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Experimental Modification of Appraisal Style in a Depression Vulnerable Sample:

The Benefits of Seeing the Big Picture

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Experimental Modification of Appraisal Style in a Depression Vulnerable Sample: The Benefits of Seeing the Big Picture

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Depression is a serious public health concern that affects large numbers of individuals. Furthermore, individuals who experience a major depressive episode are at increased risk for additional episodes. It is important for research to examine the underlying mechanisms contributing to depression and develop interventions to prevent and reduce depressive relapse. Cognitive models of depression hold that depression is caused by biases in information processing. Thus, to address depression vulnerability, it is essential to consider information processing styles that may be beneficial. One such processing style is a type of appraisal termed big picture thinking. Big picture thinking involves considering context in order to obtain a wider perspective when in the midst of adversity.

Existing research in the field of cognitive bias modification has begun to explore methods of altering biases in information processes. The present study contributes to this line of work by targeting a depression vulnerable population and examining the extent to which cognitive bias modification for interpretation (CBM-I) can be used to encourage big picture thinking, an appraisal style thought to be beneficial for depression vulnerability.

The current study had two primary aims: 1) to determine whether CBM-I could be used to induce a big picture appraisal style and whether such training would transfer to other tasks; 2) to examine the extent to which training in big picture thinking would reduce emotional reactivity to failure, rumination, and depression vulnerability. The study compared a group that received repeated sessions of cognitive bias modification aimed at training big picture thinking to a personal appraisal control condition aimed at training personal interpretations. Results provide evidence that big picture thinking can be trained using CBM-I and can generalize. Participants in the big picture condition transferred big picture thinking to two other tasks, one similar to the training task and one dissimilar to the training task. Training effects on a self-report measure of big picture thinking were not observed. Contrary to hypotheses, the big picture condition did not show benefits in emotional reactivity, and did not show lower depression or rumination immediately after training or at 2-week and 3-month follow-up.

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Chapter 1:

Introduction

Problem of Depression

Depression is a serious public health concern (Wells & Sherbourne, 1999; Wulsin, Vaillant, & Wells, 1999). According to the National Institute for Mental Health (NIMH), in 2012, an estimated 16 million adults aged 18 or older in the U.S. had at least one major depressive episode in the past year. This represented 6.9 percent of all U.S. adults. Furthermore, individuals who experience a major depressive episode are at increased risk for additional episodes, with each episode significantly increasing risk for future episodes (Mueller et al., 1999; Solomon et al., 1997). Not only does depression affect large numbers of individuals, but those suffering from depression struggle to access effective psychological treatments making it a costly disease for society at large. The World Health Organization ranks depression as the leading cause of burden of all diseases in middle and high-income countries (Segal, Williams, & Teasdale, 2013). Given the substantial public health significance, it is important that research examine the underlying causes of depression and develop interventions that will effectively prevent and reduce depressive symptomology.

Cognitive Model of Depression Vulnerability

Cognitive models of depression hold that depression is caused by biases in information processing (e.g. Beck, 1987). Supporting these models, research has found that individuals prone to depression are more likely than others to attend more to emotionally negative cues (Joormann & Gotlib, 2007), to interpret ambiguity in a

negative way (Butler & Mathews, 1983; Rude, Wenzlaff, Gibbs, Vane, & Whitney, 2002), and to selectively recall negative information (Mathews & MacLeod, 2005). Additionally, depression has been found to be associated with reduced vividness for positive imagery of both the future (Morina, Deeprose, Pusowski, Schmid, & Holmes, 2011) and the past (Werner-Seidler & Moulds, 2011). One cognitive theory of depression vulnerability that has garnered much research support is Teasdale's (1988) differential activation hypothesis (DAH). The DAH builds on Beck's stressor-vulnerability model of depression which posits that specific patterns of negative thinking make a person particularly sensitive to stressors (Beck, 1987). According to the DAH, certain patterns of processing are established during early episodes of depression (Segal, Williams, Teasdale, & Gemar, 1996; Teasdale & Barnard, 1993) and these patterns lead to an association between depressed mood and negative patterns of thinking. Therefore, depressed mood reactivates the negative thinking patterns. In sum, according to cognitive models of depression, negative mood and information processing interact in ways that results in a feedback loop that serves to perpetuate dysphoria and lead the individual in a downward spiral of depression.

Emotion Regulation: Reappraising from a Broader Vantage Point

In seeking to address depression vulnerability and the associated biases in information processing, it is important to consider the type of processing styles that may prove beneficial for individuals prone to depression. Recent attention has been given to the important role of reappraisals in regulating emotion. Gross and Thompson (2007) have argued that *reappraisal* of stressors is an adaptive emotion regulation strategy

because it can alter cognitive-emotional responses at an early stage of processing and does not demand a high level of cognitive resources. Following from this, reappraisal may serve as an important tool in avoiding depression recurrence. The important question of what sorts of reappraisals are helpful in modulating emotional reactions has only begun to receive research attention.

A promising new direction in reappraisal work has supported the utility of reappraisals that broaden individuals' perspectives on distressing events. Several different approaches to conceptualizing wider perspective appraisals have been explored: Rude et al. (2013, May) described *big picture appraisal* as considering context in order to obtain a wider perspective when in the midst of adversity. Rude et al. (2013, May; Rude & Miller, 2016) suggest that, at the most general level, the following dimensions are important aspects of big picture thinking from which benefits for emotion regulation, informed action, and well-being derive. It should be noted that these dimensions are interconnected and often co-occurring:

1. How the event and/or one's reactions to it fit into an extended time perspective. Across many different types of situations, a way to see the big picture is to appreciate an event within the larger context of time. Over time, distressing events tend to become less distressing.

2. How experiences fit into the broader context of one's life goals. At times, unpredictable and uncontrollable events thwart our attainment of things we want. The ability to manage the challenges of such realities depends on our ability to view these setbacks as part of a larger endeavor.

3. How one's experience fits into a broader human context in which people's goals and experiences are fundamentally similar. In its broadest iteration, this is the notion that recognizing the universality of suffering and human fallibility can contribute to feeling a sense of unity with others, of not being alone.

There is preliminary empirical support for the benefits of big picture appraisal. Rude, Mazzetti, Pal, and Stauble (2011) demonstrated that encouraging individuals to view social rejection experiences from a broader context by answering questions, such as, "How do you think you will view this event in 1–2 years?", "How are your responses to this even similar to those of other people?", and "How might a neutral observer describe this situation?", decreased rumination compared to answering questions about why events happened or to a no-writing control. In addition, Miller, Rude and Haner (2015) found that participants trained in Big Picture Appraisal showed a trend toward reduced emotional reactivity to a stressor as compared to control participants.

Other recent programs of research support the value of viewing difficult personal experiences from a broadened perspective. For example, in multiple studies, Ayduk, Kross, and their colleagues found that analyzing distressing events (asking why) from a distanced perspective (e.g., "take a few step back from the experience") decreased rumination and negative affect (Kross, Ayduk, & Mischel, 2005; Kross, Gard, Deldin, Clifton, & Ayduk, 2012).

Schartau, Dalgleish, and Dunn (2009) conducted four studies in which participants trained to appraise negative experiences using what Schartau et al. termed perspective broadening (appraisal themes included: "Bad things happen—bad things

happen in the world, and I need to put them behind me and move on; Silver lining—there are usually some good aspects to every situation, and it is important to focus on these; Broader perspective—bad events are rare overall, and lots of good things are happening all the time; and Time heals—in the (near) future, this will not seem anywhere near as bad as it does now") demonstrated superior outcomes compared to control participants.

Cognitive Bias Modification

Given the potential benefits of adopting appraisal styles that entail taking a broader vantage point, it is important to consider ways in which this type of thinking can be induced in individuals. Cognitive bias modification (CBM) provides one possible mechanism. The term CBM refers to procedures designed to change particular styles of cognitive processing that are theorized to contribute to emotional dysfunction using systematic practice in an alternative processing style (Koster, Fox, & MacLeod, 2009). Cognitive Bias Modification of Interpretation (CBM-I) paradigms offer the possibility of isolating the causal influence of changes in cognitive interpretations and therefore represent an important tool in clinical theory building (Woud & Becker, 2014). As Koster et al. (2009) point out, one value of CBM training is that evidence suggests that training occurs mostly implicitly and that the bias, when observed on a similar task, is not produced intentionally (Hertel, Holmes, & Benbow, 2013). Further, there is much current interest in adaptation of CBM techniques for use as clinical treatments, either adjunctive or stand-alone, because of advantages including convenience, flexibility, and autonomy of administration (Yiend et al., 2014).

While CBM research has made many important contributions to our

understanding of the causal role cognitive biases play in emotional dysfunction, there remain a number of ways in which the CBM paradigm can be expanded. In his review of CBM procedures in the management of mental disorders, MacLeod and Mathews (2012) points out that while much research has demonstrated the effectiveness of CBM-I in alleviating anxiety, little research has examined the effects of CBM-I on depression.

An important area for investigation involves the question of whether CBM-I can contribute to the illumination of causal mechanisms contributing to the development as well as the treatment of clinical depression. Several studies have examined the impact of CBM training that emphasizes the use of imagery on depression. The use of such training to address depression follows from the ideas that imagery may have a more powerful impact on emotional responses than verbal processing of the same material (Holmes, Mathews, Dalgleish, & Mackintosh, 2006), and that depression is characterized by reduced vividness for positive imagery of both the future and the past (Lang, Blackwell, Harmer, Davison, & Holmes, 2012). Other studies have developed CBM training protocols that target particular styles of interpretation thought to be beneficial for those experiencing depression. Such studies have included training concrete thought (Watkins et al., 2011), appraisals of negative intrusive memories (Newby, Lang, Werner-Seidler, Holmes, & Moulds, 2014), and positive attribution style (Peters, Constans & Mathews, 2011). Studies have also begun to explore the impact of CBM training on mood reactivity, a symptom of depression vulnerability. Miller, Rude, and Haner (2015) found preliminary indications that CBM training of big picture appraisal led to a trend of less mood reactivity than control training. As Peters et al. (2011) argue, support for specific

theories of depression can be augmented by experimental work that demonstrates how changes in cognitive biases are associated with changes in vulnerability to depression.

The Present Study: Training Big Picture Thinking

The present study seeks to build on previous work by examining whether big picture appraisal can be trained using CBM procedures and how such training may translate to benefits related to depression vulnerability. Miller et al. (2015) showed preliminary indications that big picture thinking can be induced using CBM-I and that such training may impact stress reactivity. Using the Miller et al. (2015) study as a starting point, the present study sought to extend upon this work in a number of ways. First, the current study targeted individuals vulnerable to depression rather than unselected college students as were used in Miller et al. (2015) in order to assess particular benefits of big picture thinking for this population. Second, while Miller et al. (2015) used one training session, the present study included six training sessions over the course of a week. Additionally, in the current study an attempt was made to enhance training effects by emphasizing the use of imagery and including auditory items in addition to written items. Finally, the current study assessed participants at a two-week follow-up session as well as a three-month follow-up session, allowing for the testing of CBM-I effects over time.

In summary, the study used a depression vulnerable sample and compared a condition that receives repeated sessions of CBM aimed at training big picture thinking to a personal appraisal control group aimed at making more personal interpretations. It was predicted that those participants in the big picture condition would show generalization of

big picture thinking to tasks both similar to the training task and different from the training task. Furthermore, it was hypothesized that participants in the big picture condition would display reduced emotional reactivity in response to laboratory-induced stress, reduced cognitive biases, and reduced depressive symptomology over the course of a 3-month follow-up.

Chapter 2:

Literature Review

Depression Vulnerability

Depression is a serious public health concern. Research shows that 6.6% of the U.S. population have experienced clinical depression in the past year, and between 18 and 22% of women and 7 and 11% of men will suffer a clinical depression during their lifetime (Segal, Williams, & Teasdale, 2013). Further, while depression affects significant numbers of people, individuals with depression are not likely to seek treatment. Of those who do seek treatment, only 22% actually see a specialist for their problem and receive adequate treatment (Segal et al., 2013).

In addition to the significant emotional suffering incurred by those with the disorder, evidence suggests that the level of functional impairment associated with depression is comparable to that found in major medical illnesses, including cancer and coronary artery disease. Wells, Sturm, Sherbourne and Meredith (1996) found that depressed patients spent more time in bed (1.4 days per month) than patients with lung disease (1.2 days per month), diabetes (1.15 days per month), or arthritis (0.75 days per month). Further, workers suffering form depression have five time more work-loss days than their healthy counterparts. According to a World Health Organization projection for the year 2020, of all diseases, depression will impose the second-largest burden of ill health worldwide (Murray & Lopez, 1998).

Research has shown that a large contributor to prevalence rates of depression worldwide was the return of new episodes of depression in people who had already

experienced one episode. A seminal study by Keller et al. (1983) followed 141 depressed individuals for 13 months and found that 43 (33%) had relapsed after having been well for at least 8 weeks. Similarly, later research has found that at least 50% of patients who recover from an initial episode of depression will have at least one subsequent depressive episode (24). For those individuals with a history of two or more episodes, the likelihood of recurrence in their life increases to 70-80%. In a widely disseminated review, Judd (1997) concluded, "unipolar depression is a chronic, lifelong illness, the risk for repeated episodes exceeds 80%, patients will experience an average of 4 lifetime major depressive episodes of 20 weeks' duration each" (p. 990). These finding highlight the importance of developing preventive measures targeting depression vulnerable individuals. In considering such measures, it is important to elucidate the factors that contribute to relapse.

Beck's cognitive theory of depression vulnerability. The work of Aaron T. Beck, beginning in the 1960s, served to provide the basis for cognitive models of depression. Beck identified distorted, negative cognition (primarily thoughts and beliefs) as a central feature of depression. According to Beck's theory, individuals prone to depression have basic beliefs about themselves, their world, and other people, that are problematic and produce maladaptive cognitions (Beck, J., 2011). It is thought that beliefs about oneself, other people, and the world (termed "core beliefs") develop during childhood based on the experiences one has growing up. The cognitive model posits that when people find themselves in situations, problematic automatic thoughts are activated that are directly influenced by their core beliefs. Automatic thoughts then influence the

ways in which one reacts to situations (Ledley, Marx, & Heimberg, 2010). Many studies have validated the cognitive model of depression and anxiety. A comprehensive review of these studies can be found in Clark and Beck (2010).

Following from these ideas, Beck developed cognitive behavior therapy (CBT) to address dysfunctional thinking. CBT makes use of controlled processes, or those that are part of the individual's awareness, to combat depressive cognitions. According to Beck, when people learn to evaluate their thinking in more realistic and adaptive ways, they experience improvement in their emotional states and in their behaviors. Cognitive behavior therapy has been extensively tested since the time the first outcome study was published in 1977 (Rush, Beck, Kovacs, & Hollon, 1978). Outcome studies have demonstrated the effectiveness of CBT for a wide range of psychiatric disorders, psychological problems, and medical problems with psychological components (e.g. Butler, Chapman, Forman, & Beck, 2006; Cambless & Ollendick, 2001).

Differential activation hypothesis of depression vulnerability. A number of theories have followed in the footsteps of Beck's cognitive model of depression. One such theory is Teasdale's differential activation hypothesis (DAH) for explaining depressive relapse. According to the DAH, vulnerability to depression is powerfully related to patterns of thinking that are activated in the depressed state. The DAH assumes that certain patterns of processing are established during early episodes of depression (Segal, Williams, Teasdale, & Gemar, 1996; Teasdale & Barnard, 1993). These patterns lead to an association between depressed mood and negative patterns of thinking. Therefore, depressed mood reactivates the negative thinking patterns. The reactivation of

negative cognitions in this theory is a relatively automatic process, often operating outside the individual's control.

Much research has confirmed the differential activation hypothesis. In a number of studies, individuals who were not currently depressed, but who had been depressed in the past, were examined with and without sad mood induction. Findings indicated that the negative mood induced in the study had a more significant impact for those with a history of depression. Individuals who had previously been depressed exhibited an exaggerated cognitive bias in response to negative mood induction (Segal & Ingram, 1994). Further support for the DAH was garnered by Miranda and Persons (1990) through their examination of the effects of mood on dysfunctional attitudes. They found that when never-depressed individuals reported being sad, their endorsement of dysfunctional attitudes changed relatively little. Contrastingly, when formerly depressed individuals reported feeling sad, they were more likely to endorse dysfunctional attitudes.

Automatic and controlled processes relevant to depression. Some of the cognitive processes assumed to be important in bringing about depressed mood are automatic and some are controlled. The dual process model of depression vulnerability represents another cognitive model that provides useful insights to the development and maintenance of depression. This model incorporates the ways in which both controlled and automatic processes play a role in depression. According to dual process models (Beevers, 2005; Lieberman, Gaunt, Gilbert, & Trope, 2002; Sloman, 1996; Smith & DeCoster, 1999; 2000;), individuals possess two types of information processing. The first is an associative mode that involves quick, effortless processing that relies on well-

learned associations. The second in a reflective mode that involves slow, effortful processing that relies on symbolic, rule-based inferences. The associative mode occurs automatically, however, when expectancies and well-learned associations are violated, the reflective mode intervenes if enough cognitive resources are available to respond. According to this theory, individuals become vulnerable to depression when negatively biased associative processing is uncorrected by reflective processing (Beevers, 2005).

This theory follows from Beck's original idea that negatively biased self-referent associative processing provides the basis for a cognitive vulnerability to depression. For example, a person who makes automatic negative associations when processing information about the self may be particularly susceptible to depression. While negatively biased associative processing provides a basis for cognitive vulnerability to depression, reflective processing can overcome this bias. According to Beevers (2005), however, there are at least three instances in which associative processing is not likely to be corrected: 1) cognitive resources are not adequate to support reflective processing; 2) a need for reflective processing is not realized; 3) reflective processing does not adequately adjust negatively biased associative processing. If negative associative processing is not corrected, this can be the impetus for a downward spiral into depression that involves the maintenance of dysphonic mood states and the continued depletion of cognitive resources (Beevers, 2005).

The interplay between associative and reflective processing has important implications for mood regulation. Forgas et al., (e.g. Forgas, 2000) argue that associative processing is used to maintain mood while reflective processing is used to change mood.

These researchers posit that associative processing maintains mood states by retrieving information congruent to the current mood, however, when mood incongruent information is present, reflective processing kicks in to alter and repair the current mood state. To investigate these ideas, Forgas and Ciarrochi (2002) gave participants mood inductions. Then, participants completed a series of social tasks. Consistent with the model, participant responses to these tasks were initially mood congruent, however, with time, responses became mood incongruent. The researchers argue these findings demonstrate that associative processing was initially used by participants, but reflective processing was later engaged in order to return mood to baseline.

Given these contributing factors to depression vulnerability, it is important to consider how this theory may be used to alter cognitive vulnerability. It may be important to develop depression treatments that specifically target biased associative processing (Beevers, 2005). This requires altering well-established patterns and associations. While this is a difficult feat, a process called consolidation (McClelland, McNaughton, & O'Really, 1995) offers a possible mechanism for accomplishing this. Consolidation involves an individual accumulating enough experience with a particular association that it becomes integrated within the associative system. Following from this, repeated exposure to new associations is needed to consolidate results of reflective processing to associative processing (Beevers, 2005). Another possible way to intervene may be to help individuals adopt reflective processing styles that would help them adaptively respond to biases in associative processing. One avenue for this latter idea involves emotion regulation.

Emotion Regulation

Empirical study of emotion regulation is critical for a number of reasons. Perhaps most notably, emotion regulatory processes are central to mental health. Emotion dysregulation is estimated to be involved in over half of the DSM-IV Axis I disorders and in all of the Axis II disorders (Gross & Levenson, 1997). Attention is currently turning to the process of emotion regulation as one element in the development of effective therapeutic treatments. Additional research is needed to further our understanding of the connection between emotional development, emotion regulation, and the emotional disorders (Moses & Barlow, 2006).

Defining emotion regulation. The field of emotion regulation is devoted to examining the ways in which individuals influence their emotions and how such modifications contribute to various psychological outcomes. In his seminal article on the subject, Gross (1998) defines emotion regulation as, "the process by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (p. 275). It is important to note that emotion regulation can be done consciously or unconsciously and regulatory strategies may be automatic or controlled. Gross highlights the complexity of emotion regulation by explaining that emotions are multicomponential processes involving aspects of behavioral, experiential, and physiological domains.

Process model of emotion regulation. Gross suggests a process-oriented approach to conceptualizing emotion regulation strategies. He distinguishes five sets of emotion regulatory processes: situation selection, situation modification, attention

deployment, cognitive change, and response modulation (Gross, 1998). These five processes fall under the two broad categories of antecedent-focused emotion regulation, or processes that occur before emotion is generated, and response-focused emotion regulation, processes that occur after emotion is generated (Gross, 1998; Gross & Munoz, 1995). Response modulation is the only one of the five processes that falls under the category of response-focused emotion regulation strategies.

Within the broader categories of these five processes, a number of specific emotion regulation strategies have been defined. For instance, problem solving falls under the larger process of situation modification. Distraction, rumination, and concentration represent strategies that are involved in attentional deployment processes. The process of cognitive change is particularly relevant to the present study. One form of cognitive change that has received recent attention is reappraisal, or the process of transforming a situation so as to alter its emotional impact. As various strategies have been defined, it is important to determine the consequences associated with each.

Adaptive and maladaptive forms of emotion regulation. A number of studies have begun to explore the various emotion regulation strategies in an attempt to determine which strategies are beneficial to individuals and which are not. Aldao, Nolen-Hoeksema, and Schweizer (2010) conducted a meta-analytic review examining the relationships between six emotion-regulation strategies (acceptance, avoidance, problem solving, reappraisal, rumination, and suppression) and symptoms of four psychopathologies (anxiety, depression, eating, and substance-related disorders). Among their findings, results showed reappraisal, problem solving, and acceptance served as

adaptive regulatory strategies across a variety of contexts. In contrast, suppression, avoidance, and rumination were found to be maladaptive strategies.

