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EFFECTS OF MINDFULNESS AND EXPERIENTIAL AVOIDANCE IN RESPONDING TO EMOTIONAL FILM CLIPS

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ABSTRACT OF THESIS

EFFECTS OF MINDFULNESS AND EXPERIENTIAL AVOIDANCE IN RESPONDING TO EMOTIONAL FILM CLIPS

This study examined if levels of self-reported mindfulness and experiential avoidance were associated with subjective and physiological outcomes following exposure to distressing film clips. Participants consisted of 108 college-aged young adults who completed self-report measures assessing levels of mindfulness, experiential avoidance, and negative affect. Several devices designed to monitor physiological activity, specifically sympathetic nervous activation, were also attached to participants. Participants were shown four brief film clips of neutral and unpleasant stimuli while these devices were attached. After each film, subjective distress ratings were gathered every 20 seconds for a period of two minutes to determine extent of emotional recovery. Results showed that, contrary to predictions, self-reported mindfulness was positively correlated with subjective distress following particular emotional film clips. Furthermore, self-reported mindfulness was largely unrelated to changes in physiological activity during the film clips, in addition to subjective and physiological recovery from the films. Although most findings were nonsignificant, this investigation contributes to the existing literature by being the first to include a measure of self-report mindfulness in combination with an array of subjective and physiological instruments to evaluate responses to aversive stimuli.

KEYWORDS: Mindfulness, Experiential Avoidance, Emotion, Self-report, Psychophysiology

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EFFECTS OF MINDFULNESS AND EXPERIENTIAL AVOIDANCE IN RESPONDING TO EMOTIONAL FILM CLIPS

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THESIS

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2009

EFFECTS OF MINDFULNESS AND EXPERIENTIAL AVOIDANCE IN RESPONDING TO EMOTIONAL FILM CLIPS

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
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Chapter One: Introduction

Mindfulness originates from Eastern spiritual traditions and has been called the "heart of Buddhist meditation" (Kabat-Zinn, 1994). It is rooted in the Theravada, Zen, and yogic practices, and is often associated with Vipassana, or "insight" meditation. Mindfulness can be described as "paying attention in a particular way: on purpose, in the present moment and nonjudgmentally" (Kabat-Zinn, 1994). That is, one is encouraged to attend to internal (cognitions, emotions, and physical sensations) and external (environmental) stimuli as they arise in one's field of awareness, approaching them with an attitude of nonjudgment and acceptance. Although historically rooted in Buddhism, mindfulness has been adopted by many in Western medicine as an intervention for a multitude of psychological and medical disorders (Baer, 2003). Skills are usually taught outside of a religious context and in a secular manner.

Mindfulness is commonly associated with sitting meditation, which is one of the most frequently used forms of practice. During a typical session, the breath is used to anchor attention, and focus is placed on observing each inhalation and exhalation as it passes through the body. As thoughts, emotions, and physical sensations begin to arise, one is taught to simply label them (i.e. "I feel anxious", "thought") and gently turn attention back to the breath, thereby returning to the present moment. It is expected that the mind will wander a great deal, and when this occurs, an attitude of nonjudgment and acceptance should be maintained. Intruding stimuli should not be evaluated as "good" or "bad," but simply as what is (Kabat-Zinn, 1990, 1994). The regular practice of these skills is believed to lead to increased self-awareness, insight, and mental flexibility, and decreased reactivity to passing thoughts and emotions.

Within psychology, the mindfulness literature began with investigations of the effects of several mindfulness-based interventions. This literature continues to grow rapidly and suggests that these interventions are helpful in reducing symptoms. More recently, investigators have begun to argue that the effects of mindfulness training cannot be thoroughly evaluated without assessing participants' levels of mindfulness. For this reason, measures of mindfulness, primarily using self-report methods, have begun to appear in the literature. The availability of such measures makes possible the investigation of relationships between individual differences in levels of mindfulness and

a wide range of other characteristics. One promising area of research explores relationships between levels of mindfulness and coping with stress induced in artificial environments. As described in later sections, more mindful individuals can be expected to manage stressors in characteristic ways. The general aim of the proposed study is to contribute to this literature by exploring relationships between self-reported mindfulness and reactions to distressing film clips. The study will be described following a summary of current mindfulness-based interventions, methods for assessing mindfulness, and the budding literature on how mindfulness and related constructs influence responses to laboratory stressors.

Mindfulness-Based Interventions

One of the most cited programs in mindfulness training is Mindfulness-Based Stress Reduction (MBSR), developed by Kabat-Zinn (1982, 1990) in a behavioral medicine setting for populations with chronic pain and stress-related disorders. The program was initially constructed as an alternative treatment for patients who were unresponsive to, or dissatisfied with, the traditional medical care they received (Kabat-Zinn, 1982). MBSR is typically conducted in a group setting over the course of 8 weeks, with weekly sessions lasting two and a half to three hours. Patients are encouraged to practice exercises at home for 45 minutes per day, six days a week during the intervention. In MBSR, patients are taught to observe uncomfortable or distressing sensations in a nonjudgmental, nonavoidant fashion. Practicing mindfulness is believed to assist in increasing patients' tolerance of unpleasant physical and emotional states, and offer a new set of coping skills which may improve health and well-being (Baer, 2003). Mindfulness practices frequently taught in this program include hatha yoga, the body scan, sitting and walking meditations, and activities for cultivating mindfulness in daily life, such as while eating or washing the dishes (Baer, 2006). Studies have shown MBSR to be efficacious for a variety of problems besides chronic pain and anxiety, such as fibromyalgia, depression, hypertension, stress associated with cancer, binge-eating disorder, and psoriasis (Baer, 2003; Kabat-Zinn, 2003). Benefits typically include reduction in mood disturbance, pain, anxiety, and other stressors, and an elevation in quality of life, quality of sleep, and immune functioning (Kabat-Zinn, 2003; McKenzie, 2005).

Mindfulness-Based Cognitive Therapy (MBCT) was developed as a relapse prevention program for individuals with recurrent depression (Segal, Williams, & Teasdale, 2002). MBCT encompasses many of the components utilized in MBSR, but also seeks to integrate cognitive therapy into mindfulness practices. Rather than evaluating the rationality of thoughts and changing their content, the aim is to help individuals make a shift in the way they relate to their thoughts, feelings, and physical sensations. Nonjudgemental observation of the phenomena as they come and go, without analyzing or evaluating them, encourages a perspective known as *decentering*. The process of decentering, or "distancing," may allow individuals to realize that thoughts and emotions may not be accurate depictions of reality, but rather constructions of the mind. Emphasis is placed on becoming both aware and accepting of habitual thoughts and emotional triggers, and learning to respond to them in an adept way rather than react to them in an automatic fashion (Segal et al., 2002). MBCT clients are also educated about depression-related thoughts and symptoms. This information may help clients to identify and recognize when depressive symptoms appear, thereby increasing the likelihood that they will utilize learned mindfulness skills to prevent relapse (Lau & McMain, 2005). MBCT has demonstrated efficacy in the prevention of depression relapse, for a period of one year following treatment, with individuals who have experienced three or more previous episodes (Teasdale, Segal, Williams, Ridgeway, Soulsby, & Lau, 2000; Segal, 2002; Ma & Teasdale, 2004).

Mindfulness is also a central component in other therapeutic interventions, including Dialectical Behavior Therapy (DBT) and Acceptance and Commitment Therapy (ACT). DBT was initially developed for treatment of borderline personality disorder, but has been adapted to additional populations. A central focus of DBT is the relationship between acceptance and change. Although organized in a somewhat different manner than MBSR, mindfulness skills are taught to clients to facilitate the integration of acceptance and change. Skills are conceptualized in two domains: the mindfulness "what" skills (observe, describe, and participate) and the mindfulness "how" skills (non-judgmentally, one-mindfully, and effectively; Baer, 2003). In DBT, mindfulness exercises are shorter and less formal, and treatment, which includes many behavior change strategies in addition to mindfulness skills, typically lasts one year

(Baer, 2003, 2006). ACT is a flexible treatment for a wide range of disorders that incorporates similar concepts into its structure. ACT teaches clients to be accepting and nonjudgmental of their internal experiences, and to alter behaviors in constructive ways to improve their lives (Baer, 2003, 2006; Hayes et al., 2004). Experiential avoidance is a key concept in ACT and can be described as the tendency to avoid unwanted internal thoughts, emotions, memories, and physical sensations, even when doing so may cause harm. Experiential avoidance is thought to contribute to a wide range of clinical disorders, and can result in counterproductive behaviors, such as substance abuse and binge eating (Hayes et al., 2004).

Mindfulness and Experiential Avoidance

Mindfulness and experiential avoidance can be seen as directly contrasting ways of responding to internal experiences, including cognitions, emotions, and sensations. As described above, mindfulness is a self-regulation of attention which provides a way to cultivate emotional balance and decrease maladaptive reactivity (Kabat-Zinn, 1990). It facilitates learning to relate to thoughts, emotions, and feelings in a new manner. As noted earlier, this can be accomplished through the process of decentering, in which the individual adopts the stance that thoughts are "just thoughts" rather than truths, and do not necessitate specific reactions (Segal et al., 2002). It is also possible that reductions in emotional or physical pain occur through a process of desensitization (Baer, 2003) as individuals engage in sustained exposure to their own thoughts and feelings. Either way, the paramount features of mindfulness are to approach internal and external experiences with awareness, acceptance, nonjudgment, and nonreactivity, even if these experiences are unpleasant or unwanted. Mindfulness skills are positively correlated with related constructs such as self compassion, emotional intelligence, and openness to experience and negatively correlated with psychological symptoms and neuroticism (Baer et al., 2006).

Conversely, when individuals are habitually non-accepting (or avoidant) of internal experiences, this can result in detrimental effects to overall physical health and psychological well-being (Kabat-Zinn, 2003). Avoidance of internal experiences can lead to numerous adverse behaviors (e.g. substance abuse), and has been implicated in a range of psychological disorders (Hayes et al., 2004), including depression, borderline

personality, anxiety, and panic disorders. Although short term effects of experiential avoidance seem positive by reducing emotional intensity at the present time, consistently utilizing such a strategy appears to lead to long term increases in the frequency and intensity of the experience that the individual is trying to avoid, and this pattern appears resistant to change (Wegner, Schneider, Carter & White, 1987; Marx and Sloan, 2002; Hayes et al., 2004; Sloan, 2004). Experiential avoidance has been shown to be negatively correlated with mindfulness (Baer et al., 2006) and positively correlated with general psychopathology (Hayes et al., 2004).

