Behaviorally Measuring Mindfulness: Evaluating Effort as an Index of Emotional Acceptance

by

Amanda Michelle Ferguson

A thesis submitted in conformity with the requirements for the degree of Master of Arts

Graduate Department of Psychological Clinical Science

University of Toronto

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Abstract

Mindfulness has received an increasingly large amount of attention in academic research. While the benefits of mindfulness are often cited, certain methodological issues significantly limit interpretation across findings. Here, we seek to address this concern through the development of a behavioral measure of emotional acceptance (i.e., a fundamental component of mindfulness). Drawing on behavioral economics, we attempt to develop a measure of emotion regulation choice behavior called the Willingness to Experience Task (WILTEX) in which participants make a series of binary choices between accepting emotion or engaging it with an alternative strategy. Across 5 studies, we demonstrate that individuals are no less likely to avoid emotional acceptance than they are to avoid other emotion regulation strategies. Implications for conceptualizing and measuring mindfulness are discussed.
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Chapter 1

Introduction

The last decade has witnessed a surge of scientific interest in the benefits of “mindfulness”. Mindfulness has been defined as a process of “bringing one’s complete attention to the present experience on a moment-to-moment basis” (Marlatt & Kristeller, 1999, p. 68) and as “paying attention in a particular way, on purpose, in the present moment, and nonjudgmentally” (Kabat-Zinn, 1994, p. 4). Research into the outcomes and correlates of mindfulness has yielded many interesting results. For example, mindfulness has been associated with increased executive functioning (e.g. Jha, Krompinger, & Baime, 2007), improve self-control (Chambers, Lo, & Allen, 2008; Teper & Inzlicht, 2013), improved well-being (Brown & Ryan, 2003), and improved academic performance (Ramsburg & Youmans, 2014).

Simultaneously, mindfulness-based practices have been incorporated into several successful treatment programs for depression (Segal, Williams, & Teasdale, 2002), anxiety (Evans et al., 2008), and chronic pain (Kabat-Zinn, 1990). Not surprisingly, public interest has begun to parallel extant academic interest. In fact, the United Kingdom has recently committed to officially incorporating mindfulness-based practices into the areas public health, education, business, and criminal justice (Mindfulness All-Party Parliamentary Group, 2015).

1 Methodological issues in mindfulness research

Despite the recent proliferation of research on the topic of mindfulness, interpretation across findings is necessarily limited by certain methodological issues. One such issue is a simple problem of measurement. Almost uniformly, researchers have relied on self-report
questionnaires to measure the construct of mindfulness. This raises two important issues. First, such measurement requires that individuals reflect on their experience practicing a skill (i.e., mindfulness) that itself affects one’s ability to interrogate the mind. Thus, the quality of response from individuals with little or no mindfulness practice might be qualitatively different from that obtained from long-term practitioners, who have (presumably) developed more familiarity with the nature of their experience (Davidson & Kaszniaak, 2015). In other words, long-term practitioners might report lower or equivalent levels of mindfulness than non-practitioners for the simple reason that they are more familiar with their own minds and with what “mindfulness” means. This is particularly problematic in a clinical research context, since mindfulness questionnaires have been used as a sort of manipulation check following a mindfulness-based treatment or induction. For example, in a recent study, a commonly used (and psychometrically sound) questionnaire known as the Five Facet Mindfulness Questionnaire (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) was not able to distinguish individuals who had received 8 weeks of Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1994) from those in an active (and intentionally not-mindfulness-based) control treatment (MacCoon et al., 2012; see also Levinson, Stoll, Kindy, Merry, & Davidson, 2013). In this instance, it is impossible to discern if 1) both treatments increased individuals’ mindfulness skill, or 2) neither treatment increased mindfulness skill. It is equally difficult to ascribe any changes associated with treatment outcome to the relative presence or lack of mindfulness, leaving unanswered questions about the extent to which (if at all) “mindfulness” was driving any observed change.

To address this issue, the present program of research seeks to develop a behavioral measure of mindfulness. Behavioral assessment requires the demonstration of ability, rather than its passive endorsement (i.e., as in self-report). This reduces the likelihood of that skill level will interfere with interpretation of the task demands, since the measurement is limited to the quality
of a single behavior across individuals. In other words, by limiting the influence of an individual’s capacity for self-reflection on the reliability of measurement, a behavioral assessment allows for more precision and consistency. If mindfulness is a type of skill set, then a behavioral task designed to assess the progression of a core skill’s development may be an especially effective way to gauge individuals’ relative level of mindfulness.

2 Defining Mindfulness: Willingness to Experience Emotion

While there is no single agreed upon definition of mindfulness (see Bodhi, 2011; Dunne, 2011; Gethin, 2011), there are several common themes that appear across conceptualizations. In general, mindfulness is associated with present-moment awareness and non-judgmental acceptance (or “letting be”) of experience (Cardaciotto, Herbert, Forman, Moitra & Farrow, 2008; Ssegal et al., 2002). Mindfulness training (MT) seeks to cultivate this attitude through the practice of meditation, focused breathing, and open monitoring of internal events (i.e., thoughts, feelings, physical sensations). Implicit in these practices is the repeated exposure to emotion, since paying attention to a negative (or positive) thought will necessarily involve feeling (or paying attention to) any associated emotion. In this way, MT involves the repeated practice of sitting with (or staying present with) emotional experience. Given this emphasis in MT, it is likely that individuals with more MT will have proportionally more practice approaching and experiencing emotion than those with less MT. Consequently, given their lack of practice, individuals without mindfulness training might find it harder to engage in this open monitoring process. As such, it may be that less mindful individuals perceive the process of monitoring and experiencing emotion as more effortful than their more mindful peers.
A large body of research has demonstrated that people prefer to avoid exerting effort (Hull, 1943; Kool, McGuire, Rosen, & Botvinick, 2010; Walton et al., 2006; Westbrook, Kester, & Braver, 2013). These findings provide support for the “law of least effort”, which suggests that “if two or more behavioral sequences, each involving a different amount of energy consumption or work, have been equally well reinforced an equal number of times, the organism will gradually learn to choose the less laborious behavior sequence” (Hull, 1943; cf. Kool et al., 2010). This makes sense from an evolutionary perspective, since a highly demanding behavior is necessarily accompanied by a proportionally large fitness cost (Kurzban, 2015). Similarly, in an economic sense, effort is a sign of potential and inherent disutility of action (Kool et al., 2010). If high and low mindful individuals vary in the extent to which they view emotional experience as effortful, the law of least effort suggests that “mindfulness” might be measurable in terms of an individual’s willingness to engage in emotional experience.

Here we developed a novel behavioral paradigm in which participants make a series of choices between experiencing emotion or engaging with it in a different way. If experiencing emotion becomes less effortful with mindfulness practice, we expect individuals with mindfulness training (i.e., high in trait mindfulness) to be less avoidant of the experiencing behavior than those with little or no mindfulness training.
Chapter 2
The Willingness to Experience Task

The willingness to experience task (WILTEX) is based on a well-validated behavioral test of effort avoidance called the Demand Selection Task (DST; Kool et al., 2010). Over a series of trials, participants are given a choice between two decks of cards – one red, one blue. Each deck is associated with a different task: one task instructs participants to pay attention to the physical experience of the emotion (the EXPERIENCE deck) and the other task instructs participants to engage in an alternative course of action (either distract themselves from the emotion, or attempt to reappraise the emotion; the DISTRACT and APPRAISE decks, respectively). Participants see the same stimulus on each trial regardless of which task is chosen, with only the instructions differing depending on chosen task.

