance.

Hypothesis 2: The acceptance intervention will be more effective for those that tend to worry at reducing the implicit and explicit negative affect associated with the thought than it will for those that tend to ruminate, whereas the intervention based on goal-progress theory will be more effective for those that tend to ruminate at reducing the negative affect associated with the thoughts than it will for the worriers. According to Trinder and Salkovskis (1994), suppression prevents people from habituating to their

thought. The more that they attempt to suppress it, the more anxious they become and the more effort they put into suppressing the thought. As stated earlier, Wegner and Gold found that when participants suppressed emotionally relevant thoughts they were more likely to show an emotional rebound effect. It follows that those who tend to naturally suppress their unwanted thoughts may become more sensitive to their existence and the thoughts may cause them to experience more negative affect. On the other hand, those participants that tend to ruminate do not tend to attempt to suppress their unwanted thoughts, persistently dwelling on blocked goals, so this intervention should not impact their level of negative affect. Mandler's (1975) emotion theory holds that when a goal is blocked the emotional response will be moderated by substitute behaviors available at the time of interruption. The other pathways the participant generates during the goal progress intervention should then show them that there are available substitute behaviors they can engage in to achieve their goals, which should decrease the amount of negative affect they have in response to the thought. Negative affect will be ascertained from responses to the PANAS (explicit) and the number of negative word choices on the word-completion (implicit).

Hypothesis 3: The acceptance intervention will be more effective for those that tend to worry at preventing the decrease in positive emotions associated with the thought than it will for those that tend to ruminate, whereas the intervention based on goal-progress theory will be more effective for those that tend to ruminate at preventing the decrease in positive emotions associated with the thought than it will for the worriers. As stated earlier, negatively valenced repetitive thought has been associated with decreases in positive affect as well as increases in negative affect (McLaughlin, 2007) and thus these

interventions aim prevent reductions in positive affect as well as decrease negative affect.

Chapter IV

Method

Design

This study was an aptitude (type of repetitive thought) x treatment (treatment condition) experiment exploring the impact of repetitive thought tendency as a moderator for effectiveness of different interventions intended to reduce frequency and distress caused by repetitive thought. Frazier, Tix and Baron (1996) provide a number of guidelines for testing moderator effects that will be followed in both the design and analyses of this study. Effect size was estimated before data collection. The number of participants were assigned to each condition will be as equal as possible in order to maintain power, and the assumption of homogeneous error variance was tested using an online program suggested by Frazier et al. (1996).

Participants

Participants included 89 undergraduate students from a large Mid-Atlantic university who were recruited through psychology classes. Students were recruited based on their results of an online questionnaire available to students in introductory psychology classes. On a semi-annual basis, students in introductory psychology courses are asked to take this questionnaire and given extra-credit for their participation. This mass-screening questionnaire included the Penn State Worry Questionnaire, and participants with a score greater than 45 were sent an email with an invitation to partake in the study (See Appendix A). A cut-off score of 45 has been found to maximize sensitivity (.99) and specificity (.98) in differentiating GAD patients from non-anxious controls (Behar, Alcaine, Zuellig, & Borkovec, 2003). It was estimated that a minimum of 91 participants were needed based on an a priori power analysis specifying a medium

effect size, an alpha of .05 and power of .80. However, although 109 participants were initially recruited, due to attrition 96 participants took part in the second timepoint of the study, meaning the attrition rate was 12%. Additionally, four of the participants' data was unusable due to a technological failure and two of the participants' data was considered unusable because coders considered their initial descriptions of worries as an indication that those participants were not taking the question seriously. The mean age of the participants in the original sample was 19.1 years ($SD = 1.59$). Of the entire sample ($n=109$), 12 of the participants were African American (11%), 75 were white (69%), 11 were Asian or Pacific Islander-American (13%), eight were Latino/a (7%), and three described themselves as "other" and did not specify (3%). Eighty-three (76%) of the participants were female, and 26 (24%) were men. Participants were compensated for their participation with extra credit.

Measures

Vulnerability to GAD and Tendency to Worry. The Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger & Borkovec, 1990; See Appendix B) was used to assess anxiety during recruitment and used to assess tendency to worry during time 1. The PSWQ is a 16 item 5-point scale designed to assess pathological worry. It has shown high internal consistency (α=.88-.95) and test-retest reliability (.74-.92 over 2 to 10 weeks) with college samples. The largest correlate of the PSWQ is neuroticism (r = .74) (Molina & Borkovec, 1994). Example items include "my worries overwhelm me" and "many situations make me worry." Participants rate the items on a scale ranging from 1 (not at all typical of me) to 4 (very typical of me). Studies have shown that the PSWQ

can be reliably used to identify individuals with generalized anxiety disorder (Fresco,

Mennin, Heimberg & Turk, 2003; Behar, Alcaine, Zuellig, & Borkovec, 2003).

Specific Thoughts. Participants were asked to self-generate two repetitive thoughts

that they struggle with. Based on findings from previous research in which type of

repetitive thought tendency has had more influence than type of a specific generated

thought, the hypotheses involved tendency to worry or ruminate and not whether the

specific thought provided was a worry or a rumination. In order to provide them the

freedom to come up with either a rumination or a worry, the question read "Often times,

people repeatedly think about situations that they would rather not think about. Examples

of this include but are not limited to worrying about something that could happen in the

future or replaying an upsetting event over and over again in your mind. Before going

onto the next screen, please take a moment to try to think about a situation or event you

wish you could stop thinking about. If possible, this should be a situation that you either

have been thinking about for a while or think that you will be thinking about for a while.

In other words it should be likely that this situation will still be relevant to you a week

from now. After you have thought of something, please move on to the next screen and

with as much detail as possible describe a specific past, current, or future upsetting

situation or interaction that is something you think about more than you would like to and

is hard for you to stop thinking about. It can be difficult to narrow it down to only one

situation or event, and you will have the opportunity to describe two different situations.

Once you have thought of your answer please check the box below." Once they checked

the box, they were brought to the next screen, which asked them again to describe the

thought in detail. Two coders were asked to look over the worries in order to make sure

that the responses to this question were taken seriously and would be appropriate for the study. Agreement between coders was perfect with a Kappa of 1.0 (*p<.001*). Descriptions that were not included were "failing the test today" and "hungry".

Tendency to Ruminate. The Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991; See Appendix C) is a 22-item subscale of the Response Styles Questionnaire and was used to measure tendency to ruminate. Each item is rated on a 4-point scale from 1 (almost never) to 4 (almost always). Example items include "go away by yourself and think about why you feel this way" or "try to understand yourself by focusing on your depressed feelings". The RRS has shown high internal consistency (α=.89; Nolen-Hoeksema & Morow, 1991, α=.90; Fresco, Frankel, Mennin, Turk, Heimberg, 2002). The construct validity has been supported as well. Scores on this scale have been shown to correlate significantly (r=.62) with reports of ruminative responses to depressed mood in a diary study (Nolen-Hoeksema, Morrow & Fredrickson, 1990). It has also been shown to predict self-reported depressed mood (Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema et al., 1994) and onset of threshold depression (Nolen-Hoeksema, 2000).

Positive and Negative Affect – Explicit Measure. The Positive and Negative Affect Scale (PANAS, Watson, Clark & Tellegen, 1988; See Appendix D) was used at each time point. During time 1 it was used to measure how the participant has felt in the past few weeks, and at time 2 it was used to measure the participant's levels of positive and negative *current* mood after the interventions. The PANAS (See Appendix D) is a 20 item self-report scale used to measure positive and negative affect. Each item is rated on a 5-point scale ranging from 1 (very slightly or not at all) to 5 (extremely). The PANAS

can be used to measure affect for varying amounts of times (e.g. today, past few days up to a year) and evidence suggests this doesn't affect the measure's psychometric properties (Watson, Clark & Tellegen, 1988). Reliability and validity of the PANAS has been explored with a large non-clinical sample and good reliability for both the Positive Affect (PA) Scale ($\alpha = .89$, 95%; CI=.88-.90) and the Negative Affect (NA) Scale (α=.85, 95% CI = .88-.90) (Crawford, & Henry, 2004). The PA and NA scales have been found to be relatively independent, sharing only 5.8% of variance. A difference thought to be present between depression and anxiety is a lack of positive affect in depression (Clark & Watson, 1991). The construct validity of the PANAS has been supported using this theory, in that the correlation between PA and depression has been shown to be significantly larger than that between PA and anxiety. Also, although both PA and NA are correlated with depression, PA (8.3%) has been shown to account for significantly more variance on measures of depression than NA (4.7%) (Crawford, & Henry, 2004)

Positive and Negative Affect– Implicit Measure. A word-stem completion measure (See Appendix E) was used to implicitly assess participants' levels of positive and negative emotion after the intervention (Twenge, Baumeister, DeWall, Marquez, Reid, & Koole, 2007). The measure includes 14 stems that can be completed to form positive, emotion words and neutral words (e.g. joy or jog) and 14 stems that could be completed to form both negative emotion words and neutral words (e.g. angle or anger). Because no validity or reliability data for this measure was available, another measure intended to get at participants' levels of negative and positive emotion was also used.