The empirical literature on the effects of mindfulness-based interventions suggests that they are efficacious in addressing many problems and disorders in a wide range of populations (Baer, 2003; Grossman, Neimann, Schmidt & Walach, 2004; Salmon, Septhton, Weissbecker, Hoover, Ulmer & Studts, 2004). Researchers have become increasingly interested in whether increases in mindfulness, or decreases in experiential avoidance, are responsible for the beneficial effects that have been observed. Exploring this question has required the development of methods for measuring mindfulness and experiential avoidance. The most widely used measures are described next.

Assessment of Mindfulness and Experiential Avoidance

Several self-report questionnaires measuring the general tendency to be mindful in daily life have been developed. The most comprehensive of these is the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, and Toney, 2006). This questionnaire was constructed by factor analyzing the combined item pool from five current self-report mindfulness inventories in a large undergraduate sample. From this analysis, five distinct facets emerged: observing, describing, acting with awareness, nonreactivity to inner experience, and nonjudging of experience. Respondents rate how well each item applies to them using a five-point Likert scale ranging from (1) *never or very rarely true* to (5) *almost always or always true*. Items include, "I pay attention to how my emotions affect my thoughts and behavior" (observing), "I'm good at finding words to describe my feelings" (describing), "I find it difficult to stay focused on what's happening in the present" (acting with awareness – reverse scored), "I tell myself I shouldn't be feeling the way I'm feeling" (nonjudging –

reverse scored), and "I perceive my feelings and emotions without having to react to them" (nonreactivity). Higher scores on the FFMQ indicate a greater tendency to be mindful in daily life.

Experiential avoidance is assessed using the Acceptance and Action Questionnaire (AAQ) (Hayes et al, 2004). This is a unidimensional measure where the single total score reflects one's level of avoidance of negative internal events or situations likely to elicit them. Ratings are on a seven-point Likert scale, ranging from (1) *never true* to (7) *always true*, and example items include, "Anxiety is bad", "When I am depressed or anxious, I am unable to take care of my responsibilities", and "I'm not afraid of my feelings" (reverse-scored). Higher scores reflect greater levels of experiential avoidance.

Empirical Research on Acceptance and Experiential Avoidance in Laboratory Settings

It is important to investigate the relationship between self-reported mindfulness and behaviors that individuals engage in when coping with stress. Such research might contribute to validating self-report methods of assessing mindfulness, if such reports are found to be correlated with behavior in laboratory-based stressful situations. Findings could also aid in understanding the mechanisms by which mindfulness exerts beneficial effects (Campbell-Sills, Barlow, Brown and Hofmann, 2006). To date, no studies have directly examined relationships between self-reported mindfulness and coping with stress induced in a laboratory setting, although several have explored related constructs including avoidance and suppression.

For example, Gross and Levenson (1993) studied the effects of emotional suppression on expressivity, subjective experience, and physiological arousal. Participants were instructed to watch three brief films consisting of 1) neutral (flowers in a park), 2) fear (treatment of burn victims), or 3) disgust-eliciting material (arm amputation). They were randomly assigned to one of two conditions. In one condition, participants were instructed to view the films and rate their emotional reactions, while in the other condition, participants were asked to suppress emotional expressivity (facial expressions) during the "disgust" and "fear" clips, and "to try and behave in such a way that a person watching you would not know you were feeling anything" (Gross & Levenson, 1993, p. 973). Results showed that those participants who were instructed to

suppress expressive emotion did in fact yield decreased observable expressions (except for blinking), yet had increased sympathetic nervous system activation, as indexed by skin conductance level, finger pulse amplitude, and finger pulse transit time. However, participants in the suppression condition displayed decreased heart rate. This finding is inconsistent with other results, as decelerated heart rate is not associated with sympathetic arousal, but with states of rest and relaxation. No difference in subjectively experienced emotion was reported in comparison to the controls. These results suggest that suppression of outward expression of negative emotion can lead to increased physiological arousal and has no impact on subjectively experienced level of emotion.

Gross and Levenson (1997) later performed a similar study, but focused on the inhibition of both positive and negative emotions. Films for this investigation consisted of 1) neutral, 2) amusement-eliciting, and 3) sadness-eliciting stimuli. Measures identical to the previous study (1993) were used, and once again, participants were randomly assigned to one of two distinct conditions. The first condition asked participants to view the films and make emotional ratings following them, and the second condition instructed the participants to remain emotionally unexpressive while watching the films and rate emotional experience afterwards. Similar to previous findings, researchers found that suppression diminished emotionally expressive behavior and increased sympathetic activation on both positive and negative films. No significant differences emerged between groups on self-report ratings of mood for each film.

Using 60 participants clinically diagnosed with mood and anxiety disorders, Campbell-Sills et al. (2006) examined the effects of emotional suppression and acceptance. Participants watched a film clip evoking negative affect (a scene from "The Deer Hunter" in which captured soldiers are forced to play Russian roulette), and were instructed either to suppress or to accept their emotional response to the film. Participants rated level of negative affect before, immediately following, and two minutes after the film. Physiological measurements were included to assess parasympathetic and sympathetic activity and consisted of heart rate (beats per minute), respiratory sinus arrhythmia (RSA), and skin conductance level. Both conditions elicited similar levels of negative affect to the film; however, a quicker recovery in mood was observed in the acceptance group. Furthermore, although both conditions displayed an increase in heart

rate from baseline to recovery, the pathways were quite different. The suppression group showed increased heart rate from baseline to film exposure, and decreased heart rate from exposure to recovery period. Conversely, the acceptance group showed decreased heart rate from baseline to exposure, and increased heart rate from exposure to recovery. Though different trajectories in heart rate were observed during the film, no significant between-group effects emerged. No differences were observed between groups for RSA or skin conductance level either. These results suggest that suppression of emotional experience in response to an artificial stressor did not successfully reduce negative affect induced by the film in individuals diagnosed with mood and anxiety disorders, though they imply that acceptance of emotional states may lead to shorter recovery time following such subjective distress. Within this particular population, experimental condition did not appear to dramatically affect physiological responses throughout the course of the study. However, the observed results seem contradictory to previous findings (Gross & Levenson, 1993; 1997) in this research domain.

More recently, related research has been performed assessing the role of experiential avoidance and acceptance in emotion regulation using interoceptive stimulation. Feldner, Zvolensky, Eifert, and Spira (2003) conducted an experiment in which 48 individuals either high or low in experiential avoidance, as measured by the AAQ, were selected to receive four inhalations of 20% carbon dioxide enriched air. Breathing carbon dioxide enriched air induces feelings of anxiety, including increased heart rate, sweating and other symptoms of autonomic arousal. Participants in each group (high/low) were randomly assigned to two separate conditions. In the first condition, participants were told to suppress both their internal subjective feelings and outward expressions, while participants in the second condition were told to actively observe internal emotions and sensations, and to let their "feelings take over". Measurements included subjective units of anxiety and distress, and recording of heart rate. Overall, findings showed that participants who were high on experiential avoidance responded with greater levels of anxiety and distress than those in the low group, and that participants high in experiential avoidance who were instructed to suppress showed greater anxiety than their counterparts in the observe group. For all participants, heart

rate appeared to decrease in the suppression condition, and increase in the observe condition.

In another study investigating subjective and physiological arousal, Eifert and Heffner (2003) recruited 60 females high in anxiety sensitivity to compare the effects of an acceptance vs. control strategy when exposed to two 10 minute trials of 10% carbon dioxide enriched air. Participants were assigned to one of three conditions. In the acceptance condition, participants were taught the Chinese finger trap metaphor (Hayes, Strosahl, & Wilson, 1999). The finger trap is a small woven straw tube, where an individual must slide both index fingers into each end of the tube, one at a time. When the fingers are placed into the tube, they become trapped, and any attempt to pull them out only leads to tightening of the tube and discomfort. Eventually the individual discovers that the only way to become free is to move the fingers closer together, thereby loosening the trap grip, and then sliding the fingers out. After hearing this verbally, participants were presented with an actual finger trap to enhance the credibility of the metaphor. Essentially, the goal was to allow participants to realize that attempts to control or reduce uncontrollable symptoms can result in suffering (i.e. pulling the fingers apart), while engaging in counterintuitive actions (i.e. pushing the fingers together) may diminish them. In the control condition, participants were instructed in diaphragmatic breathing as a strategy to control their physiological sensations. The third group received no instructions. Results indicated that, compared to the control and no-instruction conditions, participants in the acceptance condition were less behaviorally avoidant (as indexed by latency to begin the second and third trials and willingness to participate in another similar study), and reported less fear and fewer catastrophic thoughts during the trials. The use of acceptance strategies was also related to greater willingness to participate in a second carbon dioxide challenge. No differences were observed between groups in physiological measurements of skin conductance level and heart rate, or in self-reported intensity of physiological symptoms.

Sloan (2004) examined the relationship between self-reported experiential avoidance and emotional reactivity to pleasant, unpleasant, and neutral film clips. As in Feldner et al. (2003), participants both high and low in experiential avoidance were chosen. Self-report of emotional experience during the film clips was measured, in

addition to physiological measurements of emotional expressivity (facial expressions) and heart rate. Groups were given no specific instructions other than to view the clips and complete the subjective rating form. That is, this study examined whether self-reported tendency to avoid internal experiences was related to emotional reactivity to films. No main effects were found for facial movement between the groups except during the neutral film where participants with high levels of experiential avoidance elicited increased corrugator activity. Participants high in experiential avoidance also reported greater subjective arousal during both pleasant (happiness) and unpleasant (fear, disgust) film clips than participants low in experiential avoidance. Decreased heart rate was found in the high group for two of six film clips, both of which were negatively valenced (fear, disgust). No group differences in heart rate were observed on the remaining clips.

