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ATTENTIONAL AND EMOTIONAL CONSEQUENCES OF EMOTIONAL ACCEPTANCE  
AND SUPPRESSION IN AN ELEVATED ANXIETY SAMPLE

A Thesis Presented

by

NATALIE ARBID

Submitted to the Office of Graduate Studies,  
University of Massachusetts Boston,  
in partial fulfillment of the requirements for the degree of

MASTERS OF ARTS

May 2017

Clinical Psychology Program

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## ABSTRACT

### ATTENTIONAL AND EMOTIONAL CONSEQUENCES OF EMOTIONAL ACCEPTANCE AND SUPPRESSION IN AN ELEVATED ANXIETY SAMPLE

May 2017

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Acceptance- based strategies have been incorporated into behavioral therapies for anxiety and other disorders (e.g., Roemer & Orsillo, 2009). Experimental literature is in need of better, more nuances assessment of the consequences of acceptance (Kohl, Rief & Glombiewski, 2012). Therefore, this study specifically examined the way in which acceptance can increase attentional flexibility and recovery from stress, which are important factors in the maintenance of anxiety disorders (Cisler & Koster, 2010). This experimental study compared acceptance and suppression of emotional experiences, following exposure to fearful stimuli (i.e., images and film clip), to a control condition. Results indicated that there was no significant relation between dimensional self-ratings of trait and state emotion regulation ability, trait acceptance, disengagement from viewing distressing images, and recovery from distress. Experimental

analyses revealed that no emotion regulation strategy- acceptance or suppression- allowed individuals to disengage and recover from the negative images significantly more quickly. Also no emotion regulation strategy led to significantly lower levels of self-reported negative affect and higher willingness to view more distressing images. However, nonsignificant trends of medium to large effect sizes emerged, with unexpected correlational findings suggesting that trait levels of experiential avoidance and emotion regulation difficulties were associated with the ability to disengage from images, while acceptance instructions may have facilitated disengagement following the task.

There were several limitations to this study. First the sample size was small limiting the ability to detect effects of the independent variable (i.e., emotion regulation instructions). Also randomization was not successful and the conditions were imbalanced on several key variables. Lastly the mood induction was not successful in inducing fear in this sample, therefore limiting ability to comment on participants' reaction to distress and recovery from distress.

Given that there were several limitations to this study, it is important for future research to make the study alterations recommended and conduct further research on this topic.

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## CHAPTER 1

### SPECIFIC AIMS

Research has consistently demonstrated that emotion regulation skills are important to psychological well-being (Gross & Jazeieri, 2014). Emotion regulation is the process in which individuals attempt to influence the emotions they have, when they have them, and how they are expressed and experienced (Gross, 1998). This is a dynamic and temporal process that involves the adjustment of emotional experiences before, during, and after an event elicits emotions; it also includes the valuation or appraisal of one's emotional experience (Gross, 2015). This process can be relatively automatic or a habitual response pattern that happens in or outside awareness (Amstadter, 2008), consciously or automatically (Mauss, Cook, & Gross, 2007), and varies based on contextual and personal factors. Specifically, emotion regulation difficulties or emotion dysregulation has been linked to anxiety disorders such as Generalized Anxiety Disorder (GAD; Mennin, Heimberg, Turk, & Fresco, 2005), Social Anxiety Disorder (SAD; Aldao 2014; Turk, Heimberg, Luterek, Mennin, & Fresco, 2005), and Post Traumatic Stress Disorder (PTSD; Tull, Gratz, Salter, & Roemer, 2004) – for a review see Amstadter (2008).

A common way in which individuals manage their emotional experience, and a maintenance factor in several anxiety disorders, is avoidance. A specific type of avoidance is the avoidance of internal experiences, such as emotions, thoughts, and bodily sensations. This unwillingness to stay in contact with internal sensations is known as experiential avoidance (EA; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). EA has been the focus of several acceptance-based behavioral therapies (ABBTs), including Acceptance and Commitment Therapy (ACT; Hayes, Luoma, Bond, Masuda, & Lillis, 2006). The success of these therapies has been in part due to their focus on the reduction of EA and the cultivation of acceptance.

Acceptance is understood in opposition to EA and is defined as an allowance of internal experiences without efforts to rid oneself of them; it also includes a quality of relating to one's internal experiences by turning toward them in an open, nonjudgmental way (Hayes et al., 2006; Hayes, Strosahl, et al., 2004). Several investigations have found that reduction of EA and increases in acceptance predict treatment response, reduce anxiety symptomology, and are an overall mechanism of action (Hayes, Orsillo & Roemer, 2010; Arch & Craske, 2008; Arch, Wolitzky-Taylor, Eifert, & Craske, 2012a; Twohig et al., 2010; Niles et al., 2014).

There has been an increase in the number of experimental studies that have attempted to dismantle ABBTs and investigate acceptance and experiential avoidance outside of treatment. A meta-analysis of these studies found that acceptance was not significantly associated with psychopathology, yet effect sizes were small to medium and in the predicted direction, possibly indicating a need for better assessment of the construct (Aldao, 2010). In another meta-analysis (Kohl, Rief, & Glombiewski, 2012) acceptance failed to demonstrate general superiority over other emotion regulation strategies, but the large amount of variability in type of manipulation, outcome measures, and comparison groups allowed for no firm conclusions and heeds cautious interpretation of the null findings. This evidence points to the need for better, more nuanced assessment of the construct. Acceptance is not the reduction of symptoms, but it is a change in the relationship to the experience. Therefore, conclusions based on acceptance's effects on down-regulation of negative affect or other symptoms may be limited by this narrow outcome measurement. As such, I assessed acceptance in terms of recovery from distress, attentional disengagement from threat, negative affect, and behavioral action, to better capture the ways in which acceptance is effective and to expand on the experimental literature of EA and acceptance.

I was particularly interested in understanding the impact acceptance and experiential avoidance have on attention while an individual is engaged in an emotionally distressing task and their impact on recovery from emotional arousal. Emotional and expressive suppression have been used as proxy measures of experiential avoidance, therefore I used emotional suppression in this investigation as it most closely models EA. I examined whether acceptance could facilitate individuals' ability to disengage and flexibly move attention from emotionally arousing (i.e., fearful) images and recover from this heightened arousal. An attentional interference task helped elucidate if acceptance allowed individuals to have an emotional experience, while still engaging and disengaging in other activities.

## **Overarching Aims and Hypotheses**

### **Correlational Aims**

1. Examine how dimensional self-ratings of trait<sup>1</sup> emotion regulation and acceptance are related to the heightened ability to disengage from and recovery following an emotionally arousing task.
  - a. It was hypothesized that emotion regulation abilities would be positively related to ability to disengage and recover from an emotionally arousing task.
  - b. It was hypothesized that acceptance would be positively associated with ability to disengage and recover from an emotionally arousing task.
  - c. It was hypothesized that state emotion regulation abilities would be positively related to ability to disengage and recover from an emotionally arousing task.

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<sup>1</sup> The term trait is used in the adult emotion regulation literature to describe the ways in which individuals use these strategies habitually on their own without the impact of an intervention. This is usually assessed via self-report.

## **Experimental Aims**

2. Determine which emotion regulation strategies- acceptance or suppression- would allow individuals to better disengage and recover from an emotionally arousing task.

a. It was hypothesized that those instructed to use acceptance strategies would better disengage and recover from an emotionally arousing task compared to those using suppression or no strategy.

b. It was hypothesized that those instructed to use acceptance would report lower levels of negative affect at the end of the study.

c. It was hypothesized that those instructed to use acceptance would be more willing to view another set of images in the task.

## **CHAPTER 2**

### **BACKGROUND AND SIGNIFICANCE**

In this review I investigate current understandings of emotion regulation and how they relate to anxiety disorders. I focus specifically on how experiential avoidance (EA) and acceptance can play a role in modulating emotional experience. Next, I review the experimental literature on acceptance and EA, highlighting the strengths and weaknesses of the current literature and explain how this investigation can improve and expand on these studies. Finally, I review the specific ways in which I assessed the impact of acceptance and how these more nuanced assessment methods can help us better understand acceptance and its impact on individuals with anxiety disorders.

#### **Emotion Regulation (ER)**

**Models of Emotion Regulation.** There are several conceptualizations of emotion regulation (ER) in the literature (Thompson, 1994; Berking, 2008; Gross, 1998,2015; Gratz & Roemer, 2004). In a recent editorial review, Tull and Aldao (2015) explain that the commonalities in these understandings are their conceptualization of emotion regulation as a way in which individuals have an influence over, and respond to their emotional experience. Here, I provide a small sample of the ways in which emotion regulation can be understood before focusing specifically on experiential avoidance and acceptance.

Some models of emotion regulation include extrinsic and intrinsic processes that monitor, evaluate, and modify emotion to accomplish goals (Thompson, 1994). Another describes specific dimensions of adaptive emotion regulation that include awareness, understanding, and acceptance of emotional experience, the ability to act in accordance with goals, and the ability to



use different strategies flexibly (Gratz & Roemer, 2004). Synthesizing and building upon some of these theories, Berking et al. (2008) proposed a model that is built on the assumption that mental health is the ability to modify emotions in a desired direction and accept and tolerate undesired emotions. This theory conceptualizes adaptive emotion regulation as an interaction of nine specific skills, including identification and awareness of emotional experience, consciously processing emotions/being aware of emotions, identification and labeling emotions, interpreting emotion related body sensations correctly, understanding the prompts of emotions, supporting oneself in emotionally distressing situations, actively modifying negative emotions in order to feel better, accepting emotions, being resilient to /tolerating negative emotions, and confronting emotionally distressing situations in order to attain important goals.

Lastly, there is a temporal process model (Gross, 1998) that describes how individuals use strategies to influence their emotional experience before, during, and after they experience emotions. These conceptualizations are all useful and the utility of each depends on the research question at hand. When the question is framed around the positive, negative, short-term and long-term consequences of emotion regulation strategies, Gross' process model of emotion regulation (Gross, 1998a, 1998b) is the most widely used (Gratz, Weiss, & Tull, 2015).

The Gross model includes five strategies, divided into two categories of regulation strategies: antecedent-focused strategies that occur *before* the emotional response and response-focused strategies that occur *after* the emotional response. An extended version of this model has been developed, which includes a valuation system (Gross, 2015). This valuation system is the appraisal of our internal and external worlds, and the use of that information to determine whether stimuli or experiences are indifferent, good, or bad (Gross, 2015). This valuation system is used within the whole model, both in the antecedent and response strategies.

Experimental work most often uses this model as a whole to help operationalize emotion regulation. Therefore I have framed this investigation within the Gross process model (Gross, 1998a, 1998b), while also using others to help measure trait emotion regulation abilities (Gratz & Roemer, 2004).

**Emotion Regulation and Anxiety Disorders.** As the study of emotion regulation has grown, so has an understanding of the role emotion regulation plays in anxiety and stress disorders (Amstadter, 2008). Importantly, psychologists have learned that emotion dysregulation plays a vital role in the experience of those with these disorders. For instance, individuals with generalized anxiety disorder (GAD) report higher levels of intense emotions, difficulty understanding emotions, negative reactivity to their emotional state, and maladaptive emotional response management (Mennin, Heimberg, Turk, & Fresco, 2002; Turk, Heimberg, Luterek, Mennin, & Fresco, 2005). Similarly, research has shown that individuals with social anxiety disorder (SAD) have difficulty identifying emotions, pay less attention to emotions, have difficulty repairing negative mood states, are fearful of experiencing emotions (Turk et al., 2005), and use expressive suppression (Werner, Goldin, Ball, Heimberg, & Gross, 2011) more than nonclinical samples. Also, posttraumatic stress disorder (PTSD) has been associated with thought suppression (Tull, Gratz, Salters, & Roemer, 2004; Lee, Witte, Weathers, & Davis, 2015) and avoidance of internal experiences (Lee et al., 2015). Preliminary evidence suggests that obsessive- compulsive disorder (OCD) symptoms (e.g., washing, checking, doubting, obsessions, ordering) are related to a poor understanding of emotions, fear of positive and negative emotions, and fear of anxiety, which are features of the emotion dysregulation (Stern, Nota, Heimberg, Holaway, & Coles, 2014). These symptoms also relate to difficulties with impulse control, limited access to strategies for emotion regulation, and a lack of emotional

clarity (de la Cruz et al., 2013). As this evidence suggests, emotion regulation is crucial to understanding the maintenance factors for several anxiety disorders. Specifically, negative reactivity to and avoidance of emotional experience is a common factor among these disorders. Methods, such as acceptance, that target reactivity to and avoidance of emotions are often components of treatments for these disorders (e.g., Twohig et al., 2010; Osman, Wilson, Storaasli, & McNeil, 2006; Arch and Craske, 2008; Niles et al., 2014). For this reason, experiential avoidance and acceptance were the focus of this investigation.