A central premise of the WILTEX is that non-judgmental acceptance of emotion, as practiced through mindfulness training, is a form of emotion regulation. One’s willingness to experience emotion is a necessary first step in the acceptance process, since acceptance of an emotional experience presumes the existence of an emotional experience to begin with. In this way, the WILTEX aims to assess individuals’ predilection for a certain type of emotion regulation strategy (namely, one that involves actively feeling and attending to emotion). An effective comparison task will therefore require that the individual engage an alternative emotion regulation strategy. That is, the WILTEX seeks to determine individuals’ preferred strategy for approaching (and regulating) emotion.
2.1 Comparison tasks

In Gross’ (1998b) process model of emotion regulation, strategies are placed on a timeline according to their activation in the emotion-generative process. Given that emotions develop over time, intervening at different time points should lead to different patterns of emotion experience, expression, and physiology. Given the wide range of emotion regulation strategies available to an individual at any one time (for review see Gross, 2015), two possible comparison strategies will be investigated: distraction and cognitive reappraisal.

Distraction is from the attentional deployment family of strategies (Gross, 1998b), and occurs early in the emotion generative process (i.e., approximately 300 ms following an emotional stimulus; Thiruchselvam, Blechert, Sheppes, Rydstrom, & Gross, 2011). During distraction, an individual either shifts attention within a given situation (e.g., from an emotion-eliciting feature of an image to a neutral feature), or shifts attention away from the situation entirely (e.g., thinking about vacation plans while in a depressing meeting).

Behavioral research has demonstrated that distraction can be an effective way to down-regulate the subjective experience of negative emotion (Bennett, Phelps, Brain, Hood, & Gray, 2007; Rusting, 1998). Neurophysiological research has demonstrated that distraction attenuates an event-related potential known as the late positive potential, which is associated with both positive and negative arousal (Dunning & Hajcak, 2009). Similar findings from neuroimaging research suggests that distraction can effectively down-regulate subcortical emotion-generative structures such as the amygdala (Ferri, Schmidt, Hajcak, & Canli, 2013; McRae et al., 2010). Thus, as a comparison task on the WILTEX, distraction provides individuals with an effective alternative approach to dealing with negative emotional stimuli.

The cognitive change family of emotion regulation strategies are engaged later in the emotion-generative process (i.e., after attentional deployment strategies). One particularly well-
studied form of cognitive change is reappraisal. Using reappraisal, individuals attempt to change either the meaning of a potentially emotion-eliciting situation (e.g., “This interview isn’t do-or-die; it’s a chance for me to learn more about the industry”), or the self-relevance of a potentially emotion-eliciting situation (e.g., “This event doesn’t directly involve me, so its outcome is less important”) to regulate emotion. Although reappraisal is most commonly used to decrease negative emotion, it can be used to increase or decrease both negative and positive emotions (Ochsner & Gross, 2005).

Reappraisal has been extensively studied. When used to down-regulate negative emotions, and is consistently associated with decreased levels of negative emotion experience (Gross, 1998a; Kross & Ayduk, 2011; Lieberman, Inagaki, Tabibnia, & Crockett, 2011; Ray, McRae, Ochsner, & Gross, 2010; Szasz, Szentagotai, & Hofmann, 2011; Wolgast, Lundh, & Viborg, 2011). In low to moderate intensity situations, reappraisal appears to decrease sympathetic nervous system responses to negative emotion (Gross, 1998a; Kim & Hamann, 2012; Sheppes & Meiran, 2007; Wolgast et al., 2011), and leads to lesser activation in emotion-generative brain regions such as the amygdala (Goldin, McRae, Ramel, & Gross, 2008; Kanske, Heissler, Schonfelder, Bongers, & Wessa, 2011; Ochsner & Gross, 2008). As a comparison task on the WILTEX, reappraisal provides individuals with a common and successful cognitive option for dealing with negative emotion.

2.2 Stimuli

Images for the WILTEX were drawn from the International Affect Picture System (IAPS; Lang, Bradley, & Cuthbert, 1999). Only images that were sufficiently (but not overly) emotion-eliciting were included. That is, the purpose of the images in the WILTEX is to elicit a manageable emotion. To this end, the IAPS database was divided into sixths based on valence
(low, medium, and high for both positive and negative images), and 27 images (25 WILTEX trials plus 2 practice trials) were randomly selected from the medium-negative group. See Table 1 for image details.

The videos used in Study 5 were drawn from the Mixed Emotions Film Library (Samson, Kreibig, Soderstrom, Wade, & Gross, 2015). The videos were selected based on their valence and repulsion ratings. Video details are available in Table 2.

Table 1. Normative data from the IAPS images used in Studies 1 – 4 (Lang et al., 1999).

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Note: Images 9471 and 9495 were displayed as practice trials. Valence ratings made on a scale of 1 = very unpleasant to 9 = very pleasant.
Table 2. Normative data for the videos used in Study 5 (from Samson et al., 2015)

<table>
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<td>3.56</td>
</tr>
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</table>

*Note: Valence ratings made on a scale of 1 (very negative) to 6 (very positive). Repulsion ratings made on a scale of 1 (not at all) to 6 (very strong).*
Chapter 3
Design

Across studies, we used multiple behavioral and self-report assessments to investigate the construct validity of effort as an index of mindfulness. In all studies, the WILTEX was followed by a qualitative assessment of participants’ experience of the task and an assessment of the perceived effort, negative affect, and efficacy during each trial type. Individual difference measures were used in Studies 2 and 5 to further investigate construct validity of the WILTEX. Study 5 used an experiential discounting paradigm to investigate participants’ subjective cost of experiencing.

2.3 Post-task assessment

Following the WILTEX trials, participants completed a qualitative post-task assessment. Participants provided open-ended responses to the following prompts: “What was it like performing the task?” “Did you develop a preference for one of the decks?” “How did you choose between the decks?” and “Was there any difference between the decks?” These questions were used to assess whether or not individuals’ perceived preference for a particular deck was associated with actual deck choice.

2.4 NASA Task Load Index

In all studies, participants completed the NASA Task Load Index (Hart & Staveland, 1988) after the post-task assessment. For each deck, participants answered the questions: “How mentally demanding was this deck?” “How hard did you have to work to accomplish your level of performance with this deck?” “How insecure, discouraged, irritated, stressed, and annoyed
were you by this deck?” “How successful were you in accomplishing what you were asked to do in this deck?”. Each question was answered on a likert-type scale of 1 – 5 (1 = Very Low, 5 = Very High). For each deck, the first two questions were combined into an index of perceived effort, the third corresponds to aversiveness or perceived negative affect elicited by the deck, and the fourth corresponds to perceived efficacy/success. Across studies, we expected that participants would rate the EXPERIENCE deck as more effortful, more aversive, and as eliciting less efficacy, and that these perceptions would associate with reduced EXPERIENCE choice.