Positive and Negative Affect. Participant negative and positive emotion word usage during verbalizations after the intervention was assessed using the Lingustic

Inquiry and Word Count (LIWC; Pennebaker, Booth, & Francis, 2007). The LIWC was designed to analyze the emotional, cognitive and structural aspects of verbal and written speech. It includes a large number of subscales, but this study only used two categories: "positive emotions" (e.g. love, nice, sweet) and "negative emotions" (e.g. hurt, ugly, nasty). The positive emotion category contains 406 words, and the negative emotion category contains 499 words. These categories have been found to have high internal reliability (α=.97 for both scales). Because of time constraints, the verbalizations could not be transcribed, so in order to use the LIWC in this study, two research assistants separately recorded all words they thought could possibly be considered positive or negative emotion words when listening to the recorded data. These were combined into a larger list, and one research assistant then typed in the possible positive and negative emotion words to a free website designed to return the percentage of positive and negative emotion words contained in the LIWC dictionary based on text entered. These percentages were calculated back into number of words in each category and this number was used for the final data analysis.

Procedure

Participants were recruited from Introduction to Psychology classes. Students in these classes had the opportunity to complete an online screening survey in the beginning of the semester for extra credit. This survey included the Penn State Worry Questionnaire and participants who scored above 45 on this measure were contacted by email and informed that they were eligible to take part in this two-part research study for extra credit in their psychology class.

If the participants chose to participate in the study, they were sent an email that included information about how to sign up for both parts of the study one week apart, given a participant ID number, and were sent a link to the time 1 survey on SurveyMonkey, an online survey tool. This survey lasted approximately 15 minutes and included an informed consent page, the Ruminative Response Scale, the Positive and Negative Affect Scale, the Penn State Worry Questionnaire, and the request for a description of their specific repetitive thoughts.

One week later at Time 2 the participants came into the laboratory for the second timepoint of the study. Participants signed a consent form and were then led by the experimenter into a small room within the lab. Experimenters then instructed the participants to speak aloud for four minutes about anything that came into their minds, and reminded that it was important that they keep speaking for the entire time. The participants were assured that their results would remain confidential and they should feel free to speak about whatever thoughts come to mind. This time served as a practice exercise for speaking aloud after the intervention. It has been suggested that a practice period may help people set aside their concerns with the situation and more quickly get involved with the experimental task, as participants have been found to be more likely to report thinking of a thought they were attempting to suppress when they had a practice period to acclimate to the experience (Wegner, Schneider, Carter & White, 1987). During the practice period the experimenter left the room for this time period. After four minutes, the experimenter knocked on the door, told the participant they were finished with that portion of the study, led the participant to another room in the laboratory for the computer intervention and gave the participant a sheet with their descriptions of their thoughts from

the online survey. The experimenter asked the participants to read through their

descriptions. If they wrote more than one thought both thoughts were on the sheet and

they were asked to pick the one that was most relevant to them and circle it. The

experimenter then told the participants that they may be asked questions about that

particular thought during the intervention. After the participant read the description the

experimenter started the intervention on the computer and left the room.

Following this uniform procedure, the computer randomly assigned participants to

one of two conditions; Goal Progress or Acceptance. This portion of the study was

created using Medialab, computer software designed for psychology experiments.

Instructions and interventions included both text on the screen and the experimenter's

voice reading the instructions and interventions aloud.

Goal Progress Condition. The first portion of the computerized intervention for

participants in the Goal Progress condition consisted of a computerized card sort.

Participants compared their current concern with ten common higher-order goals, such as

"having meaningful relationships" or "being independent" (See Appendix F) and ranked

the concerns from most relevant to least relevant to their particular concern. The card sort

activity included 10 computerized "cards", each representing a higher order goal. The

goals were adapted from the 12 content categories that (Emmons, Cheung, & Tehrani

1998) developed in their coding system for "personal strivings" which are defined as "the

characteristic types of goals that individuals try to achieve through their everyday

behavior" (Emmons, 1986). Two of the content categories were dropped because of their

lack of specificity of content (approach/avoid and self-defeating). Three of these are

based on the "Big Three" (McAdams, 1999) motives (achievement, affiliation/intimacy

and power) but they also include other higher-order themes such as independence, self-presentation and generativity. The wording of the cards was put in a relatable format. For example, the card representing the goal "affiliation/intimacy" read "to have meaningful relationships." The computer program then led participants through a series of questions designed to help the participant recognize that their current issue is only one way that they could meet their higher-order goal. For example, as part of this portion participants generated other available paths toward attaining their higher order goals that did not require solving their current concern.

Acceptance Condition. The Acceptance intervention was based on an ACT exercise developed by Hayes (2005; see Appendix G). Similar, shorter exercises have been used in studies comparing thought suppression and acceptance (Marcks & Woods, 2005). This exercise consisted of imagining a stream with leaves floating on top of it, and then placing any thoughts that come to mind on the leaves and watching them go by. Participants read words on a computer screen while at the same time hearing the words they were reading aloud (experimenter's voice). The screens were timed (30 seconds each) to coincide with the sound. The intervention is intended to help delineate the content of a thought from the process of a thought. A common phrase in ACT is "buying a thought" meaning basically to take a thought literally (Hayes, 2005). Hayes explains the difference between "buying a thought" and "having a thought" by explaining that the thoughts people have are not what is problematic but rather their reactions to the thought. People struggling with unwanted thoughts may have difficulty separating the content of thinking from the process of the thinking. The ability to separate the content from the process allows one to get some distance from an unwanted thought and thus provides the

freedom to choose whether and how to respond to a thought. An example would be if you experienced the thought "nobody likes me". If you "buy" that thought, it should be more difficult for you to evaluate it or choose how to respond to it. If you are able to recognize it as not necessarily a statement of fact but as a thought you are having and examine it from some distance, you should be able to evaluate it more realistically. If the participant is able to achieve this distance and practice observing their thoughts without reacting to them, the participant should be less likely to practice cognitive avoidance due to a decrease in negative emotion aroused by the presence of the thought. After the exercise the participant responded to questions about what the exercise was like, what was difficult and what thoughts they became "stuck" on. These questions were intended not only to allow for deeper thinking about the process but also to make the intervention more interactive, increasing its similarity to the goal progress intervention.

Following the interventions all participants completed the PANAS and the word-stem completion task. When they finished the last task the computer program asked them to alert the experimenter, who led them back to the room where they had originally been asked to speak aloud. They were then asked to speak aloud again for four minutes, with their responses being recorded. Participants were then debriefed (See Appendix H) about the purpose of the study and thanked for their participation. An overview of the procedure can be seen in Figure 4.

Chapter V

Results

In the following chapter, the results of all statistical analyses will be described. The chapter begins with results of the preliminary analyses, which includes details from the data screening process as well as descriptive statistics for all variables of interest. See Table 1 for bivariate correlations between these variables as well as the means, standard deviations, and internal consistency. See Table 2 for the means of outcome variables by condition. Following this section are the tests of hypotheses and additional analyses.

Data Screening and Descriptive Statistics

All analyses were completed using the statistical package SPSS version 16. The variables used in the analyses were screened for missing values and normality and the scales were checked for internal consistency. A total of eleven missing values were found across the two time points in this PSWQ, RRS, and PANAS, and these were replaced using the participant's means for that scale. Tests for skewness and kurtosis were done, revealing values lower than one, meaning that the variables were close to normally distributed. Bivariate correlations among all predictor and outcome variables were calculated (see Table 1). The relationship between tendency to ruminate (measured by RRS) and tendency to worry (measured by PSWQ) was .39, was moderate but low enough to assume they are not measuring the same construct. The recordings of participants' verbalizations after the interventions were coded separately by two research assistants for number of seconds spent talking and number of seconds spent talking about their target thought. The ratings were examined for any large (more than five seconds) discrepancies and none were found. Krippendorff's (2004) alpha (α) was calculated for

reliability using a macro created for SPSS (Hayes & Krippendorff, 2007). This measure corrects for chance and can be used for ratio data. Coders reached acceptable levels of reliability for both total time sent talking (α=.88) and time spent on topic (α=.84).

General Analytic Strategy

Moderated multiple regression was used to test the interaction effects of repetitive thought tendencies and type of treatment with levels of positive and negative affect and amount of time spent verbalizing about the target thought as the dependent variables, with alpha set at .05. Because of the possible problems with collinearity between tendency to ruminate and tendency to worry, alternative methods such as using proportion scores were considered. However, using proportion scores would have violated the assumption of independence and thus was ultimately deemed to be less satisfactory. Additionally, using regression to some extent accounts for the overlap between these two predictors, because the individual beta weights examined for significance have the influence of the other variables partialled out.