**Experiential Avoidance and Acceptance.** Experiential avoidance (EA) is the unwillingness to remain in contact with private internal experiences, such as thoughts, bodily sensations, emotions, memories or behaviors, along with the effort or action taken to alter the form or frequency of these internal experiences (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Avoidance of painful memories, experiences, or emotions is a natural part of the human experience. Individuals are motivated to avoid or get rid of these negative internal and external experiences because of the psychological discomfort they cause. Although avoidance can be adaptive (e.g., avoiding physical danger), when it becomes a habitual manner of responding to emotional material or experiences that are not necessarily dangerous, rigid behavioral and emotional patterns can develop. In particular, individuals with anxiety disorders often experience intrusive, distressing thoughts, attend to threatening material more often, and have strong beliefs that these experiences are unavoidable, and therefore use avoidance as a way to cope (Salters-Pedneault, Tull, & Roemer, 2004). Avoidance of emotional material does not allow individuals to engage with these internal experiences in a new way that facilitates new learning to take place (Salters-Pedneault et al., 2004). These habitual patterns of avoidance can spread to a wide range of contexts and eventually become maladaptive, not allowing for new and corrective learning to

take place, fostering disengagement from life, and restricting valued actions (Roemer & Orsillo, 2009). Experiential avoidance becomes negatively reinforcing because it seems effective in eliminating distressing internal experiences in the short-term, but the long-term paradoxical effects are that it actually increases distress and restricts individuals' lives (Hayes et al., 1996; Lee et al., 2010; Wegner, 2011).

As evidence of the pervasiveness of experiential avoidance among the anxiety disorders mounted, it became a target of several behavioral treatments, such as Acceptance and Commitment Therapy (ACT; Hayes et al., 1999) and other Acceptance-Based Behavioral Therapies (ABBTs; Roemer, Orsillo, & Salters-Pednault, 2008). With the success of these treatments, investigations on how they actually work, or through which mechanism they produce change, have shown strong evidence that the reduction of EA is a mechanism of action (Hayes-Skelton, S. A., Usmani, A., Lee, J. K., Roemer, L., & Orsillo, S. M., 2012; Arch & Craske 2008; Niles et al., 2014). The reduction of experiential avoidance has been captured with the concept of experiential acceptance. Experiential acceptance<sup>2</sup> refers to the allowance of internal experiences, the ability to notice and pay attention to internal experiences, and the ability to turn towards these experiences in a nonjudgmental way (Hayes et al., 1996). In an ABBT for individuals with GAD, Hayes, Orsillo and Roemer (2010) found that the larger session-by-session increases in acceptance reported by clients over the course of therapy, the more likely that they were later considered a treatment responder. When cognitive behavioral therapy (CBT) and ACT were compared in treating individuals with heterogeneous anxiety disorders, improvements in EA occurred across both conditions and the ACT group reported significantly less EA at the 12-month follow up (Arch et al., 2012b). In another randomized clinical trial for individuals

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<sup>2</sup> Experiential acceptance and acceptance are interchangeable. For the remainder of the document acceptance will be used.

diagnosed with OCD, ACT was compared to progressive relaxation training (Twohig et al., 2010). Participants in the ACT condition showed significantly greater reductions in experiential avoidance from pre-treatment to post-treatment compared with progressive relaxation training participants. Dalrymple and colleagues (2007) conducted a waitlist control study with a group of individuals diagnosed with social anxiety disorder who received ACT and exposure. The authors found that earlier decreases in EA predicted later symptom change.

There is strong empirical support for the increase of acceptance and decrease of EA in ABBTs, especially for individuals diagnosed with various anxiety disorders. This evidence points to acceptance being an important mechanism of change in manualized or comprehensive treatments (Roemer & Orsillo, 2002). Further research is needed to elucidate the specific ways in which acceptance brings about symptom change in these clinical samples. With an experimental design, this investigation determined the effects acceptance has on individuals who are experiencing elevated levels of anxious arousal and general anxiety.

### **Experiential Avoidance, Acceptance, and Emotion Regulation**

Integration of the experiential avoidance, acceptance, and emotion regulation literature can be helpful in investigating these constructs in the context of an experimental study. There is theoretical and empirical evidence that EA and acceptance are opposing ways to regulate one's emotional experience (Hofmann & Asmundson, 2008; Blackledge & Hayes, 2001; Webb, Miles, & Sheeran, 2012). Using Gross's (1998) process model, there is disagreement as to whether acceptance is an antecedent focused strategy (Webb, Miles, & Sheeran, 2012), a response focused strategy (Hofmann & Asmundson, 2008) or a combination of both (Wolgast, Lars-Gunnar, & Viborg, 2013; Liverant, Brown, Barlow, & Roemer, 2008). Webb and colleagues (2012) conceptualize acceptance as an antecedent focused strategy that involves cognitive

change. This classification stems from an understanding of acceptance as reappraisal of the emotional experience (Webb et al., 2012). Acceptance as an antecedent strategy implies an internalization of this approach toward internal experiences and emotion generation. In other words, this is when acceptance becomes an established habitual pattern of approaching and responding. We could also understand this as the use of acceptance within an experimental framework where individuals are instructed to use acceptance *before* an emotional reaction. On the other hand, among individuals first beginning an ABBT, acceptance can be used as a response strategy to help change the already established problematic relationships to one's internal experience. This dichotomous view of acceptance can be helpful to operationalize it in these instances, but is also problematic because it does not capture the complexity of acceptance used across multiple contexts (i.e., when implemented before an emotional experiences, used after an emotionally triggering event, and even during an emotional experience). Acceptance can be understood as actually both antecedent and response focused, depending on the context and the interaction between the environment, the individual, and their ability to implement aspects of acceptance when needed. Acceptance incorporates elements of antecedent-focused emotion regulation via reappraisal of the acceptability of emotional experience and response-focused emotion regulation when allowing the experience of emotion without attempts to alter or suppress it (Wolgast, Lars- Gunnar, & Viborg, 2013; Liverant, Brown, Barlow, & Roemer, 2008).

Revisiting Gross's (2015) updated process model of emotion regulation, it more clearly states that emotion regulation is not linear but a cyclical process. A strategy is implemented, we receive feedback either from ourselves or the environment about its usefulness, we form a valuation or judgment of its efficacy, and finally make a decision about when, where, and how it

may be implemented again. Acceptance can be used as an emotion regulation strategy to approach an interaction, then used after the interaction, and finally can be used to approach our own emotions in response to the interaction. Placing acceptance into this cycle sheds light on the multiple understandings of acceptance and the complexities of operationalizing it.

In this investigation I used a response- focused conceptualization of acceptance for several reasons. First, the target sample is individuals experiencing elevated levels of anxious arousal and generalized anxiety. These individuals may already experience difficulties with their internal experiences and therefore instructing them to approach their reactions in an accepting way will require a response-focused approach. For example, as mentioned earlier, novices in treatment initially use acceptance as a response modulation strategy. Since a broader aim of this investigation is to better understand the effects of a component of treatment (i.e., acceptance), I used clinical work as a reference point. Secondly, I understand acceptance and cognitive reappraisal or cognitive change as related but distinct concepts (Wolgast, 2013; Hofmann & Asmundson 2008). Although acceptance is usually used in response to negative judgment of response patterns, it does not promote a reappraisal of this response or situation into something better or worse. Acceptance includes attempts to place no value judgment on internal experiences and to understand them merely as responses. For example, using cognitive reappraisal would involve reinterpreting a failing grade on an exam as being due to the difficulty of the test instead of one's lack of studying and preparation. In contrast, the use of acceptance would involve allowing oneself to feel disappointed, acknowledge these feelings as feelings, and approaching oneself gently without harsh judgment.

Before turning toward how both acceptance and experiential avoidance have been evaluated in the experimental literature, I explain how EA is operationalized. Experiential

avoidance has been tested via the use of suppression of both internal experiences and external output. Internal or emotional suppression is the suppression of internal experiences, such as thoughts, memories or emotions (e.g., instructing people to suppress their internal emotional response/experience). External or expressive suppression is the elimination of facial and other outward signs of emotion (e.g., instructing people to conceal their facial expression when emotions arise). Both internal and external suppression have been shown to have paradoxical effects; in the short-term, suppression can alleviate distress, while the long-term effects cause an increase in the symptoms (Wegner et al 1987; Abramowitz, Tolin & Street, 2001). I focused on internal or emotional suppression in this investigation since it most aligns with the definition of EA.

**Review of Experimental Studies of Experiential Avoidance and Acceptance.** A body of experimental literature investigates the emotional, physiological, and behavioral consequences of suppression and acceptance. Tull, Jakupcak, and Roemer (2010) found that men using emotional suppression compared to allowance of emotions experienced higher levels of distress after listening to situations of men failing to conform to gender role norms (gender role stress-related distress). Moreover, responding to these situations, men using emotional suppression had significant increases in heart rate, and 23.5% of them were unwilling to participate in the experiment again (compared to 0% in the emotional allowance group). In a group of individuals diagnosed with anxiety and depression, those who were instructed to use emotional suppression had poorer recovery in that negative affect subsided to a lesser extent compared to those who used emotional acceptance in response to an aversive film clip (Campbell-Sills, Barlow, Brown, & Hofmann, 2006). Also the heart rate of both the suppression and acceptance groups increased from anticipation to recovery, yet participants in the suppression group showed an increase in



HR from anticipation to exposure, and a decrease in HR from exposure to recovery. Hofmann, Heering, Sawyer, and Asnaanu (2009) also found that when individuals were asked to use suppression (both expressive and emotional suppression) while giving a speech, they reported higher anxiety than those in the reappraisal group and increased heart rate compared to both reappraisal and acceptance. There was no difference in levels of reported anxiety between the acceptance and reappraisal group and no difference between the acceptance and suppression groups. During a CO<sub>2</sub> challenge, participants with panic disorder using acceptance reported significantly less anxiety than those in the suppression group, controlling for resting state anxiety (Levitt, Brown, Orsillo, & Barlow, 2004). Also individuals in the acceptance group were more willing to participate in a second challenge than those in the suppression and control groups, with no difference between the suppression and control groups. In an investigation comparing cognitive reappraisal and acceptance in a healthy sample, participants in both conditions reported significantly less negative emotion when compared to a control condition in response to fear and sadness film clips (Wolgast, Lundh, & Viborg, 2011). Both of these strategies were also related to less behavioral avoidance as measured by reluctance to view the same film clip again. Importantly, there was no association between self-reported negative emotion and avoidance in the acceptance condition, indicating that those using acceptance had a higher tolerance for aversive emotional experiences and were possibly less likely to resort to avoidance (Wolgast et al., 2011).

This evidence suggests that experiential suppression is related to increases in distress, poorer recovery from elevated levels of negative affect, and higher levels of self-reported anxiety. On the other hand, evidence points to acceptance relating to more rapid recovery from aversive stimuli, lower levels of self-reported anxiety, and more behavioral willingness to engage

in emotionally evocative tasks. Both suppression and acceptance were related to similar increases in HR. Importantly these relationships were found in different contexts such as in response to film clips, in response to a stressful social situation (i.e., giving a speech on a controversial topic), and during a CO<sub>2</sub> challenge.

A meta-analysis on emotion regulation strategies found that acceptance was not significantly associated with psychopathology, yet effect sizes were small to medium and in the predicted direction, possibly indicating a need for better assessment of the strategies (Aldao, 2010). In another meta-analysis, acceptance failed to have a general superiority over other emotion regulation strategies (Kohl, Rief & Glombiewski, 2012). These findings should be interpreted with caution because of the large amount of variability in type of manipulation, outcomes, and comparison groups. This meta-analysis only used 14 studies and investigated the use of acceptance in relation to pain tolerance, pain intensity, negative affect, and psychophysiology. Unsurprisingly, acceptance was efficacious in increasing pain tolerance but not in decreasing pain intensity compared to other strategies. This is consistent with the conceptualization of acceptance as an allowance of internal experiences and a letting go of control because the ability to tolerate pain increased, but change in pain intensity did not improve. This evidence points to acceptance helping individuals to engage in behavior that is meaningful and allowing for better functioning, while still experiencing distress. Acceptance was not more effective than other emotion regulation strategies in reducing negative affect and psychophysiological arousal. This review (Kohl et al., 2012) also included qualitative information, which indicated that clinical samples were more likely to show an effect on negative affect, although not significantly so. This information is important to consider since acceptance may be best suited for individuals experiencing clinically elevated symptoms.

In sum, acceptance is not the reduction of symptoms but is a change in the relationship to the experience, therefore conclusions based on its effects on down-regulation of negative affect or other symptoms may be limited and only apply to a narrow set of outcomes. Measuring change or effects should be broader when the goals are not only symptom reduction but also improvement in quality of and engagement in life. For example, ABBTs help individuals not only manage symptoms, but also identify values in order to engage in life in a full and meaningful way. Therefore assessment of acceptance needs to tap into constructs such as recovery from distress, engagement in tasks, behavioral action, and attentional capacity in order to better measure its' effectiveness in different contexts.