2.5 Individual difference measures

2.5.1 Physical and Mental Health

The health benefits of mindfulness practice are well-established (see Grossman, Niemann, Schmidt & Walach, 2004 and Keng, Smoski & Robins, 2011 for review). Thus, if the WILTEX is assessing an individuals’ “mindfulness”, we would expect it to correlate with health and well-being. To investigate this possibility, two subscales of the Patient Health Questionnaire (PHQ; Spitzer, Kroenke, & Williams, 1999) were administered. The PHQ is a self-administered version of the PRIME-MD diagnostic instrument for common mental disorders. The diagnostic validity of the PHQ has been established in 2 studies involving 3,000 patients in 8 primary care clinics and 3,000 patients in 7 obstetrics-gynecology clinics (Spitzer, Kroenke, & Williams, 1999); Spitzer, Williams, Kroenke, Hornyak, & McMurray, 2000).

The PHQ-9 is the 9-item depression subscale from the PHQ. Participants are asked to reflect on the past 2 weeks, and indicate how often they have been bothered by certain issues, such as “feeling tired or having little energy” and “little interest or pleasure in doing things”. Individuals rate each item on a scale of 0 (not at all) to 3 (nearly every day). A final assessment
of severity is included at then of the PHQ-9, with a single item asking those who checked off any problems on the questionnaire: “How difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?” The PHQ-9 has demonstrated good internal consistency (Cronbach’s $\alpha = .89$) and validity (Kroenke, Spitzer, & Williams, 2001).

The PHQ-15 is comprised of the 15 somatic symptoms assessed on the PHQ. Somatization is the association of medically unexplained physical symptoms with psychological distress. It is associated with more healthcare utilization (e.g., doctor’s visits) than depression and anxiety, and is present in at least 10% to 15% of patients seeking primary care (Kroenke, Spitzer, & Williams, 2002). The PHQ-15 asks individuals to reflect on the past 4 weeks, and indicate how much they have been bothered by certain problems, such as “Headaches”, “Back pain”, and “Nausea, gas, or indigestion”. The symptoms assessed on the PHQ-15 account for more than 90% of the physical complaints reported in the outpatient setting (Kroenke, Spitzer, & Williams, 2002). Individuals rate each item on a scale of 0 (not bothered at all) to 3 (bothered a lot). The PHQ-15 has demonstrated good internal consistency (Cronbach’s $\alpha = .80$) and validity (Kroenke, Spitzer, & Williams, 2002).

2.5.2 Mindfulness

Trait mindfulness will be assessed with the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) and the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto et al., 2008). The FFMQ was developed from research suggesting that there are five distinct capacities associated with “mindfulness” (Baer et al., 2006). These facets are known as describing, observing, acting with awareness, nonjudging, and nonreactivity (Baer et al., 2006). Describing refers to the ability to label one’s internal experiences using language. Observing refers to the
process of attending to one’s internal and external experiences. Acting with awareness involves attending to current activities in the present moment (i.e., rather than operating on “auto-pilot”). Nonjudging refers to taking a nonevaluative approach towards thoughts and emotions. Nonreactivity involves allowing thoughts and emotions to drift in and out of awareness without reacting or fixating on them. The FFMQ is a 39-item measure, with each item rated on a scale of 1 (never or very rarely true) to 5 (very often or always true). Its subscales are made up of 7 to 8 items, and each assesses one of the facets. The FFMQ has been well validated, and each subscale has shown adequate to excellent internal consistency (nonreactivity subscale $\alpha = .75$, observing subscale $\alpha = .83$, acting with awareness subscale $\alpha = .87$, describing subscale $\alpha = .91$, and nonjudging subscale $\alpha = .87$).

Some participants completed the 20-item Philadelphia Mindfulness Scale (PHLMS; Cardaciotto et al., 2008). The PHLMS is a bidimensional trait measure of mindfulness that was intentionally constructed to independently measure the two primary dimensions of mindfulness: present-moment awareness (e.g. “I am aware of what thoughts are passing through my mind”) and mindful acceptance (e.g. “I try to distract myself when I feel unpleasant emotions”, reverse coded). Awareness items on the PHLMS are intended to capture the extent to which the individual monitors ongoing internal and external experiences; acceptance items are intended to evaluate the extent to which the individual experiences internal and external events with a non-judgemental attitude. Items on the PHLMS are rated on a 5-point Likert scale, ranging from strongly disagree to strongly agree, based on how frequently these experiences occurred over the previous week. The PHLMS subscales have demonstrated adequate to good internal consistency (Cronbach’s $\alpha = .75$ to .82), and validation analyses have provided support for the relationship between mindfulness and mental health in both clinical and non-clinical samples (Cardaciotto et al., 2008).
3 Experiential discounting paradigm

In addition to testing for effort avoidance, we developed a discounting paradigm to assess the subjective value that individuals assign to engaging in emotional acceptance. The discounting paradigm is adapted from similar tasks that have been used to assess subjective value assigned to cognitive effort (Westbrook et al., 2013). In this task, participants are given a series of choices between completing an EXPERIENCE deck trial for $2.00, or the alternative deck trial (e.g., DISTRACT) for a variable lesser amount (see Figure 4). After practicing with each deck trial type, participants will receive the following instruction (see Appendix A for full instructions):

Now that you are familiar with the task, you will be making choices about the relative value of each deck. Remember, the DISTRACT deck asks you to move your attention away from your emotions, and the EXPERIENCE deck asks you to notice and attend to the experience of the emotion in your body. In all cases, the images shown will be similar to those you saw in the practice trials. In this section, you will see a bonus payment for completing a trial from each deck. Please select the option that you prefer. There are no accurate or inaccurate answers, but your choices will have consequences: ten percent of participants will be randomly selected to complete 20 minutes worth of their final preference selection, for their preferred bonus rate. So be sure to choose carefully!

Participants’ series of choices iterates until they reach a point at which they do not distinguish the value between experiencing an emotion (EXPERIENCE) and distracting themselves from it (DISTRACT), providing a financial quantification of how much money it would take for a particular participant to choose EXPERIENCE. We expected that participants will require an
additional cost to choose EXPERIENCE, and that this perceived financial cost will correlate negatively with an individual’s proportion of EXPERIENCE choices on the WILTEX.
Chapter 4

Studies 1 - 5

In the following experiments, we investigated the role of effort avoidance in emotion regulation strategy preference. Given the novelty of the task, several variations in task details were evaluated. For clarity, only 5 versions are discussed here. However, several versions were piloted – for basic information about each pilot study, please see Table 3.

In Study 1, distraction was used as the comparison task, and participants were asked to provide written feedback after each trial. The WILTEX versions used in Studies 2 and 3 were identical to that of Study 1, except the comparison task in Studies 2 and 3 was reappraisal. In Study 4, we adjusted the comparison task instructions to be more thorough (comparison task was reappraisal), and changed the required feedback to a likert-type response. Study 5 used videos rather than images, and the comparison task was distraction.