Regression was chosen over ANOVA due to the continuous nature of the proposed moderator (i.e., repetitive thought). Furthermore, ANOVA would have required establishing artificial cut points for the continuous variables of tendency toward rumination and worry, which has been shown to result in more Type I and Type II errors in detecting moderator effects (Frazier, Tix, & Baron, 2004). The treatment conditions (Goal Process and Acceptance) were dummy coded using the values 0 and 1, and the scores on the measures of rumination and worry were standardized (i.e., z-scored), which reduces problems with multicollinearity between variables (Aiken & West, 1991; Frazier et al 2004). The dummy code and worry z-scores and rumination z-scores were each multiplied together. These product terms represented the interaction between the

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predictor (condition) and the moderator (type of repetitive thought tendency). The first step of the regression included three predictors: the dummy code for condition and the two z-scores of worry and rumination. The second step included the two interaction terms. The third step was not expected to produce a substantial three-way interaction, but is a statistical best practice in moderated multiple regression (Aiken & West, 1991).

Step 1

z-scored Rumination Score

z-scored Worry Score

Dummy Code for Condition (0 = Goal Progress Condition, 1 = Acceptance Condition)

Step 2

z-scored Rumination x Dummy Code for Condition

z-scored Worry x Dummy Code for Condition

z-scored Rumination x z-scored Worry

Step 3

z-scored Rumination x z-scored Worry x Dummy code for Condition

The results of interest based on the hypotheses in this study were the moderator effects, rather than the main effects.[2] However, the main effects will be presented in the

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[2] A subset of studies from Abramowitz et al.'s 2001 meta-analysis in which participants were given permission to think of a target thought or instructed to think about it and repetitive thought was measured using the same method (streaming) as the current study showed that these interventions had a mean

additional analyses, as they may be of interest to some readers due to their examination in previous research. In order to interpret the results, the *F* tests were examined to see if there was a significant change in the variance accounted for in the second step of the regression as a result of the interaction term between worry x condition or rumination x condition. Examining the omnibus F to determine the significance of the entire step helps control for type 1 error that can be introduced by testing multiple moderators (Frazier et al., 2004). If the second step of the regression accounted for a significant amount of variance, then the individual beta for the worry x condition and rumination x condition interactions were examined for significance. As an estimate of effect size at the level of each interaction term, the squared semi-partial squared correlations between the variables of interest were examined by squaring the semi-partial correlation output generated in SPSS. If there were meaningful interactions between worry x condition or rumination x condition, then predicted values for the outcome variable at one standard deviation above and below the mean of the moderator were plotted in order to obtain a visual and practical significance understanding of the results.

Tests of Hypotheses

<u>Hypothesis 1</u>: The acceptance procedure will be more effective at reducing the amount of time spent thinking about their unwanted repetitive thought for those participants who

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weighted effect size $d_+=.46_+$ so it seems reasonable to assume that conditions that have some aspect of acceptance are consistently effective (.23, -.12, Clark, Ball, & Pape, 1991; .63, Clark, Winton, & Thynn, 1993; .03, .16, Davies & Clark, 1998; -.35, .68, .86, Roemer & Borkovec, 1994; .78, Wegner & Gold, 1995; .57, Wegner, Carter, Schneider & White, 1987). Since both of the interventions in the current study have an element of acceptance the treatment conditions were not compared to a control condition.

tend to worry than those participants who tend to ruminate, whereas the intervention that is based on goal-progress theory will be more effective for participants who tend to ruminate at reducing the amount of time spent thinking about their unwanted repetitive thought (measured by seconds spent verbalizing about the situation described at time 1) than it will for those that tend to worry.

The regression findings for hypothesis 1 did not reveal any significant interaction effects. The interaction terms of interest did not account for unique variation in number of seconds spent on the topic, thereby failing to support Hypothesis 1 (see Table 3).

Hypothesis 2: The acceptance intervention will be more effective for those that tend to worry at reducing the implicit and explicit negative affect associated with the thought than it will for those that tend to ruminate, whereas the intervention based on goal-progress theory will be more effective for those that tend to ruminate at reducing the negative affect associated with the thoughts than it will for the worriers. Negative affect will be ascertained from responses to the PANAS (explicit) and the number of negative word choices on the word-completion (implicit).

Explicit Results. The interaction terms did not account for unique variation in participant scores on the negative affect subscale of the PANAS, thereby failing to support Hypothesis 2 (see Table 4).

Implicit Results The interaction terms did not account for unique variation in the number of negative word stems completed by participants, thereby failing to support Hypothesis 2 (see Table 5).

LIWC Emotion Words. The interaction terms did not account for unique variation in number of negative emotion words said by the participant, also failing to support Hypothesis 2 (see Table 6).

Hypothesis 3: The acceptance intervention will be more effective for those that tend to worry at preventing the decrease in positive emotions associated with the thought than it will for those that tend to ruminate, whereas the intervention based on goal-progress theory will be more effective for those that tend to ruminate at preventing the decrease in positive emotions associated with the thought than it will for the worriers.

Explicit Results None of the interaction terms in the regression analyses testing for positive affect using the positive affect subscale of the PANAS accounted for unique variance, thereby failing to support Hypothesis 3 (see Table 7).

Implicit Results None of the interaction terms in the regression analyses testing for positive affect measured by number of positive word stems completed accounted for unique variance, thereby failing to support Hypothesis 3 (see Table 8).

LIWC Positive Emotion Results

None of the interaction terms in the regression analyses testing for positive affect measured by number of positive emotion words used accounted for unique variance, thereby failing to support Hypothesis 3 (see Table 9).

Additional Analyses

Four sets of additional analyses were done. First, the first steps of all regression output were examined for any main effects of condition on the outcome variables. Type of condition was found to explain significant variance on the amount of time spent verbalizing about the topic (See Figure 5). Specifically, those in the ACT condition

tended to spend less time focusing on their thought than those in the goal-progress condition (β=-.25, *p*=.01), though the effect size was small by Cohen's standards (.06).

Type of condition also explained significant variance of the number of negative words said by the participant during the verbalization (See Figure 6). Specifically, those in the ACT condition tended to use significantly lower amounts of negative words during the verbalization that followed the intervention than those in the goal-progress condition for both worriers and ruminators (β=-.46, *p*<.01). This effect size was medium by Cohen's standards (.22).

Next, the participants concerns were coded by both research assistants with the goal of determining whether their specific concern was a rumination or a worry and a two-way ANOVA was done to see if this moderated the effects of condition on the outcome variables of interest. The concern was considered a rumination if it was past-focused, and a worry if it was future or present focused, based on the finding that one of the primary differences between the content of worry and rumination is that rumination tends to be focused on the past (Watkins, Moulds, & Mackintosh, 2005). The reliability for the raters was found to be high, with Kappa = .87 (*p*<.001). Coders discussed all disagreements until they were resolved. Results indicated no significant main effects of type of concern or interaction effects of type of concern by condition on any of the outcome variables of interest.

Third, to ensure that the group differences in number of seconds talking about the topic were not confounded by group differences in total number of seconds talking, a t-test was run and it was determined that the conditions did not differ significantly on this variable, (t=-.030, *p*=.976).

Fourth, in order to ascertain whether or not condition influenced the number of negative emotion words used above and beyond the time spent on the topic, another regression analyses was run with negative emotion words used as the dependent variable controlling for seconds spent on topic. Once seconds spent on topic was entered along with worry, rumination, and condition in the first step of the regression equation predicting number of negative emotion words, condition still added unique variance significant at the $p<.001$ level (see Table 10), though the effect size was reduced to .13, a small to medium effect.

Chapter VI

Discussion

This study compared two computer-based interventions intended to reduce frequency of unwanted repetitive thought, decrease negative affect and prevent reductions of positive affect in college students at risk for GAD and examined how scores on scales of tendency to worry or ruminate were associated with the effectiveness of the interventions. The first time point in this study took place online and participants filled out measures of tendency to ruminate and tendency to worry and were asked to describe unwanted repetitive thoughts that they wished they could stop thinking about. At the second time point the participants experienced one of two interventions, an intervention adapted from Acceptance and Commitment Therapy and an intervention based on goal progress theory designed for the experiment. This study was unique in its exploration of type of repetitive thought tendency as a moderator for effectiveness of interventions intended to reduce the frequency of repetitive thought and the negative emotional impact associated with it. The interaction hypotheses for this study were not supported, though some interesting patterns were evident. This section will discuss the findings of this study in further detail. It will begin by reviewing the descriptive statistics determine generalizability. It will then review the tests of hypotheses and possible explanations for the findings. Next, the additional analyses will be discussed. After these findings are discussed the limitations of this study will be reviewed, as well as the implications for future research and practice.