General Conclusions from Laboratory Research on Acceptance and Avoidance

As evidenced by the aforementioned studies (Gross & Levenson, 1993, 1997; Eifert & Heffner, 2003; Feldner et al., 2003; Sloan, 2004; Campbell-Sills et al., 2006), it appears that engaging in avoidant emotion regulation behavior is a maladaptive coping mechanism. In most cases, avoidant or suppressive behavior does not seem to decrease experienced negative affect, distress, or fear as individuals utilizing such strategies may believe, but instead appears to increase such states in certain contexts or situations (Eifert & Heffner, 2003; Feldner et al., 2003; Levitt, Brown, Orsillo, & Barlow, 2004; Karekla, Forsyth, & Kelly, 2004; Sloan, 2004). In addition, several studies within the literature found avoidant coping strategies to lead to an increase in sympathetic nervous system activation (Gross & Levenson, 1993, 1997; Campbell-Sills et al., in 2006), as well as delayed physiological (Feldner, Zvolensky, Stickle, Bonn-Miller, & Leen-Feldner, 2006) and subjective recovery (Campbell-Sills et al., 2006) from distress. Acceptance-related strategies were shown to decrease emotionally experienced negative affect and symptoms, compared to suppression or control conditions (Eifert & Heffner, 2003; Levitt et al., 2004), and yield quicker recovery times to baseline as well (Campbell-Sills et al., 2006).

Purpose of Study

Previous research on acceptance- and suppression-based regulation strategies suggests that acceptance of emotional states may be related to less distress during a stressor, quicker return to baseline after a stressor, and greater willingness to experience similar stressors in the future. However, there are inconsistencies with studies performed in this program of research. Several studies report differences in self-reported distress or negative affect, although others do not, and few studies report differences in physiological measurements. These disparate findings may be due to the use of inadequate or inconsistent instruments across studies. Furthermore, although previous research makes claims about the beneficial effects of acceptance-based strategies, such as mindfulness, no published study has directly assessed participants' levels of self-reported mindfulness or explored whether self-reported mindfulness correlates with stressful responses induced in a laboratory setting. The current study sought to address these inconsistencies.

As previous studies have assessed experiential avoidance but not mindfulness, this study was the first to investigate relationships between the self-reported tendency to be mindful in daily life and coping with an artificial stressor. In addition, the studies described earlier that examine the relationship between self-reported experiential avoidance and coping with an artificial stressor did not measure participants' level of negative affect at the time of the experiment. Thus, it is impossible to determine whether observed differences between groups in coping with the stressor are due to an accepting or avoidant approach to unpleasant internal experience, or are better explained by their levels of negative emotion. Therefore, the current study included a measure of negative affect at the time of the experiment. This study also strove to incorporate empirically-validated self-report and physiological measurements used within the literature. Finally, this study attempted to compare general self-reported mindfulness at baseline with mindfulness-consistent behaviors while watching stressful films. This was accomplished using a post-film questionnaire that asked respondents to rate how much they attended to the film or tried to distract themselves from it, how much they noticed their reactions to the film, judged or criticized the reactions they were having, and tried to control or suppress them (see Appendix A).

Participants in the present study were asked to complete self-report measures of their levels of mindfulness, experiential avoidance, and negative affect, and watched four brief film clips of neutral and unpleasant stimuli. Physiological measurements (skin conductance level and finger pulse transit time) were included to assess sympathetic nervous system activation and physiological recovery. After each film, a subjective rating of distress was gathered every 20 seconds for a period of two minutes to determine emotional recovery from distress. Following this, the participants were given another two minutes to fill out a post-film questionnaire, and given an additional one minute rest period. Once the experiment was complete, participants rated how willing they would be to watch similar film clips in the future (see Appendix B). The primary dependent variables were self-reported emotional reactions to film clips, skin conductance level, finger pulse transit time, emotional and physiological recovery following film clips, and willingness to watch additional films.

Hypotheses

1. As mindfulness involves observation and acceptance of internal experiences, whereas experiential avoidance involves efforts to avoid or suppress them, it was hypothesized that mindfulness and experiential avoidance would be negatively correlated.
2. Participants scoring high in self-reported mindfulness at baseline (and low in experiential avoidance) should be more mindful of their experiences during the film clips. Therefore, it was hypothesized that self-reported mindfulness during film clips would positively correlate with self-reported tendency to be mindful in daily life, and negatively correlate with experiential avoidance.
3. It was hypothesized that participants scoring high in self-reported mindfulness, and low in self-reported experiential avoidance, would show less subjective distress during the negative film clips and quicker recovery than those scoring low in mindfulness and high in experiential avoidance, and that this effect would hold after accounting for baseline levels of negative affect.
4. Similarly, it was hypothesized that participants scoring high in self-reported mindfulness, and low in experiential avoidance, would show less sympathetic activation during negative film clips and quicker recovery time than those scoring

low in mindfulness and high in experiential avoidance. This effect was predicted to hold after accounting for baseline levels of negative affect.

5. It was predicted that participants scoring high in self-reported mindfulness would report a greater willingness to re-experience similar distressing events in the future compared to participants scoring low in self-reported mindfulness.
6. Exploratory analyses were performed to examine relationships between individual mindfulness facets and the dependent variables in this study.

Chapter Two: Methodology

Participants

Participants in this study were 108 undergraduate students from the University of Kentucky. Ages ranged from 18-36 (*M*=19.24) and women constituted 61.1% of this sample. The majority of participants were of Caucasian descent (80.6%) with African-Americans (10.2%), Asian/Pacific Islanders (5.6%), Hispanics/Latino(a)s (.9%), and Other ethnicities (2.8%) comprising the remaining sample. Participants received course credit for their involvement in the study.

Measures

Self-Report Measures

Five Facet Mindfulness Questionnaire (FFMQ). As noted earlier, the FFMQ (Baer et al., 2006) is a 39 item self-report questionnaire designed to measure five facets of mindfulness: observing, describing, acting with awareness, nonjudging of experience, and nonreactivity to inner experience. The FFMQ has shown good internal consistency with alpha coefficients ranging from .75-.91 for the five facets. It has also demonstrated convergent and discriminant validity with several measures of related constructs and all facets appear to be distinct from one another, exhibiting only moderate intercorrelations (see Appendix C).

Acceptance and Action Questionnaire (AAQ). The AAQ (Hayes et al., 2004) is a nine-item self-report measure of experiential avoidance. Experiential avoidance is defined as an unwillingness to experience negatively evaluated thoughts, emotions, feelings, and physiological sensations. The AAQ has demonstrated adequate internal consistency (coefficient alpha = .70), and has been shown to correlate with measures of psychopathology, depression, anxiety, and thought suppression (see Appendix D).

Positive and Negative Affect Schedule – Expanded Form (PANAS-X). The PANAS-X (Watson, & Clark, 1994) is a 60-item self-report measure assessing two broad distinct domains of affect: positive affect (PA) and negative affect (NA). Each scale consists of mood adjectives (e.g. “excited” and “irritable”) that are rated on a five-point Likert scale ranging from (1) *very little to not at all* to (5) *extremely*. Respondents are asked to rate each adjective on how it applies to them. Multiple time frames can be used with this instrument, but for current purposes, participants were asked to rate how they

feel “right now”. Only the NA scale was calculated. The PANAS-X NA scale has demonstrated high reliability (coefficient alpha=.85), and correlates with expected measures of related constructs (see Appendix E).

Subjective Units of Distress (SUDS). SUDs is a 100-point scale (amended from Wolpe, 1982) where participants rate their level of distress from zero (no distress) to one-hundred (extremely distressed). SUDs assessments were collected after each film clip every 20 seconds for a period of two minutes (see Appendix F).

Post-film Questionnaire. The Post-film Questionnaire is an 18-item self-report measure written for the current study. Items were composed to represent elements of mindfulness (as described in Baer, 2006) relevant to the experience of watching a film. Participants were asked to rate their experiences during each film clip on a scale of (1) *not at all* to (5) *very much*. Sample statements include “I was focused on the film”, “I was noticing the reactions I was having”, “I was trying to stay calm”, and “I was trying to push away the thoughts or feeling I was having”. Higher scores represent higher levels of mindfulness.

Willingness to Re-experience Negative Emotional States. Willingness was measured by responses to two questions provided in a brief self-report measure following the task (see Appendix B). This measure consisted of the statement: “Research on emotion may ultimately contribute to discovering beneficial treatments for people with emotional dysregulation disorders. Please indicate your willingness to contribute to this important area of research,” followed by the questions, “How willing would you be to watch additional distressing film clips before leaving today?” and, “How willing would you be to watch similar film clips in a future study?” Each question was followed by a 5-point Likert scale anchored with the labels “not at all willing” at one end and “completely willing” at the other. Willingness was operationalized as the sum of the two responses.

Physiological Measures

Skin Conductance Level (SCL). Skin conductance level has been shown to be a reliable and valid measure of assessing sympathetic nervous system activation in studies involving emotional arousal (Gross & Levenson, 1993; Gross & Levenson, 1997). Typically, electrodes are attached to surfaces where eccrine sweat glands are concentrated (e.g. palms of hands) to determine how much sweat rises towards the skin’s

surface. As an individual becomes autonomically aroused, more salty sweat hydrates the skin, thereby increasing SCL.

SCL was measured by the MP100 (Biopac Systems) using a GSR100C amplifier and skin conductance electrodes (TSD203 Transducer) attached to the palmar surface of the middle phalanges of the second and third fingers of the non-dominant hand. Gain was set to 2 μV and low pass and high pass filter were set to 1.0Hz and DC, respectively. SCL was measured in micromhos and recorded at a rate of 1000 samples/second.

Finger Pulse Transit Time (FPTT). Finger pulse transit time assesses sympathetic nervous system activation by measuring pulse transit time from the heart to the finger. ECG electrodes are attached to the distal end of each collarbone and to the lower left rib cage to measure heart rate and the pulse pressure wave formed from the ejection of blood from the left ventricle (Stern, Ray, & Quigley, 2001). A photoelectric plethysmograph is attached to the finger to detect when the pulse pressure wave from the left ventricle reaches the finger. As blood pressure increases (sympathetic activation), the arterial walls become constricted, resulting in decreased pulse transit time. Conversely, as blood pressure decreases, the arterial walls become dilated, resulting in increased pulse transit time.