More specifically, Aldoa et al. (2010) conducted a direct comparison of the degree to which each emotion regulation strategy was related to psychopathology. The researchers found that the relationship between emotion regulation strategies and psychopathology may vary by strategy and type of psychopathology. Certain emotion regulation strategies were more strongly related to overall pathology than others. For instance, when studying the relationship between each emotion regulation strategy across the four disorders, they found that the effect size for rumination was large, effect sizes for avoidance, problem solving, and suppression were medium to large, and effect sizes for reappraisal and acceptance were small to medium. This particular finding may demonstrate that maladaptive emotion regulation strategies are more harmful than the relative absence of adaptive strategies. In addition, the relationships between certain emotion regulation strategies were stronger for depression and anxiety than for substance abuse and eating disorders suggesting that mood-related disorders may be more closely related to certain problems in emotion regulation than externalizing disorders.

Reappraisal. Reappraisal represents one such regulatory strategy involving attentional deployment. Gross and John define reappraisal as a form of cognitive change that involves construing a potentially emotion-eliciting situation in such a way that changes its emotional influence. These researchers (2007) have argued that *reappraisal* of stressors is an adaptive emotion regulation strategy because it can alter cognitive-emotional processes arising in response to an emotion-inducing event at an early stage of

processing and does not demand a high level of cognitive resources. In support of this, studies have tended to show reduced distress and physiological reactivity among individuals who reappraise (Goldin, Manber-Ball, Werner, Heimberg, & Gross, 2009; Gross, 1998).

Gross and John (2003) conducted a series of studies that illuminated the specific benefits of reappraisal by examining individual differences in use of reappraisal versus suppression and the implications of such differences on affect, well-being, and social relationships. Expressive suppression was defined as a form of response modulation that entails the inhibition of emotion-expressive behavior. In contrast to reappraisal, suppression is a response-focused strategy. It occurs relatively late in the emotion generative process, and primarily modifies the behavioral aspect of emotion response tendencies.

In order to designate individuals as "reappraisers" or "suppressors", the researchers derived the Emotion Regulation Questionnaire (ERQ). For each item on the ERQ, the researchers labeled which emotion regulatory process was being measured. Examples of items include, "I control my emotions by changing the way I think about the situation I'm in" (reappraisal) and "I control my emotions by not expressing them" (suppression). Additionally, both the reappraisal scale of the ERQ as well as the suppression scale included at least one item asking about regulating negative emotions and one item about regulating positive emotions. The resulting ERQ consisted of 10 items that participants rated on a scale from 1 (strongly disagree) to 7 (strongly agree).

To study the implications of using suppression and reappraisal for affective responding, the researchers related ERQ Reappraisal and Suppression to self-reports of emotion experience, and to self- and peer-reports of emotion expression. In choosing to include peer-reports, the researchers explain that many instances of emotion expression both take place in social interaction and are often triggered by social interaction. Thus, peers serve as a rich source of information regarding an individual's emotionally expressive behavior. To further examine the implication of emotion regulation on social functioning, participants completed measures of avoidance and attachment, peers rated individuals on *relationship closeness* as well as *peer liking*, and indices of *social support* (Emotional Support and Instrumental Support scales from the COPE) were included. Finally, to assess overall Well-Being, the following instruments were administered: the Beck Depression Inventory (BDI), the Center for Epidemiological Studies Depression Scale (CES-D), the Self-Rating Depression Scale, the Satisfaction With Life Scale, and the Rosenberg Self-Esteem scale.

Gross and John's findings demonstrate a number of implications of individual differences in those who use reappraisal as compared to those who employ suppression. Reappraisers were found to negotiate stressful situations by taking an optimistic attitude, reinterpreting what they find stressful, and making active efforts to repair negative moods. Reappraisers both experience and express more positive emotion and less negative emotion than those who reappraise less frequently. Socially, reappraisers are more likely to share both positive and negative emotions with others, and they have closer social

relationships. In regards to well-being, reappraisers demonstrate fewer depressive symptoms, greater self-esteem and higher life-satisfaction.

On the other hand, suppressors experience themselves as inauthentic, feeling that they mislead others about their true self. Compared with those who do not use suppression, they handle stressful situations by masking their inner feelings and working to hide their outward display of emotion. They have less clarity regarding their feelings, are less successful at mood repair, and view their emotions in a less favorable or accepting light. They have less positive emotional experience and expression. They experience more negative emotions including distressing feelings of inauthenticity. Socially, suppressors appear reluctant to share both negative and positive emotions with others and they avoid close relationships. Finally, suppressors score lowest in the domain of positive relations with others, they have lower levels of self-esteem, are less satisfied with life, and have more depressive symptoms.

In sum, the findings of Gross and John extend prior empirical work by demonstrating the following: individuals differ in their use of suppression and reappraisal; these differences are significant and meaningful; and these differences have systematic effects in naturally occurring situations. Also, these findings show long-term consequences of using reappraisal and suppression in everyday life.

Reappraisal Strategies that Encourage Taking a Wider Vantage Point

It is clear that reappraisal represents a powerful and beneficial emotion regulation strategy. Thus, it is important to consider which types of reappraisals are most likely to prove beneficial for individuals. A number of researchers have taken various approaches

to address this question. The work of several labs, has supported the utility of reappraisals that broaden individuals' perspectives on distressing events (e.g., Kross & Ayduk, 2011; Kross, Ayduk, & Mischel, 2005; Rude et al., 2011; Schartau, Dalgleish, & Dunn, 2009).

Self-distancing. Kross and colleagues (e.g. Kross & Ayduk, 2011) have conducted a series of studies examining an appraisal strategy they term "self-distancing". This work began in an effort to address what Kross and Aykuk (2011) call the "self-reflection paradox". This paradox refers to contradictory findings regarding self-reflection in current literature. On the one hand, a number of studies suggest that reflecting on negative emotions leads to important physical and mental health benefits (e.g. Pennebaker, 1997). Theory suggests that through reflection, people develop explanations for their negative experiences, providing them with closure and emotional relief. On the other hand, another set of studies indicate that people's attempts to understand their feelings are harmful, leading to ruminations that make them feel worse (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Acknowledging this paradox, Kross and Ayduk set out to explore why self-reflection on negative experiences sometimes succeeds and at other times fails. More specifically, Kross and Ayduk set out to locate the psychological mechanisms that enable individuals to reflect on negative experiences adaptively.

In their effort to address this question, Kross and Ayduk began studying self-distancing, an approach to negative experiences that allows individuals to focus on the broader context of the situation at hand in order to reconstrue their experiences in ways that reduce distress. These researchers conceptualize self-distancing as becoming an

observer of the self. The idea is that self-distancing allows individuals to process their negative emotions and experiences from an ego-decentered, third person perspective. This enables individuals to contemplate emotional experiences without activating intense levels of affect. The person is better able to achieve representations of the reasons underlying their negative experience. Thus, the authors point out that self-distancing capitalizes on the unique benefits associated with both emotional approach and emotional avoidance strategies in that it functions to decrease emotional reactivity, as avoidance strategies do when successfully implemented, while simultaneously allowing the individual to focus on and work through negative feelings, an important feature of adaptive emotional approach strategies. A number of studies (described below) subsequently demonstrated the beneficial nature of this type of perspective/appraisal.

Kross and colleagues (e.g., Kross & Ayduk, 2011) have found in multiple studies that participants instructed to analyze reasons for a distressing event while adopting a *self-distanced* perspective (e.g. "…take a few steps back and move away from your experience…watch the experience unfold as if it were happening all over again to the distant you…" Kross & Ayduk, 2008, p. 926), experience less distress, lower physiological reactivity, and less rumination as compared to control participants instructed to adopt either a self-immersed perspective (e.g. "… relive the situation as if it were happening to you all over again" Kross & Ayduk, 2008, p. 926) or participants instructed to adopt a distraction strategy. Self-distancing has also been associated with more problem-solving behavior and less reciprocation of negativity during conflicts (Ayduk & Kross, 2010). In addition, reflecting on past provocations from a self-distanced

perspective was found to reduce aggressive thoughts and angry feelings (Kross, Gard, Deldin, Clifton, & Ayduk, 2012). Benefits have been found both immediately following and up to one week after the self-distancing manipulation (Kross & Ayduk, 2008; Ayduk & Kross, 2010; Kross et al., 2005). Kross and colleagues (e.g., Kross & Ayduk, 2011) have interpreted their self-distancing manipulation as helping participants view distressing events in context.

Perspective broadening. Schartau et al. (2009) represent another group of researchers examining a type of big picture appraisal. Shartau and colleagues conducted a series of studies in which participants trained to appraise negative experiences using what the researchers termed *perspective broadening* demonstrated superior outcomes compared to control participants. In three studies, participants trained in perspective broadening were instructed to adopt one or more of four appraisal themes as they watched a series of distressing films. These appraisal themes included: "*Bad things happen*—bad things happen in the world, and I need to put them behind me and move on; *Silver lining*—there are usually some good aspects to every situation, and it is important to focus on these; *Broader perspective*—bad events are rare overall, and lots of good things are happening all the time; and *Time heals*—in the (near) future, this will not seem anywhere near as bad as it does now" (Shartau et al., 2009, p. 17). Control participants were given no appraisal instructions. In comparison, participants in the perspective broadening condition showed lower levels of self-reported negative emotion and electrodermal responses to a final test film. Similar effects were found in a follow-up study when participants were instructed to apply perspective broadening appraisal themes

to distressing autobiographical memories and demonstrated reduced intrusion and avoidance of negative memories relative to control participants.

Big picture appraisal. Similar to perspective broadening work, Rude et al. (2011; Miller et al., 2015) defined an appraisal strategy called *big picture appraisal*. Big picture appraisal is defined as viewing a difficult situation and one's reactions to it in ways that transcend or go beyond the immediate perspective and view the situation in context. For current purposes, big-picture appraisal is operationally defined as maintaining awareness of how a distressing event and/or one's reactions to it fit into one or more larger contexts: (1) an extended time perspective which includes an awareness of how emotional states fluctuate and distress tends to dissipate with time; (2) the broader context of one's life goals; and (3) the broader human context, in which human wants and needs are fundamentally similar, and distress and fallibility are universal.

In support of this framework, Rude et al. (2011) found that college students who reported a recent interpersonal rejection experienced lower levels of rumination after receiving an experimental *big picture* intervention as compared to either of two control interventions. Participants in the big picture reappraisal condition wrote in response to probe questions that encouraged them to consider how they would feel about the experience in 1-2 years time, how their responses were similar to those of other people, and how a neutral observer might describe the situation. Instructions for one control condition asked participants to explore the *reasons* for the event and their reactions to it (e.g., Why do you think this happened?); another control condition did not write about their rejection experience.

Given that emotion regulation research has found certain styles of cognitive processing to be more beneficial than others, it is important for future work to examine the direct effects of specific appraisal strategies on clinical populations An innovative body of research called cognitive bias modification offers the tools to address such future directions.

Cognitive Bias Modification

The term CBM refers to procedures designed to change particular styles of cognitive processing that are theorized to contribute to emotional dysfunction using systematic practice in an alternative processing style (Koster, Fox, & MacLeod, 2009). CBM procedures are designed to directly modify one specific low-level bias in selective information processing, usually assumed to operate automatically (Koster et al., 2009). These biases relate to attention, interpretation of ambiguity, memory, and appraisal, among other processes. In addition, CBM procedures do not rely on insight. The targeted biases do not need to be introspectively accessible to the individual. CBM simply seeks to change the target bias through extended practice on a task designed to induce change.

Another component of CBM methodologies includes the study of what are referred to in the CBM literature (see Hertel & Mathews, 2011) as *transfer* tasks (also referred to as generalization tasks). The purpose of transfer tasks is to determine whether the style of thinking trained using CBM generalizes to other tasks.

Hertel and Mathews distinguish between near transfer effects, those with a strong degree of overlap between training and transfer task and far transfer effects, those with a lesser degree of overlap between training and the nature of the transfer task. Most CBM

studies employ near-transfer tasks. That is, the situations during training are similar to those in the transfer phase. These near-transfer tasks are used to examine the extent to which training in one type of attention of interpretation task generalizes to other tasks with similar processing requirements.

Far-transfer effects are demonstrated when the context of the training and that of the transfer task are substantially different. Stressful transfer tasks such as emotional response to viewing a distressing video can be thought of as far-transfer tasks. Far-transfer effects are powerful because they are used to establish causal links between cognitive processing bias and emotional reactivity.

Many researchers (e.g. Lange et al., 2010) point to the need for studies to demonstrate transfer from CBM-I procedures to different bias measures, cognitive domains, and behavior. A number of studies have been successful in modifying cognitive biases, but have failed to show that these bias changes translate to behavior effects (e.g. Lange et al.,2010; Williams & Grisham, 2013). In their commentary on the special issue of cognitive bias modification, Fox, Mackintosh, and Holmes (2014) point out that many studies rely on self-report measures of clinical outcomes with few studies incorporating behavioral or somatic indicators of relevant symptoms.

The exact nature of CBM procedures depends on the particular type of bias being targeted as well as the psychological outcome under investigation. For the purpose of the present study, I will focus on studies seeking to modify interpretive and appraisal biases (CBM-I).

CBM targeting interpretive selectivity. CBM procedures aimed at modifying interpretive biases (CBM-I) present participants with ambiguous information and encourage a certain type of interpretive style. The idea is that through practice, participants will come to adopt a particular pattern of selective interpretation. One version of CBM-I, first created by Mathews and Mackintosh (2000) provided participants with a series of textual descriptions of ambiguous situations, and participants were instructed to complete a final word fragment that provided a meaningful ending to the vignette. In conditions inducing negative interpretive bias, final word fragments lead to negative interpretations of the preceding ambiguous vignette. In the positive interpretive bias induction group, fragment completions lead to positive interpretation of ambiguity. As an example, consider the following vignette (from Hertel & Mathews, 2011):

> You have decided to go caving even though you feel nervous about being in an enclosed space. You get to the caves before anyone else arrives. Going deep inside the cave you realize you have completely lost your…*w_y* (*way*, a negative interpretation) or *f_ar* (*fear*, a positive interpretation).

Research has shown that extended practice using such training procedures leads to induced changes in interpretive biases (e.g., Grey & Mathews 2009).

A number of studies have demonstrated the effectiveness of interpretive bias training in addressing anxiety. Mathews and Mckintosh (2000) found that participants trained in a positive interpretive bias subsequently reported lower state anxiety levels than those who completed the task in the negative interpretive bias condition. Additional research confirmed and extended these findings by showing that the same interpretive

bias training (positive condition vs. negative condition) led to significant decline not only in state anxiety but in trait anxiety questionnaire scores as well (Salemink, van den Hout, & Kindt, 2007, 2009). CBM-I procedures have also proven effective in decreasing social anxiety (Beard & Amir, 2008) and reducing the frequency of negative thought intrusions in worry-prone individuals (Hirsch, Hayes, & Mathews, 2009) and participants who meet diagnostic criteria for GAD (Hayes, Hirsch, Krebs, & Mathews, 2010).

Several researchers have examined whether CBM-I can influence subsequent emotional reactivity. Wilson, Smith, Chattington, Ford and Marple-Horvat (2006) conducted a study in which they delivered a single session of Grey and Mathews' (2000) CBM-I task to mid-trait anxious students and then exposed them to a distressing video clip. Participants in the negative bias interpretation group demonstrated elevation of both state anxiety and depression in response to the video clips, while the clips did not lead to such elevations in the positive bias interpretation group. Additionally, Miller, Rude, and Haner (2015) found that college students given CBM-I for big picture thinking showed a trend toward endorsing less emotional reactivity following a stressor as compared to a control group.

While a number of studies have found preliminary support for the effects of CBM-I on emotional reactivity, it should be noted that other studies have not been able to produce such effects (Hallion & Ruscio, 2011; Yiend et al., 2014). The mixed results regarding emotional reactivity suggest a need for further work to examine such results and to determine the conditions under which individuals are most likely to experience benefits in response to stress.

Researchers have also employed multiple sessions of CBM-I delivered over more extended periods of time in order to examine the extent to which CBM-I effects endure. Mathews, Ridgeway, Cook, and Yiend (2007) delivered four CBM-I sessions across a two-week period to high trait anxious individuals. When assessed one week later, participants in the positive interpretive training condition demonstrated reduced negative interpretation of ambiguity and reported lowered trait anxiety scores than those in the control condition. Extended CBM-I procedures were also shown to be beneficial in reducing trait anxiety in individuals with a pre-existing high level of anxiety vulnerability (Salemink et al., 2009), and in decreasing social anxiety symptoms (Beard & Amir, 2008; Vassilopoulos, Banerjee, & Prantzalou, 2009).

Imagery based CBM-I. A number of studies have found powerful effects by incorporating the use of imagery in CBM-I training protocols (Torkan et al., 2014). Unlike other CBM-I approaches that require the active resolution of ambiguous scenario content (e.g. word fragment completion), imagery-based CBM-I often involves auditory presentation of scenarios describing everyday events. Listeners are asked to actively imagine the situations described using a first person perspective. Research has found it is important that the auditory scenarios be constructed such that they are initially emotionally ambiguous, with the emotional tone of the situation only becoming apparent in the final words (Clarke et al., 2014). One way many studies manipulate emotional imagery is by asking participants to rate the vividness of each scenario on a five-point scale from 1, perfectly clear and as vivid as normal vision, to 5, no image at all. Researchers posit that imagery may have a more powerful impact on emotional responses

than verbal processing of the same material (Holmes, Mathews, Dalgleish, & Mackintosh, 2006).

The results of these studies support the idea that interpretive biases causally contribute to variation in vulnerability to and symptoms of various emotional disturbances, especially those related to anxiety and depression. Hence, these findings lend support to cognitive models of emotional dysfunction that implicate biased interpretation in the etiology of pathology. In addition, they bode well for the potential therapeutic value of CBM-I.

CBM Studies Addressing Depression

Preliminary work has begun to explore the effects of CBM on depression. One approach of such work has been to use CBM to target specific cognitive processes thought to contribute to depression. For example, a study by Watkins et al., (2012) created training aimed at inducing concrete thinking. Watkins et al. used a sample of individuals currently experiencing a depressive episode and compared treatment as usual (TAU), TAU plus concreteness training (CNT) guided self-help, and TAU plus relaxation training (RT) guided self-help. The concreteness training used in this study was designed to switch patients from an unhelpful abstract thinking habit to a helpful concrete thinking habit, targeting processes related to depression such as rumination and overgeneralization. Results from this study indicated the addition of CNT to TAU significantly improved depressive symptoms at post-treatment, 3- and 6-month follow-ups and for rumination and overgeneralization post-treatment. There was no difference in the reduction of symptoms between CNT and RT.

Newby, Lang, Werner-Seidler, Holmes, and Moulds (2014) compared the efficacy of computerized bias modification positive appraisal training (CBM) versus a therapist-delivered cognitive behavioral therapy session (CB-Education) that both aimed to target and alter negative appraisals of a negative intrusive autobiographical memory—a common symptom of depression. The sample included dysphoric participants (Mean BDI-II = 27.85; N = 60). The CBM training used in this study was aimed specifically at addressing maladaptive appraisals of intrusive memories. Results showed that for both groups (CBM and CB-Education) there were significant reductions in mood (depression and anxiety), memory intrusiveness, and negative appraisals with the CB-Education group showing greatest reduction, followed by the CBM group.

Micco, Henin, and Hirshfeld-Becker (2014) examined the effects of CBM-I in dysphoric adolescents and young adults (BDI-II > 14). The CBM-I training used in this study encouraged a positive interpretation of a series of scenarios. Results showed that both the CBM-I condition as well as the control condition experienced reductions in interpretation bias, however, when limited to those participants with negative bias at baseline (26 of the 45 participants), the intervention group showed greater improvement in interpretation bias. There were no differences found between groups in depression or anxiety symptom change.

A number of studies have examined the effects of imagery based CBM-I training protocols (Torkan et al., 2014) in depressed or dysphoric samples. Researchers posit that imagery may have a more powerful impact on emotional responses than verbal processing of the same material (Holmes, Mathews, Dalgleish, & Mackintosh, 2006).

Lang et al. (2012) argue that depression is characterized by reduced vividness for positive imagery of both the future and the past. Further, these researchers suggest that since imagining the outcome of a situation may be one powerful way of resolving ambiguity, an inability to generate adaptive mental imagery may make a significantly negative contribution to interpretation bias and to the hopelessness that characterizes depression. Therefore, according to Lang et al. (2012), repeated practice in generating adaptive imagery in response to ambiguous stimuli is particularly applicable to the treatment of depression. An additional benefit of imagery-based training is that the auditory presentation of vignettes is conducive for maintaining participant interest and concentration.

Blackwell and Holmes (2010) investigated CBM targeting interpretation via positive mental imagery in depression. In this study, which used a single case series design, seven depressed individuals (currently experiencing a depressive episode) completed a one-week CBM training in which they received daily doses of training. Results indicated participants experienced significant improvement in depressive symptoms, cognitive bias, and general mental health. Furthermore, the improvements in depressive symptoms were maintained at two-week follow up.

Lang et al. (2012) used a novel training procedure that combined auditory and written CBM-I training materials. Participants currently experiencing a major depressive episode completed daily training sessions for one week. This study found that among the participants that received positive imagery CBM-I, everyday use of imagery and ability to generate positive mental imagery at baseline differentiated responders and non-

responders. Based on these findings, the researchers suggest it may be important to provide participants with additional training on imagery, prior to CBM training. Torkan et al. (2014), incorporated this suggestion in a study that examined the importance imagery instructions during CBM training for treatment-seeking individuals with major depression in outpatient psychiatry clinics in Iran. This study included additional training in imagery use prior to the CBM-I protocol. During this training, participants in the imagery condition were given brief practice in a task that asked them to imagine cutting a lemon followed by practice with four sample vignettes emphasizing the use of a field perspective. This study found that individuals in the imagery condition demonstrated reduced symptoms of depression and negative interpretive bias as compared to the no-imagery condition.