**Assessment of Recovery.** In a study mentioned prior, Campbell-Sills et al. (2006) found that among individuals diagnosed with anxiety and/or mood disorders, acceptance manifested a greater decrease in negative affect in a recovery period after viewing a distressing film in comparison to those in the suppression group. Two other studies found that individuals in the acceptance groups were significantly more willing to engage in a second CO<sub>2</sub> challenge than other groups (Levitt et al., 2004) and more willing to participate in another distressing task (Tull et al., 2010). In a study examining the use of emotional suppression and acceptance in a sample of depressed individuals, results indicated that, although the acceptance group experienced more sadness in response to a sad film clip, their level of sadness decreased more steeply in the recovery period (Liverant, Brown, Barlow, & Roemer, 2008). This evidence points to the ways in which acceptance may have residual effects that do not appear in the height of distress. Acceptance may facilitate a quicker path to recovery from a heightened state of arousal. Recovery can be measured in the form of quicker or more drastic reductions in negative affect, physiological arousal, and, in the case of this investigation, attentional engagement.

**Assessment of Attention and Disengagement.** The attentional bias toward threat in anxiety disorders has been studied extensively (See Cisler & Koster, 2010 for review). This is the tendency for individuals with high trait anxiety to turn their attention to more threatening or negative information in the environment more than non-clinically anxious individuals do (Bar-Hain, Lamy, Pergamin, Bakermnas-Kranenburg & van Ijzendoorn, 2007; MacLeod, Mathews & Tata, 1986; Mogg & Bradley, 1998). This finding has been consistent across anxiety disorders and across the use of different experimental paradigms used to detect and measure this bias (Cisler & Koster, 2010). Studies indicate that anxiety is maintained and exacerbated through prolonged attentional engagement with threatening information (Constans, 2005; Elzinga & Bemmer, 2002). Relatedly, an important component of attentional bias is disengagement from the threatening stimuli; evidence demonstrates that anxious individuals have difficulty disengaging (Koster, Crombez, Verschuere & De Houwer, 2006; Koster, Crombez, Verschuere et al., 2004). Also, the ability to flexibly use attention in arousing situations can help alleviate distress (Bardeen & Orcutt, 2011; Bardeen & Read, 2010). Experimental tasks that measure attention can help elucidate attentional flexibility capacities. Specifically, a dual task paradigm in which individuals engage in an emotionally evocative task (i.e., viewing distressing images), while then engaging in another (i.e., responding to an auditory tone), can help elucidate the ability to disengage from the images and respond to the second stimulus. Several theories (Easterbrook, 1959; Eysenck, Derakshan, Santo, & Calvo, 2007; Lavie, Hirst, de Fockert, & Viding, 2004) propose that when the primary task is cognitively demanding and the secondary stimulus is less salient, performance on the secondary task will suffer. Incorporating an emotion regulation strategy may change the way in which the evocative images are experienced or responded to, therefore influencing the flexibility of attentional response to the secondary

stimulus. The use of different emotion regulation strategies may facilitate the loosening of fixed attention on threatening stimuli.

Attentional ability can serve as a unique and important outcome of the use of acceptance and suppression. Ortner, Zelazo, and Anderson (2013) investigated the effects of reappraisal and suppression on attention using a dual task paradigm. Participants were significantly slower to respond to the tone when using reappraisal and suppression than the control group (view condition) while viewing unpleasant images. This finding indicates that emotion regulation strategies utilize cognitive demands such as working memory and attention, therefore slowing their performance. There was a post-picture presentation period that revealed no effect of condition, but exploratory analyses revealed that participants using suppression in response to unpleasant images were significantly slower to respond to the distractor stimulus (i.e., tone). Similar work has been done using this paradigm measuring the effects of mindfulness on attention (Ortner, Kilner, & Zelazo, 2007), but to our knowledge no one has yet to use this attentional paradigm to investigate acceptance. This investigation was a replication and extension of the Ortner et al. (2013) and Ortner et al. (2007) studies with a sample of individuals who are experiencing elevated levels of anxious arousal and general anxiety, and examining the effects of acceptance and experiential suppression.

### **The Current Study**

Given the findings that acceptance may be beneficial for individuals with anxiety disorders, but *not* by reducing distress immediately, the current study expands our understanding of the effects of acceptance by examining how acceptance relates to 1) ability to disengage attention from an emotional task, and 2) affective and attentional recovery following an emotional task. I have investigated these relationships using both correlational and experimental

methods. First, I predicted that higher self-reported trait levels of emotion regulation abilities and acceptance would predict disengagement and recovery from an emotionally arousing laboratory task, and that state levels of emotion regulation would also predict disengagement and recovery. Then I predicted that experimental instruction to accept emotions would lead to better disengagement of attention during a second administration of the emotional arousing laboratory task, as well as attentional and emotional (i.e., negative affect) recovery after the task. I also predicted that those in the acceptance group would be more willing to engage in viewing another set of images. A sample of individuals with elevated levels of anxiety was recruited, as evidence suggests that acceptance may be better suited for individuals with elevated levels of anxiety (Kohl et al., 2012) and because of the need for more experimental work to be done with clinical populations rather than with healthy controls, to allow more generalizability of findings to the target populations (Mennin et al., 2007).

## **CHAPTER 3**

### **METHODS**

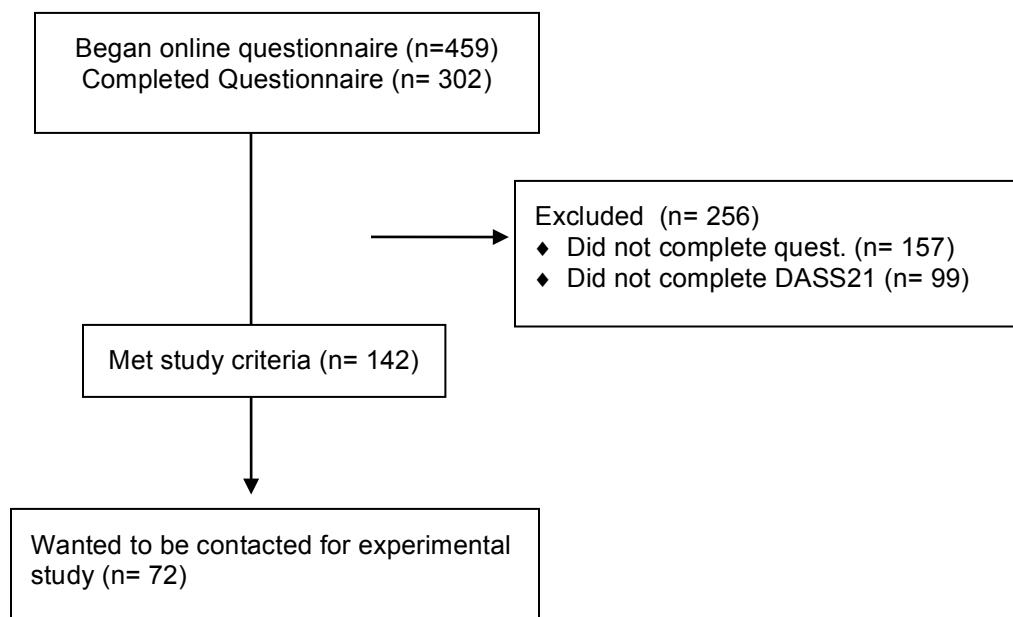
#### **Broad Procedural Overview**

For this study, I recruited the sample from University of Massachusetts Boston, an urban commuter school. The investigation consisted of two parts: part one included prescreening measures (n=302) and part two was an experimental study (n=18). The purpose of collecting the prescreening measures was to recruit individuals who were currently experiencing elevated levels of general anxiety or anxious arousal for the experimental portion of the study, as well as to assess trait levels of emotion regulation skills and acceptance for the correlational analyses. Recruitment for part one of the study included email blasts that included a Psychdata link to measures that students completed if they were interested in and consented to participate in the study. The prescreening measures are described in more detail below. All individuals 18 years of age or older and who had spoken English for at least 5 years were eligible to complete part one. Those who completed part one were either entered into a raffle to win a \$50 Amazon gift card or received psychology course credit. Students were not able to receive both forms of payment.

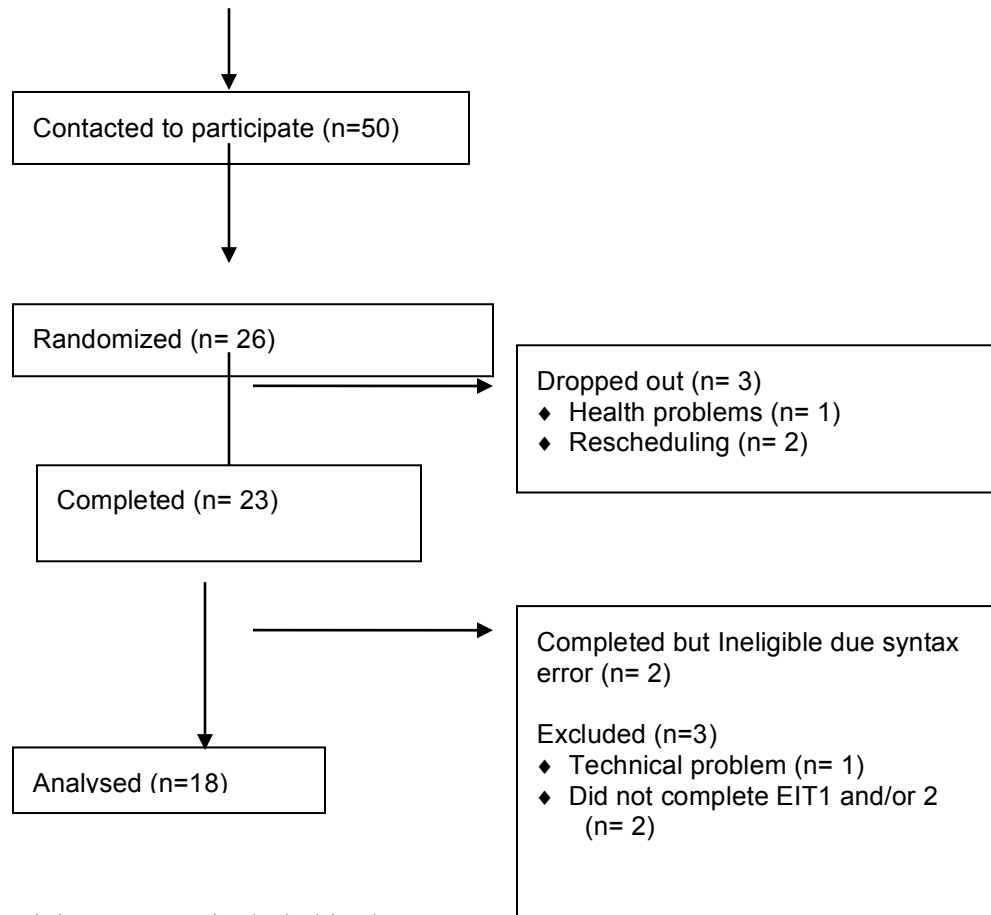
Prescreening measures were used to determine eligibility for the experimental portion of the investigation (part two). Inclusion criteria for part two included, individuals who were 18 years of age or older, English speakers for at least five years, had the ability to hear and see, indicated that they were interested in being contacted for a related study, and scored at or above the moderate threshold of the stress or anxiety subscales of the Depression, Anxiety, Stress Scales 21 (DASS-Lovibond & Lovibond, 1995). Those who met all of these inclusion criteria were sent an email invitation to participate in part two, the experimental portion of this investigation. Those who completed part 2 received monetary compensation (\$20).

## Recruitment

I sent two emails blasts in the Spring 2016 semester to recruit participants at University of Massachusetts Boston. A flow chart of recruitment and enrollment is presented below. A total of 459 participants began the online questionnaire and 302 completed the questionnaire. One hundred forty two participants met criteria for part two of the study, meaning that they scored at or above the moderate range of the anxiety and/or stress scales of the DASS (DASS-21; Lovibond & Lovibond, 1995). Of those, 72 were willing to be contacted for future studies and 50 were contacted via email to participate. A total of 26 participants responded and were randomized to condition. Two participants no-showed several times and one participant decided to not participate due to health problems. Twenty-three participants completed part 2; however, two individuals were excluded from analyses due to an early syntax error in DASS scores, which meant they were ineligible. One participant was excluded due a technical problem because they did not hear any tones during the experiment. Lastly, two other participants were excluded because they did not respond to any auditory tones and had no laboratory task data. A total of 18 participants (6 per condition) were included in the analyses.