Heart rate and finger pulse were sampled at a rate of 1000 samples/second by the MP100 (Biopac Systems) with the use of ECG (MEC100) and PPG (PPG100C) amplifiers. Two disposable ECG electrodes were placed on the distal end of the right (negative lead) and left (ground lead) collarbones, and one on the lower left rib cage (positive lead) to monitor heart rate. A photoelectric plethysmograph (TSD200 Transducer) was placed on the distal phalange of the index finger of the non-dominant hand to record finger pulse amplitude. FPTT was calculated by subtracting the peak of each cardiac R-wave, as measured by ECG electrodes, from the peak of each pulse wave at the finger, as measured by photoelectric plethysmograph (PS117).

Emotion-eliciting stimuli

Participants viewed four brief film clips (ranging from 70 to 180 s in length) of neutral and unpleasant stimuli. The clips included a scene involving Russian roulette (fear), people grieving over a dying man (sadness), a surgical amputation of an arm (disgust), and changing color bars (neutral). The neutral film was always shown first to

establish a baseline measurement of subjective and physiological states. The remaining films were randomized to avoid order effects. Previous studies (Gross & Levenson, 1995; Frederikson & Levenson, 1996; Sloan, 2004; Campbell-Sills et al., 2006) have shown that these films successfully evoke the targeted emotions.

Procedure

Each participant was individually tested in what they were told was a study examining how people respond to emotional movies. At the beginning of each session, informed consent was explained and acquired. Those who consented to participate were asked to fill out a short demographic questionnaire requesting their age, sex, race, year in school, and experience with meditation. Next, they completed the FFMQ, AAQ, and PANAS-X. After filling out all necessary questionnaires, participants were asked to situate themselves in a comfortable chair facing a television screen in a dimly lit, quiet room. At this time, physiological instruments were attached to participants. Participants were then asked if the hand bearing the physiological equipment could be lightly restrained with a Velcro strap, as any major movement could affect recording and data collection. If permission was granted, the strap was placed over the participant's non-dominant wrist beginning on one side of the chair's arm and ending at the other. Next, participants were told:

> You are going to be shown four brief film clips. It is important that you watch each film clip in its entirety; however, if you find the film clips too distressing, it is okay if you look away or shut your eyes. Following each film clip, you will be asked to rate how you feel *in the present moment* using a scale we call 'Subjective Units of Distress, or SUDS' (The participant was shown a SUDS scale [see Appendix F]). Every 20 seconds, for a period of two minutes, I will call out SUDS, and you will rate on a scale from 0 to 100 how you feel, with zero meaning you are not distressed at all, and one-hundred meaning you are extremely distressed. Once the two minutes of emotional ratings is completed, you will be given another two minutes to fill out an additional questionnaire asking about your personal experiences during each film. Upon completion of this questionnaire, you will have one minute to rest before watching the next film clip.

During this time please try to clear your mind of all thoughts, feelings, and memories. Do you have any questions?

Once it was assured that participants understood all procedures, the experimenter began showing the series of film clips, always starting with the baseline (neutral) clip. While participants were viewing the film clips, the experimenter sat quietly on the opposite side of the room and monitored physiological data until it was time to collect SUDS ratings. Following each clip, the experimenter collected SUDS ratings and asked participants to complete a post-film questionnaire and rest. After all film presentations, SUDS ratings, and recovery periods were complete, participants were asked to rate their willingness to return for similar experiments in the future. Following this, physiological recording equipment was removed and participants were debriefed.

Chapter Three: Results

Because this is a new area of research, correlations that are significant at $p<.05$ or $p<.01$ are identified in the following text and tables. However, the large number of correlations suggest that correlations significant at $p<.05$ should be interpreted cautiously.

Hypothesis 1: Relationship between Mindfulness and Experiential Avoidance at Baseline

Pearson product moment correlations were calculated to examine the relationship of self-reported mindfulness to experiential avoidance at baseline. As expected, FFMQ scores were negatively correlated with AAQ scores ($r = -.49$, $p < 0.001$). These results can be seen in the first line of Table 3.1.

Hypothesis 2: Relationship between Mindfulness, Experiential Avoidance, and Post-Film Questionnaires

Although the post-film questionnaire was modeled after the FFMQ, it was a measure specifically developed for this study and had not undergone previous validation. Therefore, some of its psychometric properties were examined. Internal consistency (Cronbach's alpha) was adequate for each distressing film (sad= .76, disgust= .78, and fear= .77). At the facet level, alphas were more variable. Some facets yielded alphas in the good to adequate range on particular film clips (.76 to .83) while others demonstrated poor reliability even after the removal of bad items (.39 to .68). For this reason, only the total score for the post-film questionnaire was used in these analyses. Furthermore, it was observed that participants' responses to the post-film questionnaire were highly skewed. Inspection of item means indicated that there was little variability in responses on particular facets; participants reported that they engaged in very little judging, reactivity, or lack of awareness during each film.

Pearson product moment correlations were calculated between post-film questionnaire total scores and scores on the FFMQ and AAQ at baseline. As expected, FFMQ scores were positively correlated with responses on post-film questionnaires assessing participants' level of mindfulness while viewing each clip (ranging from $r=.32$ to .38, $p < 0.001$). Similarly, as expected, baseline AAQ scores were negatively correlated with post-film questionnaire scores (ranging from r= -.19 to -.34), although

only for the disgust film (arm amputation) did the significance level reach .01. These results can also be seen in Table 3.1.

Hypothesis 3: Relationships between Mindfulness, Experiential Avoidance, and Subjective Distress and Recovery from Emotional Film Clips

Preliminary analyses. Before testing these relationships, levels of self-reported distress (SUDS ratings) immediately following each film clip were examined, to determine whether the emotional films induced more distress than the neutral film, as intended. Means and SDs are shown in Table 3.2 and Figure 3.1. A one-way ANOVA was conducted to compare immediate post-film distress ratings across film clips. The F-test indicated significant differences between films, $F(1, 106) = 37.60$, $p < 0.001$. Post-hoc Bonferroni comparisons revealed that the neutral film was less distressing than the emotional films, which did not differ from each other. However, overall levels of distress were quite low for all films. The most distressing film (arm amputation) showed a mean SUDS rating of about 37. A rating of SUDS = 50 is equivalent to "somewhat distressing." Therefore, on average, participants appeared to experience the films as only mildly distressing.

In addition, before testing hypothesized relationships, subjective distress (SUDS ratings) over the 2-minute post-film recovery period were examined, to determine whether distress decreased during this period as expected. For each film, a paired-samples t-test was performed to assess the significance of the change in SUDS ratings from the first post-film rating to the last post-film rating. These findings can be seen in Figure 3.2 and Table 3.3. Results indicate that, although degree of distress experienced after viewing each film was minimal, decrease in SUDS rating over the 2-minute recovery period was statistically significant for all films.

Testing hypothesized relationships. For the emotional films, change scores were calculated for subjective distress to determine how distressed participants became during each film, as compared to subjective distress during the neutral film (color bars), which served as the baseline measurement. Film-induced distress was operationalized as the most immediate post-film SUDS rating. To calculate change scores, the neutral film's distress score was subtracted from each emotional film's distress score. These change scores were then correlated with FFMQ and AAQ scores to ascertain if self-

reported mindfulness or experiential avoidance at baseline was related to subjective levels of distress following each film. These results are presented in Table 3.1. (For the neutral film, the immediate post-film SUDS score was correlated with FFMQ and AAQ. For the emotional films, difference between each film and the neutral film was correlated with FFMQ and AAQ). Findings suggest that self-reported mindfulness was associated with significantly less distress following the neutral clip (color bars; $r = -.18$, $p < 0.05$), but greater change in distress following sad (funeral; $r = .16$, $p < 0.05$), and fearful (Russian roulette; $r = .22$; $p < 0.05$) stimuli. FFMQ scores were not significantly correlated with change in distress following the disgust (arm amputation; $r = .03$; $p = .37$) film. As state negative affect was unrelated to these variables ($r = .06$ - $.10$, $p > 0.05$), partial correlations controlling for level of negative affect were not performed. AAQ scores were found to be positively correlated with change in distress following the disgust-eliciting film ($r = .23$, $p < 0.01$), though not with change in distress following any of the other films.

To calculate recovery from subjective distress over the 2-minute post-film recovery period, the last post-film SUDS rating (operationalized as "least distressed") was subtracted from the first post-film SUDS rating ("most distressed") for each film. Recovery scores were correlated with baseline FFMQ scores and AAQ scores to determine if self-reported mindfulness or experiential avoidance was related to emotional recovery following films. Table 3.1 presents these findings. Results suggest that self-reported mindfulness was related to recovery from subjective distress during the fear-eliciting film ($r = .17$, $p < 0.05$). All other correlations, ranging from -.15 to .11, were non-significant. Because most of these findings were nonsignificant, analyses controlling for state negative affect were not conducted.

Hypothesis 4: Relationship between Mindfulness, Experiential Avoidance, and Physiological Activity and Recovery from Emotional Film Clips

Preliminary analyses. One-way ANOVAs were performed to examine if Skin Conductance Level (SCL) and Finger Pulse Transit Time (FPTT) measured during the neutral film were significantly different from SCL and FPTT during emotional films. Unlike subjective distress findings, F-tests were nonsignificant, suggesting that, as measured by SCL and FPTT, emotional films were not more distressing than the neutral

film. Mean SCL for each film can be seen in Table 3.2 and Figure 3.3. Mean FPTT results are presented in Table 3.2 and Figure 3.4.

Paired sample t-tests were also conducted to determine if changes in SCL and FPTT over the 2-minute post-film recovery period were significant for each film. Results showed significant decreases in post-film SCLs, indicating that any elevations participants experienced as a result of viewing each film were able to stabilize after a brief recovery period. These results imply that participants did not remain sympathetically activated following each recovery period. Table 3.3 and Figure 3.5 display SCL recovery for each film. For FPTT, results showed significant increases in post-film transit time, suggesting decreased sympathetic arousal following the 2-minute recovery period, for sad and fearful films only. No significant differences were observed in FPTT for neutral and disgust films. FPTT recovery is shown in Table 3.3 and Figure 3.6.