A study by Williams, Blackwell, Mackenzie, Holmes, and Andrews (2013) evaluated both the independent effects of a CBM protocol targeting imagery (see Blackwell & Holmes, 2010) and interpretation bias and the combined effects of CBM-I followed by internet based cognitive behavioral therapy (iCBT) in participants diagnosed with a major depressive episode. Results suggest that internet-delivered CBM-I for depression can effect symptom reduction. In addition, results demonstrate the feasibility of integrating CBM into an existing iCBT treatment program for depression.

Chapter 3:

Methodology

Overview

The study by Miller et al. (2015) served as a starting point for the present study because this study provided promising initial evidence that big picture thinking can be trained using CBM-I and that such training may have benefits for emotional reactivity. The present study sought to extend these findings in the following ways: by targeting a depression vulnerable sample; by including repeated CBM-I sessions over the course of a week; by enhancing training by emphasizing imagery and including auditory items; and by including a two-week follow-up session and a three-month follow-up session.

The study compared an individually administered CBM-I big picture appraisal intervention with a control condition that encouraged a personal appraisal style (described below). Measures were administered during a pre-test session (Session 1), followed by a post-test, one week later at the end of the final training session (Session 6), a two-week follow-up and a 3-month follow-up. After completing pre-intervention measures, participants were randomly assigned to one of the two conditions: Big Picture or Personal Appraisal Control. Between pre-test (Session 1) and post-test (Session 6), participants received four training sessions (Sessions 2-5) described in more detail below. The pre-test session (Session 1) was completed in person in a computer lab. All other sessions were completed via computer from locations chosen by participants. See Table 1 for a session-by-session breakdown for each condition and Figure 1 for a flowchart of study procedures.

Study Aims and Hypotheses

The first aim of the study was to determine whether participants in the big picture condition demonstrated generalization of big picture thinking. It was hypothesized that the intervention group as compared to the personal appraisal control group would: (1a) provide more big picture interpretations of novel, ambiguous vignettes at post-test (Session 6); (1b) form more big picture sentences on a Scrambled Sentence Test of big picture appraisal (SST-BPA) at post-test (Session 6); (1c) demonstrate higher scores on the Big Picture Questionnaire at post-test (Session 6).

The second study aim was to examine whether the big picture condition and the personal appraisal control condition would differ on measures related to depression. Following this, it was predicted that the intervention group as compared to the personal appraisal control group would: (2a) show less negative mood and more positive mood in response to the RAT stressor task at posttest (Session 6); (2b) show lower scores on the CES-D at posttest (Session 6) as well as at both follow-up periods; (2c) show lower scores on the RRS at post-test (Session 6) as well as both follow-up periods; (2d) show less depressive symptomology as indexed by the SCID-RV at the three-month follow-up.

Participants

The study recruited adults vulnerable to depression, as indexed by their having a history of depression, but not meeting criteria for a depression diagnosis at the time of the study. A G-Power analysis (Faul, Erfelder, Buchner, & Lang, 2009) was conducted to determine appropriate sample size to obtain a medium effect size of .25, and a power level of .95 with an alpha level of .01. It was determined that 54 participants were needed

for the study. Volunteers were recruited via advertisements on Craigslist, posts on Facebook, and utilization of email list serves. Characteristics of the sample are described under Results and in Table 2.

Potential participants completed a phone screen to establish eligibility for the study. Inclusion criteria were: (1) experienced a recent depressive episode (within the last 5 years) based on the Structured Clinical Interview for DSM 5 Disorders SCID-RV; (2) remission for at least the previous 8 weeks (participants were deemed ineligible if they reported that at least 1 week during the previous 8 they had experienced either a core symptom of depression (depressed mood, anhedonia) or suicidal feelings and at least one other symptom of depression) (3) demonstrated fluency in the English language; (4) were between 18 and 70 years of age; and (5) provided informed consent. Exclusionary criteria included: (1) experience of a current episode of Major Depressive Disorder (MDD); (2) prior or current experience of a manic episode; (3) acute suicidality; (4) history of psychosis, (5) diagnosis of dyslexia (due to the amount of reading involved in the study), (6) current abuse of alcohol or other substances; (7) diagnosis of obsessive-compulsive disorder; (8) diagnosis of an eating disorder; (9) new psychiatric medication or dose changes within the two weeks prior to starting the study, or (10) changes in psychotherapy within two weeks prior to participation.

CBM Training

The CBM-I training given to both conditions included a written component and an auditory component (Blackwell & Holmes, 2010), both described below. Both components included a series of vignettes. The vignettes consisted of 3-5 sentences that

described personally relevant scenarios involving common situations such as gatherings with friends, dates, and attending classes (examples provided below). Scenarios were designed such that their potential outcome (big picture vs personal appraisal control) only became clear at the end of the vignette (Clarke et al., 2014). In the big picture training condition, every training vignette resolved with a big picture ending, whereas in the personal appraisal control condition, the vignettes resolved with an ending that encouraged a personal appraisal. The nature of items in both conditions will be discussed in more detail below.

The aim of the study was to change participants' way of thinking rather than to simply produce positive mood. In addition, it was important to avoid inadvertently training a bias to expect only negative events. To address these concerns, some of the vignettes were neutral in valence and the rest were evenly split between those that were negative in valence (describing adverse events) and those that were positive in valence (describing fortunate events).

For both written and auditory items, participants were instructed to "imagine the scenarios as if you are actively involved, seeing them through your own eyes." To focus participants on appropriately generating imagery, participants were periodically asked to provide a rating of vividness of their imagery ('How vividly could you imagine the situation that was described?") on a 5-point (1-5) scale ranging from 'not at all' to 'very' (Holmes et al., 2006). These imagery ratings were collected twice within every set of 8 vignettes. Training sessions included a mix of written and auditory vignettes.

Nature of the training conditions. Below is a detailed discussion of the characteristics of the items within each condition.

Big picture condition. In creating items for the big picture condition, the multiple dimensions of big picture thinking were considered. Recall these dimensions include: (1) an extended time perspective which includes an awareness of how emotional states fluctuate and distress tends to dissipate with time; (2) the broader context of one's life goals; and (3) the broader human context, in which human wants and needs are fundamentally similar, and distress and fallibility are universal. While these dimensions inspired items generally, there were items that did not fall neatly into one specific category. Nevertheless, all big picture vignettes were thought to reflect an appraisal that considers a wider perspective. A sampling of vignettes from the big picture condition are provided below. Both positive and negative items are given.

Example 1: Negative Valence

Recently, you got into an argument with your brother. You decide to break the ice by dropping by his house. While hanging out, you have a long and rather intense conversation together. Afterwards, as you are headed home you think about how (time often heals conflict).

Example 4: Positive Valence

You invite some friends over for dinner and spend several hours cleaning your place and preparing the meal. The conversation is lively and interesting—

everyone seems to find lots to talk about. Drinking coffee afterwards, you think (deep down all people are alike).

Personal appraisal control condition. A personal appraisal style is one in which both positive and negative occurrences are attributed to characteristics of oneself. This control was adapted from a control condition used by Watkins et al. (2008). Watkins et al. developed an abstract, verbal-analytical, evaluative condition thought to reflect depressive rumination, which they called the DR condition (depressive rumination condition). This DR condition had participants focus on the causes, meanings, and consequences of their feelings. A version of this control was also used by Miller et al. (2015). Upon examining the DR items from the Watkins et al. (2008) study and the personal appraisal items from the Miller et al. (2015) study, it was noted that many of the items seemed too negative in tone. Given the vulnerable sample in the present study as well as the idea that the personal appraisal control was not intended to induce negative mood, attention was given to creating items for the present study that were not overly negative. To do this, some of the negative items were edited in order to be more neutral in nature. Additionally, a number of positive items were added so that there was an even split between positive and negative valence. Consider the following examples of items from the personal appraisal control condition. Both positive and negative items are provided. It should be noted that appraising items in terms of one's personal characteristics often seems inherently more valenced than big picture appraisal. This will be apparent in the examples below.

Example 2: Negative Valence

A month ago your beloved dog died from illness. The memory of how sad you felt as you stroked his soft fur for the last time is still vivid. Reflecting on the loss of your dog, you think (you're a caring person).

Example 1: Positive Valence

You've recently gotten to know two of your coworkers that you hadn't talked much to before, and you are really enjoying the friendship. Today you all had the day off so you drove to a nearby town to explore it. The weather was beautiful and you had a great day. As you return home, you smile, thinking you (form good relationships).

Written training component. The last word or phrase of each written vignette provided either a big picture interpretation of the scenario at hand or a personal appraisal of the scenario. Participants were shown the first few sentences of the vignette (without the big picture or personal appraisal control ending) on an initial screen. On the next screen they were shown the final sentence of the vignette. In this final word or phrase, there was a word fragment to be completed by the participant. Completion of the word fragment resulted either in a big picture interpretation of the vignette (for the big picture condition) or in a personal interpretation of the vignette (for the control condition). Participants were asked to fill in the word fragment in a text box provided. A simple "yes/no" comprehension question followed all written vignettes. Completion of the

comprehension questions was intended to enhance training effects (see Hertel & Matthews, 2011). This training procedure follows a standard form of CBM training (e.g. Watkins et al., 2008, experiment 3). As mentioned previously, in order to ensure the training vignettes were not mood inducing, some of the vignettes in the written training component were positively valenced and others were negatively valenced. Following are examples of a negative and a positive vignette, along with the condition endings for each:

Negative valence:

First screen:

The death of your cousin last month hit you hard and you haven't felt like yourself lately. After a week in which you felt especially emotional you decide to spend some time writing in your journal.

Second screen:

As you write, you reflect upon how (_ll people experience painful losses) [*all*, Big Picture]/ (you are a deep, tho_ghtful person) [*thoughtful*, Personal Appraisal Control].

Comprehension Questions:

Are you alone in your grief? YES/**NO** (Big Picture)

Are you someone who really contemplates things? **YES**/NO (Personal Appraisal Control)

Positive valence:

First screen:

You have gotten to know a co-worker better recently and find you really enjoy each others'company. One day you have lunch with this person and have a fascinating conversation about how you each see life.

Second screen:

At the end of the meal, your co-worker comments that the way you approach things is actually (pretty univers_l) [*universal*, Big Picture] / (pretty sm_rt) [*smart*, Personal Appraisal Control].

Comprehension Questions:

Does your co-worker think you share things in common with many people? **YES**/NO (Big Picture)

Does your co-worker find you intelligent? **YES**/NO (Personal Appraisal Control)

Auditory training component. Each training session also included vignettes that were presented in an auditory fashion. These vignettes were digitally recorded and lasted 10 to 13 seconds. Vignettes were designed such that their resolution (big picture or personal appraisal control) only became clear in the final word or phrase of the vignettes, after a short pause in the narration. Like the written vignettes, the auditory items were followed by comprehension questions. Examples of positively and negatively valenced auditory vignettes for each condition are presented below.

Positive valence:

You just received your annual evaluation at work. The company had a tough year, and you worked really hard. As you look at the evaluation, you are pleased to see that it is better than you had hoped. You enjoy your success, thinking that

(short pause)…

….(life has moments to s_vor) /[*savor*, big picture](you are really talent_d)[*talented*, personal appraisal control]

Comprehension Questions:

Are you seeing the big picture? **YES**/NO

Are you good at your job? **YES**/NO

Negative valence:

On your way to an appointment one morning, you can't remember whether you locked your front door. You are in a rush, so you decide not to go back and check. When you get home, you find that someone has been in your house. It looks like they only managed to take a couple things of low value. After calling the police, you remind yourself…

(short pause)

…(this could have been worse) [Big Picture] / (you are usually very careful) [Personal Appraisal Control].

Comprehension Questions:

Were you fortunate in some ways? **YES**/NO [Big Picture]

Do you usually take care when locking up your home? **YES**/NO [Personal Appraisal Control]

Generalization of Training Task: Similarity Ratings Test

In order to test for the generalization of training, a similarity ratings task was used. This task was based on a common procedure in CBM-I work (e.g. Watkins et al., 2008). Training vignettes were followed by a set of 18 new test-vignettes, each headed with a brief identifying title. Each test-vignette included a word fragment and was followed by a comprehension question. The resolution of the new vignettes was left ambiguous (i.e. did not encourage a big picture or personal interpretation). An example follows:

The gossip

One morning you are at school having coffee with some of your co-workers. You tell them a juicy piece of gossip about one of your peers. Suddenly the person you are talking about appears at the door. You aren't certain how much they've heard but you realize you were not being careful and reflect with regret on your actio_s [*actions*].

Are you drinking tea? Yes/**No**

After participants completed a short buffer task, consisting of ten easy true/false questions, they read the identifying title of each generalization test-vignette, followed by three versions of the final sentence, reflecting a personal appraisal-, a big picture-, or an irrelevant- interpretation of the vignette. Participants were told that none of the endings were identical to those in the original vignette, but that one was most similar in meaning

to the original. Participants were instructed to rank the answer choices according to which ending of the scenario was most similar to the one they previously read. Participants gave the option they thought was most similar to the original ending a "1", the option they thought was the next most similar a "2" and so on. An example follows:

The gossip

(a) Suddenly this co-worker appears at the door, and you regret this mistake that is so easy for people to make (big picture).

(b) Suddenly this co-worker appears at the door, and you regret your social incompetence (personal appraisal control).

(c) Suddenly this co-worker appears at the door, and you realize that you were so surprised you spilled your coffee (irrelevant).

To indicate that training generalized to this task**,** participants in the big picture intervention condition were expected to rank the big picture interpretation of the ambiguous scenario as the most similar, and so on.

Measures and Tasks

Remote Associations Task (RAT). The RAT was used successfully to induce negative mood by Watkins (2004), Hunt (1998), McFarlin and Blascovich (1984), and Brown and Dutton (1995). In the present study, the task was described to participants as a measure of intelligence. Participants were given 15 very difficult items. Each item consisted of a set of three words (e.g. bass, complex, sleep), all of which share a fourth word as a common associate (deep). The task was to supply the fourth word. Participants had 30 s to complete each item.

The RAT was administered at posttest (Session 6) in order to detect differences in emotional reactivity between the intervention group and the personal appraisal control group. PANAS mood scores measured after the first and second administration of the RAT for both groups will be compared.

Structured Clinical Interview for DSM 5 Disorders (SCIDV-RV). The Structured Clinical Interview for DSM-V Axis I Disorders is a semi-structured interview for making the major DSM-V Axis I diagnoses. Previous work has found evidence to support the psychometric properties of the SCID (Lobbestael & Leurgans, 2011).

In the present study, the SCID-RV was used to determine eligibility for the study. It was also administered at the three-month follow-up in order to assess for depression symptomology. Inter-rater reliability for the SCID-RV was 100% in the present study.

Scrambled Sentences Test for Big Picture Appraisal (SST-BPA; Haner et al., 2013, May). This measure of Big Picture Appraisal was modeled after an established measure of depressive cognitive biases, the SST (Rude, Durham-Fowler, Baum, Rooney, & Maestas, 2010; Wenzlaff; 1988, 1993; Wenzlaff, Rude, Taylor, Stultz, & Sweat, 2001). A number of recent CBM studies have used the SST as a measure of altered cognitive biases (Blackwell & Holmes, 2010; Yiend et al., 2014). As in the original SST, items developed for the SST-BPA were groups of 6 words (e.g., "temporary is bad think pain I") that respondents unscramble by placing numbers above each word to reflect the chosen word ordering (e.g., "I think pain is temporary" or "I think pain is bad"). Items (e.g., "me every like no feels person") were constructed to allow formation of sentences judged consistent with BPA (e.g., "Every person feels like me") or inconsistent with BPA

(e.g., “No person feels like me”). Three studies conducted by Haner & Rude (2015) provide preliminary support for the reliability and validity of the SST-BPA.

Two sets of seven sentences (14 total) were presented for two minutes per set. To further decrease the use of volitional control on responding, items were administered under cognitive load (maintaining a 6-digit number in memory while completing the items). The SST-BPA was administered at pretest (Session 1) and posttest (Session 6) Inter-rater reliability for the SST-BPA was 100% in the present study.

Positive and negative affect schedule *(PANAS; Watson*, Clark, & Tellegen, *1988).* The PANAS consists of two 10-item scales measuring positive affect (e.g., “enthusiastic”, “excited”, “proud”) and negative affect (e.g., “distressed,” “hostile,” “scared”). Each item is rated for the extent to which the participant feels that way right now on a 5—point scale from 1 (very slightly or not at all) to 5 (extremely). The PANAS was used to examine emotional reactivity following the RAT stressor task. Therefore, it was administered twice during Session 6, once before the RAT and once after the RAT. The PANAS was also administered at pretest (Session 1), the two-week follow-up, and the three-month follow-up.

The PANAS has been found to be a reliable (Positive Affect: α=0.86-0.90; Negative Affect: α=0.84-0.87) and valid measure of mood (Watson et al., 1988). Internal consistency for the PANAS Positive Affect scale and Negative Affect scale in the present study was good (Positive Affect Pre-Stressor: α=0.91, Positive Affect Post-Stressor: α=0.92; Negative Affect Pre-Stressor: α=0.91; Negative Affect Post-Stressor: α=.92).

Ruminative Response Scale- 10 item version (RRS; Nolen-Hoeksema & Morrow, 1991; Treynor, Gonzalez, & Nolen-Hoeksema, 2003) asks respondents to rate how frequently they react to depressed mood with ruminative thoughts, symptoms, or consequences of the depressive mood (e.g., ‘‘think ‘I won’t be able to do my job/work because I feel so badly’”). The items are scored 1 (Never), to 4 (Almost Always). The RRS was administered at pretest (Session 1), posttest (Session 6), at the two-week follow-up session, and at the three-month follow-up session.

Nolen-Hoeksema and Morrow (1991) have reported good internal consistency (α = .89) and predictive validity. Internal consistency for the RRS in the present study was good (Session 1/Pretest: α=0.76; Session 6/Post-test: α=.79; 2-week follow-up: α=0.78; 3-month follow-up: α=0.73).

The Centers for Epidemiological Studies- Depression scale (CES-D; Radloff, 1977) is a widely utilized instrument that consists of twenty items designed to measure depressive symptomatology in the general population. Respondents are asked to indicate the frequency of symptoms on a scale ranging from 0 (Rarely or none of the time) to 3 (Most of the time). Radloff suggested a threshold score of 16 for the indication of clinically significant depression. The CES-D was administered at pretest (Session 1), posttest (Session 6), at the two-week follow-up session, and at the three-month follow-up session.

Internal consistency using coefficient alpha is estimated to be .85 for the community samples and .90 in clinical samples (Radloff, 1977). Internal consistency for

the CES-D in the present study was good (Session 1/Pretest: α=0.73; Session 6/Post-test: α=.81; 2-week follow-up: α=0.84; 3-month follow-up: α=0.78).

Vividness of Visual Imagery Questionnaire (VVIQ) (Marks, 1989 *a*). The VVIQ consists of 16 items separated into four groups of 4 items in which the participant is invited to consider the image formed in thinking about specific scenes and situations. Subjects twice rate (once with eyes open, once with eyes closed) the vividness of their imagery on a five-point scale (with lower numbers indicating higher vividness). In the present study, the VVIQ was administered at pretest (Session 1). The VVIQ has been found to be a valid and reliable measure (Marks, 1989). Internal consistency for the VVIQ in the present study was good (α=.92).

Big Picture Appraisal Questionnaire (BPQ) (Rude et al., May 2013)**.** The instructions ask respondents to think back to situations in which they have been upset or unhappy and to characterize the way they usually respond in such situations by rating each of the 23 items on a 5-point scale, ranging from "never" to "very frequently.". Items are included tapping each of the three dimensions reported here (e.g., extended time perspective: "I remind myself that if I wait it out I will eventually feel better;" broader context of life and self: "I realize that this is only part of who I am;" and broader human context: "I know that others experience feelings like mine."). In several samples, the BPQ has shown good internal consistency and convergent-discriminant validity (Gill et al., 2013, Gill, Miller, Rude, & Haner, in press). The BPQ was administered at pretest (Session 1) and posttest (Session 6). Internal consistency of the BPQ in the present study was good (Pre-Test/Session 1: α=.94; Post-Test/Session 6: α=.96).

Procedure: Session by Session Breakdown (also see Table 1 and Figure 1)

Session 1 (pretest; approximate time: 60 minutes). This session took place in person. Prior to beginning session 1, researchers completed the portion of the SCID that was not completed over the phone. This part of the SCID involves questions regarding suicidality, therefore, we decided to ask these questions in person so that the appropriate referrals and resources could be provided to participants.

Upon completion of the SCID, participants were directed to begin Session 1 of the study which was administered primarily online. Once participants followed the link to Session 1 (administered using Qualtrics survey software) they were randomly assigned to either the big picture condition or the personal appraisal control condition. Participants in both conditions began by completing pre-test measures (Scrambled Sentence Task, Positive Negative Affect Scale, Ruminative Response Scale, Center for Epidemiological Studies Depression Scale, Vividness of Visual Imagery Questionnaire, Big Picture Questionnaire).

Next, participants were guided through a brief imagery training in which they were asked to imagine cutting a lemon in order to clarify what is meant by "using mental imagery" (see Lang et al., 2012). They then practiced four sample descriptions with a particular emphasis on using imagery from field perspective, and not using observer imagery or verbal processing (Torkan, Blackwell, Holmes, Kalantari, Doost, & Maroufi, 2014). It should be noted that the imagery training was done by the researcher, verbally with the participants. After imagery training, participants were redirected to the online survey. After completing practice training items, participants in both conditions were

given stimuli from both auditory and written CBM components (8 auditory vignettes; 8 written vignettes). The aim of the first session was to familiarize participants with the study and prepare them for the training tasks ahead.