## Participants

Eighteen participants were included in the analyses. Participants identified their biological sex as well as gender identity; 77.78% (n=14) identified their biological sex as female, 22.22% (n=4) identified their biological sex as male; 55.55% (n=10) of the sample identified their gender identity as female, 22.22% (n=4) as male, 5.56% (n=1) transgender, 5.56% (n=1) non-binary, and 11.11% (n=2) did not specify their gender identity. In terms of sexual orientation, 16.67% (n=3) self-identified as bisexual, 11.11% (N=2) as gay/lesbian, 55.56% (N=10) as heterosexual, 5.56% (N=1) as queer, 5.56% (N=1) as asexual, and 5.56% (N=1) indicated “Other”. The majority of participants 61.11% (N=11) self-identified as White, 22.22% (N=4) as Black, 11.11% (N=2) as Latinx/Hispanic (White), 11.11% (N=2) as Middle Eastern and North African (MENA), 5.56% (N=1) as Asian, 5.56% (N=1) as Alaskan Native, 1 participant identified as Romani, 1 identified as West Indian/American, and 1

participant wrote in that “none of these adequately describe me.” I allowed participants to select as many racial categories as they felt best describe their identity, therefore these numbers are frequencies of categories. The age range of participant was 18-30 years old with the mean age of 22.33 ( $SD=3.40$ ).

## **Measures and Assessment**

**Prescreening measures.** All UMass Boston students were sent an email recruiting them for part one of the study, which contained a Psychdata link. This link included a consent form for part one, a demographic questionnaire, the Difficulties in Emotion Regulation Skills (DERS), DASS-21, Acceptance and Action Questionnaire (AAQ), Multidimensional Experiential Avoidance Questionnaire (MEAQ) (described below), a question asking if they would be interested in being contacted for another related study, and contact information forms for the raffle and for future studies. All measures in this link were presented in a fixed order in order to be consistent across all participants.

***Difficulties in Emotion Regulation Scale (DERS).*** The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item self-report multidimensional measure. Participants indicate how often each item on the scale applies to them on a regular basis, using a 5-point Likert scale. Example items include: “When I’m upset, I feel guilty for feeling that way” and “When I’m upset, I believe that I’ll end up feeling very depressed.” The DERS is composed of items representing six factors of emotion regulation including: awareness and understanding of one’s emotions, acceptance of one’s emotional experience, one’s ability to control impulsive behaviors and continue to engage in goal-congruent behaviors while emotional distress, and lastly the flexible use of situationally appropriate emotion regulation strategies to meet individual goals (Gratz & Roemer, 2004). The DERS has been shown to have adequate

predictive and construct validity, and good test-retest reliability (Gratz & Roemer, 2004). The DERS total score was used to predict individual performance on first laboratory task without emotion regulation instructions. Higher scores indicate more difficulties with regulating emotional experience. Internal consistency in the current sample was .90.

***The Depression, Anxiety, Stress Scales (DASS).*** The Depression, Anxiety, Stress Scales (DASS-21) (DASS-Lovibond & Lovibond, 1995) is a 21-item measure that assesses three symptoms over the past week: depression, anxiety, and stress. The scale ranges from: 0 (Did not apply to me at all) to 3 (Applied to me very much, or most of the time). Examples include: “I found it difficult to relax”, “I found it difficult to work up initiative to do things”, and “I felt I had nothing to look forward to.” The DASS-21 has been shown to have adequate construct validity, internal consistency, temporal stability, and strong reliabilities within community and clinical samples (Henry & Crawford, 2005). In this investigation the anxiety and stress subscales were inclusion criteria such that individuals currently experiencing elevated levels of anxious arousal or general anxiety were contacted for the experimental portion. The target population was individuals who score at or above the moderate range, which is a score at or above a raw score of 10 on the anxiety subscale and/or those who score at or above a raw score of 19 on the stress subscale (Lovibond & Lovibond, 1995). Internal consistency for the stress subscale was .70 and the anxiety subscale was .69.

***Acceptance and Action Questionnaire (AAQ).*** The Acceptance and Action Questionnaire (AAQ) (Hayes et al., 2004) is a self-report measure of experiential avoidance. Participants completed a 22-item version of the AAQ, which can be used to score all validated versions of the AAQ (single factor 16-item, single factor 9-item, or two-factor 16-item). The 9-item version has demonstrated adequate internal consistency (Cronbach’s alpha= .70), and test-

retest reliability ( $r=.64$  in an undergraduate sample over 4 months; Hayes et al., 2004). The 16-item single factor version is highly correlated with the 9-item version, but has demonstrated higher internal consistency and is thought to be more sensitive to change (Hayes et al., 2004), therefore we used the 16-item version scoring for this study. Participants rated the degree to which each statement applied to them on a 7-point Likert scale, where 1 is never true and 7 is always true. The AAQ has been successfully used in other investigations of experiential avoidance using evocative films and images (Tull, Jakupcak, & Roemer, 2010; Sloan, 2004). Sample items include: “I’m not afraid of my feelings”, “Anxiety is bad”, and “When I evaluate something negatively, I usually recognize that this is just a reaction not an objective fact” (reverse scored). Higher scores on the AAQ indicate a habitual or frequent use of experiential avoidance. Scores on this measure were used to predict performance on the first laboratory task. I predicted that those with higher levels of trait EA would have poorer performance on the task. Internal consistency in this sample was .68.

***Multidimensional Experiential Avoidance Questionnaire (MEAQ).*** The Multidimensional Experiential Avoidance Questionnaire (MEAQ) (Gámez et al., 2011) is a newer 62-item self-report measure of experiential avoidance. Participants rate the extent to which they agree or disagree with statement on 6-point Likert scale from strongly disagree to strongly agree. Statements include, “I feel disconnected from my emotions”, “I work hard to keep out upset feelings”, and “Pain always leads to suffering.” The MEAQ has shown adequate internal consistency in community, undergraduate, and clinical samples. We included this addition measure of EA in order to more fully measure and capture the construct of EA. There is evidence the AAQ only captures nonacceptance of distress and interference with values (Gamez et al., 2011). Therefore in order to more fully measure experiential avoidance and all its

multifaceted aspects, such as behavioral avoidance and distraction, we included this additional measure of EA, and also examined whether it predicted poorer performance on the first laboratory task. Higher scores on this measure indicate higher levels of experiential avoidance. Internal consistency in this sample was .95.

### **Emotional Interference Task and State Measures**

***Emotion Interference Task (EIT).*** In the Emotional Interference Task (EIT; Buodo et al., 2002) participants viewed 40 images: 20 neutral and 20 unpleasant images from the International Affective Picture System (IAPS; Lang et al. 2008), in random order, for 6,000 ms each. At either 1,000 ms (stimulus onset asynchrony (SOA)), or 4,000 ms after picture is on the screen, a high- or low-pitched tone was presented. The high tone was set at 2,000 Hz and the low tone was set at 400 Hz (Ortner et al., 2007). Images selected were based on Ortner's 2007 and Buodo's 2002 studies. I selected images based on mean arousal ratings used by these authors who utilized the same task. In Buodo's (2002) investigation the mean arousal for neutral images was 2.88 and threatening images was 6.91. Ortner and colleagues (2013) did not report the mean arousal ratings in their study, but I requested the images they used. The mean arousal rating for their neutral images was 2.74 and mean arousal rating for negative images was 6.32. Therefore, I adhered as closely as possible to these means. The mean arousal rating for the neutral images I chose was 2.80 and mean arousal for negative images was 6.53.

Participants completed the task by viewing the images and then responding as quickly as possible by indicating if the tone they heard was high or low. There was a 1 second inter-stimulus interval (ISI) between picture presentations, meaning that there was a blank screen for 1 second between images. After the images, there was a three-minute recovery period. During this time the screen was blank and the auditory tones were presented again using the same

randomization as during the picture viewing period. Again participants had to indicate if the tone was low or high as quickly as possible. There was a tone presented at either every 1 ms SOA or 4ms SOA with a 1 ISI in between tones. This three-minute recovery period was a deviation from methods used in Ortner's 2013 paper. In order for us to test our hypothesis about recovery effects, we included a recovery period of this length to be consistent with the literature on recovery (See Levitt et al., 2004).

Participants completed the EIT twice, once with instructions to simply complete the task (EIT 1) and a second time with instructions on how to regulate their emotional experience while conducting the task (EIT 2).

*Calculations of EIT.* Emotional interference was calculated separately for reaction time (RT) to tones happening at 1ms SOA and 4ms SOA. This score was calculated by subtracting the mean RTs to tones at neutral images from the mean RTs to unpleasant images (Ortner et al., 2007). Emotional interference recovery was determined by calculating the RT to tones at 1ms SOA and a separate mean for RT to tones at 4ms SOA. Due to a technical error, tones at 4ms SOA were not presented during the picture presentation period. Therefore I only utilized EIT score to 1ms SOA for the EIT score. The recovery period did utilize the 4ms SOA, therefore both 1ms SOA and 4ms SOA recovery scores were utilized.

***State Difficulties in Emotion Regulation Scale (S-DERS).*** The State Difficulties in Emotion Regulation Scale (S-DERS; Lavender et al., 2015) is a 21- item self-report measure of in the moment difficulties of emotion regulation. It was developed from the DERS (Gratz & Roemer, 2004). Participants indicate how much each statement applies to their current emotions, using a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*completely*). Sample items include: "I am embarrassed for feeling this way" and "I am having difficulty controlling my behavior."

The S-DERS contains four factors of state emotion regulation including: nonacceptance of current emotions, limited ability to modulate current emotional and behavioral responses, lack of awareness of current emotions, and lack of clarity about current emotions (Lavender et al., 2015). The S-DERS total scale has been shown to have good internal consistency ( $\alpha = .86$ ) and the Nonacceptance ( $\alpha = .92$ ), Modulate ( $\alpha = .85$ ) and Awareness ( $\alpha = .79$ ) subscales demonstrate adequate to excellent internal consistency. The Clarity subscale ( $\alpha = .65$ ) demonstrated marginal internal consistency, related to the subscale containing only 2 items. Construct validity was examined using other measures of mindfulness, experiential avoidance, emotional intensity and reactivity, and with measures of substance use problems. All positively correlated with measure and in the predicted directions. S-DERS was administered after each EIT in order to investigate whether state difficulties regulating emotion impact performance. Internal consistency at time point one (S-DERS1) was .91 and at time point two (S-DERS2) was .92.

***Positive and Negative Affect Schedule (PANAS).*** The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) is a 20-item state mood adjective checklist designed to measure Positive Affect (PA) and Negative Affect (NA) factors. Participants rate on a 5-point Likert scale from 1 (very slightly or not at all) to 5 (extremely) the extent to which they are currently experiencing the described affective state. For this investigation we only used the negative affect scale. Sample descriptors from this scale include, “upset”, “jittery”, “distressed” and “upset.” This measure was used to assess mood before and after EIT1, the mood induction (i.e., viewing of film) and after EIT2. Internal consistency in this sample measured at the first time point negative affect was .75. For negative affect assessed at the second time point, the internal consistency was .84. For negative affect measured at the third and final time point, the internal consistency was .82.

***Subjective Units of Distress scale (SUDs).*** The Subjective Units of Distress scale (SUDs) (Wolpe, 1982) is a self-report measure used to index in the moment anxiety or distress. Participants indicate on a scale from zero (no anxiety) to 100 (extreme anxiety) their level of current anxiety. The SUDs was used to measure anxiety before and after both EITs and after the fear induction film.

***Mood Induction.*** I chose to use a film in an attempt to increase the level of negative affect, specifically fear, participants experienced before completing the second EIT. Using a film allows for consistency across participants and does not rely on individuals to recall past experiences or use imagination. Films clips have been successfully used in previous studies to elicit emotion in the laboratory (Gross & Levenson, 1995; Sloan, D. 2004; Wolgast et al., 2011). I used a clip from “The Ring” (Verbinski, 2002) because it has been successfully used to induce fear in previous laboratory investigations (Wolgast et al., 2011). This is a three minute and sixteen second clip that depicts a scene in which a family is being haunted by a ghostly figure.

***Emotion Regulation Instructions.*** Instructions for the acceptance condition are taken from Campbell- Sills et al. (2006). Participants assigned to the acceptance condition were given instructions encouraging them to experience their emotions as fully as possible and to refrain from control efforts while completing the EIT. (e.g., “Struggling against relatively natural emotions can actually intensify and prolong your distress;” “Allow yourself to accept your emotions without trying to get rid of them”; Cambell-Sills et al., 2006). Instructions for the suppression condition were an adaptation of Cambell-Sills et al. (2006) and Tull et al. (2000). The suppression instructions instructed participants to control their emotional reactions as much as possible during the task (e.g., “it is possible to experience emotions at lower levels if you really concentrate on controlling them;” “you should not have to put up with more discomfort



and distress than is necessary’’). If they did experience emotions during viewing of the images, they were instructed to try their best to push these emotions away so that they did not feel them (Tull et al., 2000). Full instructions for both these conditions are in Appendix A. Instructions for the control condition simply told participants to complete the task as previously instructed. All participants viewed the fear inducing film clip and then completed the EIT once again using their specified emotion regulation strategy.