Sample

The sample included in this study was predominantly female, perhaps limiting the generalizability of findings. However, the proportion of men in the overall sample (24%) was similar to the proportion of men in the initial screening sample of introductory psychology classes (30%) and there were no significant correlations between gender and other variables. This is in contrast to some previous studies that have shown that women tend to have higher rates of rumination and (Nolen-Hoeksema, 1987), though this finding is not always consistent (Butler & Nolen-Hoeksema, 1994; Roelofs, Hubers, Peeters, & Arntz, 2007). No significant difference between genders was found in the mean scores on the Penn State Worry Questionnaire. This finding is in line with research that has found that although women report more worry than men in the general population, among GAD patients that gender difference is not found (Startup & Erickson, 2006). The participants were screened in order to make the sample generalizable to a clinical sample. It's interesting (and perhaps troubling) to note that the mean score for the entire sample of the screening questionnaire at the time of recruitment (n=691) was also above the clinical cut-off point used in this study (M= 51.48, SD=13.66) with 472 (68%) of the sample scoring above the cut-off point. This supports the recent finding that the number of college students experiencing problems due to stress and anxiety is quite high (Benton, Robertson, Tseng, Newton & Benton, 2003).

Tests of Hypotheses

Contrary to prediction, repetitive thought tendency did not moderate the relationship between condition and the number of seconds spent discussing the target thought, positive affect after the intervention, or negative affect after the intervention. There are a number of possible explanations for this. One possible explanation is that

contrary to previous findings showing the tendency to ruminate and the tendency to ruminate lead to different cognitive and behavioral responses to unwanted thoughts (Watkins, 2004), both may actually involve cognitive avoidance in different ways. Self-report data has shown that people that tend to ruminate are more likely to react to the thought by trying to understand it better, whereas those that have a high tendency to worry are more likely to try to avoid thinking about the thought by replacing it with another thought or suppressing it (Watkins, 2004; Freeston, et al**.,** 1991). It could be possible that these self-report measures of responses to thought do not sufficiently explain reactions to unwanted thoughts. It's possible that *through* dwelling on possible causes, and meaning of upsetting situations one is still in effect avoiding becoming comfortable with the presence of the thought. According to the cognitive avoidance theory of worry, a person must accept the presence of an unwanted thought and be comfortable in its presence in order for extinction of a negative response to the thought to occur. If a person is unable to tolerate the presence of an upsetting thought, actual and specific problem-solving is unlikely to occur (Borkovec, 2003). This explanation would contradict Martin and Tesser's (1996) goal progress theory of rumination. However, it's also possible that since this is the first experimental test of the theory that we know of, the intervention designed for this study did not actually allow participants to disengage from their lower-order goal by exploring alternative avenues to reaching their higher-order goal. If this were the case it would not be surprising that this intervention failed to work any differently for ruminators or worriers, as it would not address the desire to achieve blocked goals, the theorized mechanism behind rumination.

Another explanation is that the average score on the PSWQ was relatively high, so even people who had a high tendency to ruminate as measured by the RRS tended to have a high tendency to worry as well. These high levels of worry may have made it so that despite levels of rumination, these participants may be more likely to exhibit cognitive avoidance, which only the acceptance intervention was designed to address.

Every effort was made to ensure the two conditions were as similar as possible except for the focus on acceptance of the presence of the thought in the acceptance condition and tying the current thought to higher order goals and considering alternate pathways to meet them in the goal condition. Nonetheless, an alternative explanation for the lack of findings could be that during the intervention there were some unintended differences that may have influenced the results. For example, those in the goal condition were asked more questions that were directly related to their target thought. It's possible that these participants were in effect primed to think about their thought, and in a way they were just continuing the process they began during the intervention, which could have led to an increase in the frequency of the thought when compared to those in the acceptance condition, despite repetitive thought tendency. However, participants in both conditions were reminded of their thought, asked to read through their descriptions and to remember their thought in case they had to answer any questions about it during the intervention. Also, the answers to the questions included in the acceptance condition regarding what thoughts the participants had difficulty with during the interventions almost always indicated their target thought. For example, one particular participant whose thought had to do with her friend who was in the army wrote "After I thought about my friend who is in the army, I visioned (sic) the words worried and scared." This

pattern indicates that participants in the Acceptance condition were still very much thinking about their concern even if the questions did not directly ask about it.

It's also possible that the interventions were too similar to find the interaction effects that were sought after. If the differences were not sufficient, it may have obscured potential moderation effects.

Additional Analyses

For both those who were high in rumination and those who were high in worry, those in the acceptance condition spent fewer seconds discussing their target concern, and those in the acceptance condition tended to use significantly fewer negative words during the verbalization that followed the intervention than those in the goal-progress condition. These results bring up the question of why these results were not found on either of the other two measures of negative affectivity. One explanation is that the PANAS and the word stem measure both took place on the computer directly after the intervention. It's possible that participants somehow felt different after the interventions than they did when they were still answering the questions, which may have been somewhat tedious. This change in level of negative affect has been found in previous studies in which participants experienced a significant decrease in level of discomfort after engaging in an acceptance-based strategy (Marcks & Woods, 2005). Another explanation for the difference in findings between number of negative words and negative word completion is that the implicit measure may not be a valid measure, considering its fairly low internal reliability estimates. It's also likely that especially for those that are high in worry thinking about how their thought relates to their larger goals

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would not achieve the goal separating the content of the thought from the process of the thought as is hopefully done in the acceptance condition.

There were no differences found between conditions on levels of positive affect. One explanation for the difference in findings between the number of positive words said and the number of negative words said is that this is primarily an anxious sample. Although both depression and anxiety share an underlying component of negative affectivity (Watson, 2005), one difference thought to be present between depression and anxiety is a lack of positive affect in depression (Clark & Watson, 1991). This means that those who have anxiety struggle primarily with high levels of negative affect, not low levels of positive affect.

Limitations

The hypotheses of this study were not supported, and though some of the analyses were informative, there were a number of limitations to this study that may have prevented finding the hypothesized effects. The first major limitation was the lack of a comparison group, although a number of factors supported this choice. The first factor was that it would have been extremely difficult enact an actual control condition that addressed the current questions. Because acceptance has been shown to be superior to suppression in so many studies, this study was intended to move beyond the question of whether or not acceptance can be more effective than suppression. The hypotheses for this study were not that these interventions would be effective, but that different interventions may work better for different people.

Another limitation in the design of this study was that the PSWQ was used both in the screening and as a measure of worry in the study. This led to a lack of range in the

PSWQ when compared to the RSS, since the participants needed to score at least a 45 on the PSWQ initially to be included in the study. This resulted in a sample that was made up of people who tended to be very high in worry, regardless of their level of rumination. This could mean that the hypothesized interaction effects still exist but were not evident due to the fact that the large majority of the sample was made of worriers, whose habitual cognitive avoidance would only be addressed in the acceptance condition. This would also result in the appearance of an overall lack of effectiveness of the goal progress intervention, when it's possible that the sample simply did not include those for whom it would be effective. Though this adds complications, it is also a reflection of the real world, in which anxiety, rumination and worry often co-occur in different combinations, often with depression as well. Because of the frequent co-occurrence of rumination and worry, perhaps it is just as important to focus on which interventions are most effective for those with a tendency to do both. Future studies could address this problem by recruiting participants using measures of both rumination and worry, and including only participants who had high levels of one and low levels of the other. Despite the lack of significant hypothesized findings, this study was necessary and important for furthering the still new line of research that focuses on acceptance interventions for reducing both frequency and negative emotional impacts of repetitive thought, and also for attempting to test goal progress theory, which to the best of our knowledge has not been done.

Future Research and Practice

The usefulness of the results of this study to practitioners may be somewhat limited due to the fact that the intervention is administered using a computer program. However, it was decided that the internal validity gained by ensuring each participant in

each condition has the exact same intervention was more important. The researcher attempted to temper this weakness somewhat by having a voice read what the participants are reading on screen to make the experience more similar to a human interaction. This issue should be addressed by future studies. Future studies would also benefit from increasing the dosage of acceptance interventions. Acceptance is not something that can be easily manipulated, and interventions are more likely to be done within the context of a therapeutic relationship. Though the search for effective treatment components requires dismantling the therapy process, such a brief intervention done within the context of a research study may limit both effectiveness and generalizability. Earlier studies using similar interventions have called for more participant interaction, and although this study to some extent addressed this concern by asking participants to think critically and answer questions about the process as part of the intervention, future research could benefit from longer and more intensive interventions.

As stated earlier it's also possible that the intervention based on goal progress theory was unsuccessful in helping participants disengage from their lower-order goal. This intervention could also perhaps benefit by lengthening the amount of time participants are given and increasing the number of ways it attempts to help participants think of other ways of meeting their higher-order goals.