Sessions 2-5 (training sessions; approximate time: 20 minutes each). Participants completed sessions 2-5 via computer at locations of their choosing. Participants were sent emails with the links to these sessions and were encouraged to complete each subsequent session within 48 hours from the time they completed the previous session. Sessions 2-5 each included 40 training scenarios (32 written items; 8 auditory items). The items were presented in blocks of eight. In each of these sessions participants completed 3 blocks of written items, followed by one block of auditory items, and finished with a final block of written items. The estimated time for completion of sessions 2-5 was about 20 minutes per session.

Session 6 (posttest; approximate time: 60 minutes). After completing sessions 2-5, participants were sent an email with a link to session 6. In this session, participants completed a final round of training (8 written items; 8 auditory items). After this, they completed the transfer similarity ratings task, the RAT stressor, and then the posttest measures (Big Picture Appraisal Questionnaire, PANAS, Scrambled Sentence Test, Center for Epidemiological Studies Depression Scale, Ruminative Response Scale). The RAT stressor task was meant to induce a sense of disappointment in participants. Participants were informed that the task is a measure of their intelligence when in fact the task is made up of very difficult items. Participants were debriefed about the RAT and informed about this deception upon conclusion of the study.

Two-week follow-up (approximate time: 15 minutes). At the two-week follow-up, participants completed the RRS, and the CES-D via computer from a location of their choosing.

Three-month follow-up (approximate time: 15 minutes). The three-month follow-up consisted of an online component as well as an interview component. In the online session participants completed the RRS and the CES-D. During the telephone interview, participants were given the SCID-IV to assess for depressive symptomology. Finally, participants were asked open-ended questions that encouraged them to reflect on what it was like to be a participant in the study.

Figure 1

Study Procedure

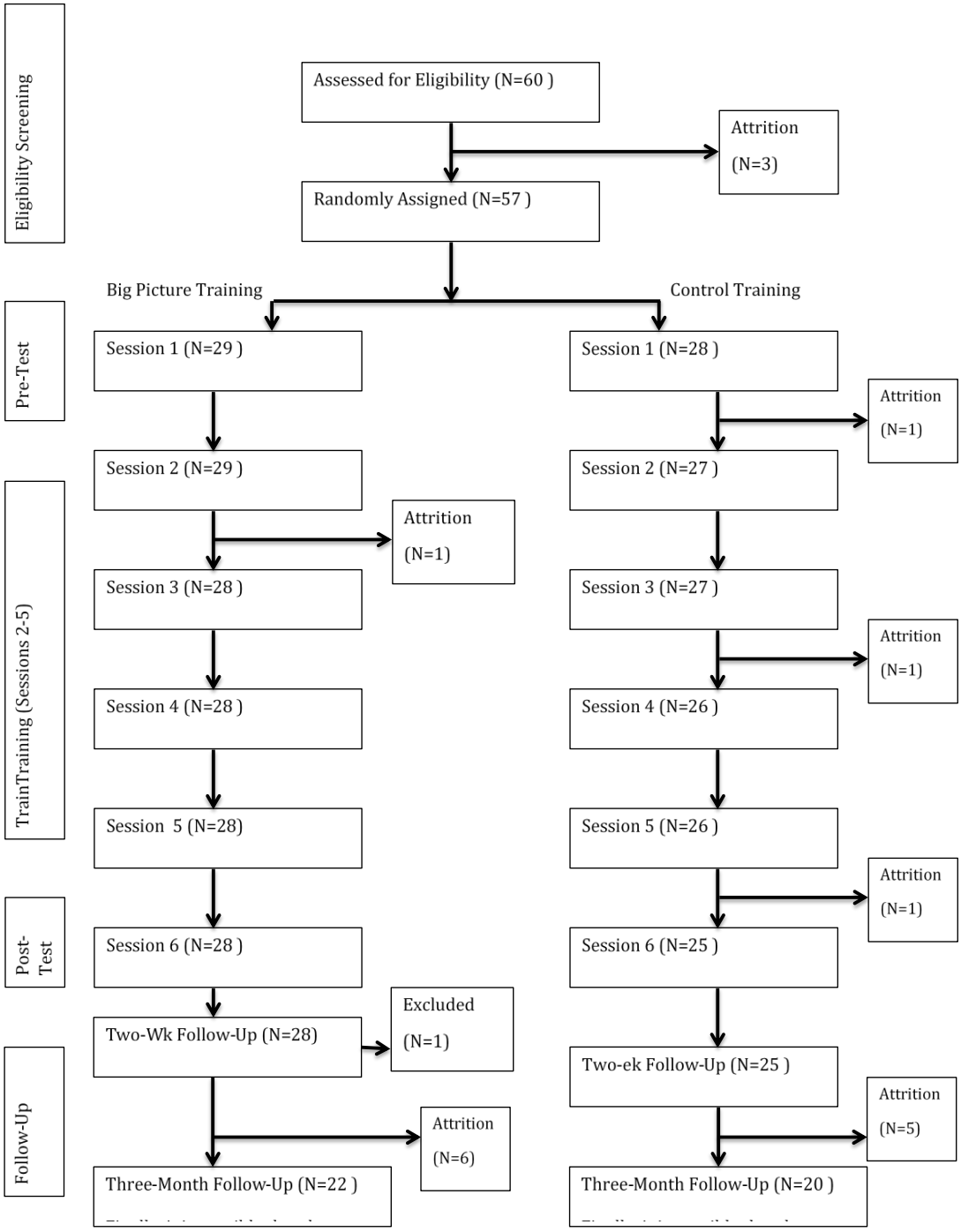


Table 1

Study Sessions and Activities

Session	Procedures
Session 1 (pre-test)	Pretest measures (SST-BPA, PANAS, RRS, CES-D, VVIQ, BPQ), imagery training, initial training items specific to condition (8 written, 8 auditory)
Sessions 2-5 (training sessions)	CBM training specific to condition (3 sets of 8 written, 1 set of 8 auditory, 1 set of 8 written)
Session 6 (post-test)	training items specific to condition (8 written, 8 auditory), similarities ratings task, RAT stressor, post-test measures (SST-BPA, PANAS, RRS, CES-D, BPQ)
Two-week follow-up	Complete RRS, CES-D, PANAS
3 month follow-up	Complete RRS, CES-D

Note: SST-BPA (Scrambled Sentences Test-Big Picture Appraisal); PANAS (Positive and Negative Affect Schedule); RRS (Ruminative Response Scale); CES-D (Center for Epidemiological Studies-Depression Scale); VVIQ (Vividness of Visual Imagery Questionnaire); RAT (Remote Associations Task); SCID (Structured Clinical Interview for DSM V)

Chapter 4:

Results

There were two primary aims in the present study. The first aim was to examine whether big picture thinking could be trained using cognitive bias modification for interpretation and if so, to examine the extent to which training in big picture thinking would generalize to other tasks. Specific hypotheses predicted that participants in the big picture condition would: 1a) endorse more big picture interpretations of novel vignettes on the similarity ratings task as compared to the personal appraisal control group; 1b) form more big picture sentences at posttest on the scrambled sentences task as compared to the personal appraisal control group; and 1c) score higher on the Big Picture Questionnaire at posttest as compared to the personal appraisal control group. The second aim of the study was to examine whether the big picture condition and the personal appraisal control condition would differ on measures of stress reactivity, depression, and rumination. Specific hypotheses predicted that participants in the big picture group would: 2a) endorse less negative mood and more positive mood in response to a stressor task as compared to the personal appraisal control condition; 2b) endorse less depression at posttest and both the 2-week follow-up session and three-month follow-up session as compared to the personal appraisal control group; and 2c) endorse less rumination at posttest and both the 2-week follow-up session and the three-month follow-up session as compared to the personal appraisal control group; 2d) endorse less depressive symptomology on the SCID-RV interview at the 3-month follow-up as compared to the personal appraisal control condition.

It should be noted, that the three-month follow-up (which relates to hypotheses 2b, 2c, and 2d) data was analyzed separately because it has only been possible to collect data from 42 out of the 53 participants. The results from this data are reported in a separate section at the end of this results chapter.

Analytic Strategy

Data were analyzed using the IBM Statistical Package of Social Sciences (SPSS) version 23. Variables were checked for the assumptions of parametric testing prior to applying statistical tests. Outliers were identified by visual inspection of box plots and examination of z scores and some analyses were conducted both with and without cases identified as potential outliers. The alpha level was set at .05 for significance tests.

Independent samples t-tests and mixed model repeated measures ANOVAs were used to test hypotheses. In the case of the mixed model ANOVAS, hypotheses were tested using measurements taken at two or more time points and were analyzed using time as the within-participants variable and group as the between-participants variable.

Characteristics of the Sample

Through the SCID screening interview, it was determined that 60 participants qualified for the study. As shown in Figure 1, three participants dropped out between the time of the screening interview and Session 1. An additional four participants dropped out after being assigned to a condition (Personal Appraisal Control=3, Big Picture=1). Of these four participants, one control participant dropped out after Session 1, one big picture participant after Session 2, one control participant after Session 3, and one control participant after Session 5. The participants that dropped out (7 in total) belonged to the

following demographic categories: male=5, female=2, Caucasian=3, Non-White=4, some college=5, completed college=2, English Speaking=7.

The final sample consisted of 52 participants, 27 in the big picture condition and 25 in the personal appraisal control condition. One participant in the big picture condition was excluded from analyses due to a particularly large delay (35 days) in completing sessions. This represented an outlying value (z score > 3) since the mean number of days participants took to complete sessions was 14 days. Baseline characteristics of participants in the big picture and personal appraisal control conditions were compared using two-tailed independent samples t-tests or chi-square tests of independence (See Table 2). Of note, the chi-square test assumes an expected cell frequency of 5. Therefore, categories were collapsed as needed to meet this assumption and are specified in Table 2. For racial group, participants identified as the following: White, Latino, Asian, Multi-Racial, or Black. In order to obtain appropriate cell counts, participants were collapsed into white and non-white categories. While it is not assumed that there is a common experience for these non-white ethnic/racial groups, there may be some commonality in not being a member of the dominant racial/ethnic group. Therefore it was important to determine whether white and non-white participants were balanced across conditions. For the education variable, participants identified as: completing some college, obtaining a bachelor's degree, or obtaining a graduate degree. In order to obtain necessary cell counts, participants were collapsed into those that had not yet completed college and those that had completed college. The chi-square test for Language (English as first language v. English as second language) was not possible due to there only being 4

participants in each condition for whom English was the second language. Raw data are provided for the Language category. It is worth noting, all participants who indicated English is their second language also reported a high level of fluency with English. As shown in the table, participants in both groups were comparable on demographic characteristics.

Table 2

Mean participant characteristics or counts by group with standard deviations in parentheses

	Group		**Statistic**	**p**
	Big Picture (n=27)	Personal Appraisal Control (n=25)		
Sociodemographics				
Age	23.29 (6.56)	21.96 (3.29)	t=.94	ns
Ethnicity (White vs. Non-White)	13 White; 5 Latino; 6 Asian; 2 Multi-Racial; 1 Black	10 White; 2 Latino; 9 Asian; 3 Multi-racial; 1 Black	χ^2= .53	ns
Gender	19 female; 8 male	15 female; 10 male	χ^2=.62	ns
Education (some college vs. completed college)	20 some college; 2 bachelors; 5 graduate school	16 some college; 4 bachelors; 5 graduate school	χ^2= .31	ns
Language	23 English first language; 4 English not first language	21 English first language; 4 English not first language	unable to run test	ns

Pretest variables were also examined. As shown in Table 3, groups were comparable at baseline on all pretest variables except the Center for Epidemiological

Studies Depression scale (CES-D) and the Positive and Negative Affect Scale-Negative Affect (PANAS-NA). These pretest differences are surprising given that groups were randomly assigned by the Qualtrics survey software program. Due to these pretest differences, results should be interpreted with caution.

Table 3

Participant means on pretest measures by group with standard deviations in parentheses

	Group		**Statistic**	**p**
	Big Picture (n=27)	Control (n=25)		
Pretest measures				
CES-D	43.78 (9.27)	35.88 (7.33)	t= 3.40	p< .01
RRS	24.00 (4.68)	22.12 (5.34)	t= 1.35	ns
BPQ	62.37 (17.2)	63.84 (17.77)	t= -.303	ns
VVIQ	36.07 (8.16)	37.48 (15.24)	t= -.410	ns
PANAS-Positive Affect	24.37 (9.39)	24.84 (7.67)	t= -.197	ns
PANAS-Negative Affect	18.07 (6.96)	14.48 (5.25)	t= 2.09	p=.04
SST-BPA big picture	7.74 (3.48)	7.48 (2.99)	t= .289	ns

Note: CES-D (Center for Epidemiological Studies-Depression Scale); RRS (Ruminative Response Scale); BPQ (Big Picture Questionnaire); VVIQ (Vividness of Visual Imagery Questionnaire); PANAS (Positive and Negative Affect Schedule); SST-BPA (Scrambles Sentences Test-Big Picture Appraisal)

Table 4 provides the intercorrelations of pretest study variables. Significant positive interrelationships were found between the CES-D, PANAS-negative affect, ERQ-suppression ($p < .01$ for all bivariate relationships). Positive interrelationships were also found between the RRS and PANAS-negative affect ($p < .05$), between the BPQ, PANAS-positive affect ($p < .05$), ERQ-reappraisal ($p < .05$), and SST –big picture ($p < .01$), between the PANAS-positive affect and ERQ-reappraisal ($p < .05$), between

PANAS-negative affect and ERQ-suppression ($p < .01$) and between the ERQ-reappraisal and the SST-big picture ($p < .05$). Significant negative intercorrelations were found between the CES-D and BPQ ($p < .01$), the CES-D and PANAS-positive affect ($p < .05$), and the CES-D and SST-big picture ($p < .01$). Additionally, significant negative correlations were found between the PANAS-negative affect and the SST-big picture ($p < .01$) as well as between the ERQ-suppression and SST-big picture ($p < .05$). All intercorrelations were in the expected directions.

Table 4

Intercorrelations of pretest Study Variables

Study Variables	1	2	3	4	5	6	7	8	9
1. CES-D	1	.46**	-.36**	.20	-.30*	.54**	.42**	-.22	-.42**
2. RRS		1	.02	.02	.07	.23*	.14	.16	-.15
3. BPQ			1	-.18	.33*	-.27	-.24	.55*	.41**
4. VVIQ				1	-.27	.13	.01	-.12	-.11
5. PANAS-positive affect					1	.05	-.11	.29*	.15
6. PANAS-negative affect						1	.36**	-.22	-.42**
7. ERQ-suppression							1	-.12	-.27*
8. ERQ-reappraisal								1	.23*
9. SST-big picture									1

Note: **. Correlation is significant at the .01 level (2-tailed). *. Correlation is significant at the .05 level (2-tailed).

Examination of Hypotheses

Testing Generalization of Treatment. Recall the first aim of the study was to test whether big picture thinking could be trained using cognitive bias modification for

interpretation and if so, to examine the extent to which training in big picture thinking transferred to other measures that varied in their similarity to the training task. The results of each hypothesis test are discussed below.

Hypothesis 1a. Hypothesis 1a was that participants in the big picture condition would form more big-picture interpretations of novel vignettes on the similarity ratings task as compared to the personal appraisal control group. Recall that the similarity ratings task consisted of 18 vignettes, presented at the conclusion of training (Session 6). Participants in both conditions saw identical vignettes. Unlike training vignettes, which ended in either a big picture or personal interpretation, the similarity ratings task vignettes ended ambiguously. After reading through the similarity ratings task vignettes and then completing a short buffer task, participants were asked to complete an incidental recognition test. They were given the title of each similarity ratings task vignette along with three potential interpretations (one big picture, one personal appraisal control, one irrelevant) which they were asked to rank according to which most accurately reflected the ending in the previously read vignettes (1=best interpretation, 2=next best interpretation, etc.). It was hypothesized that participants in the big picture condition would give significantly more "1" ratings to the big picture endings on the similarity ratings task.

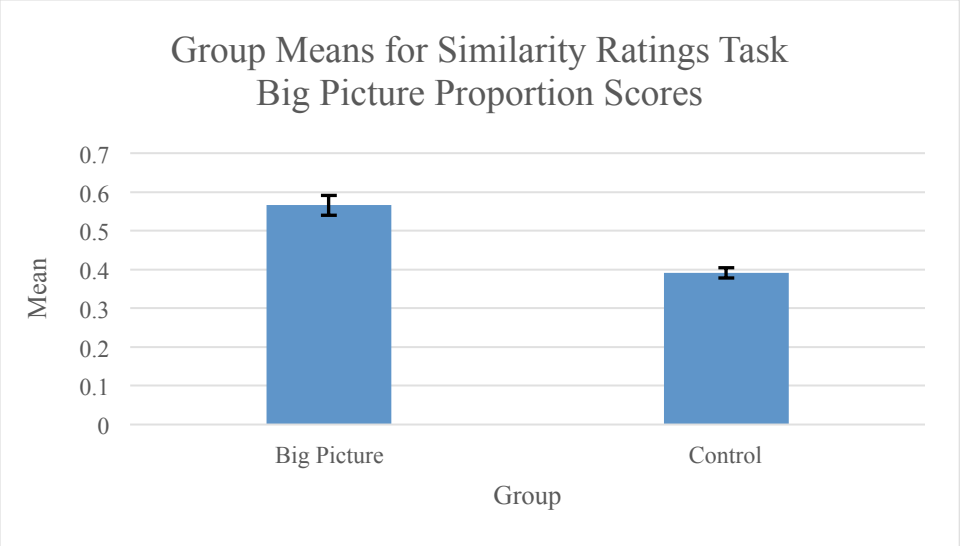
To test this hypothesis, a proportion score was calculated by taking the number of big picture interpretations given a ranking of "1" by each participant and dividing by the total number of transfer vignettes (18). Before conducting an independent samples t-test to examine differences, assumptions for this test were assessed. There were no significant

outliers in the proportion scores. Levene's test for equality of variances was significant ($p<.05$). Therefore Welch's two sample t-test was used. Skewness and kurtosis values indicated there was no violation of normality.

An independent samples t-test comparing proportion scores between the two groups showed that participants in the big picture condition chose significantly more big picture interpretations of the novel vignettes (M= .57, SD= .27) as compared to the personal appraisal control condition (M=.39, SD=.13); $t(38.78) = 2.98$. $p< 0.01$. See Figure 2.

Figure 2

Group Means for Similarity Ratings Task Big Picture Proportion Scores



Note. Bars representing standard error depicted on graph.

An identical analysis was done to test whether participants in the personal appraisal condition would form more personal appraisal interpretations of novel vignettes on the similarity ratings task as compared to the big picture group. Assumptions were

assessed. It was determined that there were no outliers. Levene's test for equality of variances was significant ($p<.05$). Therefore Welch's two sample t-test was used. Finally, skewness and kurtosis values indicated the assumption of normality was met. An independent samples t-test comparing proportion scores between the two groups showed that participants in the personal appraisal condition chose significantly more personal appraisal interpretations of the novel vignettes ($M= .57$, $SD= .13$) as compared to the big picture condition ($M=.40$, $SD=.24$); $t (32.94) = -3.0$, $p< 0.01$.

Hypothesis 1b. Hypothesis 1b was that participants in the big picture condition would form significantly more big picture sentences on the Scrambled Sentences-Big Picture Appraisal (SST-BPA) at posttest as compared to the personal appraisal control group. Recall that the Scrambled Sentences Task required participants to unscramble sets of 6 words to form 5-word sentences. This was done under time pressure (two minutes to complete seven sentences) and under cognitive load (participants were asked to remember a 7-digit number). Sentences could be unscrambled to form a big picture sentence or a non-big picture sentence. In preparation for analysis, sentences formed by participants were coded by two independent raters. Raters coded the sentences as "1" if they reflected a big picture sentence and "0" if they did not reflect a big picture sentence. Ungrammatical sentences were not coded. In order to assess inter-rater reliability, a third coder identified seven cases and recoded all sentences with perfect agreement.

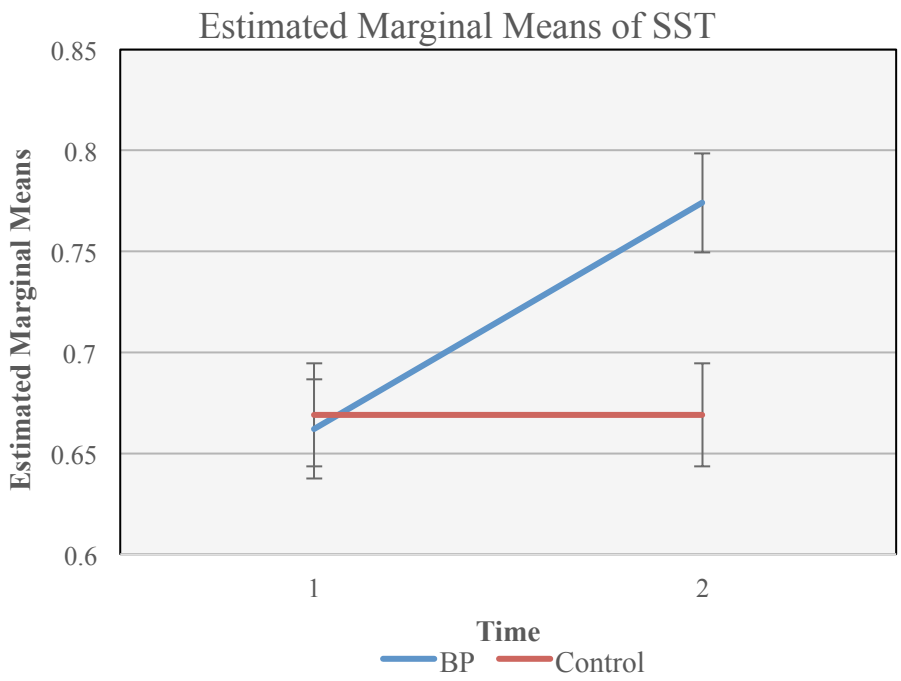
To test hypothesis 1b, proportion scores were calculated for each participant at each time point (pretest/Session 1 and posttest/Session 6). These proportion scores were created by taking the number of big picture sentences formed by each participant divided

by the total number of sentences (big picture and non big picture) formed by each participant. A mixed model repeated measures ANOVA was conducted on these SST proportion scores, with one within-participants factor, Time (pretest/Session 1, posttest/Session 6) and one between-participants factor, Condition (big picture, control). Prior to testing, assumptions of mixed model ANOVA were assessed. There were no significant outliers in the proportion scores. Additionally, Levene's Test for equality of variances indicated this assumption was met. Skewness and kurtosis values indicated there was no violation of normality.