## **Procedures**

Participants who were eligible for and interested in the experimental study were scheduled within 2-4 weeks of completing the pre-screening measures, specifically because the DASS-21 is an assessment of emotional state within the previous two weeks. Once participants were contacted and scheduled for their appointment, they were randomly assigned to condition: acceptance, suppression, or view (control). Randomization was done in a block design in order to balance conditions on self-reported levels of acceptance (using the AAQ) and was not completed by the experimenter to keep her blind to the participant levels of acceptance.

Once participants were brought to the lab they completed informed consent. The consent form included the following brief information about the study, “The study involves examining the effects of viewing unpleasant pictures on attention and emotion. I have been advised that in the study, I shall be asked to complete a task on the computer. In this task, I shall be viewing pictures of unpleasant and neutral scenes and pressing a button as quickly as I can every time I hear a tone. While viewing the pictures, I may also be asked to think about the picture in a particular way.” (Ortner et al., 2013). They were asked to silence or turn off their cellular phones to minimize distraction. They were also informed that they could stop their participation at any time.

Participants were told to keep their focus on the computer screen because images would begin to appear on the screen that they must attend to (Buodo et al., 2002; Ortner et al., 2007; Ortner et al., 2013). They were informed that the first portion was a practice trial with four images, where periodically they heard either a high or low pitch auditory tone. They responded to this tone as quickly as possible by pressing button #1 if the tone was high pitch and button #2 if the tone was low pitch. Participants placed headphones on and completed the practice trial. Once the practice trial was over, the experimenter informed participants to keep headphones on and keep eyes on the screen even when images don't appear, and keep responding to the tones, until the experimenter informs them otherwise. Then the experimenter informed participants that for the remainder of the study they would be in the adjacent room communicating with them via an intercom. This was done to minimize demand effects.

First participants were instructed to complete a PANAS and SUDS questionnaires. Then they completed the EIT1. Once EIT1 was complete (including the three minute recovery period), the experimenter used the intercom to instruct participants to complete a second PANAS, second SUDS, and the first S-DERS. Participants used the intercom to inform the researcher when they completed the questionnaires. The experimenter then informed participants they would be listening to instructions on how to approach the following video and EIT2. Participants read along while listening to manipulation instructions. After the instructions, participants watched the film clip, rated their current their current level of distress using the SUDS (third SUDS), and then completed the final EIT. Once EIT2 was complete participants again complete a third PANAS, fourth SUDS, second S-DERS, and a manipulation check (described below) on paper. Lastly, they viewed an uplifting clip from the Chocolate Factory episode of "I love Lucy" and then debriefed about the study.

**Manipulation Check.** The manipulation check was adapted from Campbell-Sills et al. (2006b). It included a true/false questionnaire that tests participants' understanding of the instructions that were presented (e.g., “During the task, I should try to suppress my emotions as much as possible;” the correct answer was “true” for the suppression group and “false” for the acceptance group). Also participants were asked, “How able were you to follow the instructions during the task?” Participants rated their ability to follow the instructions on a 0–8 scale (0 not at all able to, 8 completely able).

**Behavioral Assessment.** Once the task was done participants were asked how willing they are in viewing another set of images on a 5-point scale (0 – 4) scale, where 0 is not willing at all and 4 is willing (Levitt et al., 2004). This was a measure of behavioral engagement or avoidance.

### **Restated Hypotheses**

Hypothesis 1a predicted that the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) would be positively related to ability to disengage and recover from an emotionally arousing task as measured by reaction time in the Emotion Interference Task (EIT1; Buodo et al., 2002) and recovery from task. It was also hypothesized in hypothesis 2b that the Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004) and the Multidimensional Experiential Avoidance Questionnaire (MEAQ; Gámez et al., 2011) would be positively associated with ability to disengage and recover from an emotionally arousing task again using EIT1 and EIT recovery (Buodo et al., 2002). Hypothesis 3c predicted that the State Difficulties in Emotion Regulation Scale (S-DERS; Lavender et al., 2015) would be positively related to ability to disengage and recover from an emotionally arousing task as measured by reaction time in the EIT1 and recovery from task EIT1.

Hypothesis 2a states that those instructed to use acceptance strategies would more quickly disengage and recover from an emotionally arousing task (EIT2) compared to those using suppression or no strategy. Hypothesis 2b predicted that those instructed to use acceptance would report lower levels of negative affect from the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Hypothesis 2c predicted that those instructed to use acceptance would be more willing to view another set of images in the task.

## CHAPTER 4

### RESULTS

Tests of normality were conducted on all primary study variables. Several EIT variables were significantly skewed. The recovery score from the EIT1 at 4ms SOA was skewed, therefore a log transformation was used to transform the variable. Scores of the EIT2 at 1ms SOA contained an outlier, therefore I used a winsorization transformation in order to retain the variable while mitigating the impact of the outlier. EIT2 recovery at 1ms SOA was also skewed and was normalized using a square root transformation. The second assessment of negative affect (PANAS\_NA2) and the state emotion regulation difficulties (S-DERS) measure at both time points during the experimental portion of the study were not normally distributed. Logarithmic transformation was used to normalize the measure of negative affect. The two measures of state emotion regulation (S-DERS) were significantly positively skewed. Therefore the first S-DERS was transformed by using the reciprocal values, and the second S-DERS was transformed using a logarithmic transformation. The second manipulation check variable was significantly negatively skewed, therefore the variable was reflected, a logarithmic transformation was used, and the variable was reflected back to its original direction. Unfortunately, the manipulation check variable, which consisted of one question, was still slightly skewed, but I decided to use the closest to normal variable possible. The behavioral assessment variable was also significantly skewed and had limited range of values, therefore I transformed it into a dichotomous variable. The scale ranged from 0 (not willing) to 4 (willing). Low willingness to view another set of images was captured by those who indicated a 3 or lower and high willingness were those who indicates a 4 on the behavioral assessment of willingness. All other study variables were normally distributed.

Again this investigation was a pilot study, therefore the analyses were all underpowered and exploratory in nature. Since this study was underpowered, I will examine and interpret effect sizes rather than solely report and analyze significance levels.

### **Equivalence of Conditions on Key Variables**

To ensure that condition assignments were balanced on trait levels of acceptance, an ANOVA was conducted to examine trait acceptance (AAQ) across conditions. There were no significant differences of trait acceptance based on condition,  $F(2,15)= 1.00, p=.39, \eta^2= .12$ . The partial eta square value of .12 was a medium to large effect size, indicating that the magnitude of this relationship is strong and potentially significant with more power. Those in the suppression group reported higher levels of experiential avoidance (AAQ) and conversely lower levels of trait acceptance than those in the other two conditions. See Table 1. This is a potential confound in the results and indication that the groups were not balanced across this trait.

Separate ANOVAs determined that conditions were statistically equivalent across other relevant traits and measures of stress and anxiety. There was no statistically significant difference between condition on trait acceptance (MEAQ),  $F(2,15)= .35, p=.71, \eta^2=.04$  and difficulty with emotion regulation (DERS),  $F(2,15)= .46, p=.64, \eta^2=.06$ . The conditions also did not differ significantly based on baseline level of anxiety, (DASS\_Anxiety),  $F(2, 15)=2.73, p=.10, \eta^2=. 27$ , and did not differ in baseline levels of stress (DASS\_stress),  $F(2,15)= .70, p=.51, \eta^2=. 09$ . However, anxious arousal assessed with DASS\_anxiety had a large effect size ( $\eta^2=. 27$ ), with those in the suppression group reporting higher levels of anxious arousal than those in the acceptance and control conditions. See Table 1. This is another potential indication that those in the suppression group may be systematically different than the other two groups.

Table 1

*Means and Standard Deviations of Untransformed Variables of Interest*

Variable	Acceptance	Suppression	Control
AAQ	64.83 (8.13)	72.17 (13.20)	64.67 (9.27)
DASS_An timer	17.33 (9.09)	24.33 (8.24)	14.33 (4.80)
DASS_Stress	23.00 (7.24)	23.33 (8.82)	18.67 (6.65)
DERS	103.33 (17.13)	91.50 (24.82)	101.77 (26.77)
MEAQ	201.06 (66.11)	192.93 (52.63)	217.50 (32.25)

*Note.* AAQ= Anxiety and Action Questionnaire, DASS-A = Depression Anxiety and Stress Scale-Anxious Arousal Subscale; DASS-S = Depression Anxiety and Stress Scale- General Anxiety Subscale; MEAQ= Multidimensional Experiential Avoidance Questionnaire; DERS= Difficulties with Emotion Regulation Scale

**Manipulation Check**

In order to ensure that participants followed the emotion regulation instructions they were given, I asked them to answer two questions to assess their understanding of the instructions. These questions were answered after they completed EIT2. Participants were asked to respond to a true/false question asking, “During the task, I should try to suppress my emotions as much as possible;” the correct answer was “true” for the suppression group and “false” for the acceptance group. 100% of those in the acceptance condition responded correctly by indicating “false.” In both the suppression and control conditions one participant in each group answered incorrectly.

Also participants were asked, “How able were you to follow the instructions during the task?”, and rated their ability to follow the instructions on a 0–8 scale (0 not at all able to, 8 completely able). There was no statistically significant difference between the acceptance

(untransformed  $M=6.00$ ,  $SD=2.61$ ) and suppression (untransformed  $M=5.33$ ,  $SD=1.75$ ) conditions,  $t(10) = -.81$ ,  $p = .45$ .

Finally, there was no significant difference in self-reported levels of distress before ( $M=26.44$ ,  $SD=20.28$ ) and after the film (mood induction) ( $M=32.22$ ,  $SD=25.38$ ),  $t(17) = -0.81$ ,  $p = .43$ . This suggests that the fear induction was not successful in inducing significant levels of distress in this sample.

### Correlational Results

The first set of hypotheses focus on the relationship between both trait and state emotion regulation ability and acceptance, and participants' ability to disengage their attention from unpleasant stimuli and recovery (performance on EIT1 and recovery from EIT1). To examine these hypotheses, correlations between the self-reported trait variables DERS, AAQ, MEAQ and outcomes variables, EIT1 and EIT1 recovery were conducted. See Table 2.

Table 2

#### *Zero Order Correlations AAQ, MEAQ, DERS, EIT1*

Variable	EIT1_1ms	EITrecovery1ms	EITrecovery4ms
DERS	.17	-.32	-.36
AAQ	-.00	-.46	-.42
MEAQ	-.07	-.06	-.05

*Note.* No values were significantly correlated. EIT1ms\_soa= Emotional Interference task 1\_1 second stimulus onset asynchrony; EIT1recovery1ms soa=Emotional Interference task 1 recovery\_1second stimulus onset asynchrony; EIT1recovery4ms soa=Emotional Interference task 1 recovery\_4ms stimulus onset asynchrony; DERS= Difficulties with Emotion Regulation Scale; AAQ= Anxiety and Action Questionnaire; MEAQ= Multidimensional Experiential Avoidance Questionnaire



In addition, partial correlations were conducted of these trait variables and EIT variables, while controlling for baseline PANAS negative affect scores. See Table 3.

Table 3

*Correlations Controlling for Baseline Negative Affect*

Variable	EIT1_1ms	EITrecovery1ms	EITrecovery4ms
DERS	.16	-.25	-.31
AAQ	-.02	-.42	-.38
MEAQ	-.08	-.02	-.02

*Note.* No values were significantly correlated. EIT1ms\_soa= Emotional Interference task 1\_1 second stimulus onset asynchrony; EIT1recovery1ms soa=Emotional Interference task 1 recovery\_1second stimulus onset asynchrony; EIT1recovery4ms soa=Emotional Interference task 1 recovery\_4ms stimulus onset asynchrony; DERS= Difficulties with Emotion Regulation Scale; AAQ= Anxiety and Action Questionnaire; MEAQ= Multidimensional Experiential Avoidance Questionnaire

The first study hypothesis predicted that emotion regulation abilities would be positively related to ability to disengage and recover from the first EIT while controlling for baseline negative affect (in other words, DERS would be positively related to longer reaction times, because longer reaction times indicate inhibited responding to neutral tones). Partial correlations revealed no statistically significant correlation between EIT1 interference score and trait emotion regulation difficulties (DERS),  $r(14) = .16$ , n.s. See Table 3 for means and standard deviations. Correlations between recovery scores and difficulties with emotion regulation revealed a negative relationship, with a small to medium effect size, with a correlation of  $r(14) = -.25$  with EIT1 recovery at 1ms, and  $r(14) = -.31$  with EIT1 recovery at 4ms. This non-significant, medium sized negative relation is not in the predicted direction and does not support the first study

hypothesis. Surprisingly these results indicate that participants with more difficulties regulating their emotions actually responded to tones nonsignificantly more quickly.