In all experiments we report how we determined our sample size, all data exclusions (if any), all manipulations and all measures in the study (Simmons, Nelson, & Simonsohn, 2012). According to a power analysis using the average effect in social psychology ($d = .40$; Richard, Bond, Stolkes-Zoota, 2003), with a one-sample t-test design ($mu = .50$), we could achieve 80% power with as few as 41 participants and 90% power with as few as 55 participants (g*power; Erdfelder, Faul, & Buchner, 1996). We decided to collect data on no fewer than 41 participants per study, often exceeding this minimum to achieve more statistical power.
<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Comparison</th>
<th>Task</th>
<th>Design</th>
<th>EXP choice</th>
<th>Cost of EXP</th>
<th>Additional measures</th>
<th>Name</th>
<th>Relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>p1</td>
<td>50</td>
<td>DISTRACT</td>
<td>EDT</td>
<td>High neg images; 10s holds; written response</td>
<td>--</td>
<td>.26</td>
<td>[.13, .39]</td>
<td>AAQ-II; PHLMS</td>
<td>No correlation between any measure and DV</td>
</tr>
<tr>
<td>p2</td>
<td>197</td>
<td>DISTRACT</td>
<td>WILTEX and EDT</td>
<td>High neg images; 10s holds; written response; 1 round EDT; EDT starts at $2 for EXP, $1 for DIS</td>
<td>.53 [.49, .52]</td>
<td>.38** [.47, .30]</td>
<td>FFMQ; PHLMS; BEAQ, PHQ-9</td>
<td>No correlation between any measure and experience choice. Cost of experiencing was negatively correlated with BEAQ scores, positively correlated with FFMQ NJ, and negatively correlated with FFMQ OB, all correlations were small effects.</td>
<td></td>
</tr>
<tr>
<td>p3</td>
<td>73</td>
<td>APPRAISE</td>
<td>WILTEX</td>
<td>High neg images; 10s holds; written response</td>
<td>.48 [.41, .56]</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1</td>
<td>76</td>
<td>DISTRACT</td>
<td>WILTEX</td>
<td>Med neg images; 10s holds; written response</td>
<td>.57 [.64, .50]</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td>APPRAISE</td>
<td>WILTEX</td>
<td>Med neg images; 10s holds; written response</td>
<td>.39* [.46, .32]</td>
<td>--</td>
<td>--</td>
<td>PHQ-9</td>
<td>No correlation between PHQ-9 and experience choice</td>
</tr>
<tr>
<td>p4</td>
<td>100</td>
<td>APPRAISE</td>
<td>WILTEX</td>
<td>Med neg images; 5s holds; written response</td>
<td>.53 [.46, .59]</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>APPRAISE</td>
<td>WILTEX</td>
<td>Med neg images; 10s holds; written response</td>
<td>.46 [.52, .41]</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td>60</td>
<td>DETATCH &amp; RETHINK</td>
<td>WILTEX</td>
<td>Med neg images; 5s holds; likert response</td>
<td>.56 [.64, .48]</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
<td>DISTRACT</td>
<td>EDT</td>
<td>High neg videos; 5s holds; likert response; 3 rounds EDT; EDT starts at $1 for each deck</td>
<td>--</td>
<td>.09 [.25, -.07]</td>
<td>PHQ-9, PHQ-15, FFMQ, PHLMS</td>
<td>No correlation between FFMQ NJ and cost of experiencing. No other correlations.</td>
<td></td>
</tr>
<tr>
<td>p5</td>
<td>50</td>
<td>DISTRACT</td>
<td>WILTEX</td>
<td>High neg videos; 20s holds; likert response</td>
<td>.43 [.51, .35]</td>
<td>--</td>
<td>--</td>
<td>PHQ-9, PHLMS</td>
<td>No correlation between any measure and experience choice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DISTRACT</td>
<td></td>
<td>WILTEX</td>
<td>High neg videos; 20s holds; likert response</td>
<td>.55</td>
<td>[.62, .49]</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>p6</td>
<td>100</td>
<td>DISTRACT</td>
<td>EDT</td>
<td>WILTEX</td>
<td>High neg videos; 20s holds; likert response; 3 rounds EDT; EDT starts at $2 for EXP, $1 for DIS</td>
<td>.23**</td>
<td>[.31, .16]</td>
<td>PHQ-9, PHQ-15, FFMQ, PHLMS</td>
<td>Cost of experiencing positively correlated with PHQ-9 and PHQ-15, negatively correlated with PHLMS ACC</td>
</tr>
<tr>
<td>p7</td>
<td>100</td>
<td>DISTRACT</td>
<td>EDT</td>
<td>WILTEX</td>
<td>High neg videos; 20s holds; likert response; 3 rounds EDT; EDT starts at $2 for EXP, $1 for DIS</td>
<td>.25**</td>
<td>[.31, .18]</td>
<td>No correlation between any measure and cost of experiencing</td>
<td></td>
</tr>
<tr>
<td>p8</td>
<td>150</td>
<td>DISTRACT</td>
<td>EDT</td>
<td>WILTEX</td>
<td>High neg videos; 20s holds; likert response; 3 rounds EDT; EDT starts at $2 for EXP, $1 for DIS</td>
<td>.24**</td>
<td>[.31, .17]</td>
<td>No correlation between any measure and cost of experiencing</td>
<td></td>
</tr>
<tr>
<td>p9</td>
<td>151</td>
<td>DISTRACT</td>
<td>EDT</td>
<td>WILTEX</td>
<td>High neg videos; 20s holds; likert response; 3 rounds EDT; EDT starts at $2 for EXP, $1 for DIS</td>
<td>.24**</td>
<td>[.31, .17]</td>
<td>No correlation between any measure and cost of experiencing</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Confidence intervals are 95%. * p < .05; ** p < .001; EDT = Experiential discounting task; WILTEX = Willingness to experience task; p6 is a direct replication of p5. p8 and p9 are direct replications of p7.*
4 Study 1

In Study 1, we sought to investigate the subjective effort associated with experiencing and distracting from emotion. We hypothesize that individuals will avoid the EXPERIENCE deck, and that the extent to which they avoid it (i.e., the proportion of EXPERIENCE choice across trials) will correlate with their subjective ratings of the effort, aversiveness (i.e., feelings of negative affect), and feelings of efficacy for that deck.

4.1 Method

4.1.1 Participants

Seventy-six participants ($N = 76$) were recruited from Amazon’s Mechanical Turk. For this and all subsequent studies, only individuals in the USA with a HIT approval rating of at least 98%, and with at least 100 approved HITs, could view and participate in the study. Participants were paid $1 for every 10 minutes spent on the study.

4.1.2 Procedure

Once consent was obtained, participants were provided with instructions (see Appendix A). They then completed two practice trials – one of the EXPERIENCE deck and one of the DISTRACT deck – followed by 25 trials of the WILTEX. In this version of the WILTEX, participants were given the choice between two labeled decks. Once they chose a deck, they were presented with an image, and given the instructions associated with the deck they chose (see Figure 1 for a visualization of the trial procedure from Study 1). They were required to stay
on the image page for 10 seconds before moving forward. After 10 seconds, they were asked to write a few sentences describing their experience on that trial. Following the task, participants completed the post-task questionnaire and the NASA.