Results showed a significant main effect of time, $F(1, 50)=5.19$, $p=0.03$, partial eta squared = .09, and a significant group by time interaction $F(1, 50)=5.32$, $p=0.03$, partial eta squared= .10. The time main effect was such that overall, means on the SST increased significantly from pretest to posttest. Visual inspection of the plots and examination of means for both groups suggests that participants in the two conditions were not significantly different at pretest (control: M=.66, SD=.05; big picture: M=.67, SD=.05), however, participants in the big picture condition formed significantly more big picture sentences at posttest (M=.77, SD=.05) than the personal appraisal control group (M=.67, SD=.05). See Figure 3.

Figure 3

Group Means Across Time for Scrambled Sentence Proportion Scores



Note. Time 1 refers to SST proportion scores at pretest (Session 1); Time 2 refers to SST proportion scores at posttest (Session 6). Bars representing standard error depicted on graph.

Table 5

Means and Standard Deviations of Study Variables at Each Time Point

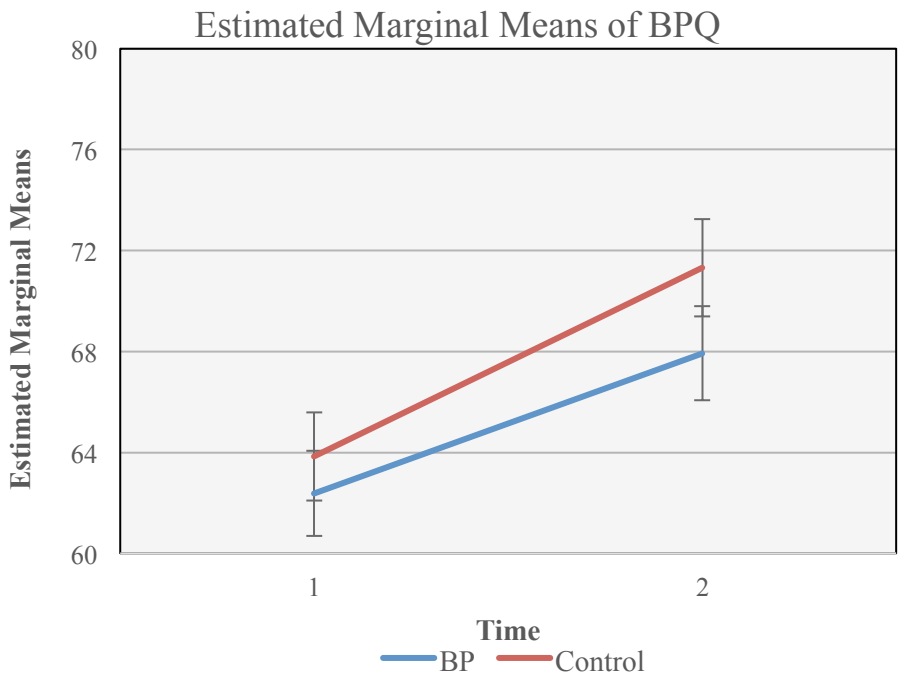
Variable	Group Big Picture	Personal Appraisal Control
Transfer Task (% BP)	.57 (.27)	.39 (.13)
SST (%BP)		
Pretest (Session 1)	.67 (.05)	.66 (.05)
Posttest (Session 6)	.77 (.05)	.67 (.05)
BPQ		
Pretest (Session 1)	62.4 (17.2)	63.8 (17.8)
Posttest (Session 6)	67.9 (18.8)	71.3 (19.9)
PANAS-negative affect		
Session 1	16.6 (6.3)	14.5 (5.2)
Session 6, pre-stressor	16.0 (6.2)	14.7 (4.3)
Session 6, post-stressor	18.9 (7.3)	18.1 (6.1)
2-week follow-up	14.2 (4.4)	13.8 (3.9)
PANAS-positive affect		
Session 1	23.5 (8.4)	24.8 (7.7)
Session 6, pre-stressor	23.6 (7.6)	23.6 (8.1)
Session 6, post-stressor	19.9 (8.3)	19.8 (7.6)
2-week follow-up	23.2 (9.0)	23.2 (8.4)
CES-D		
Pretest (Session 1)	42.8 (8.1)	35.9 (7.3)
Posttest (Session 6)	42.0 (8.9)	37.3 (7.6)
2-week follow-up	41.2 (9.4)	36.6 (8.4)
3-month follow-up (N=42)	39.1 (9.2)	36.0 (9.4)
RRS		
Pretest (Session 1)	24.0 (4.7)	22.1 (5.3)
Posttest (Session 6)	24.7 (4.8)	23.2 (5.7)
2-week follow-up	23.7 (4.7)	21.4 (5.1)
3-month follow-up (N=42)	22.5 (4.3)	21.0 (4.6)

Hypothesis 1c. Hypothesis 1c was that participants in the big picture condition would score significantly higher on the Big Picture Questionnaire at posttest as compared to the personal appraisal control condition. Before conducting statistical tests, parametric testing assumptions were assessed and no violations were identified. A mixed model

ANOVA was conducted on these BPQ scores with one within-participants factor, Time (pretest/Session 1 and posttest/Session 6) and one between-participants factor, Condition (big picture, control). Results showed a significant main effect of time, $F(1, 50)=12.27$, $p<0.01$, partial eta squared=.20, indicating scores on the Big Picture Questionnaire increased significantly for both the big picture and control conditions. There was no significant group main effect nor was there a significant group by time interaction. See figure 4.

Figure 4

Group Means Across Time for Big Picture Questionnaire Scores



Note. Time 1 refers to BPQ scores at pretest (Session 1); Time 2 refers to BPQ scores at posttest (Session 6). Bars representing standard error depicted on graph.

Testing Effects of Treatment. The second aim of the study was to examine differences between the big picture condition and the personal appraisal control condition in measures of stress reactivity, depression, and rumination. The results of each hypothesis test are discussed below.

Hypothesis 2a. Hypothesis 2a was that participants in the big picture condition would show less emotional reactivity in response to the stressor task as compared to the personal appraisal control condition. Recall that the stressor was the Remote Associations Task (RAT), which was described to participants as a measure of intelligence. Participants were given 15 very difficult items. Each item consisted of a set of three words (e.g. bass, complex, sleep), all of which share a fourth word as a common associate (deep). The task was to supply the fourth word. Participants had 30 seconds to complete each item. The RAT was administered during Session 6, after participants had completed all parts of the training in each condition. Mood was measured using the PANAS right before the stressor (Session 6-pre-stressor) and right after the stressor (Session 6-post-stressor). To show less emotional reactivity, it was hypothesized that the big picture group would endorse less negative mood and more positive mood after the stressor, as compared to the personal appraisal control group. To test this, mixed model repeated measures ANOVAs were conducted on the PANAS-negative affect scores and PANAS-positive affect scores respectively. In each analysis, there was one within participants factor, Time (Session 6-pre-stressor, Session 6-post-stressor) and one between-participants factor, Condition (big picture, control).

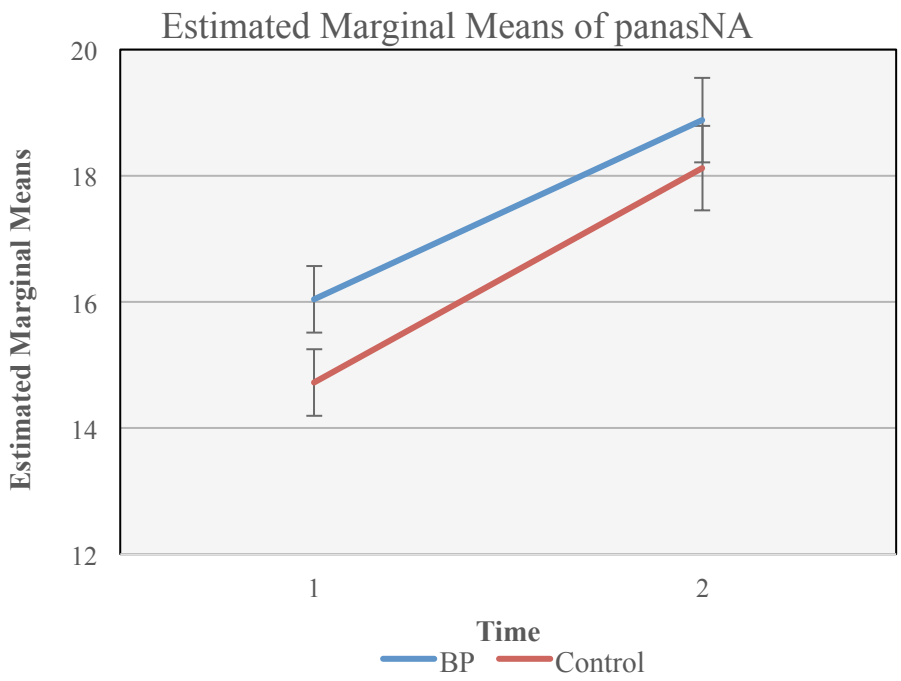
Prior to testing the PANAS-negative affect scores, assumptions of parametric testing were assessed. First, upon visual inspection of box plots, it was determined that there were two outliers during each administration of the PANAS-negative affect scale (pre-stressor and post-stressor). Both of these participants were outliers at both time points and therefore were removed from analysis. Additionally, both participants were in the big picture condition. The remaining sample consisted of 25 participants in the big picture condition and 25 participants in the personal appraisal control condition. Second, skewness and kurtosis values indicated there was no violation of normality.

Results for the PANAS-negative affect analysis showed a significant main effect of time, $F(1, 48)=35.54$, $p < .01$[1], partial eta squared= .43, such that for both groups, PANAS-negative affect was significantly higher at posttest as compared to pretest. There was no significant main effect of group nor was there a significant time by group interaction. These findings suggest that the stressor task was successful in increasing negative mood, however, the expected differences between groups were not found. See figure 5.

[1] Results from the mixed model repeated measures ANOVA with outliers included showed a significant main effect of time $F(1,50)=35.7$, $p<.01$, partial eta squared=.42. There was no significant group main effect and no significant group by time interaction.

Figure 5

Group Means Across Time for PANAS-Negative Affect Scores



Note. Time 1 refers to PANAS-Negative Affect scores pre-stressor; Time 2 refers to PANAS-Negative Affect scores post-stressor. Bars representing standard error depicted on graph.

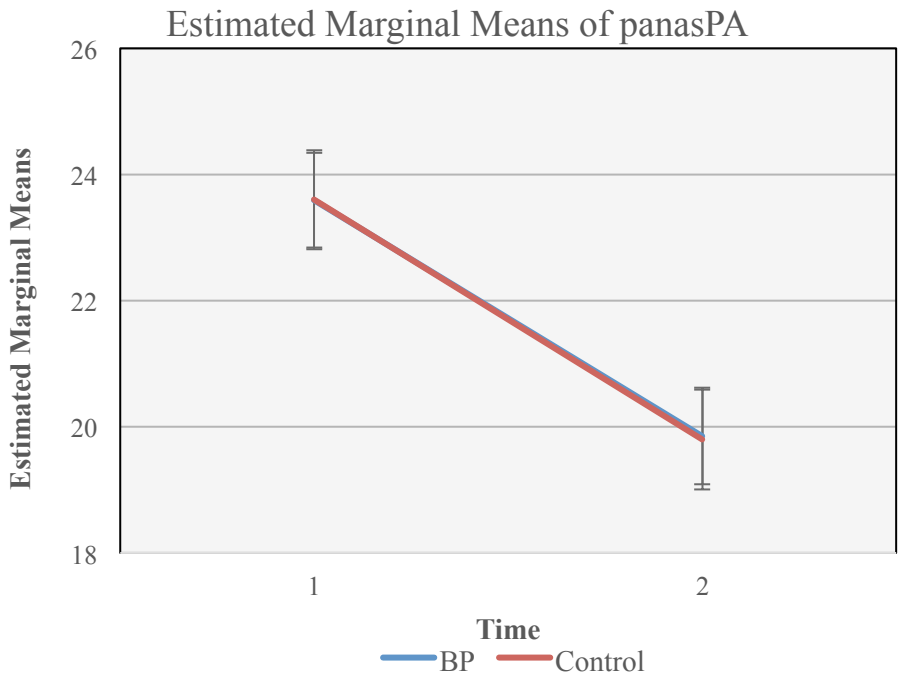
Before analyzing the PANAS-positive affect scale, assumptions of parametric testing were assessed. No outliers were identified and skewness and kurtosis values indicated there was no violation of normality. Levene's test for equality of variances indicated this assumption was met.

Results for the PANAS-positive affect analysis showed a significant main effect of time, $F(1, 50) = 34.98$, $p < 0.01$, partial eta squared=.41, such that for both groups, PANAS-positive affect was significantly lower at posttest as compared to pretest. There was no significant group main effect nor was there a significant time by group interaction.

Similar to the PANAS-negative affect results, the PANAS-positive affect results suggest the stressor was successful in reducing positive mood, but the expected differences in groups were not found. See Figure 6.

Figure 6

Group Means Across Time for PANAS-Positive Affect Scores



Note. Time 1 refers to PANAS-Positive Affect scores pre-stressor; Time 2 refers to PANAS-Positive Affect scores post-stressor. Bars representing standard error depicted on graph.

Hypothesis 2b. Hypothesis 2b was that participants in the big picture condition would endorse less depression at posttest and the 2-week follow-up session as compared to the personal appraisal control group. Recall that analyses of baseline scores showed a significant and fairly large pre-test difference in CES-D scores between the conditions, a "failure" of randomization which, unfortunately, constrains the ability to interpret results

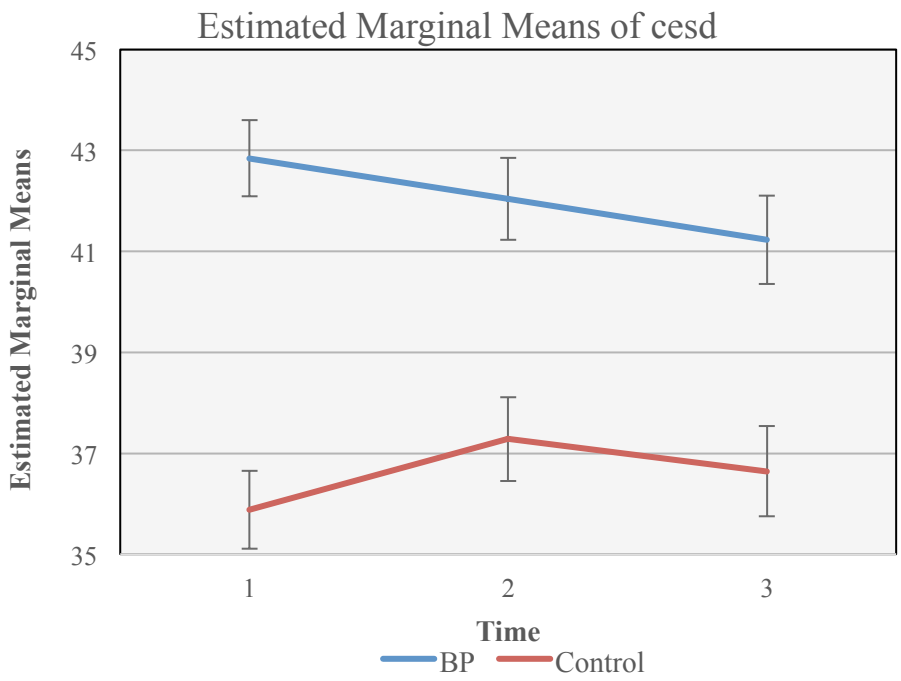
of analyses using this variable. Nonetheless, a mixed model ANOVA was conducted on the CES-D scores with one within participants factor, Time (pretest, posttest, 2-week follow-up) and one between-subjects factor, Condition (big picture, control). Assumptions of parametric testing were assessed. First, upon visual inspection of box plots, it was determined that there was one outlier during administration of the CES-D at pretest. This one participant was removed for the analysis. The outlier participant was in the big picture condition, resulting in a sample that consisted of 26 participants in the big picture condition and 25 participants in the personal appraisal control condition. Second, the Kolmogorov-Smirnov test for normality indicated normality was met during each administration of the CES-D. Finally the assumptions of equality of variances and sphericity were also met.

Results showed no main effect of time and no time by group interaction. There was a significant main effect of group $F(1,49) = 7.56$, $p = .01$[2], partial eta squared=.13 such that those in the big picture condition endorsed higher CES-D scores at all time points as compared to those in the personal appraisal control condition. See figure 7.

[2] Results from the mixed model repeated measures ANOVA with outliers showed no main effect of time and no time by group interaction. There was a significant main effect of group $F(1,50) = 8.8$, $p = .01$.

Figure 7

Group Means Across Time for CES-D Scores



Note. Time 1 refers to CES-D scores at pretest (Session1); Time 2 refers to CES-D scores at posttest (Session 6); Time 3 refers to CES-D scores at the two-week follow-up period. Bars representing standard error depicted on graph.

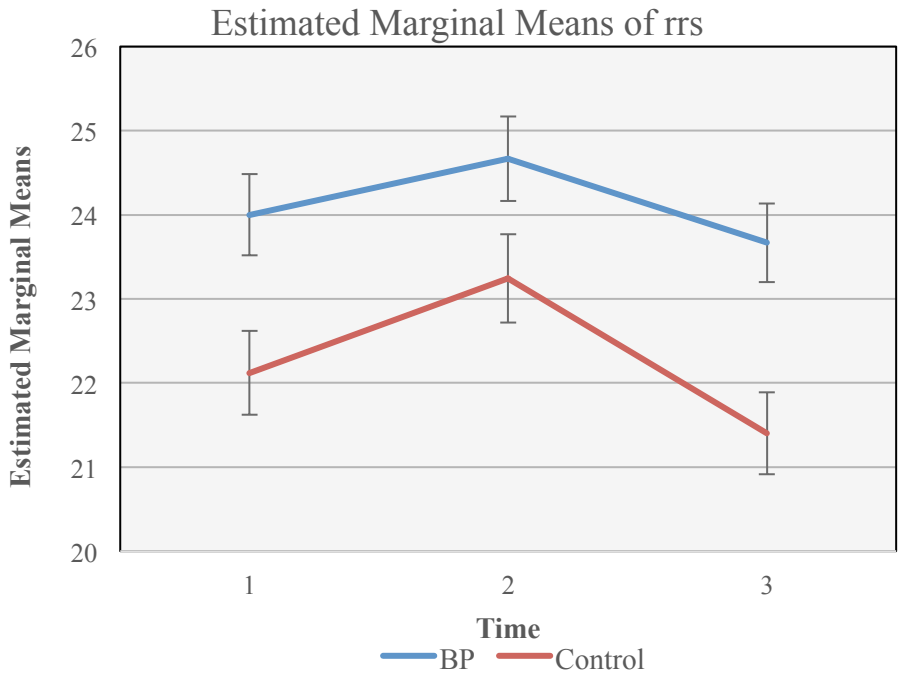
Hypothesis 2c. Hypothesis 2c was that participants in the big picture condition would endorse less rumination at posttest and the 2-week follow-up session as compared to the personal appraisal control group. A mixed model ANOVA was conducted on the RRS scores with one within participants factor, Time (pretest/Session 1, posttest/Sesion 6, 2-week follow-up) and one between-subjects factor, Condition (big picture, control). Assumptions of parametric testing were assessed. First, upon visual inspection of box plots, it was determined that there were no outliers. Second, the assumptions of normality

and equality of variances were met for each administration of the RRS. Finally, Mauchley's Test of Sphericity indicated a violation in sphericity, therefore, Huynh-Felt statistics were examined in analyses.

Results showed no main effects of group or time and no time by group interaction. It should be noted, there was a trend toward a time main effect, $F(2,100) = 2.80$, $p = 0.07$, partial eta squared=0.05 such that for both groups, RRS scores decreased over time. Examination of Pairwise comparisons examining the differences in RRS scores between each time point separately revealed a significant decrease in RRS scores occurred between post-Test/Session 6 and the two-week follow-up session ($p=0.01$). See figure 8.

Figure 8

Group Means Across Time for RRS Scores



Note. Time 1 refers to RRS scores at pretest (Session1); Time 2 refers to RRS scores at posttest (Session 6); Time 3 refers to RRS scores at the two-week follow-up period. Bars representing standard error depicted on graph.