The hypothesis also predicted that trait levels of experiential avoidance would be positively related to ability to disengage and recover from EIT1 after controlling for baseline negative affect (i.e., that higher AAQ scores (higher EA) would be positively correlated with longer reaction times). Partial correlations controlling for negative affect revealed no statistically significant correlation between EIT1 interference score and trait levels of experiential avoidance (AAQ),  $r(14) = -.02$ . See Table 3 for means and standard deviations. Correlations between recovery scores and trait experiential avoidance revealed a negative relationship, with a medium effect size, with correlational of  $r(14) = -.42$  with EIT1 recovery at 1ms, and  $r(14) = -.38$  with EIT1 recovery at 4ms. This nonsignificant, medium sized negative relation is also not in the predicted direction and does not support the first study hypothesis. This result indicates that participants with more habitual use of experiential avoidance were able to respond to tones nonsignificantly more quickly.

Next correlations between state emotion regulation ability and attentional disengagement and recovery were conducted to see if concurrent emotion regulation was associated with these outcomes. See table 4 for correlations between S-DERS and EIT 1 and recovery from EIT 1.

Table 4

*Zero Order Correlations DERS and EIT1*

Variable	EIT1_1ms	EITrecovery1ms	EITrecovery4ms
S-DER1	-.20	.27	.10

*Note.* No values were significantly correlated. EIT1ms\_soa= Emotional Interference task 1\_1 second stimulus onset asynchrony; EIT1recovery1ms soa=Emotional Interference task 1 recovery\_1second stimulus onset asynchrony; EIT1recovery4ms soa=Emotional Interference

task 1 recovery\_4ms stimulus onset asynchrony; S-DERS1= State Difficulties with Emotion Regulation

In addition partial correlations were conducted between S-DERS, while controlling for baseline negative affect (PANAS\_NA) scores. See table 5.

Table 5

*Correlations Controlling for Baseline Negative Affect*

Variable	EIT1_1ms	EITrecovery1ms	EITrecovery4ms
S-DER1	-.19	.00	-.20

*Note.* No values were significantly correlated. EIT1ms\_soa= Emotional Interference task 1\_1 second stimulus onset asynchrony; EIT1recovery1ms soa=Emotional Interference task 1 recovery\_1second stimulus onset asynchrony; EIT1recovery4ms soa=Emotional Interference task 1 recovery\_4ms stimulus onset asynchrony; S-DERS1= State Difficulties with Emotion Regulation

State difficulties with emotion regulation (i.e., in the moment ability to regulate one's emotional experience) and EIT1 1ms score were nonsignificantly negatively correlated, with a small to medium effect sizes  $r(14) = -.19$ , n.s. These findings also do not support the study hypothesis, with a nonsignificant association in the opposite direction of predictions. State difficulties with emotion regulation and EIT1 recovery at 1ms had no relation,  $r(14) = .00$ , n.s. and EIT1 recovery at 4ms were nonsignificantly negatively correlated,  $r(14) = -.20$ , n.s. The negative relation between recovery and S-DERS is also contrary to study prediction and indicate that those with more difficulty regulating their emotions in the moment were able to respond to the tones more quickly. In conclusion, the first hypothesis was not supported.

## **Experimental Results**

Next the effects of the emotion regulation instructions (acceptance, suppression, and no instructions) on attentional disengagement, recovery, and negative affect were examined.

Separate ANCOVAs were conducted to compare the ways in which acceptance, suppression and control manipulations influenced emotion interference during task 2 (EIT 2), and emotional interference during the recovery period of task 2 (EIT2 recovery), while controlling for performance on EIT1 and recovery from EIT1 respectively. Post-hoc analyses examined which groups significantly differed on these outcomes. In addition, an ANCOVA was conducted to examine the condition effects on negative affect scores (PANAS) after the recovery period of EIT2, controlling for PANAS negative affect scores after the film.

I predicted that those instructed to use acceptance strategies would better disengage (i.e., have quicker response times), and recover from the negative images compared to those using suppression or no strategy. A one- way ANCOVA was conducted to determine differences between conditions on attentional disengagement from negative images, while controlling for performance on the task prior to the manipulation. There was no statistically significant main effect of condition, although effect size was large,  $F(2, 12) = 2.52, p = .12, \eta p^2 = .30$ .

Table 6

*Mean of EIT2 at 1ms SOA*

Variable	Unadjusted Mean (SD)	Adjusted Mean (SE)
Acceptance	24.50 (107.35)	49.65 (31.42)
Suppression	-35.72 (97.16)	-27.19 (29.38)
Control	48.63 (19.56)	50.31 (29.45)

*Note.* EIT2 1ms SOA= Emotional Interference task 2 at 1 second stimulus onset asynchrony

The means indicate that participants using suppression ( $M = -27.18, SE = 29.38$ ) were able to more quickly disengage their attention from threat images than those using acceptance ( $M = 49.65, SE = 31.42$ ) and the control group ( $M = 50.31, SE = 29.45$ ) suggesting this strategy may

be more beneficial in the short-term. In fact, those in the suppression condition responded more quickly to threat versus neutral images. See Table 6. The large effect size indicates that the relationship between condition and attentional disengagement from fearful images, although not statistically significant, may be meaningful and likely to be significant with a larger sample size

Then two one-way ANCOVAs were conducted to determine differences between acceptance, suppression, and control on response times to tones during the recovery period from emotional interference task (EIT2), while controlling for response times during the recovery period from EIT1. The first ANCOVA for recovery from EIT2 of tones at 1ms revealed a nonsignificant, but large main effect of condition,  $F(2,12)= 3.15, p=.08, \eta p^2=.35$ . Those utilizing acceptance ( $M=676.26, SE=61.59$ ) responded to tones during the recovery period more quickly than those using suppression ( $M=722.62, SE=61.83$ ) and those in the control group ( $M=698.74, SE=56.72$ ), relative to their performance prior to the manipulation (i.e., adjusting for their scores during the first EIT). See Table 7 and Figure 1. These nonsignificant trending findings do support the study hypothesis.

Table 7

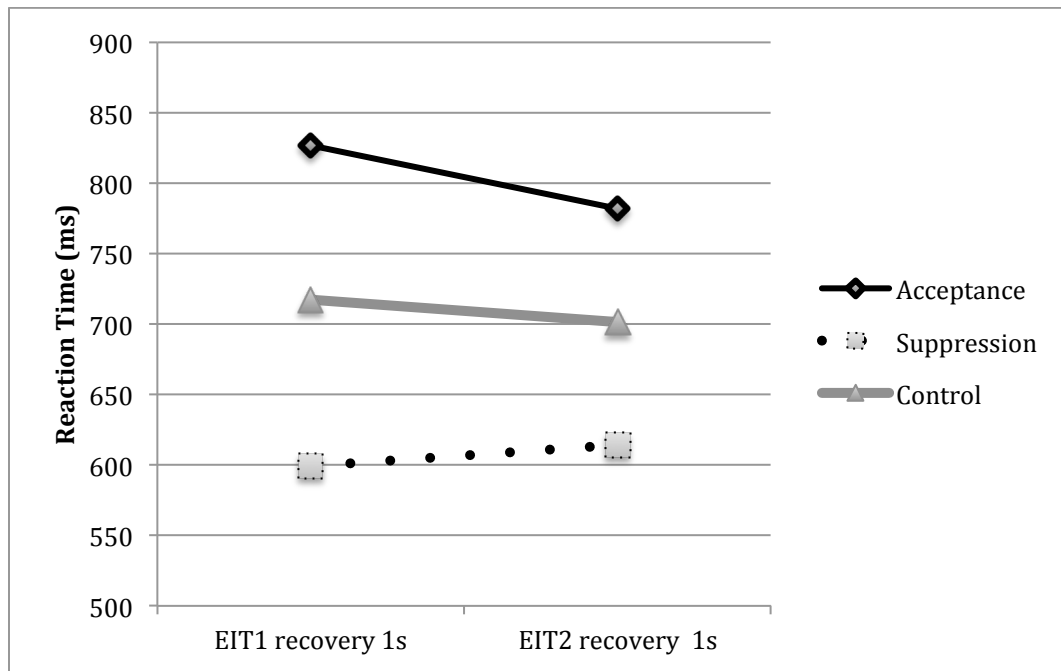
*Mean of Recovery at EIT2 at 1ms SOA*

Variable	<u>Unadjusted Mean (SD)</u>	<u>Adjusted Mean (SE)</u>
Acceptance	782.03 (297.24)	676.26 (61.59)
Suppression	614.15 (74.10)	722.62 (61.83)
Control	701.44 (187.04)	698.74 (56.72)

*Note.* EIT2 1ms SOA= Emotional Interference task 2 at 1 second stimulus onset asynchrony

Figure 1

*Unadjusted Means of Reaction Time During Recovery of EIT1 and EIT2 at 1ms SOA*



The second ANCOVA investigated recovery of EIT2 and RT to auditory tones at 4ms. The main effect of condition was nonsignificant, but medium to large in effect size,  $F(2,12)=.70$ ,  $p=.52$ ,  $\eta p^2=.10$ . Those utilizing acceptance ( $M=691.60$ ,  $SE=53.10$ ) were quicker to respond to tones during the recovery period than those in the suppression ( $M=719.14.58$ ,  $SE= 86.69$ ) and control conditions ( $M=695.16$ ,  $SE=48.99$ ), relative to their performance prior to the manipulation (i.e., adjusting for their scores during the first EIT. See Table 8 and Figure 2. These nonsignificant, but large effect size findings do support the study hypotheses about the influence acceptance would have on attentional disengagement. These findings indicate that acceptance may actually allow individuals to recover from negative stimuli more rapidly, and/or that, conversely, suppression may slow recovery from negative stimuli.

Table 8

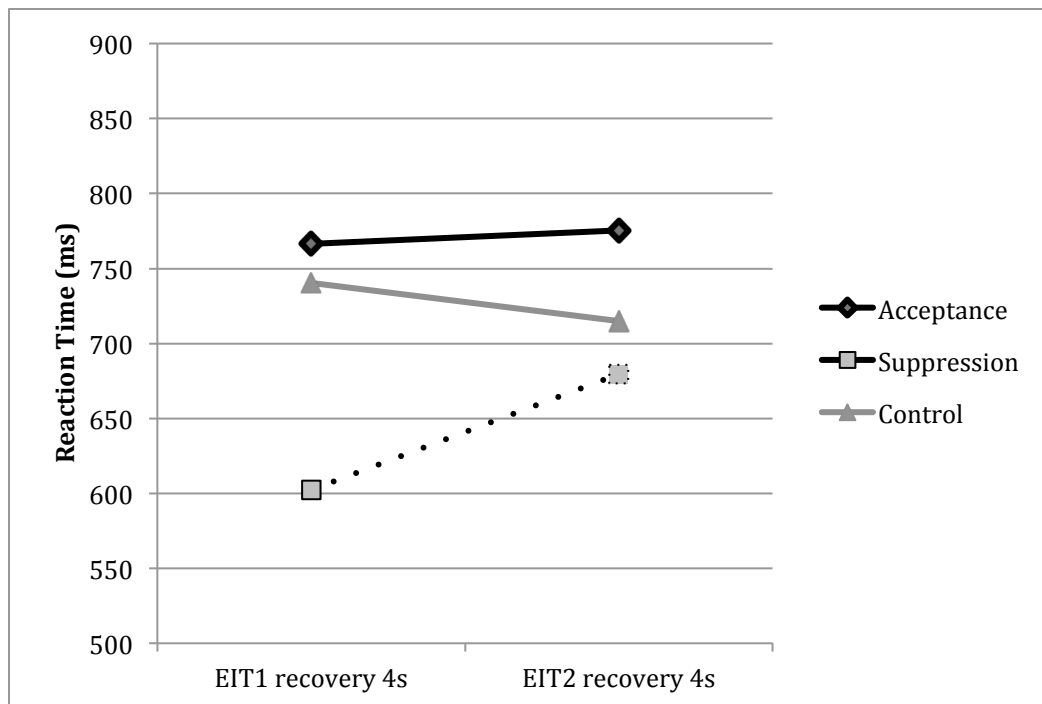
*Means of Recovery at EIT2 at 4ms SOA*

Variable	Unadjusted Mean (SD)	Adjusted Mean (SE)
Acceptance	775.50 (254.64)	691.60 (53.10)
Suppression	679.58 (102.76)	719.14 (86.69)
Control	714.92 (237.18)	695.16 (48.99)

*Note.* EIT2 1ms SOA= Emotional Interference task 2 at 4 second stimulus onset asynchrony

Figure 2

*Unadjusted means of reaction time during recovery of EIT1 and EIT2 at 4ms SOA*



In order to more closely examine the change across tasks, I looked at the mean reaction time during recovery of first and second EIT across groups. These means and standard deviation are reported in Table 9. Those in the suppression group were quickest to recover in the first task (without manipulation). This will be discussed further below.