Testing hypothesized relationships. Change scores were calculated for each of the physiological measurements to evaluate the extent to which data recorded during and after emotional films deviated from observations during the neutral film. To assess physiological activity during film exposure periods, both SCL and FPTT were averaged for each film. Change scores for SCL and FPTT were calculated by subtracting the averaged response from the baseline film from the averaged response during each emotional film. For each film, change scores were correlated with FFMQ and AAQ scores to determine if self-reported mindfulness and experiential avoidance were associated with physiological responsiveness during the film.

Physiological recovery was operationalized as the amount of change observed from the first 20-second SUDS period ("most distressed) to the last 20-second SUDS period ("least distressed"). To calculate physiological recovery for SCL and FPTT, the averaged response from the last 20-second SUDS period was subtracted from the averaged response of the first 20-second SUDS period for each film clip. For each film, recovery scores were correlated with FFMQ and AAQ scores to determine if self-reported mindfulness and experiential avoidance were associated with physiological recovery after each film.

Skin Conductance Level

Results show that FFMQ and AAQ scores were not significantly correlated with SCL during each film (ranging from r = -.01 to .16, p > 0.05), or with degree of recovery in SCL during the 2-minute period following each film (ranging from r = -.08 to .16, p > 0.05). These findings suggest that self-reported mindfulness and experiential avoidance were not related to SCL, or to any changes in SCL, as a result of viewing neutral or distressing film clips. Results are shown in Table 3.4.

Finger Pulse Transit Time

Findings reveal that FFMQ and AAQ scores were not significantly correlated with FPTT during emotional films (ranging from r = -.10 to .03, p > .05). However, FFMQ scores were negatively correlated with FPTT during the neutral film (r = -.21, p < .05), suggesting that participants high in dispositional mindfulness experienced decreased pulse transit time (or increased sympathetic activation) while viewing this film. Given the number of correlations reported here, this may be a chance finding. The correlation between AAQ score and FPTT during the neutral film was nonsignificant (r = .12, p > .05). Lastly, FFMQ and AAQ scores were not significantly associated with recovery from each film following the 2-minute rest period (ranging from r = -.14 to 14, p > .05). Table 3.4 displays these findings.

Hypothesis 5: Willingness to Re-Experience Emotional Events.

Finally, willingness to re-experience similar events in the future was correlated with baseline FFMQ and AAQ scores. Findings showed that self-reported mindfulness was associated with greater willingness to return for similar emotional inductions (r= .17, p < 0.05).

Hypothesis 6: Relationship of Dependent Variables to Facets of Mindfulness at Baseline

Associations were also examined between subscales of the FFMQ (facets of self-reported mindfulness) and post-film distress, post-film recovery, and willingness to view more films.

Correlations between Facets of Mindfulness and Self-Report Dependent Variables.

Most of these correlations were nonsignificant. The observing and nonjudging facets of mindfulness showed no significant relationships with post-film distress, recovery, or willingness ratings. Results show that being able to put one's experiences

into words was associated with less distress during neutral film ($r = -.26$, $p < 0.01$), but increased distress following sad ($r = .21$, $p < 0.05$) and fear evoking ($r = .24$, $p < 0.05$) films. The acting with awareness facet was also associated with greater levels of distress following sad ($r = .26$, $p < 0.01$) and fearful ($r = .29$, $p < 0.01$) film clips, yet positively associated with greater recovery (sad: $r = .29$, $p < 0.01$; fear: $r = .32$, $p < 0.01$) from such distress. Non-reactivity to internal/external events was related to decreased distress following sad ($r = -.20$, $p < 0.05$) and fearful ($r = -.22$, $p < 0.05$) films and greater willingness to experience similar emotional events in the future. These findings can be seen Table 3.5.

Correlations between Facets of Mindfulness and Physiological Dependent Variables.

Correlations between trait-level mindfulness at the facet level and physiological dependent variables were largely nonsignificant. The number of significant findings was not greater than the number that would be expected by chance, suggesting that these findings should not be interpreted. Table 3.6 displays these findings.

Table 3.1

Correlations between Mindfulness, Experiential Avoidance, Post-Film Questionnaires, and Subjective Distress and Recovery Ratings for Neutral and Emotionally-Valenced Film Clips

	FFMQ (baseline)	AAQ (baseline)
AAQ	-.49**	--
Post-Film mindfulness questionnaire		
Color Bars	.32**	-.20*
Funeral	.37**	-.20*
Arm Amputation	.38**	-.34**
Russian Roulette	.37**	-.19*
Post-Film Distress Ratings		
Color Bars	-.18*	.05
Funeral	.16*	.02
Arm Amputation	.03	.23**
Russian Roulette	.22*	.07
Post-Film Recovery Ratings		
Color Bars	-.11	-.05
Funeral	.11	-.15
Arm Amputation	.01	.06
Russian Roulette	.17*	-.02
Willingness Ratings	.17*	-.05

**p <.01 (One-tailed)
*p <.05 (One-tailed)

Note. FFMQ = Five Facet Mindfulness Questionnaire from Baer et al. (2006). AAQ=Acceptance and Action Questionnaire from Hayes et al. (2004). Neutral film. Funeral = Sad film. Arm Amputation = Disgust film. Russian Roulette = Fear film.

Table 3.2

Mean Levels of Subjective Distress, Skin Conductance Level, and Finger Pulse Transit Time for Neutral and Emotionally-Valenced Film Clips

	Neutral		Sad		Disgust		Fear		
	M	SD	M	SD	M	SD	M	SD	F
Immediate SUDS	8.34_a	12.64	29.81_b	22.43	36.83_b	26.38	32.94_b	22.59	37.60***
SCL During Film	5.43_a	2.64	5.15_a	2.40	5.73_a	2.77	5.52_a	2.56	.95
FPTT During Film	422.42_a	58.79	416.71_a	55.39	417.53_a	57.81	416.53_a	57.58	.25

***p <.001

Note. In each row, means that share a subscript do not differ at the .05 level using Bonferroni post-hoc comparisons. SCL = Skin Conductance Level. FPTT = Finger Pulse Transit Time.

Table 3.3

Mean Recovery from Subjective Distress, Skin Conductance Level, and Finger Pulse Transit Time for Neutral and Emotionally-Valenced Film Clips

	Immediate Post-Film		2-Minute Post-Film			
	Mean	SD	Mean	SD	*t*	df
Subjective Distress						
Color Bars	8.42	12.67	3.77	10.96	3.23*	106
Funeral	29.62	22.45	7.51	14.87	10.57***	106
Arm Amputation	36.83	26.38	9.70	18.04	10.82***	107
Russian Roulette	32.69	22.55	6.82	12.04	13.41***	106
SCL						
Color Bars	5.80	2.84	5.23	2.68	9.16***	107
Funeral	5.48	2.62	5.21	2.47	3.35**	107
Arm Amputation	5.88	2.78	5.27	2.55	9.31***	107
Russian Roulette	5.68	2.66	5.24	2.44	7.46***	107
FPTT						
Color Bars	415.26	54.94	414.37	55.56	.62	98
Funeral	408.66	53.37	413.31	55.65	-2.94**	98
Arm Amputation	412.85	56.38	413.23	57.00	-.27	98
Russian Roulette	408.10	54.38	412.63	55.74	-2.96**	98

***p <.001
**p <.01
*p <.05

Table 3.3 (Continued)

Note. Color Bars = Neutral film. Funeral = Sad film. Arm Amputation = Disgust film. Russian Roulette = Fear film. SCL = Skin Conductance Level. FPTT = Finger Pulse Transit Time.

Table 3.4

Correlations between Mindfulness, Experiential Avoidance, and Physiological Activity and Recovery for Neutral and Emotionally-Valenced Film Clips

	FFMQ (baseline)	AAQ (baseline)
SCL During Film Clips		
Color Bars	.05	-.06
Funeral	-.06	.07
Arm Amputation	-.01	.16
Russian Roulette	-.07	.03
Post-Film Recovery in SCL		
Color Bars	.11	.16
Funeral	.10	-.08
Arm Amputation	.14	.06
Russian Roulette	.12	.00
FPTT During Film Clips		
Color Bars	-.21*	.12
Funeral	-.03	-.07
Arm Amputation	.02	-.10
Russian Roulette	-.05	.03

Table 3.4 (Continued)

Post-Film FPTT Recovery		
Color Bars	.14	-.06
Funeral	.11	-.02
Arm Amputation	-.02	-.14
Russian Roulette	.07	-.02

*p <.05 (One-tailed)

Note. FFMQ = Five Facet Mindfulness Questionnaire from Baer et al. (2006). AAQ=Acceptance and Action Questionnaire from Hayes et al. (2004). Neutral film. Funeral = Sad film. Arm Amputation = Disgust film. Russian Roulette = Fear film. SCL = Skin Conductance Level. FPTT = Finger Pulse Transit Time.

Table 3.5

Correlations between Facets of Mindfulness and Subjective Distress and Recovery Ratings, and Willingness to Re-Experience Events

	observe	describe	act aware	nonjudge	nonreact
Post-Film Distress Ratings					
Color Bars	.02	-.26**	-.08	-.12	.08
Funeral	-.01	.21*	.26**	.04	-.20*
Arm Amputation	.04	.14	-.01	-.01	-.17
Russian Roulette	.07	.24*	.29**	.06	-.22*
Post-Film Recovery Ratings					
Color Bars	.04	-.14	-.03	-.18	.12
Funeral	.01	-.02	.29**	.01	-.02
Arm Amputation	-.05	-.12	.08	.09	.01
Russian Roulette	.09	-.00	.32**	.08	-.10
Willingness Ratings	.13	.10	.06	-.05	.28**

**p <.01 (Two-tailed)
*p <.05 (Two-tailed)

Note. Neutral film. Funeral = Sad film. Arm Amputation = Disgust film. Russian Roulette = Fear film.