Three-Month Follow-Up Data

The three-month follow-up data were examined separately because it has only been possible to collect data from 42 out of 53 participants. Of these participants, 22 were in the big picture condition and 20 were in the personal appraisal control condition. The three-month follow-up data relates to hypothesis 2b: participants in the big picture condition would endorse less depression at posttest and both the 2-week follow-up session and the three month follow-up session as compared to the personal appraisal

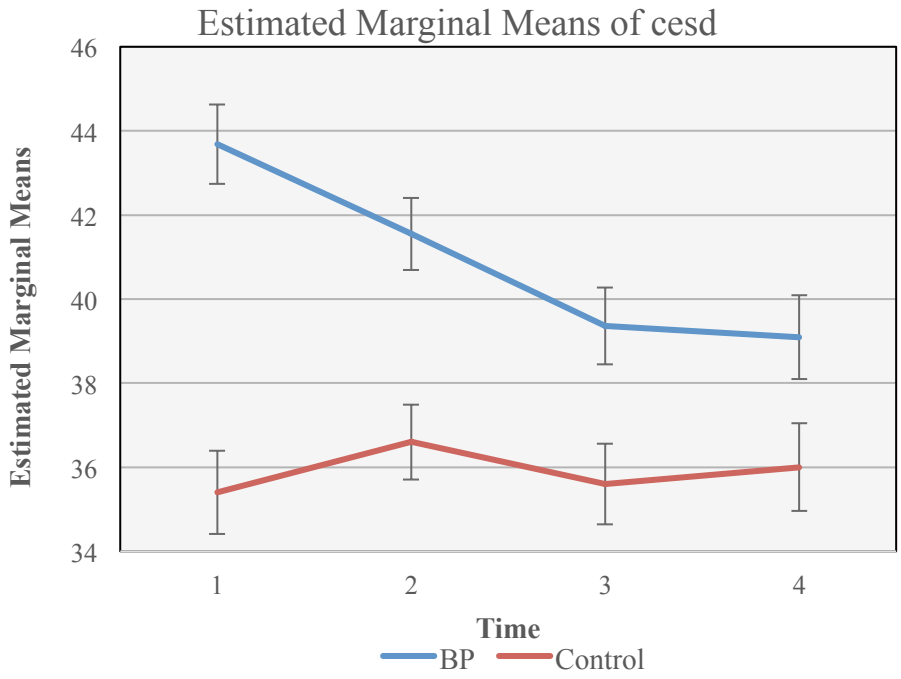
control group; and 2c: participants in the big picture condition would endorse less rumination at posttest and both the 2-week follow-up session and three-month follow up session as compared to the personal appraisal control group. Also, recall that there was one hypothesis that related *only* to the 3-month follow-up data--hypothesis 2d: participants in the big picture condition would show lower levels of depressive symptomology as indexed by the SCID-RV at the three-month follow-up as compared to the personal appraisal control condition. The results for each hypothesis are discussed separately below.

Hypothesis 2b including 3-month follow-up data. Hypothesis 2b was that participants in the big picture condition would endorse less depression at posttest and both the 2-week follow-up session and the three-month follow-up session as compared to the personal appraisal control group. To test this, a mixed model ANOVA was conducted on the CES-D scores with one within participants factor, Time (pretest/Session1, posttest/Session 6, 2-week follow-up, 3-month follow-up) and one between-subjects factor, Condition (big picture, control). Assumptions of parametric testing were assessed. First, upon visual inspection of box plots, it was determined that there were no outliers. Skewness and kurtosis values indicated there was no violation of normality. The assumptions of equality of variances was met; however, sphericity was violated. Due to the violation of sphericity, Huynh-Feldt statistics are reported. Results showed no main effect of time and no time by group interaction. There was a significant main effect of group, $F(1,40) = 5.14$, $p = 0.03$, partial eta squared=.11 such that those in the big picture

condition endorsed higher CES-D scores at all time points as compared to those in the personal appraisal control condition. See figure 9.

Figure 9

Group Means Across Time for CES-D Scores



Note. Time 1 refers to CES-D scores at pretest (Session1); Time 2 refers to CES-D scores at posttest (Session 6); Time 3 refers to CES-D scores at the two-week follow-up period; Time 4 refers to CES-D scores at the three-month follow-up period. Bars representing standard error depicted on graph.

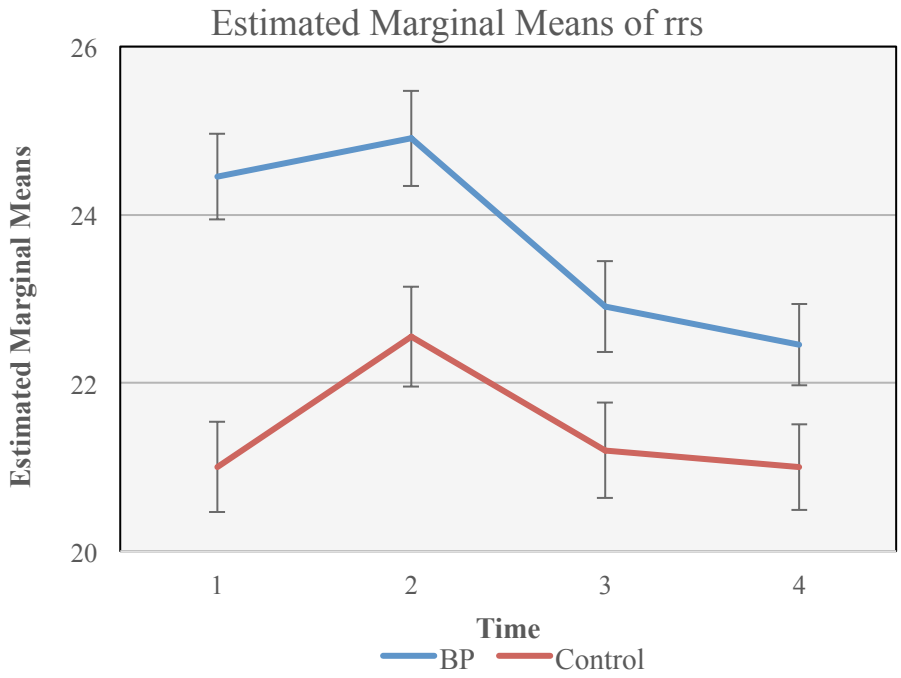
Hypothesis 2c including 3-month follow-up data. Hypothesis 2c predicted that participants in the big picture condition would endorse less rumination at posttest and both the 2-week follow-up session and three-moth follow up session as compared to the personal appraisal control group. To test this, a mixed model ANOVA was conducted on the RRS scores with one within participants factor, Time (pretest/Session1,

posttest/Session 6, 2-week follow-up, 3-month follow-up) and one between-subjects factor, Condition (big picture, control). Assumptions of parametric testing were assessed. First, upon visual inspection of box plots, it was determined that there were no outliers. Second, the assumptions of normality and equality of variances were met for each administration of the RRS. Finally, Mauchley's Test of Sphericity indicated a violation, therefore Huynh-Felt statistics were examined in analyses.

Results showed no group by time interaction and no main effect of group. There was a significant main effect of time $F(3,120) = 3.27$, $p = 0.03$, partial eta squared=.08 such that for both groups, RRS scores decreased over time. Examination of pairwise comparisons show that there was a significant decrease in RRS scores between posttest/Session 6 and the two-week follow-up session ($p<.01$). See figure 10.

Figure 10

Group Means Across Time for RRS Scores



Note. Time 1 refers to RRS scores at pretest (Session1); Time 2 refers to RRS scores at posttest (Session 6); Time 3 refers to RRS scores at the two-week follow-up period; Time 4 refers to RRS scores at the three-month follow-up period. Bars representing standard error depicted on graph.

Hypothesis 2d including 3-month follow-up data. Hypothesis 2d was that participants in the big picture condition would show less depressive symptomology as indexed by the SCID-RV at 3 month follow-up as compared to the personal appraisal control condition. To test this hypothesis, results of the SCID-RV interview administered at the 3-month follow-up session were examined. Of the 42 participants that completed the 3-month follow-up SCID interview, 4 met criteria for experiencing an episode of depression within the 3 months following participation in the study. Of these 4

participants, 2 were in the big picture condition and 2 were in the control condition. There was no significant difference in endorsement of depression at the 3-month follow-up between the big picture condition and the control condition.

Chapter 5:

Discussion

Summary and Discussion of Findings

The present study used cognitive-bias modification for interpretation (CBM-I) to train big picture appraisals of emotionally relevant events. Big picture appraisals are defined as those that take a broadened perspective on events, recognizing the contexts of an extended time perspective, the multiple domains of one's life, and the broader human context. This dissertation project consisted of two primary objectives. The first objective was to examine whether big picture thinking could be trained using cognitive bias modification for interpretation and if so, to examine the extent to which training in big picture thinking would generalize to other tasks. The second objective was to examine whether the big picture condition and the personal appraisal control condition would differ on measures of stress reactivity, depression, and rumination. This section will review findings and implications from the study and consider how they relate to the research objectives and the extant literature. Suggestions for future research directions will also be discussed.

Can big picture thinking be trained using cognitive bias modification?

The study provides promising evidence that big picture thinking can be induced using cognitive bias modification for interpretation (CBM-I). Participants in the big picture condition transferred big picture thinking to two other tasks, one similar to the training task (near-transfer task) and one dissimilar to the training task (far-transfer task). Notably, far-transfer effects on a self-report measure of big picture thinking (The Big

Picture Questionnaire) were not observed. Each of these findings is discussed in more detail below.

Similarity ratings task (near-transfer task). Recall that the similarity ratings task consisted of 18 vignettes, presented at the conclusion of training (Session 6). Unlike training vignettes, which ended in either a big picture or personal interpretation, the similarity ratings task vignettes ended ambiguously. After reading through the similarity ratings task vignettes and then completing a short buffer task, participants were asked to provide interpretations of the similarity ratings task vignettes by choosing from three potential interpretations (one that was big picture, one that was personal, and one that was irrelevant). Results showed that participants in the big picture condition provided significantly more big picture interpretations of the ambiguous vignettes than did personal appraisal control participants.

This similarity ratings task represents a near-transfer task (Hertel & Mathews, 2011) or a task with a strong degree of overlap between training and transfer. That is, the situations during training were similar to those in the transfer phase. This form of transfer task is common in the CBM-I literature as such tasks allow for the examination of the extent to which training in a certain form of interpretation (in this case, big picture thinking) generalizes to a task with similar processing requirements. Thus the results found for the near transfer task represent an important first step in supporting the generalization of training in the present study.

Scrambled Sentences Test for Big Picture Appraisal (far-transfer task). Second, participants in the big picture condition formed significantly more big picture

sentences on the Scrambled Sentence Task for Big Picture Appraisal (SST-BPA) as compared to those in the personal appraisal control condition. The SST-BPA represents a far-transfer task, or a task that is different in nature from the training task. The SST-BPA is a performance measure which asks participants to form five word sentences from a set of six words while experiencing cognitive load and time pressure. As Haner and Rude (2015) point out, a specific strength of the SST-BPA is that it does not rely on standard self-report methodology. It has been suggested that scrambled sentence tasks tap into different aspects of an individual than self-report measures do—that this type of measure provides a snapshot of the mind in action rather than as an object of self-reflection (Robinson & Neighbors, 2006). As discussed earlier in this dissertation, cognitive models of depression hold that depression is caused by biases in information processing (Beck, 1987). It is therefore important to be able to measure such processing bias as directly as possible.

Big Picture Questionnaire (far-transfer task). While the transfer of big picture thinking was demonstrated on the Similarity Ratings task and the SST-BPA, transfer effects were not observed on the Big Picture Questionnaire (BPQ). Contrary to hypothesis 1c, participants in the big picture condition did not demonstrate higher scores on the BPQ at posttest as compared to the personal appraisal control condition. Rather, participants in both conditions had higher scores on the BPQ at posttest as compared to pretest. Because the nature of the BPQ (self-report measure) is different from the nature of the training task (vignettes), this measure represents a far-transfer task. Several explanations for the failure of far transfer to the BPQ should be considered.

First, since the BPQ represents a self-report measure, it is prone to demand effects. Haner and Rude (2015) argue self-report measures may be more subject to demand effects than performance measures like the SST because they explicitly ask participants about their understandings of typical reactions rather than yielding an index of how the individual reacts in a given situation. It is possible that participants in both conditions assumed the purpose of the study was to change the way they handled negative emotions in a positive way. Thus, they may have answered the BPQ (which specifically asks participants to indicate what they do when they are upset or unhappy) in a way they felt aligned with the study purpose.

Another possible explanation for the lack of treatment effects relates to the fact that the BPQ is a trait measure that asks participants to make statements about how they usually behave, summarizing across a variety of situations. It is possible this measure would be less sensitive than the similarity ratings task or the SST-BPA to any treatment effects because it is summarizing across time. Because the BPQ is topographically very different from the other two transfer tasks (asking participants to generalize over time rather than provide in-the-moment interpretations), it can be argued that the BPQ represented the most far transfer task in the present study, and thus the most difficult task on which to observe generalization effects. Finally, the null results on the BPQ could reflect a problem with the questionnaire such that it is unable to accurately measure big picture thinking. While preliminary evidence suggests that the BPQ is reliable and valid (Gill et al., in press), further work is needed to assess the psychometric properties of this measure.

Did the big picture condition and the personal appraisal control condition differ on measures of stress reactivity, depression, and rumination?

The second major aim of the study was to examine whether the big picture condition and the personal appraisal control condition would differ on measures of stress reactivity, depression, and rumination. Supporting the hypothesized benefits of the big picture training would have important implications for a depression vulnerable population. Unfortunately hypothesized group differences on the outcome measures were not found. Possible explanations for the lack of results will be discussed for each outcome measure separately below. Following this discussion, a discussion of key study factors that may have influenced *all* outcome effects will be provided.

Stress reactivity. Contrary to hypotheses, the big picture and personal appraisal control conditions did not show differences in emotional reactivity after the stressor task. Regarding negative mood, both the big picture and personal appraisal control condition endorsed significantly more negative mood after the stressor as compared to before the stressor. For positive mood, participants in both conditions endorsed significantly less positive mood after the stressor as compared to before. Both of these findings suggest the Remote Associations Task (RAT) was successful in inducing stress. However the anticipated group differences in response to such stress were not found.

Failure to detect significant effects for emotional reactivity is a common occurrence in the literature (Hallion & Ruscio, 2011; Yiend et al., 2014). Thus, a number of explanations have been offered for such null effects. The present discussion will

consider previous explanations as well as factors unique to the present study in an attempt to explain the lack of effects. First, it is possible that failure feedback on the RAT task was powerful enough in inducing stress that it washed-out group differences, making it difficult to observe training effects. In response to open ended questions asked at the end of the study, several participants remarked on the highly stressful nature of the RAT task. One participant said, "it took me a while to recover from the intelligence test [RAT]." This comment suggests that in the immediate aftermath of the RAT stressor, participants may have experienced a significant level of stress, so high that it may have been difficult to accurately assess for differences in emotional reactivity.

Another plausible explanation has to do with the type of processing required in regulating emotional reactivity. Recall that the dual process model of depression vulnerability posits that individuals engage in two types of information processing, the associative mode which involves quick, effortless processing, and the reflective mode which involves slow, effortful processing (Beevers, 2005; 2000; Lieberman et al., 2002; Sloman, 1996; Smith & DeCoster, 1999). According to this theory, individuals become vulnerable to depression when negatively biased associative processing is uncorrected by reflective processing (Beevers, 2005). Because the RAT task was administered toward the end of Session 6, after participants had engaged in a number of other tasks, perhaps fatigue effects interacted with participant's ability to use the more effortful processing involved in reducing emotional reactivity. It is also possible that the timing of the PANAS (directly after the stressor; and toward the end of Session 6) decreased the likelihood of detecting group differences because it was administered too soon after the

stressor. Future work should consider assessing for stress reactivity over a longer period of time, allowing for the measure of processing effects that may take more time to operate.

One final explanation for the lack of stress reactivity effects has to do with the nature of the RAT stressor. The RAT stressor task is aimed at inducing achievement threat in participants, but it does not measure threats to other domains (e.g. social acceptance). It is possible that the RAT stressor did not represent the most appropriate stressor task for the present study. CBM studies have used a variety of stressor tasks in the examination of emotional reactivity. One stressor that has been used in several studies (Lester et al., 2011; Yiend et al., 2014) involves watching a distressing film. It may be that this represents the type of stressor (sad experiences observed in life) that big picture thinking may prove helpful in managing. Furthermore, Hallion and Ruscio (2011) call for the need to assess emotional reactivity in the context of naturally occurring stressors. Rather than the RAT, which is a laboratory stressor, it may be important for future studies to assess the extent to which training may affect stressors encountered in everyday life. It will be important for future studies to include different types of stressors in order to gain a clearer picture of ways in which big picture thinking may prove beneficial for emotional reactivity.

There has been a movement in the CBM field (Hallion & Ruscio, 2011) toward including a measure of emotional reactivity both before CBM training as well as after CBM training in order to allow for an assessment of changes in emotional reactivity over time. The present study originally planned to have both a pre-training stressor as well as a

post-training stressor, however, due to the time demands on participants, the first stressor was removed. Future work should include such a pre-training measure in order to get a clearer picture of the potential effects of big picture thinking on stress reactivity.

Depression. Contrary to study hypotheses, there was no significant group by time interaction for the Center for Epidemiological Studies-Depression scale (CES-D). There was a significant main effect of group such that those in the big picture condition endorsed higher CES-D scores at all time points (pretest, posttest, 2 week follow-up, 3 month follow-up) as compared to those in the personal appraisal control condition. In considering these results, it must be noted that although participants were randomly assigned to condition by the Qualtrics survey software program, participants in the big picture condition endorsed significantly more depression at pre-test. This surprising pre-treatment difference is an obstacle to interpretation.

The fact that the groups started with very different depression scores may have obscured or dampened the predicted treatment differences. For example, previous research (Baert, De Raedt, Schacht, & Koster, 2010) suggests CBM interventions yield most benefit for those with milder depression levels. It is possible that those with more depression are experiencing cognitive deficits that may make it more difficult to use appraisal such as big picture thinking, resulting in a lack of effects on measures such as emotional reactivity, depression symptom change, and rumination.

On the other hand, it is also possible that the pre-group differences in depression scores worked in the opposite direction, making the big picture group more likely to experience treatment effects. While this particular outcome was not found in the present

study, the more important point is that the pre-test differences on the CES-D make it difficult to compare groups or to understand the mechanisms at play in the results. While failures of randomization of this magnitude are extremely rare, in the future, it may be advisable for future work to create matched pairs based on pre-test depression scores and to randomize within these matched pairs.

Rumination. There were no significant differences in the Ruminative Responses Scale (RRS) between the big picture condition and the personal appraisal control condition at posttest (session 6), at the 2-week follow up period, or at the 3-month follow-up period. Additionally, there was no group main effect for rumination. There was a trend toward a significant time main effect without the 3-month follow-up data included, and a significant main effect of time when the 3-month follow-up period was included in analysis.

The lack of interaction effects on the RRS may indicate that big picture appraisal does not have a unique impact on rumination. Such null results prove important for future studies because they suggest the need to evaluate other outcomes by which CBM-I for big picture appraisal may be effective and beneficial. Additional explanations for the lack of treatment effects for rumination relate to study factors that may have impacted all outcome measures. These factors are considered below.

Key Study Factors Related to all Outcome Measures

Nature of the personal appraisal control condition. It is important to consider study factors that may have influenced the ability to find group differences for all outcomes. First, it is possible that the personal appraisal control condition was not

distinct enough from the experimental condition to elicit any differential outcome effects. Many studies in the CBM literature (e.g. Mathews & Mackintosh, 2000) compare positive training to negative training, which is arguably more likely to show contrasting effects. Comparing big picture training to a personal appraisal training is a much subtler distinction than training positive versus negative. Furthermore, in the creation of the control condition, much attention and effort was devoted to matching the valence of the big picture condition so that one condition was not more likely to induce negative mood. Additionally, it was important to avoid inadvertently training a bias to expect only negative events. To address these concerns, some of the vignettes were negative in valence (describing adverse events) and some were positive in valence (describing fortunate events). Consider the following examples of vignettes. The endings for both conditions (big picture and personal appraisal control) are provided.

Negative event:

You recently gave a presentation at work and received some critical feedback from your boss. Although you had waited until the last minute to prepare the presentation, you went into it thinking your content was pretty good. As you look back over your slides you realize that (some talks go better than oth_rs) [*others*, Big Picture]/ (You're generally a g_od speaker) [*good*, Personal Appraisal Control].

Positive event:

It is your birthday, and several friends take you out for a celebratory meal at one of your favorite restaurants. Everyone laughs a lot and seems to enjoy the evening. As the waiter comes over with the check, you think about how much you enjoy (feeling close and connect_d with others) [*connected*, Big Picture]/ (being popul_r and well-liked) [*popular*, Personal Appraisal Control].

It can be argued that the personal appraisal control condition posed a particularly stringent test of the big picture training because it was intended to be at least as positive in valence. In creating such a stringent control, the hope was to be able to show that in the long run, it is more helpful to take a big picture perspecitve than a personal perspective. However, this creates a "high bar" for obtaining a training effect. Several comments from participants throughout the study suggest that the personal appraisal control condition induced positive interpretations. In response to open-ended questions at the end of the study, one control participant noted, "I felt good about myself a lot while taking the study." Another said, "I started narrating the stories in everyday experiences by thinking things like 'I am smart' or 'I can do this'". Given the nature of the control condition, which may have had an overall positive tone, it may have been especially difficult to detect group differences on outcome measures. Additionally, it is possible that the time main effects for the Big Picture Questionnaire and the Ruminative Response Scale indicate that both the personal appraisal control condition and the big picture condition led to positive effects (increase in big picture thinking and decrease in rumination).

Another possible explanation for the time main effects for the BPQ and the RRS includes the idea that the nature of the training task in both conditions served to increase big picture thinking. Both conditions involved reading a series of personally relevant scenarios, some positive in nature, others negative. It is possible that such a task is inherently perspective-giving in that it implicitly encourages one to reflect on the big picture notion of an extended time perspective. This perspective includes the idea that life is full of positive and negative occurrences and a way to see the big picture is to appreciate an event within a larger context of time.

Non-compliance and fatigue. Another concern in considering the data in the present study is the lack of control over participant compliance. Blackwell et al. (2010) speak to this concern, pointing out that CBM protocols often do not allow the researchers to be certain of the extent to which participants complied with the task demands while completing the CBM-I sessions at home. Furthermore, Hallion and Ruscio (2011) highlight the solitary and repetitive nature of most CBM paradigms, suggesting these factors may contribute to the problem of participant compliance and fatigue. In the present study, there were indicators of such non-compliance. For example, while participants were asked to complete each successive training session within 24-48 hours of the previous session, participants varied in their duration between sessions. Additionally, in response to open-ended questions at the end of Session 6, several participants remarked on feeling distracted or stepping away from the session to complete other tasks while at home. Due to such factors, it is possible that the results of the present

study do not reflect he full potential of the training schedule. Future studies should consider ways of controlling for compliance.