Table 9

*Mean and Standard Deviations of EIT1 recovery during 1ms and 4 ms SOA*

Variable	EIT1 1msSOA	EIT 1 4msSOA
Acceptance	826.69 (132.07)	766.44 (201.62)
Suppression	599.10 (61.47)	602.30 (56.03)
Control	717.20 (251.63)	740.25 (269.93)

*Note.* EIT11ms SOA= Emotional Interference task 1 at 1 second stimulus onset asynchrony;  
EIT1 4ms SOA= Emotional Interference task 1 at 4 second stimulus onset asynchrony

A final ANCOVA was conducted to determine condition effects of negative affect after the EIT2, while controlling negative affect after the EIT1. The ANCOVA main effect of condition revealed was non-significant, with a medium effect size,  $F(2,11)=.42$ ,  $p=.67$ ,  $\eta p^2=.07$ . Although conditions did not differ in negative affect, those in the suppression group ( $M=13.90$ ,  $SE=1.40$ ) reported lower levels of negative affect than those in the acceptance ( $M=17.34$ ,  $SE=1.58$ ) and control groups ( $M=15.11$ ,  $SE=1.80$ ). See Table 10. These nonsignificant, medium effect size findings do not support the study hypothesis.

Table 10

*Means of negative affect*

Variable	<u>Unadjusted Mean (SD)</u>	<u>Adjusted Mean (SE)</u>
Acceptance	16.20 (3.55)	17.34 (1.58)
Suppression	13.67 (3.93)	13.90 (1.40)
Control	17.40 (5.59)	15.11 (1.80)

A chi-square test of independence was performed to examine the relation between willingness to view another set of images and emotion regulation instructions used by



participants. The relation between these variables was significant,  $\chi^2 (2, N = 18) = 8.55, p = .01$ . All participants (i.e. 100%) in the suppression group had high willingness (indicated a 4 on the behavioral assessment measure) to view another set of images. Half of the participants in acceptance condition indicated high willingness. Those in the control condition were mostly in the low willingness category with 62.5% indicating low willingness to view another set of images.

## **CHAPTER 5**

### **DISCUSSION**

This study hoped to elucidate the ways in which acceptance, a proposed mechanism of change in ABBTs (Hayes, S.A et al., 2010; Arch & Craske, 2008; Arch et al., 2012a; Twohig et al., 2010; Niles et al., 2014), helps make clinically meaningful change for individuals who are experiencing elevated levels of anxious arousal and generalized anxiety. Research suggests that anxiety is maintained and exacerbated through prolonged engagement with threatening information (Constans, 2005; Elzinga & Bemmmer, 2002) and that the ability to flexibly shift attention in arousing situations can help alleviate distress (Bardeen & Orcutt, 2011; Bardeen & Read, 2010). Therefore I investigated how emotion regulation strategies, acceptance and suppression, impact attention and potentially increase attentional flexibility. Specifically, I examined whether acceptance could help individuals experiencing moderate to high levels of anxiety disengage their attention from negative images, recover from this distress, mitigate negative affect, and increase behavioral willingness. These negative images were part of a dual task paradigm (i.e., the emotional interference task), which measured the time individuals took to respond to the distractor stimuli (i.e., auditory tone) while viewing negative images. Reaction time to auditory tones was a proxy measure for attentional disengagement and flexibility. To assess recovery, participants responded to the distractor stimuli while looking at a blank screen (not viewing negative images); recovery was calculated using reaction time to tones.

In order to investigate these relations, I conducted both correlational and experimental analyses. For the correlational analyses I investigated the relations between dimensional self-ratings of trait and state emotion regulation ability, trait acceptance, disengagement from viewing distressing images, and recovery from distress. For the experimental analyses, I investigated

which emotion regulation strategy- acceptance or suppression- would allow individuals to disengage and recover from the negative images more quickly, controlling for performance prior to the manipulation. I also investigated which emotion regulation strategy would lead to lower levels of self-reported negative affect and higher willingness to view more distressing images.

Correlational hypotheses were not supported and results indicated that there was no significant relation between attentional disengagement from negative images (EIT1), and trait experiential avoidance, trait difficulty with emotion regulation, and state difficulties with emotions regulation. Therefore the hypotheses that fewer difficulties with emotion regulation and higher levels of trait acceptance (lower levels of EA) would facilitate quicker disengagement and recovery on the task were not supported. There may be moderating factors that could have more specifically impacted this relation that were not assessed in this study. Since this was a heterogeneous sample of anxious and stressed individuals, the images presented in the task may have been too varied to truly impact attention, especially in such a small sample. There also may be a more nuanced relation between these trait characteristics and attention that research needs to further elucidate. Also, the small sample size of the experimental portion of this study is a major limitation to this investigation. The lack of power to find effects in the correlational findings indicates need for larger sample. Once all limitations of the study are further discussed in later sections, implications of these findings will be discussed.

When assessing whether these characteristics would predict recovery from the task, there were nonsignificant, but medium to large negative relations, such that those with higher levels of experiential avoidance (lower levels of acceptance) and more difficulty with emotion regulation were able to respond to tones more quickly during recovery. Although these findings were not statistically significant, this may suggest that individuals' who more habitually use suppression

towards distress may have had more intact attention allowing them to recover from exposure to threat more quickly. This also may suggest that when individuals habitually utilize suppression, it is less likely to impact their attention during a brief, time limited task. Also difficulty with regulating one's emotion in the moment (state) was not related to disengagement from negative images and recovery. The trait findings are quite surprising, and with a larger sample findings could indicate that dysregulation is correlated with no difficulty performing this attentional task and quicker recovery from the task. On the other hand a larger sample could also weaken this relation and indicate that there is no relation between these trait factors and performance in this attentional task and recovery from the task. These findings indicate that more research is needed to understand how these trait characteristics impact attentional disengagement and the ability to recover.

Experimental hypotheses predicted that those instructed to use acceptance during the task would more quickly disengage their attention and recover from distress. Results revealed that that there was no statistically significant difference between groups (acceptance, suppression, control) on disengagement from images and the ability to recover from the task. Therefore, the emotion regulation strategy that participants were assigned to use did not significantly impact their ability to respond to auditory tones while viewing negative images and recover from distressing images.

There was a medium to large effect size findings that may be telling with a larger sample. Those in the suppression group were able to disengage their attention from negative images more quickly than those in the other two conditions. Recovery from task (response time to tones without images) indicated an interesting relation. Those in the acceptance condition were quickest to recover from the task after controlling for recovery from the first task (EIT1).

Interestingly, when *not* controlling for recovery from EIT1, those in the suppression group actually were quicker to recover from this task. When comparing means in EIT1 those in the suppression group indeed had quicker recovery, but after the instructions were followed and recovery from EIT1 was controlled for, those using acceptance more quickly recovered during EIT2. This potentially indicates that acceptance in the moment may help with quicker attentional recovery after viewing threatening images. Conversely, explicit instructions to use suppression actually slowed participant response time during recovery and therefore slowed their recovery. It is important to highlight that there are several baseline differences between groups, therefore these findings may be due to differences between the groups rather than the independent variable (emotion regulation instructions). No firm conclusions can be made because of these differences and further implications will be explored in a later section.

Results in the correlational analyses suggest that those who habitually use experiential avoidance may be more able to more quickly disengage from negative images and recover more quickly. However, the experimental findings offer some indication that utilizing acceptance might lead to faster reaction times after the EIT or that using suppression might slow reaction times during the recovery period, although participants in the suppression condition reported nonsignificantly less negative affect at the end of the study. Lastly, everyone in the suppression group, while only half of those in the acceptance group, were highly willing to view another set of images; more than half of those in the control group were in the low willingness group. The implication of these findings will be discussed further below.

## **Limitations**

Before further interpretation of these findings and their implications, it is important to acknowledge limitations of the study. First, this was a pilot study, therefore the sample size was

small and all interpretations are of effect sizes since none of the results were statistically significant. Therefore these results and interpretations are preliminary, because findings may or may not hold up in a larger sample. Also, conditions were not balanced on certain key characteristics. Participants in the suppression group had higher levels of experiential avoidance or lower levels of acceptance. Participants in the suppression condition also had higher levels of anxious arousal (DASS\_anx) than those in the acceptance and control groups. These differences indicate that individuals in the suppression group were characteristically different than the acceptance and control groups. These potential confounds need to be carefully taken into consideration when interpreting the results which will be further discussed below.

Also participants did not report a significant difference in levels of distress after the film. This suggests that the film was not successful in inducing significant levels of distress in this sample. It is possible that participants did not experience the film as distressing because they may have already seen the film. Also, individuals are exposed to events in their daily lives (e.g., death, news exposure, trauma, discrimination, assault) that are more distressing than a film which is fantasy. I conducted post-hoc exploratory analyses of distress before and after the first EIT. There was a significant increase in distress from before the first EIT ( $M=23.88$ ,  $SD=24.56$ ) and after the completion of EIT1 ( $M=36.09$ ,  $SD=19.18$ ),  $t(10)=-.60$ ,  $p<.00$ , indicating that the images in the task were distressing. Therefore distress did increase but not because of the film; instead the task itself may have elevated distress. Again I looked at the trajectory of distress by comparing distress after the film ( $M=32.22$ ,  $SD=25.37$ ) and distress at the end of EIT2 ( $M=31.50$ ,  $SD=22.35$ ) and they did not significantly differ,  $t(17)=.17$ ,  $p=.87$ . Importantly, the mean peak distress in this sample was in the 30s (on a 0-100 scale) indicating some distress, but potentially not enough to be analogous to real life distress. This is a limitation of conducting

experimental studies where participants are placed in an artificial setting and asked to call upon emotions that happen in very different contexts.

Lastly, both the suppression and control groups had one participant in each group who answered the manipulation check question incorrectly, suggesting that they did not follow the appropriate emotion regulation instructions. Considering the very small sample size, one participant that did not follow the instructions correctly may have had an impact on the results. With this information, I reanalyzed the data without these two participants and findings remained the same, indicating that this may not have impacted results.

## **Interpretation and Implications of Findings**

### **Correlational Interpretation and Implications**

Although none of the correlational findings were statistically significant, it is important to note that individuals with higher levels of trait experiential avoidance and more difficulties regulating their emotions demonstrated medium effect size negative relations with recovery from the first task. This suggests that these participants may have been able to more quickly respond to auditory tones during recovery period even though they reported more avoidance and dysregulation in general. These findings are surprising because literature suggests that efforts to suppress internal experiences, although they can alleviate distress in the short term, have paradoxical rebound effects in the longer term by actually increasing the severity and frequency of these internal experiences (Hayes, et al 2006; Wegner et al 1987; Abramowitz, Tolin & Street, 2001). The habitual use of suppression theoretically should have increased reaction time during the task and led to longer recovery periods. One important consideration is that the recovery period was actually very close in time to the task therefore this may not capture an actual “long term” rebound effect. These findings could have exemplified the short-term benefits of

suppression when directed at a specific, time limited task. On the other hand, participants' habitual use of this strategy muddies this interpretation. The finding that dysregulation is nonsignificantly related to quicker attentional disengagement and recovery is still puzzling and needs to be further investigated with a larger sample size.

### **Experimental Interpretation and Implications**

Again, although not statistically significant, the experimental results suggest that suppression could have facilitated disengagement from viewing negative stimuli and lower levels of negative affect at the end of the study if a larger sample were used. Suppression therefore could have facilitated flexible attention during the task, but it is not clear through what mechanism this happened. It is also possible that with a larger sample these effects may weaken so that the potential relation is no longer supported. Also, it is important to remember that those in the suppression group had higher levels of anxious arousal, therefore this short-term benefit of suppression while anxious could have helped their performance and elicited short term benefits. Since both acceptance and suppression utilize cognitive demands, there is little prior evidence to suggest that either strategy would have led to faster disengagement while viewing negative images.