Table 3.6

Correlations between Facets of Mindfulness and Physiological Activity and Recovery

	observe	describe	act aware	nonjudge	nonreact
SCL During Film Clips					
Color Bars	.28**	-.08	.05	-.10	.05
Funeral	-.07	.03	.00	-.09	-.03
Arm Amputation	.06	.05	-.01	-.08	-.02
Russian Roulette	-.07	.04	-.02	-.13	.03
Post-Film Recovery in SCL					
Color Bars	.09	-.07	.07	.08	.13
Funeral	-.01	-.01	.12	.05	.12
Arm Amputation	.21*	.05	.05	-.01	.10
Russian Roulette	.17	.08	.01	.02	-.00
FPTT During Film Clips					
Color Bars	-.09	-.13	-.11	-.08	-.13
Funeral	.01	.06	.02	-.21*	.06
Arm Amputation	.02	.13	.03	-.13	.00
Russian Roulette	-.11	.12	.00	-.20*	.08

Table 3.6 (Continued)

Post-Film Recovery in FPTT

Color Bars	-.03	.18	-.03	.13	.12
Funeral	-.12	.09	.08	.18	-.00
Arm Amputation	-.13	-.06	.03	.14	-.05
Russian Roulette	-.02	.12	.01	.04	-.01

**p <.01 (Two-tailed)
*p <.05 (Two-tailed)

Note. Neutral film. Funeral = Sad film. Arm Amputation = Disgust film. Russian Roulette = Fear film.

Figure 3.1

Mean Levels of Subjective Distress Following Neutral and Emotionally-Valenced Film Clips