The outcome measures in the present study (PANAS, CES-D, RRS) may have been particularly susceptible to participant fatigue due to a couple of factors. First, during posttest (Session 6), the stressor task, the CES-D, and the RRS were administered at the end of the session, after participants had already engaged in training items as well as the similarity ratings task (which involved reading 18 additional vignettes, completing a buffer task, and then the recognition ratings task). Arguably, these tasks require significant cognitive effort. By the time participants reached the end of the session and were completing the self-report measures, they may have been more likely to gloss over these items or answer carelessly.

Nature of the outcome measures. There are several characteristics of the CES-D, RRS, and BPQ that may have reduced the likelihood of detecting treatment effects. First, it can be argued that the self-report outcome measures were less engaging than other parts of the study such as the training vignettes, the scrambled sentences, or the stressor task. Thus, it is possible participants approached these measures with less care.

As mentioned previously self-report measures are prone to demand effects. It is possible that participants in both conditions assumed the purpose of the study was to change the way they handled negative emotions in a positive way. Thus, they may have answered the BPQ and RRS in a way they felt aligned with the study purpose. Fox, Mackintosh, and Holmes (2014) point out that many studies rely on self-report measures of clinical outcomes with few studies incorporating behavioral or somatic indicators of

relevant symptoms. Perhaps other measures such as health behaviors or somatic indices could provide information relevant to CBM's effect on symptoms related to depression.

Theory. A final explanation for the null effects in the present study is the idea that big picture appraisal is not beneficial for those prone to depression. There are several limiting conditions of the study and the theory of big picture appraisal that are worth noting. First, it is possible that the CBM methodology used in the present study is not a good match for individuals prone to depression. CBM requires consistent cognitive effort and attention. If those prone to depression are experiencing cognitive deficits, it is possible they are less likely to fully engage in CBM procedures. Additionally, it is possible that big picture thinking is not powerful in influencing depression vulnerable individuals. It is possible that there may be a type of depression vulnerability (e.g. a specific type of cognitive bias), or a degree of depression vulnerability (e.g. two or more previous episodes), that influences the extent to which people will respond well to a big picture intervention. One useful next step would be to identify subgroups of depression vulnerable participants with different Big Picture Appraisal deficits (as measures on the BPQ). Perhaps treatment would differentially affect those with pre-existing deficits.

Implications of the Present Study and Next Steps

The present study addresses a number of gaps in the literature and suggests important next steps in the CBM field. This section will highlight the important contributions of the present study as well as the implications of findings.

Study population. First, the application of CBM-I to a depression vulnerable population addresses an important frontier. As Macloed and Mathews (2012) point out,

much research has demonstrated the effectiveness of CBM-I in alleviating anxiety, however, little work has examined the effects of CBM-I on depression. The depression vulnerable population is of particular interest because research indicates that those who have experienced depression in the past are more likely to relapse than those who have not (Mueller et al., 1999; Solomon et al., 1997). In fact, Judd et al. (1997) found that at least 50% of patients who recover from an initial episode of depression will have at least one subsequent depressive episode. If effective treatments can reduce the likelihood of depressive relapse for this group, this has significant implications for the field of depression research.

Thus far, no CBM studies have used a depression vulnerable population. The existing CBM studies examining depression have either used individuals currently experiencing depression (Watkins et al., 2012; Micco et al., 2014; Blackwell & Holmes, 2010; Lang et al., 2012; Torkan et al., 2014; Williams et al., 2013; Yiend et al., 2013), or dysphoric individuals (Mean BDI-II = 27.85; Newby et al., 2014). In these studies, results have been mixed. Some studies have found effects for depressed individuals when CBM is paired with forms of CBT (Watkins et al., 2012; Williams et al., 2013), others have found improvements in interpretation bias or emotional reactivity but not in depression or anxiety symptom change (e.g. Micco et al., 2014), while others have observed improvements in depression and anxiety symptoms (e.g. Williams et al., 2013; Torkan et al., 2014). Due to the mixed results in the existent literature, future work is needed to obtain a clear picture of the potential benefits of CBM for depression, and more specifically, for a depression *vulnerable* population.

One line of research that has studied the depression vulnerable population is Mindfulness Based Cognitive Therapy for Depression (MBCT). In this research, effects have been more prominent for participants that had experienced multiple depressive episodes in the past (Williams et al., 2013). Future work should use a diagnostic interview, such as the SCID-RV used in the present study, to define a depression vulnerable sample. Additionally, in order to build upon the current sample, which only required one previous depressive episode, future work should include a sample with a more severe history of depression.

Training procedure. Within recent CBM work, there has been a strong call for research aimed at optimizing methods of shifting maladaptive biases (Fox et all, 2014). The training in the present study built on a number of previous findings in an effort to develop a more powerful CBM-I procedure. Specific strengths of the procedure that should be considered for use in future studies are discussed below.

First, the training used in the current study emphasized participants' use of imagery as they completed training sessions. This was accomplished through various means including training in imagery for both groups during Session 1 as well as prompts throughout the training sessions reminding participants to utilize imagery as they read or listened to the scenarios. Previous work argues that imagery may have a more powerful impact on emotional responses than verbal processing (Holmes et al., 2006). Therefore, according to Lang et al. (2012), repeated practice in generating adaptive imagery in response to ambiguous stimuli is particularly applicable to the treatment of depression.

Future work should continue to find creative ways to incorporate imagery in CBM interventions.

A number of steps were taken in the present study to increase participants' engagement in training and to enhance the impact of training. For example the training incorporated auditory vignettes in addition to written vignettes. Previous work (Lang et al., 2012) as well as anecdotal information gathered from participants during the 3-month follow-up suggests the auditory vignettes helped participants maintain interest and concentration. Anecdotal comments from participants suggested they found the auditory items to be a welcome reprieve from the written vignettes, of which there were more. Future studies should consider including more auditory vignettes, perhaps a number equal to the number of written items.

The current study also utilized repeated training sessions over the course of a week (6 training sessions in total), representing a departure from much previous CBM work, which often includes one training session (e.g. Mathews & Mackintosh, 2000). In their meta-analysis on CBM, Hallion and Ruscio (2011) found a trend such that those studies that included more than one training session were more likely to demonstrate effects. This finding led these researchers to call for future studies to examine the parameters of these findings (i.e. how many training sessions are optimal in CBM-I studies). Future work should extend upon the present study by examining whether additional training sessions would increase the power to detect treatment effects. Future researchers should use creativity in considering ways such sessions could be delivered.

For example, perhaps a smartphone application with CBM auditory items could be developed for participants to use at their discretion.

One last strength of the training used in the present study is the inclusion of the personal control condition. As mentioned previously, the inclusion of this condition, which was aimed at inducing a personal interpretation of vignettes while matching the valence of the big picture condition, provided a strong comparison group. Rather than comparing to an overtly negative control (as many previous CBM studies have done) or a no-treatment control, the control used in this study allowed for the examination of the extent to which big picture may prove beneficial over and above a common personal interpretation of events. Given the success of inducing big picture thinking in the present study (as shown on the transfer tasks), it is important to continue to assess outcome effects of big picture as compared to common appraisal styles. In addition to continuing to use the personal appraisal control used in the present study, it is recommended that future studies also incorporate a no-treatment control. This will allow for an examination of how both a big picture interpretive style and a personal interpretive style compare to the effects of no training. Furthermore, future work should collect information ratings indicating how positively or negatively the vignettes in both conditions are viewed in order to get a better picture of the overal valence of the training conditions. The fact that this was not done in the current study is a limitation.

Follow-up sessions. Finally, the inclusion of the 2-week and 3-month follow-up sessions in the present study represents an important addition to the field. Hallion and Ruscio (2011) point to the need to have longer term follow-up sessions in CBM studies in

order to assess for any gradual changes in symptoms that CBM might produce. Furthermore, Lancaster et al. (2004) call for the need for studies include follow up assessments in order to estimate feasibility parameters including response rates, selection of most appropriate outcomes and testing of data collection methods. Such information has important implications for the timing of CBM treatments and the power of its effects. While the current study only included self-report measures in the two-week and 3-month follow-up sessions, future studies should consider using alternative outcome measures such as physiological measures or additional stressor tasks in order to examine the extent to which CBM effects last over time.

Conclusions

The present study provides promising evidence that big picture thinking can be trained using CBM-I methods. Participants in the big picture condition demonstrated transfer of training to a near and a far transfer task. While transfer effects were observed, effects on emotional reactivity, depression, and rumination were not. It is possible big picture thinking does not impact depression, however, the many possible explanations for the null effects found in the present study call for the importance of continuing to investigate this area. Future work is needed to assess the potential benefits training in big picture thinking can have for a depression vulnerable population.

The finding that big picture training generalized on both near and far transfer tasks should not be understated. Such results add the current literature by providing important information about optimal CBM-I procedures. The training procedure used in

this study should be replicated in future studies in order to explore potential benefits and applications of big picture thinking.

The lack of findings regarding clinical effects is a common occurrence in the CBM literature. In the commentary on the CMB special issue in Cognitive Therapy and Research (Fox, et al., 2014), a pioneering researcher in the CBM field, Bundy Mackintosh, discusses what she calls an "important dilemma in the CBM field". She goes on to describe the dilemma saying, "we have good paradigms and there are many well designed studies. However, often we do not find what we expect, particularly regarding the clinical effects. This does not mean that CBM doesn't work. Moreover, null results are crucial and informative. But maybe this is an indication that CBM effects are much more subtle or experimental than we think?" (p. 241). Following from this, there is a call for future work to identify the boundary conditions and mechanisms underlying CBM effects.

The CBM field is still in its infancy. The present study represents an important contribution to the literature because it introduces a unique and effective way to train big picture thinking. Future work is needed in order to fully examine the potential applications of this training.

Appendix A

Ruminative Responses Scale

	Almost Never	Sometimes	Often	Almost Always
1. Think "What am I doing to deserve this?"	0	1	2	3
2. Analyze recent events to try to understand why you are depressed	0	1	2	3
3. Think "Why do I always react this way?"	0	1	2	3
4. Go away by yourself and think about why you feel this way.	0	1	2	3
5. Write down what you are thinking and analyze it.	0	1	2	3
6. Think about a recent situation, wishing it had gone better.	0	1	2	3
7. Think "Why do I have problems other people don't have?"	0	1	2	3
8. Think, "Why can't I handle things better?"	0	1	2	3
9. Analyze your personality and try to understand why you are depressed.	0	1	2	3
10. Go someplace alone to think about your feelings.	0	1	2	3

Appendix B

CES-D

Below is a list of some of the ways you may have felt or behaved. Please indicate how often you have felt this way during the past week by checking the appropriate space.

1. I was bothered by things that usually don't bother me.
2. I did not feel like eating; my appetite was poor.
3. I felt that I could not shake off the blues even with help from my family or friends.
4. I felt that I was just as good as other people.
5. I had trouble keeping my mind on what I was doing.
6. I felt depressed.
7. I felt that everything I did was an effort.
8. I felt hopeful about the future.
9. I thought my life had been a failure.
10. I felt fearful.
11. My sleep was restless.
12. I was happy.
13. I talked less than usual.
14. I felt lonely.
15. People were unfriendly.
16. I enjoyed life.
17. I had crying spells.
18. I felt sad.
19. I felt that people disliked me.
20. I could not get "going."

THE FOLLOWING RESPONSES ARE PROVIDED FOR EACH ITEM:
1. Rarely or none of the time (Less than 1 day)
2. Some of a Little of the Time (1-2 days)
3. Occasionally or a Moderate Amount of the Time (3-4 days)
4. Most or All of the Time (5-7 days)

Appendix C

Big Picture Appraisal Questionnaire

Directions:
Please think back to times when you have felt upset or unhappy. Many different situations provoke such feelings (e.g., when you felt you had failed or did not live up to your own or others' expectations, or when you experienced a loss, or felt rejected), and the emotions involved may vary (e.g., hurt, anger, sadness, grief, jealousy). Rate each of the following items on a scale from 1 to 5 to indicate how often you have had thoughts similar to those listed.

Response Scale:

1	**2**	**3**	**4**	**5**
Never	Rarely	Sometimes	Frequently	Very Frequently

Stem:
When I am upset or unhappy…

1. I remember that other aspects of my life are going better.
2. I remind myself that I will grow from this experience.
3. I know that other areas of my life are going okay.
4. I remind myself that painful experiences are a part of everyone's life.
5. I know I will be able to come to terms with this.
6. I reflect on how people I know have gone through similar situations.
7. I know this situation will teach me things.
8. I understand that the situation will look different to me after some time passes.
9. I view this as a part of life's lessons.
10. I stay aware of what I can do well.
11. I find inspiration in other people's experiences.
12. it feels like I will be wiser from this.
13. I remind myself that what I am experiencing is something everyone feels.
14. I know there is value in painful experiences.
15. I remind myself that I have felt this bad before and come out of it.
16. I know that this is only part of my life.
17. I realize that I will learn from this.
18. I am aware that other people often feel the way that I do.
19. I remind myself that suffering is part of life.
20. I know there is value in experiencing my emotions fully.
21. I remind myself that everyone suffers sometimes.
22. I know that others share experiences like mine.
23. I know that there are many ways to view the difficult situation.

Appendix D

Scrambled Sentence Task (Big Picture Version)

1 mostly others to I'm similar
2 can I learn fear cannot from 2
3 think I pain lasting is temporary
4 badly people often few all feel
5 doesn't me suffering wiser make does
6 weird I normal think I am
7 seldom most bad feel people often
8 quickly painful cannot shift can emotions
9 my weak human show faults I'm
10 don't me do difficult damage situations
11 like everyone has noone feelings me
12 sadness tends linger pass always to
13 do learn I don't failures from
14 experience few other many failure people
15 believe I shameful human is sadness
16 to end seems anxiety always never
17 unlike really others am I like
18 things time do don't with improve
19 happens rejection some people all to
20 sadness cannot from learn can I
21 people insecurities have do all don't
22 problems grown I have from haven't
23 lasting is long suffering isn't often
24 happen to painful me events everyone
25 experiences cannot me can teach painful
26 unusual people rejection all experience
27 stay does usually distress doesn't around
28 last moods to seem pass bad
29 me painful do experiences don't benefit
30 means mistakes normal making flawed I'm
31 sadness doesn't lessons bring valuable does
32 other no scared many feel people
33 fairly I'm not think I typical
34 moods away go do bad don't
35 are feelings my definitely universal not
36 failure my indicate humanness worth
37 learn I rejection may from won't
38 inappropriate having is clearly human anxiety
39 nervous often people feel few all
40 don't always better do things get

Appendix E

Phone Screen: Demographics Information

SCID Telephone Screening

Temporary ID _____ Interviewer _____ Date _____

Okay with follow-up phone call: _____ YES _____ NO

Times later today: _____

Times tomorrow: _____

Preferred phone number: _____

CONTACT INFO

Home Phone: _____
Work Phone: _____
Email address: _____

Where would you prefer to be contacted? What time of day?
_____
Alternate Contact Name/ Number: _____

Permission for audio recording: _____ YES _____ NO

CONSENT

_____ Participant verbally agreed to voluntarily give informed consent to participate in study
_____ Participant did NOT agree to voluntarily give informed consent to participate in study

Meets age requirement (18-60): _____ YES _____ NO

Able to come in person for Session 1 at UT: _____ YES _____ NO

DEMOGRAPHIC DATA

PART 1

Full Name _____

1. Sex circle one: Male/ Female

2. Age _____
Date of Birth _____

PART 2 (If eligible)

1. What is your ethnicity _____

2. What is your highest level of education? (i.e. high school degree, GED, 4-yr college_

---

3. Are you currently working? Circle one: Yes/ No
If yes: what do you do? _____
If no: when was the last time you worked? What did you do then?
_____

4. Have you ever been diagnosed with Obsessive Compulsive Disorder? YES/NO

5. Have you ever been diagnosed with an eating disorder? YES/NO

6. Do you have Dyslexia or another type of difficulty that makes reading difficult for you? YES/NO

7. Is English your first language? YES/NO
If "NO", how would you rate your fluency with English?

1	2	3	4	5
not fluent at all		Moderately fluent		Very fluent

8. Do you take psychotropic medications (mood medications)? YES/NO
If "YES", have you made any changes to your psychotropic medications in the last month?YES/NO
If "YES", ask them to describe the changes.

9. Do you attend psychotherapy? YES/NO
If "YES", have you made any changes to your therapy in the last month? YES/NO
If "YES", ask them to describe the changes.

10. If they take psychotropic medecations and or are in psychotherapy, ask:
Do you expect to make any changes to your medication or therapy during the time of the study? YES/NO
If "YES", we ask that you do not make changes to your medications or therapy during the time of the study if possible. Please let us know if you feel you need to make changes.

Notes:

SUMMARY (circle as appropriate) Inclusion/ Exclusion for study

If ineligible for study- reason(s):

_____

COMPLETE FOR EVERY SCREEN:

Depression	past	current	none
Bipolar Disorder	dx	none	
Psychosis	dx	none	
Substance Abuse- Alcohol	dx	none	
Substance Abuse- Drug	dx	none	

FYI: INCLUSION/ EXCLUSION CRITERIA

Inclusion	***Exclusion***
Depression- past (over 2 months ago)	Depression- current (within last 2 months)
	At risk for suicide
	Bipolar Disorder (past or current)
	Psychosis (past or current)
	Alcohol or Drug- current (within last 6 mo.)
	Under 18 yrs. Or over 60 yrs.

Appendix F

PANAS

This scale consists of a number of words that describe different feelings and emotions. Please indicate the degree to which the following words describe you **at this moment**. Right now I feel:

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

_____ interested
_____ guilty
_____ irritable
_____ determined
_____ distressed
_____ scared
_____ alert
_____ attentive
_____ excited
_____ hostile
_____ ashamed
_____ jittery
_____ upset
_____ enthusiastic
_____ inspired
_____ active
_____ strong
_____ proud
_____ nervous
_____ afraid

Appendix G

Vividness of Visual Imagery Questionnaire (VVIQ)

Please rate the vividness of each image by reference to the rating scale shown below:

1	2	3	4	5
Perfectly Clear and as vivid as normal vision	Clear and reasonably vivid	Moderately clear and vivid	Vague and dim	No image at all (only "knowing" that you are thinking of the object)

Think of some relative or friend whom you frequently see (but who is not with you at present), and consider carefully the picture that comes before your mind's eye. Then rate the following items:

1	The exact contour of face, head, shoulders, and body.
2	Characteristic poses of head, attitudes of body, etc.
3	The precise carriage, length of step, etc., in walking.
4	The different colors worn in some familiar clothes.

Visualize a rising sun. Consider carefully the picture that comes before your mind's eye. Then rate the following items.

5	The sun is rising above the horizon into a hazy sky.
6	The sky clears and surrounds the sun with blueness.
7	Clouds. A storm blows up, with flashes of lightning.
8	A rainbow appears.

Think of the front of a shop to which you often go. Consider the picture that comes before your mind's eye. Then rate the following items.

9	The overall appearance of the shop from the opposite side of the road.
10	A window display including colors, shapes, and details of individual items for sale.
11	You are near the entrance. The color, shape, and details of the door.

12	You enter the shop and go to the counter. The counter assistant serves you. Money changes hands.

Finally, think of a country scene which involves trees, mountains and a lake. Consider the picture that comes before your mind's eye. Then rate the following items.

13	The contours of the landscape.
14	The color and shape of the trees.
15	The color and shape of the lake.
16	A strong wind blows on the trees and on the lake, causing waves.

Appendix H

Remote Associations Task (RAT)

The next part of the study is a word task that serves as a measure of verbal intelligence.

For the task, you will be presented with three words on your screen. Your goal is to think of a fourth word that is related to the words on the screen. When you think of a fourth word, write the word in the text box provided.

Click below to see an example.

Here's an example. Remember, you are trying to think of a fourth word that related to the three words below.

Athletes web rabbit

The correct answer is "foot" because "foot is related to each of the three words, as in "athlete's foot," "webbed foot," and "rabbit's foot," so the word "foot" would go in the text box provided. Go ahead and write "foot" in the box.

There will be 15 sets of words. You will have 30 seconds to look at each set and record your answer in the box. Then, the next item will be presented. Please write an answer for every item, even if it is just a guess. If you don't write anything in the box, your answer will be counted wrong.

If you feel like you're not doing well, don't worry, most college students do not get more than 10 of the 15 problems correct.

This task is important because we need a measure of verbal intelligence that we can compare to your reading comprehension scores.

Keep in mind as you do this task that no measure of intelligence is completely reliable.

When you are finished, you will be given feedback regarding your performance.

Click below to begin.

Item 1:

Bass complex sleep

Item 2:

Chamber	staff	box
Item 3:		
Desert	ice	spell
Item 4:		
Base	show	dance
Item 5:		
Inch	deal	peg
Item 6:		
soap	shoe	tissue
Item 7:		
Blood	music	cheese
Item 8:		
Skunk	kings	boiled
Item 9:		
Jump	kill	bliss
Item 10:		
Shopping	washer	picture
Item 11:		
Hot	butterflies	pump
Item 12:		
Bald	screech	emblem
Item 13:		

Room	Saturday	salts
Item 14:		
Widow	bite	monkey
Item 15:		
Cherry	time	smell

REFERENCES

Aldoa, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*, 217-237.

Ayduk, Ö., & Kross, E. (2010). From a distance: Implications of spontaneous self-distancing for adaptive self-reflection. *Journal Of Personality And Social Psychology, 98*(5), 809-829.

Baert, S., De Raedt, R., Schacht, R., & Koster, E. W. (2010). Attentional bias training in depression: Therapeutic effects depend on depression severity. *Journal Of Behavior Therapy And Experimental Psychiatry, 41*(3), 265-274. doi:10.1016/j.jbtep.2010.02.004

Beard, C., Amir, N. (2008). A multi-session interpretation modification program: changes in interpretation and social anxiety symptoms. *Behavioral Research and Therapy, 46*, 1135-1141.

Beck, A. T. (1987). Cognitive models of depression. *Journal of Cognitive Psychotherapy, 1*(1), 5-37.