On the other hand, the results from the recovery period suggest that acceptance could have facilitated quicker recovery from task after controlling for performance on EIT1. This finding is complicated by the fact that before controlling for performance on EIT1, those in the suppression group had quicker recovery reaction times. Exploratory analyses revealed that those in the suppression group were actually faster to recover during the first EIT before using any emotion regulation instructions. Therefore suppression may have actually slowed performances or hampered attention during recovery in EIT2 or acceptance may have sped up performance



from EIT1.. In a study examining the use of emotional suppression and acceptance in a sample of depressed individuals, results indicated that although the acceptance group experienced more sadness in response to a sad film clip, their level of sadness decreased more steeply in the recovery period (Liverant et al., 2008), which is consistent with our results. Similarly, Ortnier, Zelazo, and Anderson (2013) investigated the effects of reappraisal and suppression on attention using the EIT. During their post-picture presentation period, analogous to this study's recovery period, results revealed no effect of condition, but exploratory analyses revealed that participants using suppression in response to unpleasant images were significantly slower to respond to the distractor stimulus. This evidence and this investigation's results points to the way in which acceptance may have residual effects that do not appear in the height of distress, or suppression may have residual negative effects. Acceptance may facilitate a quicker path to recovery from a heightened state of arousal, or suppression may interrupt recovery. Recovery measured here is in the form of quicker or more attentional engagement or flexibility. When looking closely at the mean reaction times of those in the acceptance condition, the quicker recovery may indicate that acceptance can help individuals more quickly regain attentional control. Although these differences are not statistically significant, it would be interesting to see if with a larger sample size these differences emerge as significant. Alternatively, the baseline group differences of experiential avoidance, anxious arousal, and negative affect may be impacting these findings, therefore it is hard to make any conclusions about the emotion regulation strategies impact on attention.

Interestingly, everyone in the suppression group, while only half of those in the acceptance group were highly willing to view another set of images. Considering that those in the suppression group nonsignificantly reported less negative affect after the tasks, they may

have found the task less aversive than those in the acceptance group, thereby increasing their willingness. Those experiencing more negative affect would be less willing to engage in a task arousing negative affect. This is in contrast to two other studies which found that individuals in the acceptance groups were significantly more willing to engage in a second CO<sub>2</sub> challenge than other groups (Levitt et al., 2004) and more willing to participate in another distressing task (Tull et al., 2010). Although these studies indicate contrasting findings, an important consideration is that the film did not increase levels of distress in the sample, yet the first task did. Also, the level of distress indicated some distress, but was not analogous to real life situations that these participants may endure on a day-to-day basis. Participant distress did not significantly change after the movie and EIT2, therefore willingness towards something that did increase distress is not exactly being captured here. This is one limitation of conducting laboratory based experimental studies; external validity is limited.

Another very important implication about this study is that the task itself may not be tapping into attention, disengagement, or flexibility in ways that are generalizable to other circumstance and more importantly to clinical circumstances. Assessing reaction times to distractor tones was used as a proxy measure for disengagement, but these preliminary findings may call into question the validity or usefulness of this task in assessing attention. Also the images, film, and complete task may not have taxed cognitive demands/load as expected.

I utilized this task in an attempt to capture a clinical phenomena where individuals with elevated anxiety attend to more threatening stimuli in their environment, and the prolonged engagement with threat or negative images maintains anxiety symptoms. Also there is evidence that flexibility in attention can help alleviate some of this distress and anxiety. Therefore the task's intended effect was to assess the ways in which different emotion regulation strategies

impact attentional disengagement and flexibility. Responding to distractor tones may not have captured flexibility in attention as expected for several reasons. Although the first task was distressing, the mood induction (i.e., film) did not induce fear or more distress as anticipated, therefore participants' attention to threat may not have been as engaged in the first place. Also, it is possible that a distractor stimulus that was visual and not auditory could have better assessed a shift in attention. The task may have also been an assessment of how quickly participants were able to do two non-arousing tasks. When thinking about clinical applications of attentional flexibility, the stimuli individuals usually encounter are more dynamic. The negative stimuli they stay in contact with may be contextual or specific to their own idiosyncratic anxieties and fears. It is important to point out that the generalizability of this task is limited to visual images, not any real life events, specific phobias, or human feedback or interaction.

Another important consideration is to critically examine how the recovery period was measured in this task, because it may not have accurately assessed the ability to recover as intended. Since the film and second task may not have been as emotionally arousing as anticipated, participants may not have had any arousal to recover from. Therefore if participants were not distressed, there was no opportunity to truly assess recovery. The recovery period may merely have been an assessment of how quickly the sample could respond to the tones. Future studies could consider altering the recovery period by having participants respond to tones while looking at neutral images rather than a blank screen. The use of a blank screen may not have engaged their visual attention or even induced boredom, therefore recovery of one's attention may not have been engaged. Another idea is for future studies to use tools such as eye tracking that could more precisely measure visual attention. Another consideration is assessing the ability to recover via other means, such as physiology.

Overall this pilot investigation helps us think more deeply and thoroughly about how emotion regulation impacts attention, and the ways that attention and disengagement can be measured and operationalized. Future investigations should assess attention through different measures such as eye tracking, using more arousing or dynamic tasks, and ecological momentary assessment. Another consideration would be to assess recovery after several hours or days; conducting more long-term follow up for recovery could help us understand the longer term consequences of acceptance. Future research could also investigate how individuals are able to engage in daily activities or tasks that are personally meaningful while distressed, as a way of capturing another component of attention and acceptance. Also, the use of psychophysiology could be helpful in understanding recovery from distress, in particular if we want to know how emotion regulation helps individuals manage physiological arousal and recover from this. It is also important to consider moderating factors that could impact the outcomes measured here. For example, suppression may be useful for short periods of time and when individuals are experiencing certain levels of anxious arousal or general anxiety. Another consideration is that future research should consider the type of distressing stimuli being presented to participants in order to ensure an elevation of negative affect or distress.

Given the amount of research in the area of clinical trials of acceptance- based therapeutic approaches, examining the mechanisms by which these therapies make change is a critical next step. This investigation was an attempt to break down the ways in which acceptance can facilitate change. Importantly, this study helps us understand that this emotion regulation strategy cannot be solely measured via momentary symptom reduction, but it may have alternative impacts on attention and attentional recovery that help individuals engage in activities while feeling distress. The clinical implications of these findings are at this point tenuous. There

is need for a larger sample and more research to better understand how using acceptance impacts the ability to help individuals experiencing anxious arousal and stress to recover their attention from distressing stimuli and still engage in action. Future studies could also clarify the contexts in which acceptance can be beneficial and suppression disruptive, and conversely when or for whom suppression might be beneficial. This could translate to helping individuals expand their lives instead of restricting behavior because of anxiety.

## APPENDIX A.

### EMOTION REGULATION INSTRUCTIONS

#### Instructions for the Acceptance Condition

In a few minutes, you will be asked to watch a short movie clip and look at some pictures. I would like you to listen to the following discussion about how to deal with emotions that you may feel while you are watching.

Most people say that the movie and pictures shown in this research study are somewhat distressing and produce emotions like anxiety and fear. Many people also think that their negative emotions must be controlled or stopped. They may learn, from an early age, that they can and should control negative thoughts and feelings. People are told things like “just stop worrying” or “put it behind you”. Also, you see people controlling their feelings on many occasions, such as at funerals or in crisis situations, and you may come to believe that people should *always* try to control their emotions.

In some cases you *can* control your feelings. If you are feeling too cold in your house you can turn up the heat. If you are feeling uncomfortable in a chair you can stand up and move around. Certain actions can be taken to control how we are feeling on the inside. In the same way, emotional control can sometimes work in temporary ways. Distraction, for example, can help you feel less pain while you’re in a dentist’s chair.

However, it is often *not* so easy to control or stop emotions like anxiety, sadness, anger, or fear. Just think of how difficult it is to follow through on another person’s suggestion to “just calm down” or “just relax” when you are feeling upset. It’s not as easy as it sounds, right?

Given that we all experience some difficulty with emotions like fear, anxiety, and stress, efforts to block these feelings are quite understandable. However, although self-control may

work in many areas of your life, there are situations involving emotions where it might be difficult or even impossible. Struggling against relatively natural emotions can actually make your distress more intense and last longer, rather than making the situation better. Also, if you try to suppress your emotions and are unable to do so, this may lead to feelings of failure, guilt, or lack of control. Finally, your efforts to block out negative emotions may become a constant battle, draining you of energy and happiness.

So, am I suggesting that you just give up on changing your emotional experiences? No, what I'm suggesting is that there is an alternative to struggling or battling with your emotions and it is called acceptance. Accepting your emotions means that you are willing to experience them fully and that you don't try to control or change your emotions in any way.

Am I proposing that you should just put up with discomfort and distress? No, what I'm suggesting is that you can come to think about your emotions in a different way; not as something that always needs to be contained or controlled in order for you to be OK, but as natural reactions that happen, get strong, and fade away without leading to any awful consequences and without you having to struggle or fight with your feelings at all.

Accepting emotions like fear, anxiety, and stress may be difficult, especially when common sense tells you that these emotions are bad. There are times in life, however, when our common-sense reactions get us into trouble. Have you ever driven your car on a sheet of ice and lost control? Usually, the mistake people make is that they try to correct the situation by turning in the *opposite* direction from which they are skidding. This seems to make sense, but the more effective approach is to do the opposite – to turn the wheel *into* the direction of the skidding.

What I am suggesting is that dealing effectively with your emotions may be very similar. It is against your natural reaction to allow yourself to feel negative feelings. However,

just like turning into the direction of the skidding is a better way of dealing with icy road conditions, leaning into your emotions and fully experiencing them may be a better way of dealing with emotional situations.

So, if emotions occur while you watch this short video or look at these pictures, try to give up the struggle to suppress or control them. Allow yourself to accept and stay with your emotions without trying to get rid of them. Do not try to distract yourself or otherwise lessen your feelings, and instead allow yourself to feel your emotions as fully as possible. Just let your emotions run their natural course and see how that goes.

Now look at the screen and watch the short film. When it is over remove your headphones and you will receive more instructions.

#### Instructions for Suppression Condition

In a few minutes, you will be asked to watch a short movie clip and look at some pictures. I would like you to listen to the following discussion about how to deal with emotions that you may feel while you are watching.

Most people say that the video and pictures shown in this research study are somewhat distressing and produce emotions like anxiety and fear. In addition, many people do not do anything to try to control their emotional reactions, which makes the experience even more distressing. Although experiencing anxiety and other negative emotions is normal when watching this video and looking at these pictures, it is possible to experience these emotions at lower levels if you really concentrate on controlling them.

There is a great deal of evidence that people can control their emotional reactions. You see people controlling their emotions all of the time, such as at funerals or in crisis situations where it is important to remain calm. There are many cases in which you can do simple things to



control your feelings. If you are feeling too cold in your house you can turn up the heat. If you are feeling uncomfortable in a chair you can stand up and move around. Certain actions can be taken to control how we are feeling on the inside. In the same way, emotional control can often work to change our experiences. For example, distraction can help you feel less pain while you are in a dentist's chair.

Think of it – we have all sorts of phrases in our language that refer to people controlling their own emotional experiences. We often tell people to “calm down” when they are feeling anxious or angry. We use phrases such as “grin and bear it” or “put it behind you” to communicate that it is possible to make it through a difficult experience if you are able to control your emotions. In challenging situations, people are frequently able to do things that help them bring their emotions down to a more manageable level.

Given that we all have experienced some difficulty with emotions like fear, anxiety, and stress, it is understandable that you would consider suppressing your emotional reactions to be a difficult task. However, think of other areas in your life where you have been capable of self-control. If you are like most people, you do not feel like jumping right out of bed when your alarm clock goes off in the morning. But many times in your life you have gotten out of bed and prepared yourself for school, work, or other obligations. At first, you may have had negative feelings like fatigue or disappointment over having to get up, but you battled those feelings successfully and started your day.

I'm sure there are other times in your life when you have not allowed your feelings to take control. For instance, you might think of a time when you forced yourself to go to the gym despite feeling tired or made yourself study for an important test even though you would have preferred to relax. Although self-control can be hard at first, when you are successful you feel

proud of yourself -- like you have accomplished something important. The same is true of controlling your negative emotions. When you succeed at keeping your feelings under control, you feel proud of yourself for dealing with with an emotional situation well. However, when you just let your negative emotions run their own course and they intensify, you may end up feeling discouraged, guilty, or out of control.

So, what exactly am I suggesting here? Basically, I am suggesting that you have more control over your emotional reactions than you think. You can control how often and how intense your emotions feel and you probably have done so successfully in the past. Although many emotions fade away after a while, you should not have to put up with more discomfort and distress than is necessary.

Rather than just allowing your feelings to run their own course, I would like you to really test out your ability to control your emotional reactions. Whenever you experience emotions like anxiety or fear while watching the movie clip and looking at the pictures, please try to control them as much as possible. Try to suppress or push down your feelings, and attempt to minimize the amount of anxiety and other emotions you feel in response to the images. See just how much you can control your own distress and discomfort.

Now look at the screen and watch the short film. When it is over remove your headphones and you will receive more instructions

### Instructions for Control Condition

In a moment, you will be asked to watch a short movie clip and look at some pictures . Please watch the video and then look at the pictures carefully. When looking at the images, there may be an sound that you will hear. I would like you to identify the pitch of the sound as either low or high as quickly as possible as you did in the first computer task. Now look at the screen

and watch the short film. When it is over remove your headphones and you will receive more instructions.

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