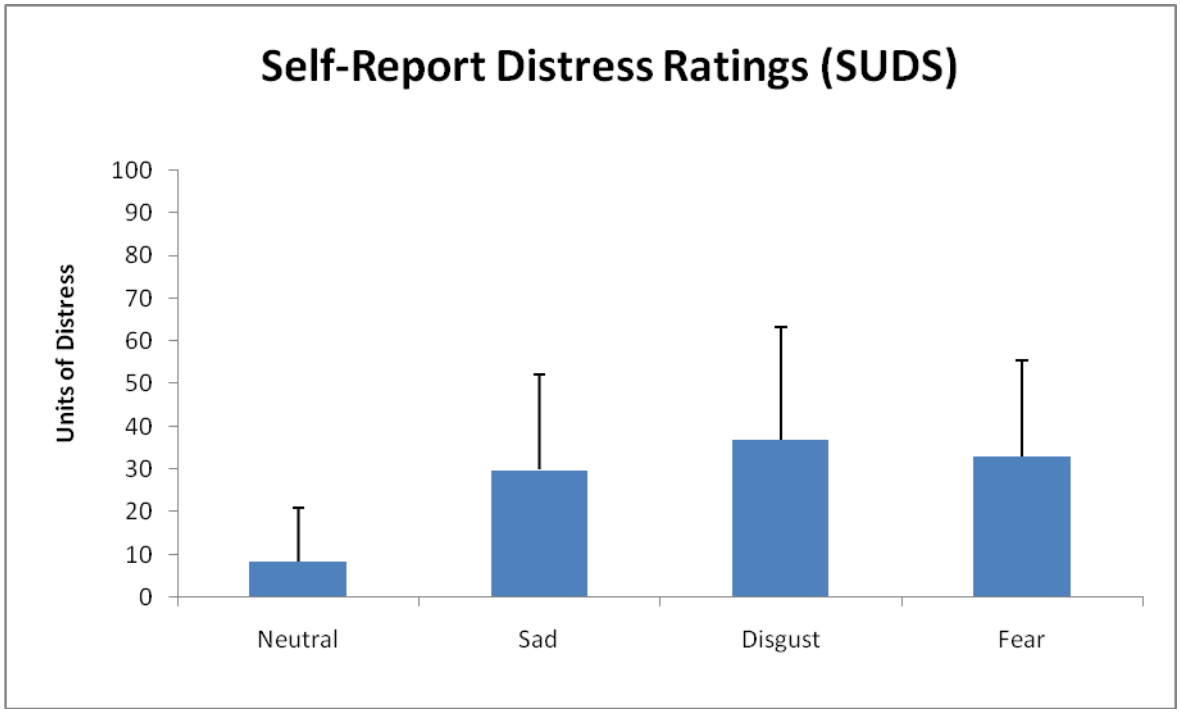


Figure 3.2

Subjective Recovery Following Neutral and Emotionally-Valenced Film Clips

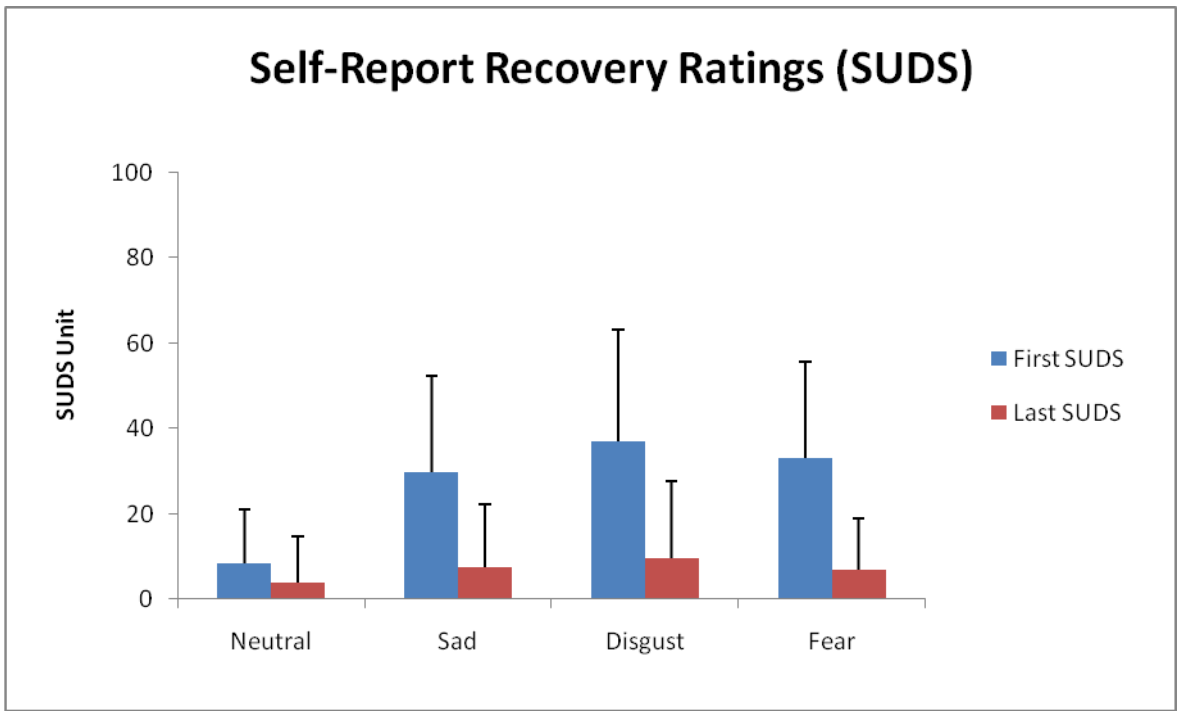


Figure 3.3

Mean Skin Conductance Levels for Neutral and Emotionally-Valenced Film Clips

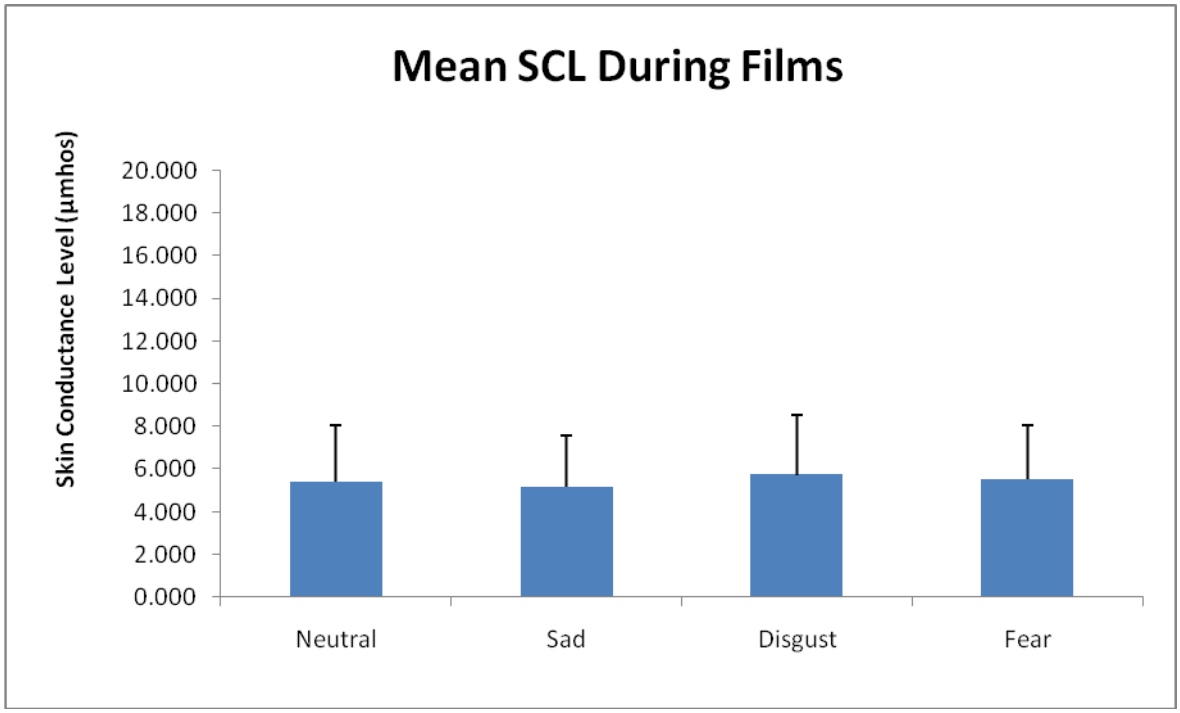


Figure 3.4

Mean Finger Pulse Transit Time for Neutral and Emotionally-Valenced Film Clips

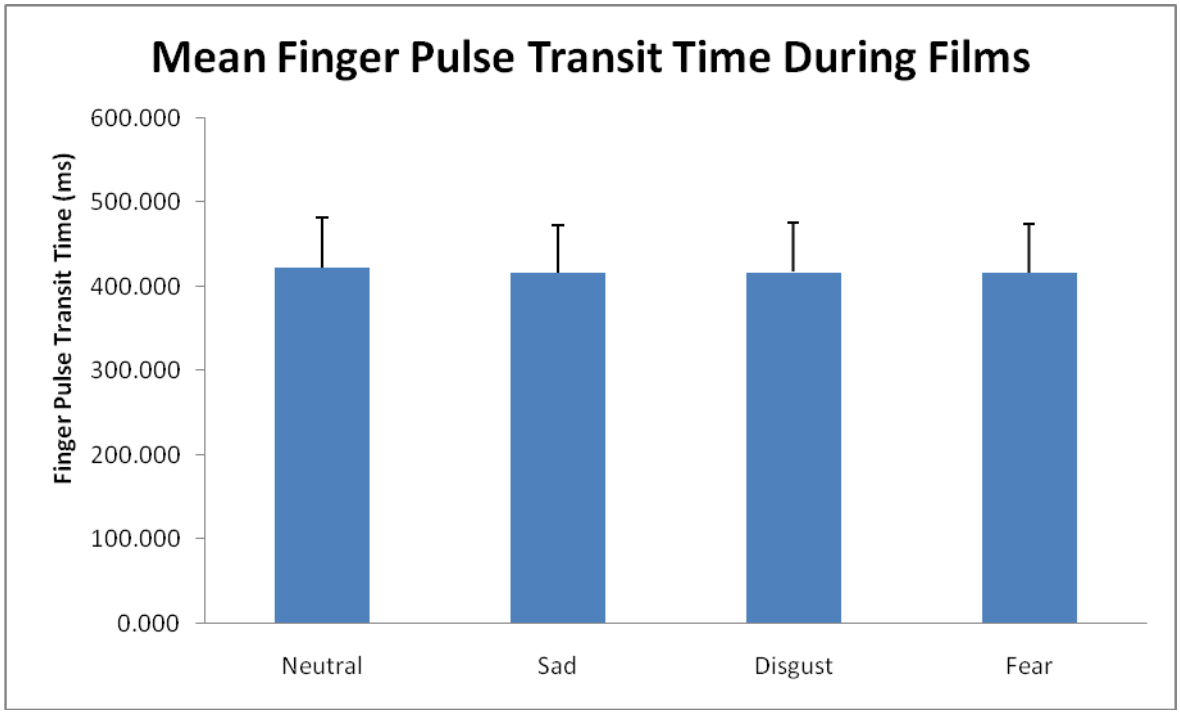


Figure 3.5

Skin Conductance Level Recovery from Neutral and Emotionally-Valenced Film Clips

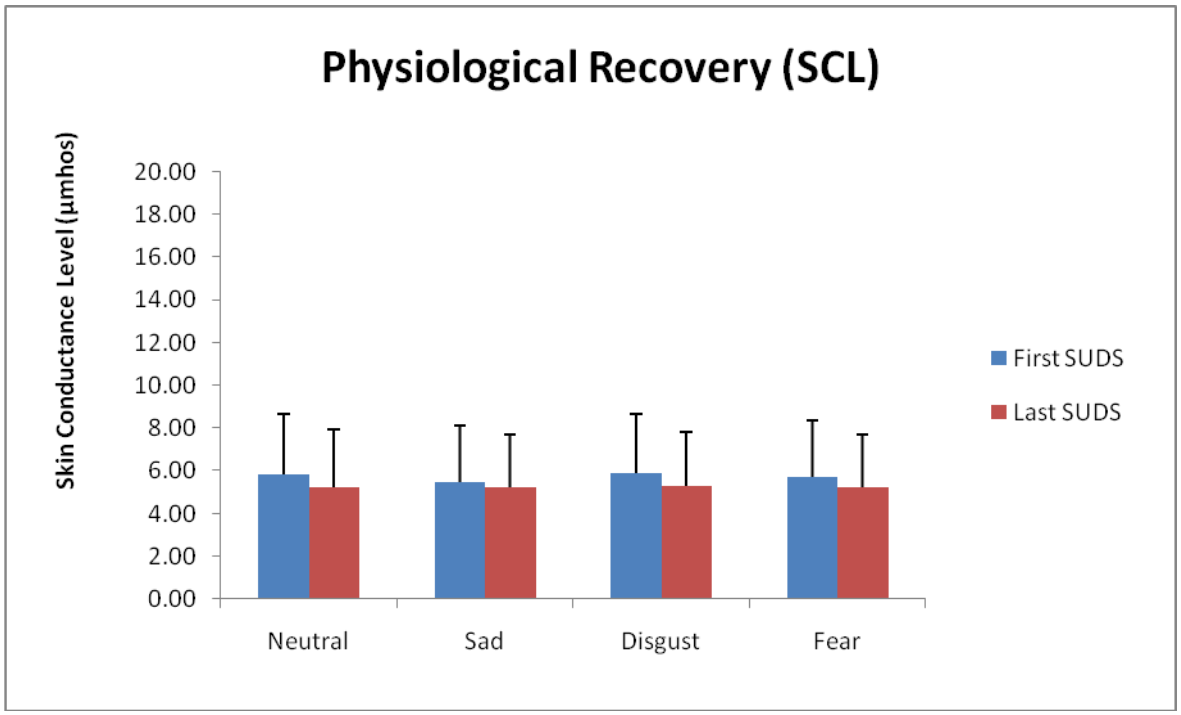
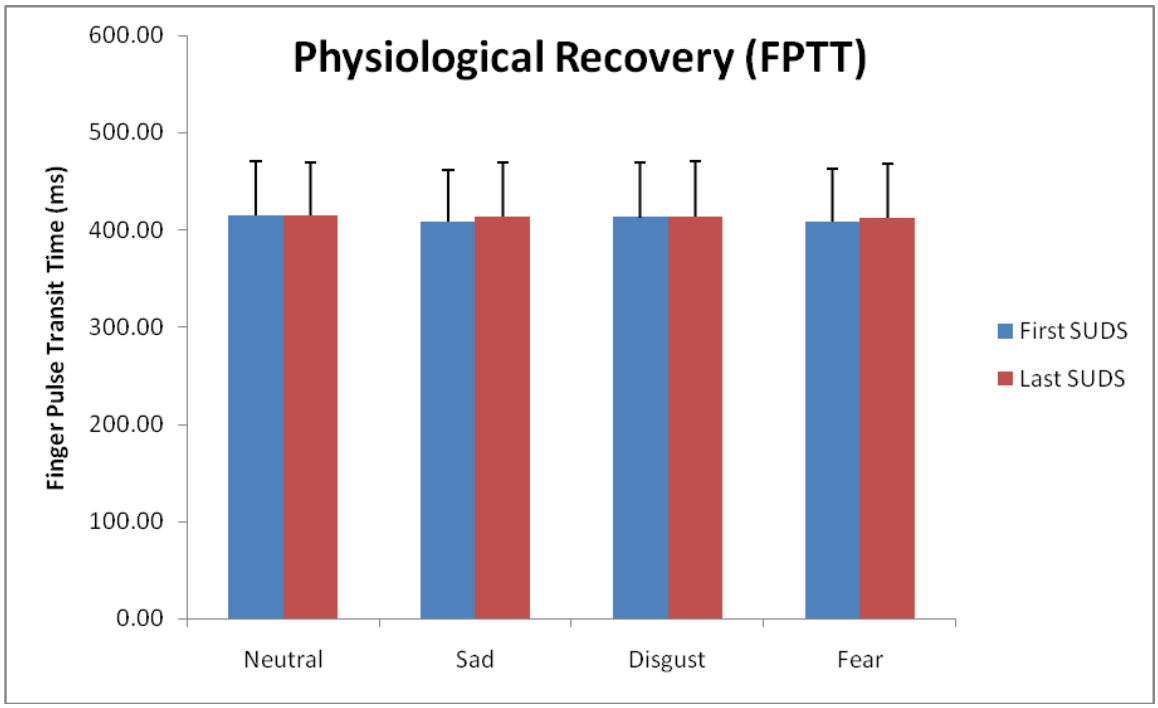


Figure 3.6

Finger Pulse Transit Time Recovery from Neutral and Emotionally-Valenced Film Clips



Chapter Four: Discussion

The primary purpose of this study was to investigate if self-reported mindfulness in daily life was associated with responses to stressful film clips in a laboratory setting. This study was unique in that it sought to incorporate several self-report and physiological instruments that have infrequently been included in previous studies within this literature. Results showed that self-reported mindfulness was correlated with some self-report measures in expected directions. For example, participants who reported being more mindful in daily life were also more likely to report responding mindfully when viewing the distressing film clips. They also reported being more willing to watch similar film clips in the future. However, several unexpected findings emerged. For instance, although self-reported mindfulness was associated with less subjective distress during the neutral film, scores were associated with greater change in distress following sad and fearful stimuli. Furthermore, self-reported mindfulness was not related to changes in subjective distress during the disgust clip. While self-reported mindfulness and experiential avoidance are inversely correlated, it may not be fair to assume participants scoring high in mindfulness would report decreased distress to aversive stimuli. As mindfulness is thought to cultivate acceptance of emotional and physical states, it may be that more mindful participants allowed themselves to fully experience induced emotions rather than attempting to evade them. If this were the case, it is likely that participants scoring high in mindfulness would report elevated distress following emotional induction. Results also showed that, contrary to most initial predictions, self-reported mindfulness was associated with subjective recovery from distress on the fearful film only. Furthermore, self-reported mindfulness was not significantly related to skin conductance level (SCL) and finger pulse transit time (FPTT) during film clips, or to recovery in SCL and FPTT following film clips (with one exception that may be a chance finding). Results showed that SUDS ratings were higher for emotional films than the neutral film, but these elevations fell short of the level of "somewhat distressed," suggesting that the films were only modestly successful in evoking the desired emotional states, and were not distressing enough to cause changes in physiology. This was further evidenced by findings demonstrating that SCL and FPTT were equivalent across all films. In addition, although changes in SCL and FPTT during

post-film recovery periods were statistically significant, apart from changes in neutral and disgust films for FPTT, these changes were extremely small.

Limitations and Future Directions

There are several limitations worth noting that may account for the largely non-significant findings. First, the film clips may not have been sufficiently distressing. Although these film clips have been shown in previous research to induce the intended emotional states (Gross & Levenson, 1995), it is possible that college-aged participants may not be greatly affected by this presentation mode. College-aged participants may be less susceptible to experiencing heightened emotional states from older film clips as they are exposed to a wider, and arguably more intense, array of stimuli in current television, film, and digital media. As observed in the present study, subjective distress ratings did not reach the level of "somewhat distressed" and there were few detectable changes in SCL and FPTT.