Conclusions

The results of this study did not find support for any of the hypothesized interactions, and thus did not find support for the theory that interventions intended to reduce repetitive thought and its accompanying negative emotional impacts should be targeted toward repetitive thought tendency. However, additional analyses indicated that

interventions based on ACT have some promise in helping those who are struggling with

repetitive thought and possibly the negative affect that comes along with it. The results

also indicated that computer interventions could have promise in creating at least a short-

term positive impact on those that are struggling with symptoms of anxiety. Differences

found in outcomes between conditions are important results because unlike many

previous studies that compare acceptance conditions with suppression, the goal condition

in this study had no element of suppression, and in fact asked the participant to think

about their unwanted thought. This may mean that just focusing the thought is not

sufficient for habituation to occur for participants with levels of worry and a specific

approach based on disengaging from the thought, such as ACT, may be indicated.

Table 1. *Correlations, Ranges, Means, Standard Deviations, and Reliability Coefficients of the Predictor and Criterion Variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. GEND[1]	1.00													
2. COND[2]	.05	1.00												
3. TYPE[3]	-.14	-.08	1.00											
4. RRS[4]	.12	.03	.05	1.00										
5. PSWQ[5]	-.05	.04	-.12	.39	1.00									
6. TOPSEC[6]	.11	-.26*	-.13	-.19	.09	1.00								
7. POSPAN1[7]	-.01	-.12	.12	-.18	-.30**	.00	1.00							
NEGPAN1[8]	.04	.02	-.02	.25**	.48**	.22*	-.09	1.00						
9. POSPAN2[9]	.04	-.09	.06	-.29**	-.34**	-.05	.72**	-.06	1.00					
10. IMPPOS[10]	.14	-.14	.05	.15	.02	-.01	.07	-.05	.02	1.00				
11. POSWORDS[11]	.05	.15	-.05	-.10	-.07	-.19	.15	.04	.12	-.19	1.00			
12. NEGPAN2[12]	-.08	.01	.01	.29**	.34**	.18	-.12	.50**	-.07	-.10	-.15	1.00		
13. NEGWORDS[13]	.18	-.47**	-.11	-.16	.03	.51**	-.01	.11	-.06	.00	.02	.02	1.00	
14. IMPNEG[14]	.05	-.14	.14	.24*	.22*	.05	-.06	.25*	-.07	.24*	-.17	.27**	.12	1.00
Possible Range	N/A	N/A	N/A	22-88	16-80	0-240	10-50	10-50	10-50	0-14	0-14	10-50	0-14	0-14
Obtained Range	N/A	N/A	N/A	23-83	29-80	0-181	11-49	10-43	15-49	0-11	0-16	10-43	0-8	1-11
Mean	N/A	N/A	N/A	47.46	55.45	38.45	31.93	23.15	29.81	4.75	2.44	18.03	2.46	2.13
Standard Deviation	N/A	N/A	N/A	17.36	11.10	43.04	7.78	7.29	1.97	5.08	2.7	6.69	1.96	2.34
A	N/A	N/A	N/A	.948	.916	n/a	.918	.868	.918	.53	n/a	.924	n/a	.32

* $p < .05$ ** $p < .01$, ***$p < .001$

[1] Gender, 1=male, 2=female), [2] Condition (1=Goal, 2=Acceptance), [3] Type (1=worry, 2=rumination), , [4] Ruminative Response Scale (tendency to ruminate), [5] Penn State Worry Questionnaire (tendency to worry), [6] seconds spent verbalizing about topic, [7] PANAS positive affect at time 1, [8] PANAS negative affect at time 1, [9] PANAS positive affect at time 2, [10] number of positive word stems completed, [11] number of positive words said, [12] PANAS negative affect at time 2, [13] number of negative words said, [14] number of negative word stems completed.

Table 2. *Means and Standard Deviations of Outcome Variables by Condition*

Condition	Total Seconds Talking		Proportion of time spent on topic		Number of Positive Words Spoken		Number of Negative Words Spoken		Time 2 PANAS (Positive)		Time 2 PANAS (Negative)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Goal Progress	211.70	30.58	0.23	0.18	2.04	2.34	3.35	1.68	29.57	7.03	17.96	6.19
ACT	211.91	36.69	0.13	0.19	2.86	3.01	1.51	1.80	28.21	7.67	18.12	7.25

Table 3. *Summary of Hierarchical Moderated Multiple Regression Analysis Predicting Seconds Spent on Topic*

Predictors	R	ΔR^2	df	ΔF	β	P	Effect size r
Step 1	.36	.13	85	4.33		.01**	
ZPSWQ					.32	.05	.04
ZRRS					-.28	.07	.03
Dummy Condition					-.25	.01**	.06
Step 2	.41	.03	82	1.02		.39	
ZPSWQ*Dummy					-.11	.49	.01
ZRRS*Dummy					-.05	.76	.00
ZPSWQ*ZRUM					.16	.15	.02
Step 3	.41	.00	81	.276		.60	
ZPSWQ*ZRUM*Dummy					.09	.60	.00

*p<.05 ** p < .01

Table 4. *Summary of Hierarchical Moderated Multiple Regression Analysis Predicting Explicit Level of Negative Affect Measured by PANAS*

Predictors	R	ΔR^2	df	ΔF	β	P	Effect Size r
Step 1	. 38	.15	85	4.81		.00**	
ZPSWQ					.21	.21	.02
ZRRS					.23	.13	.02
Dummy Condition					-.01	.94	.00
Step 2	.40	.01	82	.37		.78	
ZPSWQ*Dummy					.05	.74	.00
ZRRS*Dummy					-.04	.79	.00
ZPSWQ*ZRUM					-.10	.39	.01
Step 3	.40	.01	81	.62		.60	
ZPSWQ*ZRUM*Dummy					-.13	.43	.01

*p<.05 ** p < .01

Table 5. *Summary of Hierarchical Moderated Multiple Regression Analysis Predicting Implicit Level of Negative Affect Measured by Word Stem Completion*

Predictors	R	ΔR^2	df	ΔF	β	P	Effect size r
Step 1	.31	.10	85	3.18		.01**	
ZPSWQ					.18	.31	.01
ZRRS					.13	.43	.01
Dummy Condition					-.15	.15	.02
Step 2	.32	.01	82	.16		.39	
ZPSWQ*Dummy					-.04	.81	.00
ZRRS*Dummy					.10	.52	.01
ZPSWQ*ZRUM					-.04	.69	.00
Step 3	.33	.00	81	.01		.94	
ZPSWQ*ZRUM*Dummy					.01	.94	.00

* p<.05   ** p < .01

Table 6. *Summary of Hierarchical Moderated Multiple Regression Analysis Predicting Implicit Level of Negative Affect Measured by LIWC Negative Emotion Words*

Predictors	R	ΔR^2	df	ΔF	β	p	*Semi-partial r^2*
Step 1	.506	.256	85	9.742		.00	
ZPSWQ					.05	.74	.00
ZRRS					-.04	.76	.00
Dummy Condition					-.46	.00	.22
Step 2	.541	.037	82	1.414		.24	
ZPSWQ*Dummy					.14	.37	.01
ZRRS*Dummy					-.27	.07	.03
ZPSWQ*ZRUM					.13	.19	.02
Step 3	.541	.000	81	.004		.95	
ZPSWQ*ZRUM*Dummy					-.01	.95	.00

* p<.05 ** p < .01

Table 7. *Summary of Hierarchical Moderated Multiple Regression Analysis Predicting Explicit Level of Positive Affect Measured by PANAS*

Predictors	R	ΔR^2	df	ΔF	β	p	Semi-partial r^2
Step 1	. 39	.15	85	4.92		.00**	
ZPSWQ					-.17	.31	.01
ZRRS					-.20	.21	.02
Dummy Condition					-.08	.45	.01
Step 2	.40	.01	82	.26		.85	
ZPSWQ*Dummy					-.11	.52	.00
ZRRS*Dummy					-.01	.97	.00
ZPSWQ*ZRUM					.05	.66	.00
Step 3	.40	.00	81	.02		.90	
ZPSWQ*ZRUM*Dummy					-.02	.90	.00

* p<.05 ** p < .01

Table 8. *Summary of Hierarchical Moderated Multiple Regression Analysis Predicting Implicit Level of Positive Affect Measured by Word Stem Completion*

Predictors	R	ΔR^2	df	ΔF	β	p	Semi-partial r^2
Step 1	. 22	.05	85	1.39		.25	
ZPSWQ					.06	.72	.00
ZRRS					.01	.97	.00
Dummy Condition					-.14	.19	.02
Step 2	.29	.03	82	1.02		.39	
ZPSWQ*Dummy					-.11	.51	.01
ZRRS*Dummy					.21	.21	.02
ZPSWQ*ZRUM					-.10	.41	.01
Step 3	.32	.02	81	1.61		.21	
ZPSWQ*ZRUM*Dummy					.22	.21	.02

* p<.05, ** p < .01

Table 9. *Summary of Hierarchical Moderated Multiple Regression Analysis Predicting Implicit Level of Positive Affect Measured by LIWC positive emotion words*

Predictors	R	ΔR^2	df	ΔF	β	p	Semi-partial r^2
Step 1	.19	.04	85	1.04		.38	
ZPSWQ					-.12	.51	.01
ZRRS					-.05	.76	.00
Dummy Condition					.15	.16	.02
Step 2	.22	.01	82	.35		.79	
ZPSWQ*Dummy					.09	.66	.01
ZRRS*Dummy					-.02	.90	.00
ZPSWQ*ZRUM					.09	.43	.01
Step 3	.23	.00	81	.26		.61	
ZPSWQ*ZRUM*Dummy					-.09	.61	.00

* p<.05 ** p < .01

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Table 10. *Summary of Hierarchical Moderated Multiple Regression Analysis Predicting Implicit Level of Negative Affect Measured by LIWC negative emotion words*.