Beck, A. T. (2002). Cognitive models of depression. In R. L. Leahy, E. Dowd (Eds.), *Clinical advances in cognitive psychotherapy: Theory and Application* (pp. 29-61). New York, NY, US: Springer Publishing Co.

Beck, J. S. (2011). *Cognitive behavior therapy: Basics and beyond* (2nd ed.). New York, NY, US: Guilford Press.

Beevers, C. G. (2005). Cognitive vulnerability to depression: A dual process model. Clinical *Psychology Review, 25*(7), 975-1002. doi:10.1016/j.cpr.2005.03.003

Blackwell, S. E., & Holmes, E. A. (2010). Modifying interpretation and imagination in clinical depression: A single case series using cognitive bias modification. *Applied Cognitive Psychology, 24*(3), 338-350. doi:10.1002/acp.1680

Brown, J. D., & Dutton, K. A. (1995). The thrill of victory, the complexity of defeat: Self-esteem and people's emotional reactions to success and failure. *Journal Of Personality And Social Psychology*, *68*(4), 712-722.

Butler, A. C., Chapman, J. E., Forman, E. M., & Beck, A. T. (2006). The empirical status of cognitive-behavioral therapy: A review of meta-analyses. *Clinical Psychology Review, 26*(1), 17-31. doi:10.1016/j.cpr.2005.07.003

Butler, G., & Mathews, A. (1983). Cognitive processes in anxiety. *Advances In Behaviour Research & Therapy, 5*(1), 51-62. doi:10.1016/0146-6402(83)90015-2

Chambless, D., & Ollendick, T. H. (2001). Empirically supported psychological interventions. *Annual Review of Psychology, 52*, 685-716.

Clark, D. A., & Beck, A. T. (2010). *Cognitive Therapy of Anxiety Disorders: Science and practice*. New York, NY, US: Guilford Press.

Clarke, P. F., Nanthakumar, S., Notebaert, L., Holmes, E. A., Blackwell, S. E., & MacLeod, C. (2014). Simply imagining sunshine, lollipops and rainbows will not budge the bias: The role of ambiguity in interpretive bias modification. *Cognitive Therapy And Research, 38*(2), 120-131. doi:10.1007/s10608-013-9564-x

Daches, S., & Mor, N. (2014). Training ruminators to inhibit negative information: A preliminary report. *Cognitive Therapy And Research, 38*(2), 160-171. doi:10.1007/s10608-013-9585-5

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149-1160.

Forgas, J. P. (2000). Managing moods: Toward a dual-process theory of spontaneous mood regulation. *Psychological Inquiry, 11*(3), 172-177.

Forgas, J. P., Ciarrochi, J. V. (2002). On managing moods: Evidence for the role of homeostatic cognitive strategies in affect regulation. *Personality and Social Psychology Bullentin, 28*(3), 336-345.

Fox, E., Mackintosh, B., & Holmes, E. A. (2014). Travellers' tales in cognitive bias modification research: A commentary on the Special Issue. *Cognitive Therapy And Research, 38*(2), 239-247. doi:10.1007/s10608-014-9604-1

Gill, S., Miller, J., Rude, S., Haner, M., (in press). Putting it into context: Creating a self-report measure of big picture appraisal. *International Journal of Cognitive Therapy.*

Goldin, P. R., Manber-Ball, T., Werner, K., Heimberg, R., Gross, J. J. (2009). Neural mechanisms of cognitive reappraisal of negative self-beliefs in social anxiety disorder. *Biological Psychiatry, 66*(12), 1091-1099.

Grey, S., & Mathews, A. (2000). Effects of training on interpretation of emotional ambiguity. *The Quarterly Journal Of Experimental Psychology A: Human Experimental Psychology, 53A*(4), 1143-1162.

Grey, S. J., & Mathews, A. M. (2009). Cognitive bias modification—Priming with an ambiguous homograph is necessary to detect an interpretation training effect. *Journal Of Behavior Therapy And Experimental Psychiatry, 40*(2), 338-343.

Gross, J.J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2*(3), 271-299.

Gross, J.J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and wellbeing. *Journal of Personality and Social Psychology, 85*, 348-362.

Gross, J. J., & Levenson, R. W. (1997). Hiding feelings: The acute effects of inhibiting negative and positive emotion. *Journal of Abnormal Psychology, 106*(1), 95-103.

Gross, J. J., & Muñoz, R. F. (1995). Emotion regulation and mental health. *Clinical Psychology: Science And Practice, 2*(2), 151-164.

Gross, J. J., & Thompson, R.A. (2007). Emotion regulation: Conceptual foundations. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (pp. 3-24). New York, N.Y.: Guilford Press.

Hallion, L. S., & Ruscio, A. M. (2011). A meta-analysis of the effect of cognitive bias modification on anxiety and depression. *Psychological Bulletin, 137*(6), 940-958. doi:10.1037/a0024355

Haner, M. Gill, S., Rude, S. (2013, May). Establishing convergent and discriminant validity for a processing measure of big picture appraisal. Poster session presented at the meeting of the Association for Psychological Sciences, Washington, D.C.

Haner, M., & Rude, S. Establishing the reliability and validity of a performance measure of big picture appraisal. *Cognitive Therapy and Research, 39*(3), 709-719.

Hayes, S., Hirsch, C. R., Krebs, G., & Mathews, A. (2010). The effects of modifying interpretation bias on worry in generalized anxiety disorder. *Behaviour Research And Therapy,* doi: 10.1007/s10608-015-9688-2.

Hertel, P.T., Holmes, M., & Benbow, A. (2013). Interpretive habit is strengthened by cognitive bias modification. *Memory,* doi: 10.1080/09658211.2013.820326.

Hertel, P. T., & Mathews, A. (2011). Cognitive bias modification: Past perspectives, current findings, and future applications. *Perspectives On Psychological Science*, *6*(6), 521-536.

Hirsch, C. R., Hayes, S., & Mathews, A. (2009). Looking on the bright side: Accessing benign meanings reduces worry. *Journal Of Abnormal Psychology, 118*(1), 44-54.

Holmes, E. A., Mathews, A., Dalgleish, T., & Mackintosh, B. (2006). Positive Interpretation Training: Effects of Mental Imagery Versus Verbal Training on Positive Mood. *Behavior Therapy, 37*(3), 237-247. doi:10.1016/j.beth.2006.02.002

Hunt, M. (1998). The only way out is through: Emotional processing and recovery after a depressing life event. *Behaviour Research and Therapy, 36*(4), 361-384.

Joormann, J., & Gotlib, I. H. (2007). Selective attention to emotional faces following recovery from depression. *Journal Of Abnormal Psychology, 116*(1), 80-85. doi:10.1037/0021-843X.116.1.80

Judd, L. L. (1997). The clinical course of unipolar major depressive disorders. *Archives Of General Psychiatry, 54*(11), 989-991. doi:10.1001/archpsyc.1997.01830230015002

Keller, M., Lavori, P. W., Endicott, J., Coryell, W., & Klerman, G. L. (1983). 'Double depression': Two-year follow-up. *The American Journal of Psychiatry, 140*(6), 689-694.

Koster, E. W., Fox, E., & MacLeod, C. (2009). Introduction to the special section on cognitive bias modification in emotional disorders. *Journal Of Abnormal Psychology, 118*(1), 1-4.

Kross, E., & Ayduk, O. (2008). Facilitating adaptive emotional analysis: Distinguishing distanced-analysis of depressive experiences from immersed analysis and distraction. *Personality And Social Psychology Bulletin*, 34(7), 924-938.

Kross, E., & Ayduk, O. (2011). Making meaning out of negative experiences by self-distancing. *Current Directions in Psychological Science, 20*, 187-191.

Kross, E., Ayduk, O., & Mischel, W. (2005). When asking 'why' does not hurt: Distinguishing rumination from reflective processing of negative emotions. *Psychological Science, 16*(9), 709-715.

Kross, E., Gard, D., Deldin, P., Clifton, J., & Ayduk, O. (2012). "Asking Why" from a distance: Its cognitive and emotional consequences for people with major depressive disorder. *Journal of Abnormal Psychology*, doi:10.1037/a0028808

Lang, T. J., Blackwell, S. E., Harmer, C. J., Davison, P., & Holmes, E. A. (2012). Cognitive bias modification using mental imagery for depression: Developing a novel computerized intervention to change negative thinking styles. *European Journal of Personality, 26*(2), 145-157. doi:10.1002/per.855

Lang, T. J., Moulds, M. L., & Holmes, E. A. (2009). Reducing depressive intrusions via a computerized cognitive bias modification of appraisals task: Developing a cognitive vaccine. *Behaviour Research And Therapy, 47*(2), 139-145.

Lange, W., Salemink, E., Windey, I., Keijsers, G. J., Krans, J., Becker, E. S., & Rinck, M. (2010). Does modified interpretation bias influence automatic avoidance behaviour?. *Applied Cognitive Psychology, 24*(3), 326-337. doi:10.1002/acp.1679

Ledley, D., Marx, B. P., & Heimberg, R. G. (2010). *Making cognitive-behavioral therapy work: Clinical process for new practitioners* (2nd ed.). New York, NY, US: Guilford Press.

Lieberman, M. D., Gaunt, R., Gilbert, D. T., & Trope, Y. (2002). Reflexion and reflection: A social cognitive neuroscience approach to attributional inference. In M. P. Zanna (Ed.) , *Advances in experimental social psychology, Vol. 34* (pp. 199-249). San Diego, CA, US: Academic Press.

Lobbestael, J., Leurgans, M., & Arntz, A. (2011). Inter-rater reliability of the Structured Clinical Interview for DSM-IV Axis I disorders (SCID I) and Axis II disorders

(SCID II). *Clinical Psychology & Psychotherapy, 18*(1), 75-79. doi:10.1002/cpp.693

Mackintosh, B., Mathews, A., Eckstein, D., & Hoppitt, L. (2013). Specificity effects in the modification of interpretation bias and stress reactivity. *Journal of Experimental Psychopathology, 4*(2), 133-147.

MacLeod, C., & Mathews, A. (2012). Cognitive bias modification approaches to anxiety. *Annual Review Of Clinical Psychology*, 8189-217.

Marks, D. F. (1989). Bibliography of research utilizing the Vividness of Visual Imagery Questionnaire. *Perceptual And Motor Skills, 69*(3, Pt 1), 707-718. doi:10.2466/pms.1989.69.3.707

Mathews, A., & Mackintosh, B. (2000). Induced emotional interpretation bias and anxiety. *Journal Of Abnormal Psychology, 109*(4), 602-615.

Mathews, A., & MacLeod, C. (2005). Cognitive Vulnerability To Emotional Disorders. Annual *Review of Clinical Psychology, 1*(1), 167-195.

Mathews, A., Ridgeway, V., Cook, E., & Yiend, J. (2007). Inducing a benign interpretational bias reduces trait anxiety. *Journal Of Behavior Therapy And Experimental Psychiatry, 38*(2), 225-236.

McClelland, J. L., McNaughton, B. L., & O'Reilly, R. C. (1995). Why there are complementary learning systems in hippocampus and neocortex: Insights from the successes and failures of connectionist models of learning and memory. *Psychological Review, 102*(3), 419-437.

McFarlin, D. B., & Blascovich, J. (1984). On the Remote Associates Test (RAT) as an alternative to illusory performance feedback: A methodological note. *Basic And Applied Social Psychology*, *5*(3), 223-229.

Micco, J. A., Henin, A., & Hirshfeld-Becker, D. R. (2014). Efficacy of interpretation bias modification in depressed adolescents and young adults. *Cognitive Therapy and Research, 38*(2), 89-102. doi:10.1007/s10608-013-9578-4

Miller, Rude, & Haner (2015). Experimental Modification of Appraisal Style: Benefits of Seeing the Big Picture. *Journal of Experimental Psychopathology, 6*(1), 1-12.

Miranda, J., Persons, J. B., & Byers, C. N. (1990). Endorsement of dysfunctional beliefs depends on current mood state. *Journal of Abnormal Psychology, 99*(3), 237-241. doi:10.1037/0021-843X.99.3.237

Morina, N., Deeprose, C., Pusowski, C., Schmid, M., & Holmes, E. A. (2011). Prospective mental imagery in patients with major depressive disorder or anxiety disorders. *Journal of Anxiety Disorders, 25*(8),

Moses, E. B., & Barlow, D. H. (2006). A new unified treatment approach for emotional disorders based on emotion science. *Current Directions in Psychological Science, 15*(3), 146-150.

Mueller, T. I., Leon, A. C., Keller, M. B., Solomon, D. A., Endicott, J., Coryell, W., et al. (1999). Recurrence after recovery from major depressive disorder during 15 years of observational follow-up. *American Journal of Psychiatry, 156*(7), 1000-1006.

Murray, C. L., & Lopez, A. D. *The global burden of disease : A Comprehensive assessment of mortality and disability from disease, injuries and risk factors in 1990 and projected to 2020*. Boston : Harvard University Press, 1998.

Newby, J. M., Lang, T., Werner-Seidler, A., Holmes, E., & Moulds, M. L. (2014). Alleviating distressing intrusive memories in depression: A comparison between computerised cognitive bias modification and cognitive behavioural education. *Behaviour Research and Therapy*, 5660-67. doi:10.1016/j.brat.2014.03.001

Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta Earthquake. *Journal of Personality and Social Psychology*, *61*, 115−121.

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives On Psychological Science, 3*(5), 400-424.

Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science, 8*(3), 162-166.

Peters, K. D., Constans, J. I., & Mathews, A. (2011). Experimental modification of attribution processes. *Journal Of Abnormal Psychology, 120*(1), 168-173.

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385-401. doi:10.1177/014662167700100306

Robinson, M. D., & Neighbors, C. (2006). Catching the mind in action: Implicit methods in personality research and assessment. *Handbook of Multimethod Measurement in Psychology*, 115-125.

Rude, S.S., Durham-Fowler, J.A., Baum, E.S., Rooney, S.B., & Maestas, K.L. (2010). Self-report and cognitive processing measure of depressive thinking predict subsequent Major Depressive Disorder. *Cognitive Therapy and Research 34(2),* 107-115.

Rude, S. S., Mazzetti, F.A., Pal, H., & Stauble, M.R. (2011). Social rejection: How best to think about it? *Cognitive Therapy and Research, 35*(3), 209-216.

Rude, S.S. Miller, J., Haner, M., Gill, S., Zelmanova, J. Bruehlman-Senecal, E. (2013, May). Emotion regulation: Exploring the benefits of "big picture" appraisal. In S.S. Rude (Chair). Symposium conducted at the meeting of the Association for Psychological Sciences, Washington D.C.

Rude, S. S., Wenzlaff, R. M., Gibbs, B., Vane, J., & Whitney, T. (2002). Negative processing biases predict subsequent depressive symptoms. *Cognition and Emotion, 16*(3), 423-440.

Rush, A., Hollon, S. D., Beck, A. T., & Kovacs, M. (1978). Depression: Must pharmacotherapy fail for cognitive therapy to succeed?. *Cognitive Therapy and Research, 2*(2), 199-206. doi:10.1007/BF01172735

Salemink, E., van den Hout, M., Kindt, M. (2007). Trained interpretive bias and anxiety. *Journal of Behavior Therapy and Experimental Psychiatry, 38,* 212-224.

Salemink, E., van den Hout, M., Kindt, M. (2009). Effects of positive interpretive bias modification in highly anxious individuals. *Journal of Anxiety Disorders, 23*, 676-683.

Segal, Z. V., & Ingram, R. E. (1994). Mood priming and construct activation in tests of cognitive vulnerability to unipolar depression. *Clinical Psychology Review, 14*(7), 663-695. doi:10.1016/0272-7358(94)90003-5

Segal, Z. V., Williams, J. G., & Teasdale, J. D. (2013). *Mindfulness-based cognitive therapy for depression* (2nd ed.). New York, NY, US: Guilford Press.

Segal, Z. V., Williams, J. M., Teasdale, J. D., & Gemar, M. M. (1996). A cognitive science perspective on kindling and episode sensitization in recurrent affective disorder. *Psychological Medicine, 26(*2), 371-380. doi:10.1017/S0033291700034760

Schartau, P.E., Dalgleish, T., & Dunn, B. D. (2009). Seeing the bigger picture: Training in perspective broadening reduces self-reported affect and psychophysiological response to distressing films and autobiographical memories. *Journal of Abnormal Psychology, 118*(1), 15-27.

Sloman, S. A. (1996). The empirical case for two systems of reasoning. *Psychological Bulletin, 119*(1), 3-22. doi:10.1037/0033-2909.119.1.3

Smith, E. R., & DeCoster, J. (1999). Associative and rule-based processing: A connectionist interpretation of dual-process models. In S. Chaiken, Y. Trope (Eds.) , *Dual-process theories in social psychology* (pp. 323-336). New York, NY, US: Guilford Press.

Smith, E. R., & DeCoster, J. (2000). Dual-process models in social and cognitive psychology: Conceptual integration and links to underlying memory systems.

Personality and Social Psychology Review, 4(2), 108-131. doi:10.1207/S15327957PSPR0402_01

Solomon, D. A., Keller, M. B., Leon, A. C., Mueller, T. I., Shae, T. M., Warshaw, M., et al. (1997). Recovery from major depression: A 10-year prospective follw-up across multiple episodes. *Archives of General Psychiatry, 54*(11), 1001-1006.

Teasdale, J. D. (1988). Cognitive vulnerability to persistent depression. *Cognition And Emotion, 2(*3), 247-274. doi:10.1080/02699938808410927

Teasdale, J. D., & Barnard, P. J. (1993). *Affect, cognition, and change: Re-modelling depressive thought*. Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Torkan, H., Blackwell, S. E., Holmes, E. A., Kalantari, M., Neshat-Doost, H., Maroufi, M., & Talebi, H. (2014). Positive imagery cognitive bias modification in treatment-seeking patients with major depression in Iran: A pilot study. *Cognitive Therapy And Research, 38*(2), 132-145. doi:10.1007/s10608-014-9598-8

Tran, T. B., Siemer, M., & Joormann, J. (2011). Implicit interpretation biases affect emotional vulnerability: A training study. *Cognition And Emotion, 25*(3), 546-558. doi:10.1080/02699931.2010.532393

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy And Research, 27*(3), 247-259. doi:10.1023/A:1023910315561

Vassilopoulos, S.P., Banerjee, R., Prantzalou, C. (2009). Experimental modification of interpretation bias in socially anxious children: changes in interpretation,

anticipated interpersonal anxiety, and social anxiety symptoms. *Behavioral Research and Therapy, 47*, 1085-1089.

Watkins, E. (2004). Adaptive and maladaptive ruminative self-focus during emotional processing. *Behaviour Research And Therapy*, *42*(9), 1037-1052.

Watkins, E., Moberly, N. J., & Moulds, M. L. (2008). Processing mode causally influences emotional reactivity: Distinct effects of abstract versus concrete construal on emotional response. *Emotion, 8*(3), 364-378.

Watkins, E. R., Taylor, R. S., Byng, R. R., Baeyens, C. C., Read, R. R., Pearson, K. K., & Watson, L. L. (2012). Guided self-help concreteness training as an intervention for major depression in primary care: A Phase II randomized controlled trial. *Psychological Medicine, 42*(7), 1359-1371. doi:10.1017/S0033291711002480

Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070.

Wells, K. B., & Sherbourne, C. D. (1999). Functioning and utility for current health of patients with depression or chronic medical conditions in managed, primary care practices. *Archives of General Psychiatry, 56*(10), 897-904. doi:10.1001/archpsyc.56.10.897

Wells, K. B., Sturm, R., Sherbourne, C. D., Meredith, L. S. *Caring for depression*. Boston: Harvard University Press, 1996.

Wenzlaff, R. M. (1988). *Automatic information processing in depression.* Paper presented at the International Conference on Self-Control, Nags Head, NC.

Wenzlaff, R.M. (1993). The mental control of depression: Psychological obstacles to emotional well-being. In D.M. Wegner & J.W. Pennebaker (Eds.), *Handbook of mental control* (pp. 239-257). Englewood Cliffs, NJ: Prentice Hall.

Wenzlaff, R.M., Rude, S.S., Taylor, D.J., Stultz, C.H., & Sweat, R.A. (2001). Beneath the veil of thought suppression: Attentional bias and depression risk. *Cognition and Emotion*, 15, 435-452.

Werner-Seidler, A., & Moulds, M. L. (2011). Autobiographical memory characteristics in depression vulnerability: Formerly depressed individuals recall less vivid positive memories. *Cognition and Emotion, 25*(6), 1087-1103.

Williams, A. D., Blackwell, S. E., Mackenzie, A., Holmes, E. A., & Andrews, G. (2013). Combining imagination and reason in the treatment of depression: A randomized controlled trial of internet-based cognitive-bias modification and internet-CBT for depression. *Journal of Consulting And Clinical Psychology, 81*(5), 793-799.

Wilson, M., Smith, N. C., Chattington, M., Ford, M., & Marple-Horvat, D. E. (2006). The role of effort in moderating the anxiety-performance relationship: Testing the prediction of processing efficiency theory in simulated rally driving. *Journal Of Sports Sciences, 24*(11), 1223-1233.

Woud, M. L., & Becker, E. S. (2014). Editorial for the special issue on cognitive bias modification techniques: An introduction to a time traveller's tale. *Cognitive Therapy And Research, 38*(2), 83-88. doi:10.1007/s10608-014-9605-0

Wulsin, L. R., Vaillant, G. E., & Wells, V. E. (1999). A systematic review of the mortality of depression. *Psychosomatic Medicine, 61*(1), 6-17.

Yiend, J., Lee, J., Tekes, S., Atkins, L., Mathews, A., Vrinten, M., & ... Shergill, S. (2014). Modifying interpretation in a clinically depressed sample using 'cognitive bias modification-errors': A double blind randomised controlled trial. *Cognitive Therapy And Research, 38*(2), 146-159. doi:10.1007/s10608-013-9571-y