Figure 1. Trial procedure from Study 1. Participants first view two decks of cards, one labeled DISTRACT and one labeled EXPERIENCE. Once they choose a deck, they are shown an image and given one of two possible sets of instructions.

4.2 Results

4.2.1 Choice

For full descriptive statistics from all studies see Table 4. Contrary to our hypothesis, participants displayed a preference for the experience deck, choosing it slightly more than half
the time. The mean proportion of EXPERIENCE deck choice was .57 [.64, .50], $t(75) = 1.91$, $p = .06$, $d = 0.22$.

Table 4. Descriptive statistics from all studies.

<table>
<thead>
<tr>
<th>Study</th>
<th>Comparison Task</th>
<th>EXPERIENCE choice</th>
<th>Cost of EXPERIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DISTRACT</td>
<td>.57 [.64, .50]</td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>APPRAISE</td>
<td>.39 [46, .32]</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>APPRAISE</td>
<td>.46 [.52, .41]</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td>DETATCH &amp; RETHINK</td>
<td>.56 [.64, .48]</td>
<td>.09 [.25, -.07]</td>
</tr>
<tr>
<td>5</td>
<td>DISTRACT</td>
<td>--</td>
<td>.56</td>
</tr>
</tbody>
</table>

Note: Confidence intervals are 95%.

4.2.2 Perceived effort

Full descriptive statistics for NASA ratings is available in Table 5. Interestingly, there were no difference NASA ratings for the EXPERIENCE and DISTRACT deck. Participants reported equal levels of effort (mean difference between decks = .02 [-.19, .22], $t(75) = 0.18$, $p > .250$, $d = .02$), negative affect (mean difference = -.21 [-.51, .09], $t(75) = -1.40$, $p = .165$, $d = .16$), and efficacy (mean difference = -.05 [-.33, .22], $t(75) = -0.38$, $p > .250$, $d = .04$) for both decks.
Table 5. Mean NASA subscale ratings in all studies.

| Study | Experience deck | | | Comparison deck | | |
|-------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Mean  | CI              | SD              | Effort          | Mean  | CI              | SD              | Effort          | Mean  | CI              | SD              | Effort          | Mean  | CI              | SD              | Effort          | Mean  | CI              | SD              | Effort          | Mean  | CI              | SD              | Effort          | Mean  | CI              | SD              | Effort          | Mean  | CI              | SD              | Effort          |

*Note:* Confidence intervals are 95%. Comparison deck for Studies 1 and 5 is DISTRACT. For Studies 2 and 3 it is APPRAISE. For Study 4 it is DETATCH AND RETHINK.
See Table 6 for correlation between NASA scales and experience choice across all studies. Oddly, experience choice was positively correlated with perceived effort required on the EXPERIENCE deck, \( r = .26 \) [0.03, 0.46], \( p = .024 \), such that higher perceived effort during the experience trials were associated with choosing the experience deck more. Experience choice was also positively correlated with perceived efficacy on the EXPERIENCE deck, \( r = .54 \) [0.35, 0.68], \( p < .001 \), such that high levels of efficacy were associated with more experience choice.

There was no relation between experience choice and negative affect (i.e., as indexed by the NASA) during the EXPERIENCE trials.

Table 6. Correlations between NASA scales and dependent variables across studies

<table>
<thead>
<tr>
<th>Study (Comparison Deck)</th>
<th>1 (D)</th>
<th>2 (R)</th>
<th>3 (R)</th>
<th>4 (D/R)</th>
<th>5 (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXP Effort</td>
<td>.26*</td>
<td>.03</td>
<td>.33**</td>
<td>-.16</td>
<td>.46**</td>
</tr>
<tr>
<td>EXP Affect</td>
<td>.12</td>
<td>-.02</td>
<td>-.04</td>
<td>.01</td>
<td>.41*</td>
</tr>
<tr>
<td>EXP Efficacy</td>
<td>.54**</td>
<td>.62**</td>
<td>.53**</td>
<td>.36*</td>
<td>-.16</td>
</tr>
<tr>
<td>COMP Effort</td>
<td>.23*</td>
<td>.04</td>
<td>.24*</td>
<td>.31*</td>
<td>.19</td>
</tr>
<tr>
<td>COMP Affect</td>
<td>.42**</td>
<td>.13</td>
<td>.17</td>
<td>.46**</td>
<td>.38*</td>
</tr>
<tr>
<td>COMP Efficacy</td>
<td>-.02</td>
<td>-.02</td>
<td>-.09</td>
<td>-.47**</td>
<td>-.27</td>
</tr>
</tbody>
</table>

*Note: * \( p < .05 \), ** \( p < .001 \). Dependent variable in Study 5 was average cost of experiencing (not experience choice). COMP = comparison deck

Experience choice was positively correlated with perceived effort required on the DISTRACT deck, \( r = .23 \) [0.01, 0.43], \( p = .044 \), such that higher perceived effort when completing the distract trials was associated with choosing the EXPERIENCE deck more (i.e., avoidance of the DISTRACT deck). Similarly, experience choice was positively correlated with perceived negative affect during the DISTRACT trials, \( r = .42 \) [.22, .59], \( p < .001 \), such that high levels of negative affect during the DISTRACT trials were associated with more experience
choice (i.e., avoidance of the DISTRACT deck). There was no relation between experience choice and efficacy (i.e., as indexed by the NASA) during the DISTRACT trials.

4.3 Discussion

Contrary to our hypothesis, participants did not demonstrate an avoidance of the EXPERIENCE deck. However, as expected, perceived efficacy during EXPERIENCE trials was the strongest correlate of choice, such that individuals who felt that they could successfully complete EXPERIENCE trials were more likely to choose to complete them. Interestingly, and contrary to our hypothesis, individuals who perceived more effort during the EXPERIENCE trials were more likely to choose the EXPERIENCE deck.

5 Study 2

The finding from Study 1 that more effort during the EXPERIENCE deck was associated with more experience choice was unexpected, since our paradigm is intended to measure effort avoidance. It is possible that the task contained too few trials (there are 25) to reveal an effort avoidance effect. Alternatively, given that participants displayed a marginal preference for the EXPERIENCE deck, it may be that distraction less desirable in the present context. That is, it may be that people find experiencing emotion to be a more effective emotion regulation strategy than distraction when confronted with the types of stimuli presented. In Study 2, we address this possibility by changing the comparison task to cognitive reappraisal. Since cognitive reappraisal is associated with positive health outcomes, participants also completed the PHQ-9.
5.1 Method

5.1.1 Participants

Seventy-five participants ($N = 75$) were recruited from Amazon’s Mechanical Turk. Participants were paid $1 for every 10 minutes spent on the study.

5.1.2 Procedure

The procedure in Study 2 was identical to that of Study 1, except that the comparison deck in Study 2 was APPRAISE. See Appendix A for full instructions used in this study, and Figure 2 for a visualization of the trial procedure. Participants completed the post-task questionnaire, NASA, and PHQ-9 following the WILTEX.