Predictors	R	ΔR^2	df	ΔF	β	p	Semi-partial r^2
Step 1	.63	.39	84	13.65		.00**	
ZPSWQ					.05	.74	.00
ZRRS					-.09	.76	.00
Dummy Condition					-.37	.00**	.13
ZTOPSEC					.40	.00**	.14
Step 2	.65	.03	81	1.33		.27	
ZPSWQ*Dummy					-.18	.19	.01
ZRRS*Dummy					-.25	.06	.03
ZPSWQ*ZRUM					.07	.44	.02
Step 3	.65	.00	80	.10		.75	
ZPSWQ*ZRUM*Dummy					.09	.75	.00

* p<.05 ** p < .01

Figure 1. *Frequent conceptualization of relationships between worry, rumination, anxiety and depression.*

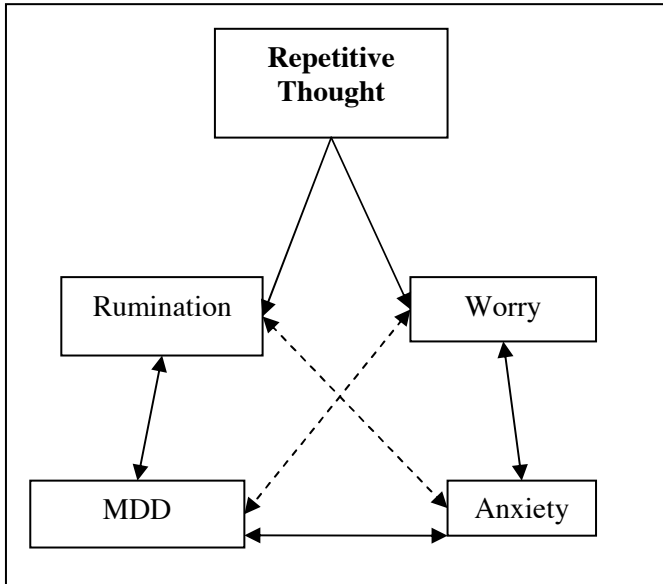Figure 2. *Location of worry and rumination in Segerstrom's circumplex of repetitive*
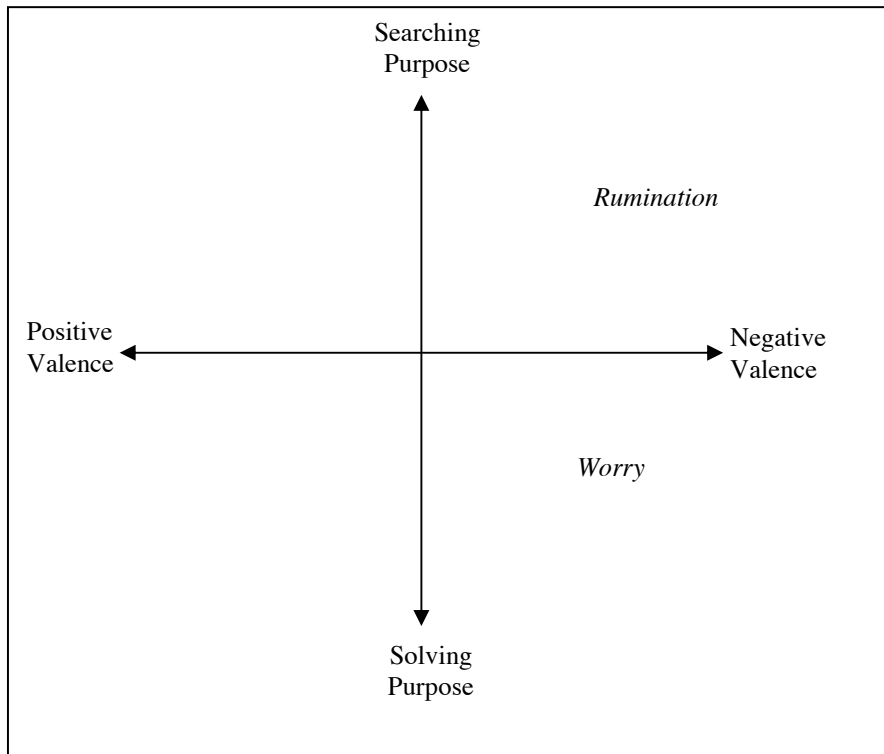
thought.

Searching
Purpose

Rumination

Positive
Valence

Negative
Valence

Worry

Solving
Purpose

Figure 3. Proposed model for the development of comorbid GAD and MDD.
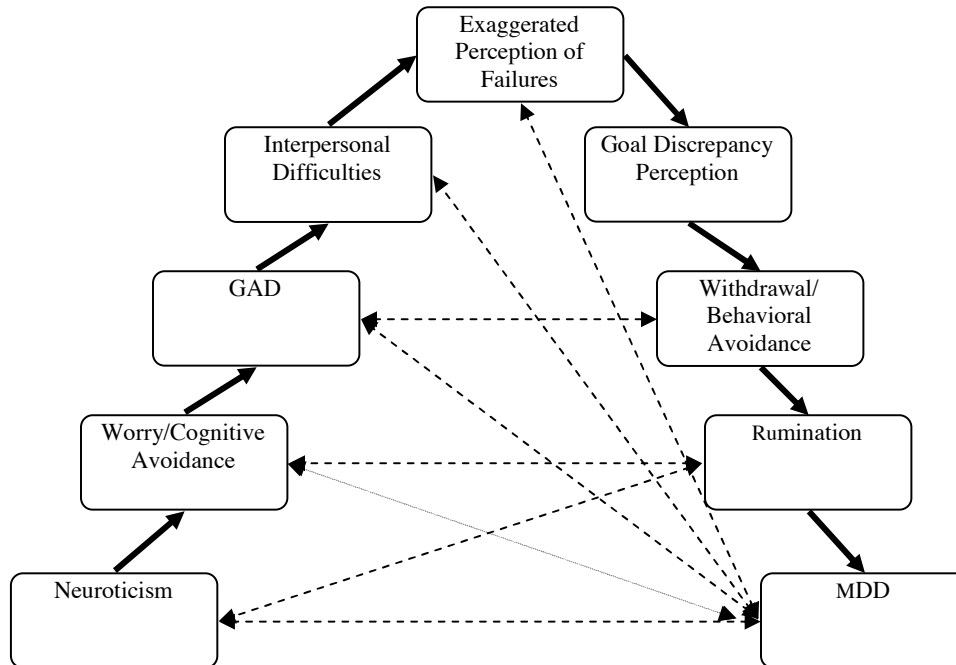
Figure 4. *Overview of Procedure*


```
                  ┌──────────────────┐
                  │    Prescreen     │
                  │     (PSWQ)       │
                  └────────┬─────────┘
                           │
                           ▼
                  ┌──────────────────┐
                  │  Time 1: Specify │
                  │ Issues, RRS, PSWQ,│
                  │      PANAS       │
                  └────────┬─────────┘
                           │
                           ▼
                  ┌──────────────────┐
                  │  Time 2 part 1:  │
                  │ Choose issue,speak│
                  │ aloud for 4 minutes│
                  └───┬──────────┬───┘
                      │          │
             ┌────────▼──┐   ┌───▼────────┐
             │Condition 1:│   │Condition 2:│
             │ Acceptance │   │Goal Progress│
             └────────┬──┘   └───┬────────┘
                      │          │
                  ┌───▼──────────▼───┐
                  │ PANAS, Word-stem │
                  │ completion, speak│
                  │ aloud for 4 minutes│
                  └──────────────────┘
```
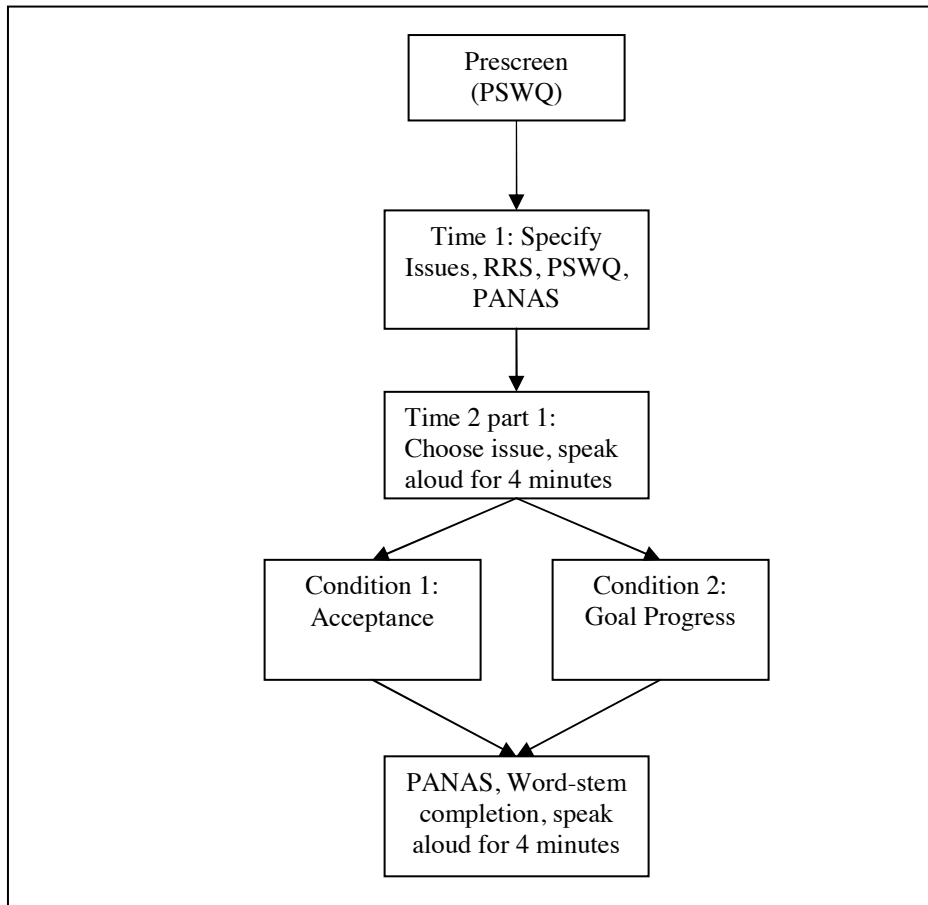
Figure 5. *Effect of Condition on Mean Number of Seconds Spent on Target Thought*.