The sample may have also had a restriction of range in emotional responsiveness to distressing film clips. Per IRB requirements, participants were forewarned about the contents of each film (i.e. "arm amputation," "wartime scene involving Russian Roulette," "funeral scene"). Participants most sensitive to such stimuli may have been deterred from signing up for the study. Furthermore, disclosing this information may have altered participant expectancies, such that participants may have found the films to be less distressing than originally anticipated.

The null findings also may be related to a restriction of range in trait mindfulness and experiential avoidance. Participants in the current study were not screened on these variables. Although previous studies with the FFMQ have demonstrated adequate variability in unselected samples to show significant relationships with other measures, research using emotional films is inconsistent on participant screening. Screening may be advisable for future studies, in order to assure adequate representation of the high and low ends of the distribution on mindfulness and experiential avoidance.

SUDS ratings may have been an inadequate measure of distress. The SUDS was chosen because it can be administered quickly, allowing assessment of distress at 20-

second intervals over a 2-minute recovery period. However, alternative measures, such as the PANAS, may be better able to detect changes in mood specific to each film.

Mindfulness may not be the most adaptive strategy for managing short-term stressors in an artificial environment. People who are mindful in daily life may not choose to manage such stressors mindfully. Future studies may find it valuable to ask participants what strategies they were using to cope with any experienced negative affect. Furthermore, future research should manipulate responses to stressors by instructing some participants to respond mindfully and others to use avoidant strategies.

Lastly, there may be limitations in the validity of the FFMQ. This questionnaire may not be able to predict subjective and physiological responses induced in artificial environments. However, as previous researchers have failed to incorporate such instruments into their studies, this conclusion cannot be supported without further investigation.

Despite its limitations, the current investigation also has several strengths. It is the first to include a measure of self-report mindfulness in combination with an array of subjective and physiological instruments to measure responses to aversive stimuli. Thus far, the relationship between self-reported trait mindfulness and responses to short-term stressors remains unresolved. Given these findings, it is important for future investigators to implement research designs that acknowledge the aforementioned limitations. Doing so will likely lead to the development of superior laboratory paradigms and shed light on how mindfulness contributes to adaptive emotion regulation.

Appendix A

Post-film Questionnaire

Below are some statements about possible responses to the film you just watched. Please read each statement and write the number in the blank showing how much each statement applied to your experience of watching this film.

1	2	3	4	5
not at all	**a little**	**moderately**	**quite a bit**	**very much**

During the plane crash (amputation, dying man) film:

_____1. I was focused on the film.

_____2. I closed my eyes or looked away so I wouldn't have to see the film.

_____3. I was noticing how my body felt during the film.

_____4. I was trying to keep my reactions from getting too strong.

_____5. I was telling myself I shouldn't have the reactions I was having.

_____6. I got absorbed in the film.

_____7. I tried to distract myself or think of something else so I wouldn't have to see the film.

_____8. I was thinking my reactions were irrational or inappropriate.

_____9. I was noticing the reactions I was having.

_____10. I was paying close attention to the film.

_____11. It was difficult to describe my feelings while watching the film.

_____12. I was noticing the thoughts and feelings that the film triggered.

_____13. My mind wandered off so I wasn't really paying attention to the film.

_____14. I was trying to stay calm.

_____15. I was trying to push away the thoughts or feelings I was having.

_____16. I was criticizing myself for over-reacting or under-reacting to the film.

_____17. I wasn't really noticing the film because other things kept coming to my mind.

_____18. I was thinking that the film was stupid or silly.

_____19. When I had a sensation in my body while watching the film, I found it difficult to describe.

_____20. I was allowing my reactions to come and go.

_____21. I tried to think of something else so I wouldn't have to see the film.

_____22. I was putting my reactions into words.

_____23. I was accepting whatever reactions I had without trying to change them.

Have you ever seen the previous film clip before? _____ Yes _____ No

Appendix B

Willingness to Re-experience

Research on emotion may ultimately contribute to discovering beneficial treatments for people with emotional regulation disorders. Please indicate your willingness to contribute to this important area of research by circling the number that best represents your opinion:

1. How willing would you be to watch additional distressing film clips before leaving today?

1	2	3	4	5
Not at all	A little	Moderately	Quite a bit	Completely

2. How willing would you be to watch similar film clips in a future study?

1	2	3	4	5
Not at all	A little	Moderately	Quite a bit	Completely

Appendix C

Five Facets of Mindfulness Questionnaire (FFMQ)

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes <u>your own opinion</u> of what is <u>generally true for you</u>.

1	2	3	4	5
never or very rarely true	**rarely true**	**sometimes true**	**often true**	**very often or always true**

_____ 1. When I'm walking, I deliberately notice the sensations of my body moving.

_____ 2. I'm good at finding words to describe my feelings.

_____ 3. I criticize myself for having irrational or inappropriate emotions.

_____ 4. I perceive my feelings and emotions without having to react to them.

_____ 5. When I do things, my mind wanders off and I'm easily distracted.

_____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.

_____ 7. I can easily put my beliefs, opinions, and expectations into words.

_____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.

_____ 9. I watch my feelings without getting lost in them.

_____ 10. I tell myself I shouldn't be feeling the way I'm feeling.

_____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

_____ 12. It's hard for me to find the words to describe what I'm thinking.

_____ 13. I am easily distracted.

_____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

_____ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.

_____ 16. I have trouble thinking of the right words to express how I feel about things

_____ 17. I make judgments about whether my thoughts are good or bad.

_____ 18. I find it difficult to stay focused on what's happening in the present.

_____ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.

1	2	3	4	5
never or very rarely true	**rarely true**	**sometimes true**	**often true**	**very often or always true**

_____ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

_____ 21. In difficult situations, I can pause without immediately reacting.

_____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.

_____ 23. It seems I am "running on automatic" without much awareness of what I'm doing.

_____24. When I have distressing thoughts or images, I feel calm soon after.

_____ 25. I tell myself that I shouldn't be thinking the way I'm thinking.

_____ 26. I notice the smells and aromas of things.

_____ 27. Even when I'm feeling terribly upset, I can find a way to put it into words.

_____ 28. I rush through activities without being really attentive to them.

_____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.

_____ 30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.

_____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.

_____ 32. My natural tendency is to put my experiences into words.

_____ 33. When I have distressing thoughts or images, I just notice them and let them go.

_____ 34. I do jobs or tasks automatically without being aware of what I'm doing.

_____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

_____ 36. I pay attention to how my emotions affect my thoughts and behavior.

_____ 37. I can usually describe how I feel at the moment in considerable detail.

_____ 38. I find myself doing things without paying attention.

_____ 39. I disapprove of myself when I have irrational ideas.

Appendix D

Acceptance and Action Questionnaire (AAQ)

Below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following scale to make your choice.

1	2	3	4	5	6	7
Never true	**Very rarely true**	**Seldom true**	**Sometimes true**	**Frequently true**	**Almost always true**	**Always true**

____1. I am able to take action on a problem even if I am uncertain what is the right thing to do.

____2. I often catch myself daydreaming about things I've done and what I would do differently next time.

____3. When I fell depressed or anxious, I am unable to take care of my responsibilities.

____4. I rarely worry about getting my anxieties, worries, and feelings under control.

____5. I'm not afraid of my feelings.

____6. When I evaluate something negatively, I usually recognize that this is just a reaction, not an objective fact.

____7. When I compare myself to other people, it seems that most of them are handling their lives better than I do.

____8. Anxiety is bad.

____9. If I could magically remove all the painful experiences I've had in my life, I would do so.

Appendix E

PANAS – X

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way *right now*. Use the following scale to record your answers:

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

1. _____ cheerful
2. _____ disgusted
3. _____ attentive
4. _____ bashful
5. _____ sluggish
6. _____ daring
7. _____ surprised
8. _____ strong
9. _____ scornful
10. _____ relaxed
11. _____ irritable
12. _____ delighted
13. _____ inspired
14. _____ fearless
15. _____ disgusted with self
16. _____ sad
17. _____ calm
18. _____ afraid
19. _____ tired
20. _____ amazed
21. _____ shaky
22. _____ happy
23. _____ timid
24. _____ alone
25. _____ alert
26. _____ upset
27. _____ angry
28. _____ bold
29. _____ blue
30. _____ shy
31. _____ active
32. _____ guilty

33. _____ joyful

34. _____ nervous

35. _____ lonely

36. _____ sleepy

37. _____ excited

38. _____ hostile

39. _____ proud

40. _____ jittery

41. _____ lively

42. _____ ashamed

43. _____ at ease

44. _____ scared

45. _____ drowsy

46. _____ angry at self

47. _____ enthusiastic

48. _____ downhearted

49. _____ sheepish

50. _____ distressed

51. _____ blameworthy

52. _____ determined

53. _____ frightened

54. _____ astonished

55. _____ interested

56. _____ loathing

57. _____ confident

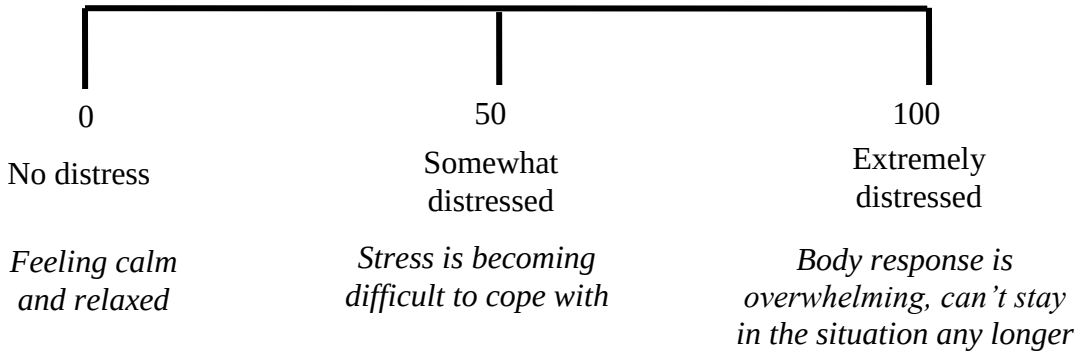
58. _____ energetic

59. _____ concentrating

60. _____ dissatisfied with self

Appendix F

Subjective Units of Distress (SUDS) Scale



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