![Figure 2](image.png)

Figure 2. Trial procedure from Study 2. Participants first view two decks of cards, one labeled APPRAISE and one labeled EXPERIENCE. Once they choose a deck, they are shown an image and given one of two possible sets of instructions.
5.2 Results

5.2.1 Choice

For full descriptive statistics from all studies see Table 4. Consistent with our hypotheses, participants displayed a preference for the APPRAISE deck (i.e., they avoided the EXPERIENCE deck). The mean proportion of EXPERIENCE deck choice was .39 [46, 0.32], $t(74) = -3.24, p = .002, d = 0.37$.

5.2.2 Perceived effort

Full descriptive statistics for NASA ratings is available in Table 5. As in Study 1, participants did not rate the EXPERIENCE deck as more effortful than the comparison deck i.e., APPRAISE), mean difference between decks = -.25 [-.59, .08], $t(74) = -1.50, p = .139, d = .17$. Compared with the APPRAISE deck, participants reported higher levels of negative affect during the EXPERIENCE deck (mean difference = -.51 [-.87, -.14], $t(74) = -2.76, p = .007, d = .32$), and lower efficacy during the EXPERIENCE deck (mean difference = .65 [.36, .94], $t(74) = 4.50, p < .001, d = .52$).

See Table 6 for correlations between NASA scales and experience choice across all studies. Experience choice was not correlated with perceived effort during the EXPERIENCE trials, $r = .03 [-.19, .26], p < .250$, nor with negative affect during EXPERIENCE trials, $r = -.02 [-.25, .21], p < .250$. As in Study 1, experience choice was positively correlated with perceived efficacy on the EXPERIENCE deck, $r = .61 [.45, .74], p < .001$, such that high levels of efficacy during EXPERIENCE trials were associated with more experience choice.
Experience choice was not correlated with perceived effort ($r = .04 [-.18, .27], p > .250$), negative affect ($r = .13 [-.10, .35], p > .250$), or efficacy ($r = -.02 [-.24, .21], p > .250$) during APPRAISE trials.

### 5.2.3 Association with health

Contrary to our hypothesis, experience choice was not significantly correlated with self-reported health (i.e., as indexed by the PHQ-9), $r = -.20 [-.41, .03], p = .09$, though the relation was in the expected direction. Scores on the PHQ-9 were not significantly correlated with the NASA subscales.

### 5.3 Discussion

Our hypothesis that individuals would avoid the EXPERIENCE deck (i.e., that they would prefer to choose from the REAPPRAISE deck) was supported. However, the lack of a relation between NASA effort ratings and experience choice suggests that the avoidance of emotional experience is not related to the effort costs associated with experiencing emotion. As in Study 1, efficacy during the EXPERIENCE trials had the strongest association to experience choice, suggesting that perceived success of an emotion regulation strategy might be an important factor determining strategy choice.

### 6 Study 3

In Study 3, we sought to replicate the avoidance effect demonstrated in Study 2. Given that we did not find an association between experience choice and the PHQ-9, we did not include it as a measure in this study.
6.1 Method

6.1.1 Participants

One hundred participants (\(N = 100\)) were recruited from Amazon’s Mechanical Turk. Participants were paid $1 for every 10 minutes spent on the study.

6.1.2 Procedure

The procedure in Study 3 was identical to that of Study 2, except that participants did not complete the PHQ-9. See Figure 2 for a visualization of the trial procedure.

6.2 Results

6.2.1 Choice

For full descriptive statistics from all studies see Table 4. Contrary to our hypotheses, participants did not display a preference for the APPRAISE deck. The mean proportion of EXPERIENCE deck choice was \(.46 [0.52, 0.41], t(99) = -1.22, p = 0.227, d = 0.12\).

6.2.2 Perceived effort

Full descriptive statistics for NASA ratings is available in Table 5. The NASA results demonstrated in Study 2 were largely replicated. Participants did not rate the EXPERIENCE deck as more effortful than the APPRAISE deck, mean difference = \(-0.07 [-0.28, 0.15], t(99) = -0.61, p = 0.542, d = 0.06\). Compared with the APPRAISE deck, participants reported higher levels of negative affect during the EXPERIENCE deck (mean difference = \(-0.72 [-0.97, -0.47], t(99) = -\).
5.81, \( p < .001, d = .58 \), and lower efficacy during the EXPERIENCE deck (mean difference = .34 \([.12, .56]\), \( t(99) = 3.06, p = .003, d = .31 \)).

See Table 6 for correlations between NASA scales and experience choice across all studies. Contrary to the results of Study 2, experience choice was positively correlated with perceived effort during the EXPERIENCE trials, \( r = .33 [-.13, .49], p = .001 \), and with perceived efficacy during EXPERIENCE trials, \( r = .53 [.36, .65], p < .001 \). Experience choice was not correlated with negative affect during EXPERIENCE trials, \( r = -.04 [-.23, .16], p > .250 \).

Experience choice was positively correlated with perceived effort during APPRAISE trials, \( r = .24 [.04, .42], p = .012 \), but it was not correlated with negative affect (\( r = .17 [-.03, .35], p = .09 \)), or efficacy (\( r = -.09 [-.28, .11], p > .250 \)) during APPRAISE trials.

**6.3 Discussion**

The results of Study 3 suggest that people do not avoid emotional experience more than they avoid cognitive reappraisal. As in previous studies, participants’ perceived success (i.e., feelings of efficacy) during the EXPERIENCE trials was strongly related to experience choice. As in Study 1, Study 3 demonstrated a positive correlation between effort on EXPERIENCE trials and experience choice. It may be that writing about emotional experience (which is required on each EXPERIENCE trial) is a qualitatively different experience than writing about reappraisal (or distraction, as in Study 1). The instructions for the APPRAISAL deck asks participants to think about what they are seeing objectively, as though they “are a judge in a photography contest”. They are asked to focus on the technical composition of the image (e.g., “its sharpness, clarity, lighting” etc.). Given these prompts, individuals may have an easier time writing about the technical composition of the image than they do writing about their emotional
experience (as is required on the EXPERIENCE trials). Thus, even if the experiential component of the EXPERIENCE deck (i.e., the emotion regulation strategy itself) is more difficult/effortful, the relative difficulty of the subsequent writing task may be washing out its influence on deck choice. We seek to address this possibility in Study 4, by changing the required feedback on each trial.

7 Study 4

Studies 1–3 demonstrated inconsistent findings with respect to the connection between effort, negative affect, and efficacy (i.e., NASA scales) and task avoidance on the WILTEX. To address the possibility that the written feedback requirement was affecting choice, we changed the required response from “a few sentences about your experience” to a rating made on a 9-point scale. To address the possibility that the variability in our findings so far was due to a lack of adherence or misunderstanding of the instructions, in Study 4 we reminded participants of the instructions 5 times throughout the experiment (every 5 trials).

7.1 Method

7.1.1 Participants

Sixty participants ($N = 60$) were recruited from Amazon’s Mechanical Turk. Participants were paid $1 for every 10 minutes spent on the study.