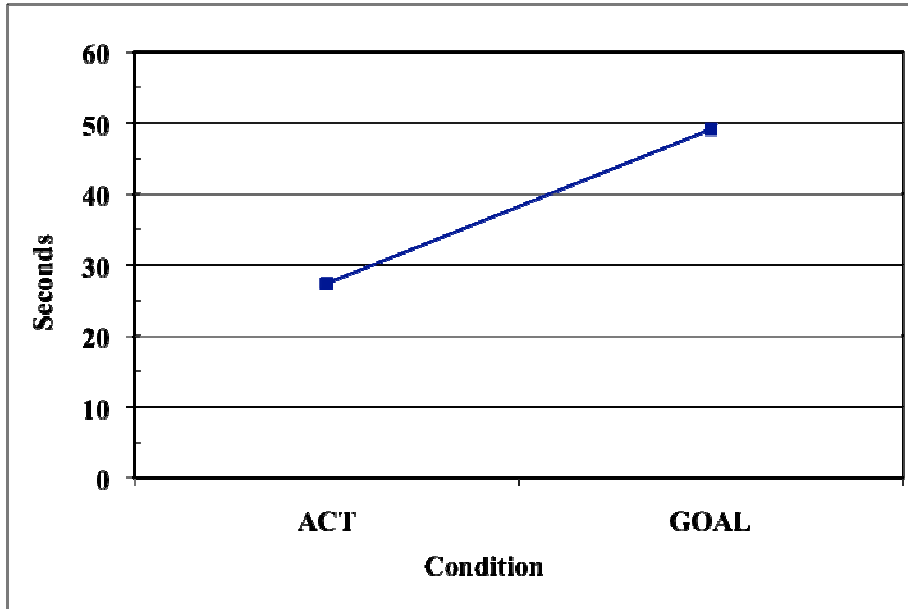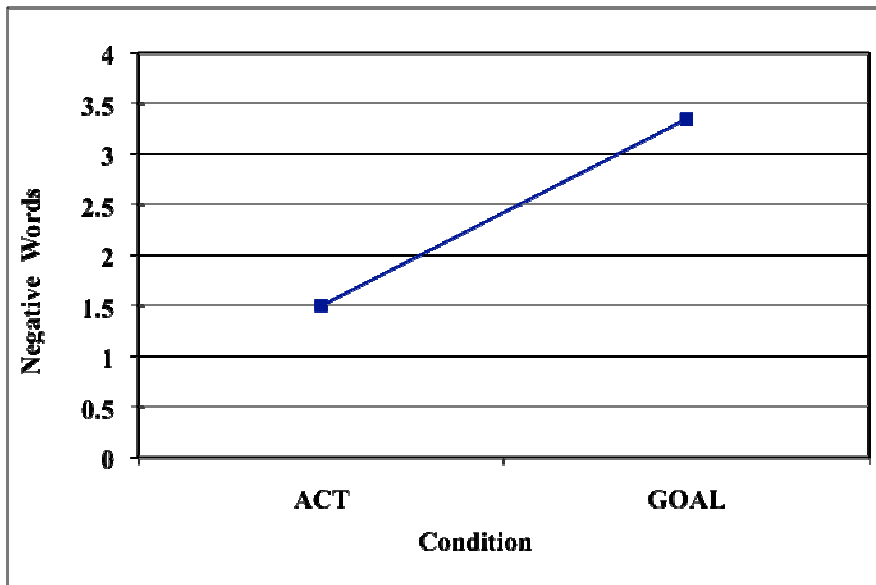*Figure 6*. Effect of Condition on Mean Number of Negative Words Said During

Verbalization.

Appendix A

<u>Recruitment Email</u>

Your results on the mass screening questionnaire indicated that you are eligible to take part in our two-part study "Finding out how to stop worrying".

You can complete the first part at home on your computer, and the second part will take place in our lab in the biology-psychology building a few days later.   The online portion should not take you more than 15 minutes and the in-lab portion should take approximately 30 minutes. If you would like to sign up for the study, PLEASE FOLLOW THESE STEPS TO ENSURE YOU RECEIVE FULL CREDIT FOR BOTH PORTIONS.

Step 1: In order to receive the full amount of extra credit you must sign up for both parts of the study. Please sign up for them AT THE SAME TIME (the online portion and the in-lab portion) on Sona systems using the code for the study which is **rtstudy.** The two parts should take place within 3-7 days of each other. If you cannot find an open slot for the second part, simply try a slightly later date to sign up for the first part.

Step 2: After you sign up for the study on Sona Systems, WAIT FOR THE DATE that you signed up for your first part of the study. You will receive a reminder from Sona by email. Please paste in the link below to access the first half of the study (the online portion) ON THE DAY that your part 1 is scheduled. THIS LINK IS NOT AVAILABLE ON SONA SYSTEMS, it is only available below. If you lose this email, please write us at this address to get it again.

Step 3: When you follow this link and begin the survey on surveymonkey - you will be asked what your 2 or 3 digit ID number is. Your assigned ID number is **XXX**. Please use this as your ID number - this id number will not work as the code to sign up for the study through sona systems.

Step 4: For part 2, please come to our lab in the Biology Psychology building room number 2101 on the date and time you signed up for using Sona Systems.

Please let us know if you have any questions.

Thanks very much,

Sara Ericson

Appendix B

Penn State Worry Questionnaire (Meyer, Miller, Metzger & Borkovec, 1990)

	Not at all typical		Somewhat Typical		Very Typical
1. If I do not have enough time to do everything I do not worry about it	1	2	3	4	5
2. My worries overwhelm me	1	2	3	4	5
3. I do not tend to worry about things	1	2	3	4	5
4. Many situations make me worry	1	2	3	4	5
5. I know I should not worry about things but I just cannot help it.	1	2	3	4	5
6. When I am under pressure I worry a lot.	1	2	3	4	5
7. I am always worrying about something.	1	2	3	4	5
8. I find it easy to dismiss worrisome thoughts.	1	2	3	4	5
9. As soon as I finish one task, I start to worry about everything else I have to do.	1	2	3	4	5
10. I never worry about anything.	1	2	3	4	5
11. When there is nothing more I can do about a concern, I do not worry about it anymore.	1	2	3	4	5
12. I have been more worried this past week.	1	2	3	4	5

13. I notice that I have been worrying about things.	1	2	3	4	5
14. Once I start worrying, I cannot stop.	1	2	3	4	5
15. I worry all the time.	1	2	3	4	5
16. I worry about projects until they are done.	1	2	3	4	5

Appendix C

Ruminative Response Scale (Nolen-Hoeksema & Morrow, 1991)

Please indicate how often you think about the following.

	Very slightly or not at all	**A little**	**Moderately**	**Quite a bit**	**Extremely**
1. Think about how passive and unmotivated you feel.	1	2	3	4	5
2. Think about how alone you feel.	1	2	3	4	5
3. Think about how sad you feel.	1	2	3	4	5
4. Think, "I won't be able to do my job/schoolwork because I feel so badly."	1	2	3	4	5
5. Think about your feelings of fatigue and achiness.	1	2	3	4	5
6. Think about all your shortcomings, failings, faults, mistakes.	1	2	3	4	5
7. Think, "Why can't I get going?"	1	2	3	4	5
8. Think about how hard it is to concentrate.	1	2	3	4	5
9. Think about how angry you are with yourself.	1	2	3	4	5
10. Think "Why do I have problems other people don't have?"	1	2	3	4	5
11. Think about how you don't feel up to doing anything.	1	2	3	4	5

	1	2	3	4	5
12. Think about how you don't seem to feel anything anymore.	1	2	3	4	5
13. Isolate yourself and think about the reasons why you feel so sad.	1	2	3	4	5
14. Go someplace alone to think about your feelings.	1	2	3	4	5
15. Go away by yourself and think about why you feel this way.	1	2	3	4	5
16. Try to understand yourself by focusing on your depressed feelings.	1	2	3	4	5
17. Analyze your personality to try to understand why you are depressed.	1	2	3	4	5
18. Analyze recent events to try to understand why you are depressed.	1	2	3	4	5
19. Listen to sad music.	1	2	3	4	5
20. Think, "Why do I always react this way?"	1	2	3	4	5
21. Write down what you are thinking about and analyze it.	1	2	3	4	5
22. Think about a recent situation, wishing it had gone better.	1	2	3	4	5

Appendix D

PANAS (Watson, Clark & Tellegen, 1988)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent you feel this way right now.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1. Interested	1	2	3	4	5
2. Distressed	1	2	3	4	5
3. Excited	1	2	3	4	5
4. Upset	1	2	3	4	5
5. Strong	1	2	3	4	5
6. Guilty	1	2	3	4	5
7. Scared	1	2	3	4	5
8. Hostile	1	2	3	4	5
9. Enthusiastic	1	2	3	4	5
10. Proud	1	2	3	4	5
11. Irritable	1	2	3	4	5
12. Alert	1	2	3	4	5
13. Ashamed	1	2	3	4	5
14. Inspired	1	2	3	4	5
15. Nervous	1	2	3	4	5
16. Determined	1	2	3	4	5
17. Attentive	1	2	3	4	5
18. Jittery	1	2	3	4	5
19. Active	1	2	3	4	5
20. Afraid	1	2	3	4	5

Appendix E

Word Stem Measure (Twenge, Baumeister, DeWall, Marquez, Reid, & Koole, 2007)

Fillers

B L A __ __

T H E __ __

Q U __ __ __

E __ __

T E __ __

S O __ __

N __ __

Positive mood

G R E __ __ (great)

H A __ __ __ (happy)

P R O __ __ (proud)

G O __ __ (good)

C A __ __ (calm)

G L __ __ (glad)

J O __ (joy)

A L __ __ __ (alert)

E X C __ __ __ __ (excited)

D E L I __ __ __ (delight)

L O __ __ (love)

A C T __ __ __ (active)

C A R __ __ __ (caring)

L I V __ __ __ (lively)

C H E __ __ (cheer)

U __ (up)

E A S __ (easy)

S E C __ __ __ (secure)

Negative mood

B A __ (bad)

U P __ __ __ (upset)

S A __ (sad)

A N G __ __ (anger or angry)

S C A __ __ __ (scared)

W O R __ __ (worry)

L O __ (low)

G U I __ __ __ (guilty)

M A __ (mad)

F E __ __ (fear)

AF __ __ __ __ (afraid)

S T R __ __ __ (stress)

B L A __ __ (blame)

D O __ __ (down

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Please complete these items to form a word in English (no proper names). Write the first word that comes to mind that fits.

THE __ __

EAS __

DO __ __

INCL __ __ __

GRE __ __

SA __

AF __ __ __ __

U __

SO __ __

LIV __ __ __

LO __

HA __ __

GO __ __

AL __ __ __

ACC __ __ __

HA __ __ __

CA __ __

FE __ __

EXCL __ __ __

WOR __ __

CHE __ __

ANG __ __

SEC __ __ __

UP __ __ __

ACT __ __ __

BA __

N __ __

LON __

SCA __ __ __

GL __ __

JO __

TE __ __

GUI __ __ __

EXC __ __ __ __

E __ __

PRO __ __

ACC __ __ __

QU __ __ __

LO __ __

MA __

REJ __ __ __

STR __ __ __

LI __ __

CAR __ __ __

BLA __ __

DELI __ __ __

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Appendix F

<u>Goal Progress Intervention</u>

On the next screen, you will see a list of goals. Please use the mouse to arrange these goals in order from most relevant to your current concern to least relevant to your current concern.

1) *Achievement*
To be successful or realize my potential.

2. *Affiliation*
Be accepted/liked by others.

3. *Intimacy*
Have close meaningful relationships.

4. *Power*
Have influence on others.

5. *Personal growth and health*
Grow to be a better or healthier person.

6. *Self-presentation*
Have others think well of me or appear attractive to others.

7. *Independence*
Be independent.

8. *Emotionality*
Be more in touch with my or other people's emotions.

9. *Generativity*
Make my life meaningful.

10. *Spirituality*
Become more spiritual/make religion or spirituality a bigger part of my life.

Questions Following Card Sort

1. In what way is your current concern related to the goal that you chose as most highly relevant?
2. In what ways are you already meeting this goal?

3. How could you achieve this goal in a way that does not require solving your current concern?

Appendix G

ACT Intervention (Adapted from Hayes, 2005, page 76-77)

Imagine a beautiful slow-moving stream. The water flows over rocks, around trees, descends downhill and travels through a valley. Once in a while, a big leaf drops into the stream and floats away down the river.

Imagine you are sitting beside that stream on a warm sunny day, watching the leaves float by. Now become conscious of your thoughts. Each time a thought pops into your head, imagine that it is written on one of those leaves. If you think in words, put them on the leaf as words. If you think in images, put the on the leaf as an image. The goal is to stay beside the stream and allow the leaves on the stream to keep flowing by. Don't try to make the stream go faster or slower; don't try to change what shows up on the leaves in any way. If the leaves disappear, or if you mentally go somewhere else, or you find you are in the stream or on a leaf, just stop and notice that this happened. File that knowledge away and then once again return to the stream, watch a thought come into your mind, write it on a leaf, and let the leaf float away down stream.

Continue to do this until you hear the tone. After the tone, you will follow answer some questions about the exercise.

Questions following intervention:

1. How long did you go until you got caught by one of your thoughts.

2. If you got the stream flowing and then it stopped, or if you went somewhere else in your mind, write down what happened just before that occurred:

3. If you never got the mental image of the stream started, write down what you were thinking while it wasn't starting.

Appendix H

Debriefing Form

Thank you for participating in this study. This study looked at the impacts of two different brief computer interventions intended to target both the amount of time spent focused on negative repetitive thought (worry or rumination) and the negative feelings that can arise as a result of the thoughts.

During the first online survey, you completed measures of worry, rumination and negative and positive emotion. These measures served as a baseline for the experimental study that took place at time 2.

At the second portion of the survey, you first spoke aloud about your thoughts in order to become comfortable with the process of being recorded. You were then randomly assigned to one of two conditions; one was focused on life goals and the other was an intervention adapted from Acceptance and Commitment Therapy. Research has shown that suppressing unwanted thoughts can increase their frequency and at times increase negative emotions, so both interventions had an element of acceptance. Research has also shown that those who tend to worry and those that tend to ruminate can differ in the reasons why they have negative repetitive thought. In this experiment we were attempting find out a) if either intervention would have a positive impact, b) if one of the interventions worked better than the other and c) if one's tendency to ruminate or worry would determine which intervention would be more effective. After the intervention you took both implicit and explicit measures of positive and negative emotion. Following the computer tasks, you once again spoke aloud and were recorded. Your data will be coded for length of time and positive and negative focus. If you are interested in finding out more about research on this topic please feel free to contact Sara Ericson at the contact information below.

Thank you again for your participation in this study. If you are ever concerned about personal issues, you can contact the counselors at the Campus Counseling Center at the University of Maryland (301.314.7651) or you may call the University Health Center (301.314.8106). If you have any questions about this research, please feel free to contact Sara Ericson at sericson@psyc.umd.edu or rtstudy.umd@gmail.com .

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