7.1.2 WILTEX

In this version of the WILTEX, participants had a choice between a deck labeled DETATCH AND RETHINK (D/R) and one labeled EXPERIENCE AND FEEL (E/F). On D/R
Trials, participants were asked to adopt a detached and unemotional attitude as they view the image. They are instructed to think about what they are seeing objectively, so as to remove the emotional impact of the image. On E/F trials, participants were asked to stay present in the moment, and pay attention to the emotional reaction that they are having to the image. They are instructed to pay close attention to their emotions, and feel them as much as possible. Once they have viewed the image for at least 10 seconds, they are asked to indicate how they feel on a 7-point scale (-3 = very negative, 3 = very positive). After every 5 trials, participants were reminded of the instructions for each trial type.

7.1.3 Procedure

The procedure in Study 4 was identical to that of Study 3. See Figure 3 for a visualization of the trial procedure.
**Figure 3.** Trial procedure from Study 4. Participants first view two decks of cards, one labeled DETATCH AND RETHINK and one labeled EXPERIENCE AND FEEL. Once they choose a deck, they are shown an image and given one of two possible sets of instructions.

### 7.2 Results

#### 7.2.1 Choice

For full descriptive statistics from all studies see Table 4. Contrary to our hypotheses, participants did not display a preference for the D/R deck. The mean proportion of E/F deck choice was .56 [.64, .48], *t*(59) = -1.62, *p* = .111, *d* = 0.21.

#### 7.2.2 Perceived effort

Full descriptive statistics for NASA ratings is available in Table 5. Participants did not rate the E/F deck as more effortful (mean difference = .20 [-.18, .59], *t*(58) = 1.06, *p* > .250, *d* = .14) or more negative (mean difference = .32 [-.11, .76], *t*(58) = 1.49, *p* = .143, *d* = .19) than the D/R deck. Participants reported slightly more efficacy during the E/F deck compared to the D/R deck (mean difference = -.39 [-.79, .01], *t*(58) = -1.96, *p* = .055, *d* = .25); this difference was marginally significant.

See Table 6 for correlations between NASA scales and experience choice across all studies. Experience choice was positively correlated with perceived efficacy during the E/F trials, *r* = .36 [.11, .56], *p* = .005, such that individuals with high efficacy during E/F trials chose E/F more often. Experience choice was not correlated with perceived effort, *r* = -.16 [-.40, .10], *p* = .227, or negative affect, *r* = .01 [-.25, .26], *p* > .250, during E/F trials.
Experience choice was positively correlated with perceived effort during D/R trials, $r = .31 \ [.06, .52]$, $p = .016$, such that higher effort ratings of the D/R deck were associated with choosing the E/F deck more. Experience choice was also associated with more negative affect ($r = .46 \ [.23, .64]$, $p < .001$), such that individuals who reported more negative affect for the D/R deck chose E/F more often. Finally, experience choice was associated with less efficacy ($r = -.47 \ [-.64, -.25]$, $p < .001$) during D/R trials, such that low efficacy on D/R trials was related to choosing E/F more often.

### 7.2.3 Trial level affect ratings

Eight participants were excluded from the affect rating analysis because they did not complete at least one trial from each deck beyond the practice trials (seven participants did not choose the E/F deck at all, and one participant did not choose the D/R deck at all; final $N = 52$).

Participants reported feeling worse following E/F trials than they did following D/R trials. Mean affect ratings were lower (i.e., more negative) on E/F trials ($m = -1.15 \ [-1.01, -1.28]$), compared to D/R trials ($m = -.30 \ [-.10, -.50]$), mean difference = -.85 [-1.06, -.63], $t(51) = -7.87$, $p < .001$, $d = 1.09$.

### 7.3 Discussion

The results of Study 4 suggest that individuals do not avoid the E/F deck, despite feeling worse (i.e., as indexed by responses to the question “how are you feeling right now?”) following E/F trials. Interestingly, the strongest predictor of experience choice in this study was efficacy on the comparison (D/R) task. This may be a reflection of the new approach to reappraisal in this study. That is, participants were instructed to “make sense” of their emotions in a way that
eliminated the emotional salience of the image. This may be a more difficult task than the APPRAISE comparison task from Studies 2 and 3, which required that participants only pay attention to objective features of the image (e.g., lighting, composure, etc.). Individuals’ may not know what it is to feel “nothing at all”, as they are instructed to do during D/R in Study 4.

8 Study 5

In Study 5 we investigated the possibility that emotions elicited from images might be less salient than those elicited from videos. Importantly, we did not include the WILTEX in this study. Instead, we used the practice trials from the WILTEX to introduce the participants to the task, then presented the experiential discounting paradigm. In this Study, DISTRACT was the comparison task, because prior research has demonstrated that individuals prefer distraction to reappraisal when faced with high intensity images (Sheppes, Scheibe, Suri, & Gross, 2011). We expect that individuals will place a higher subjective cost on the EXPERIENCE deck, and that this cost will correlate with perceived effort and efficacy associated with that deck.

8.1 Method

8.1.1 Participants

Fifty participants (N = 50) were recruited from Amazon’s Mechanical Turk. Participants were paid $1 for every 10 minutes spent on the study.

8.1.2 Subjective cost of experiencing

See Figure 4 for a visualization of the discounting procedure. The experiential discounting procedure was used to assess participants’ subjective cost of experiencing.
Participants are told that they will be making choices about the relative value of completing each deck (i.e., DISTRACT and EXPERIENCE). They were told that they will see a bonus payment for completing a trial from each deck, and to choose the option that they prefer. Participants are told that their choices will be consequential, as ten percent of participants will be randomly selected to complete 20 minutes worth of their final preference selection for their preferred bonus rate.

In previous versions of this task, the presumably more difficult choice starts at $2.00, and the less effortful choice is weighted as $1.00. This is because the more effortful choice is presumed to be more costly, and would require a larger incentive to complete. Given that we have so far failed to find a consistent avoidance effect for any of our deck options, we removed this feature of the discounting paradigm. Instead, the first choice in the discounting procedure is
between DISTRACT for $1.00 or EXPERIENCE for $1.00. If the participant chooses the DISTRACT deck, that will be the higher valued deck for that round of the discounting procedure – that is, if the participant chooses DISTRACT for $1.00 on the first choice, for their second choice they will be choosing between DISTRACT for $1.00 or EXPERIENCE for $2.00. If the participant chooses EXPERIENCE for $1.00 on the first choice, for their second choice they will be choosing between DISTRACT for $2.00 or EXPERIENCE for $1.00. Then, the series of choices iterates until the participant reaches a point at which they do not distinguish the value between the decks. This point represents a financial quantification of how much money it would take for a particular participant to choose their least preferred deck.

8.1.3 Procedure

After providing informed consent and reading instructions (full details available in Appendix A), participants completed two practice trials (one from each deck). The practice trials required watching a short video and making a momentary affect rating (as in Study 4). The videos were selected from the negative clips in the Mixed Emotions Film Library (Samson et al., 2015), see Table 2 for details.

On the DISTRACT practice trial, participants were asked to distract themselves from the emotional reactions that they are having while watching the video. On the EXPERIENCE practice trial, they are asked to pay attention to the physical nature of the emotional reaction that they are having while watching the video. Following the two practice trials, participants completed the post-task questionnaire and NASA. Participants then completed three rounds of the discounting procedure (i.e., they completed three full iterations of the procedure, in a row, to establish reliability). Following the discounting procedure, participants filled out the PHQ-9,
PHQ-15, PHLMS, ad FFMQ. Finally, roughly ten percent of participants ($n = 4$) were randomly selected to complete the “bonus round” of the discounting procedure.

8.2 Results

8.2.1 Subjective cost of experiencing

For full descriptive statistics from all studies see Table 4. The reliability of participants’ subjective cost of experiencing across the three rounds of the discounting task was $\alpha = .91 [.87, .95]$. Given the reliability of the measure, participants subjective cost on each round was averaged. All further analyses are based on mean cost of experiencing.

Contrary to our hypotheses, participants did not rate the EXPERIENCE deck as more costly. The average subjective cost of experiencing was $0.09 [.25, -.07]$, suggesting that individuals needed an extra $0.09 to complete the EXPERIENCE deck when compared to the DISTRACT deck. This was not different from zero, $t(49) = 1.10, p > .250, d = .16$.

8.2.2 Perceived effort

Full descriptive statistics for NASA ratings is available in Table 5. Participants rated the DISTRACT deck as slightly more effortful than the EXPERIENCE deck (mean difference = .29 $[-.04, .62]$, $t(49) = 1.75, p = .09, d = .25$), but this difference was not significant. Participants did not rate the decks differently in terms of negative affect (mean difference = -.10 [-.39, .19], $t(49) = -0.70, p > .250, d = .10$). Ratings of efficacy were higher for the EXPERIENCE deck than they were for the distract deck (mean difference = -.86 [-1.18, -.54], $t(49) = -5.32, p < .001, d = .75$).
See Table 6 for correlations between NASA scales and subjective cost of experiencing. Subjective cost of experiencing was positively correlated with perceived effort, \( r = .46 [.21, .66] \), \( p = .001 \), and negative affect, \( r = .41 [.14, .61] \), \( p = .003 \), during the EXPERIENCE trial, such that individuals who rated the EXPERIENCE trial as more effortful and higher in negative affect had a higher subjective cost of experiencing. Subjective cost of experiencing was not correlated with perceived efficacy during the EXPERIENCE trial, \( r = -.16 [-.42, .12] \), \( p > .250 \).

Subjective cost of experiencing was not correlated with perceived effort during the DISTRACT trial, \( r = .19 [-.09, .45] \), \( p = .175 \). Subjective cost of experiencing was positively correlated with negative affect during the DISTRACT trial, \( r = .38 [.12, .60] \), \( p = .006 \), such that individuals who reported more negative affect for the DISTRACT trial had a higher subjective cost of experiencing. Finally, there was a marginal association between one’s subjective cost of experiencing and efficacy during the DISTRACT trial, \( r = -.27 [-.51, .01] \), \( p = .061 \), such that low efficacy on DISTRACT trials was related to a higher subjective cost of experiencing.

### 8.2.3 Individual difference data

For full details of individual difference data from Study 5, see Table 7. Contrary to our hypotheses, subjective cost of experiencing was not related to physical or mental health (i.e., as indexed by the PHQ-9 and PHQ-15) or trait mindfulness (i.e., as indexed by the PHLMS and FFMQ). There was a small to medium size correlation between subjective cost of experiencing and the non-judgment subscale of the FFMQ, \( r = -.27 [-.51, .01] \), \( p = .05 \), such that individuals high on the non-judging facet had lower subjective costs of experiencing. However, given the relatively small sample in this study, this finding should be interpreted with caution.
Table 7. Correlations between variables in Study 5 (N = 60).

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<td>5. FFMQ NR</td>
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<td>7. FFMQ OB</td>
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Note: * p < .05, ** p < .001; COE = cost of experiencing; NJ = nonjudgment, NR = non-reactivity, DES = describe, OB = observe, AA = acting with awareness; ACC = acceptance, AWA = awareness.

8.3 Discussion

The results of Study 5 suggest that people do not place a higher subjective cost on experiencing rather than distracting from emotion. Interestingly, there was no relation between efficacy on the EXPERIENCE trial and cost of experiencing. However, as expected, perceived effort during the EXPERIENCE trial was positively correlated with overall subjective cost of experiencing, suggesting that the effort associated with emotional experience might play a role in an individual’s ultimate determination of cost of experiencing.
Chapter 5

General Discussion

We attempted to develop a behavioral measure of mindfulness, as indexed by one’s willingness to experience emotion. Across 5 studies, we were unable to demonstrate an avoidance of emotional experience (i.e., paying attention to the physical experience of emotion) when it was compared with two other emotion regulation strategies. Based on these results, it appears that engaging with the physical experience of emotion is not more or less preferred than regulating emotion through either reappraisal or distraction. Our design was intended to capture effort avoidance, though we found no relation between effort ratings and avoidance of the EXPERIENCE deck. The positive correlation between effort and experience choice (in Studies 1 and 3) suggests that individuals are likely considering multiple factors, beyond effort, when making choices about how to regulate emotion during the WILTEX.

For some, the effort costs of paying attention to the physical nature of emotion may be offset by some other utility of that strategy or disutility of the comparison strategy. For example, the intensity of the stimuli (or its capacity to elicit emotion in the viewer) may make a strategy less effective. In Study 5, participants viewed film clips that had normative ratings as very negative and repulsive. While distraction has been demonstrated to be the preferred strategy in response to highly negative images (i.e., compared to cognitive reappraisal; Sheppes et al., 2011), our results suggest that it may less preferred in the presence of film clips (e.g., with sound, moving images, etc.).

The extent to which an individual perceives a strategy as successful may be an important factor under consideration on the WILTEX, given our consistent finding (in Studies 1 – 4) that efficacy during the EXPERIENCE deck is related to experience choice. The lack of a consistent
finding between feelings of efficacy during the comparison deck and experience choice suggests an important role of efficacy during the experience deck, specifically. This may represent a familiarity effect – that is, the concepts of cognitive reappraisal and distraction as forms of emotion regulation are commonly known, and most people have a lifetime of experience practicing them. Conversely, and as discussed earlier, paying attention to the physical experience of emotion is less common and less practiced. This was a fundamental part of our paradigm – we expected it would result in more effort required during the EXPERIENCE trials, and subsequent avoidance of those trials. However, it is possible that the lack of familiarity was most relevant for feelings of efficacy. To the extent that individuals believe that the purpose of an emotion regulation strategy is to address or change an emotional experience in that moment, the lack of efficacy during the EXPERIENCE deck may signal an ineffective approach to regulation.

A large body of research suggests that people have context-dependent preferences for certain emotion regulation strategies over others (see Gross, 2015 for review). Since participants in our studies did not display a preference for any strategy (including well studied approaches like cognitive reappraisal and distraction), our results may partially reflect flaws in concept and/or design rather than a true lack of preference. While there is considerable evidence suggesting that mindfulness promotes healthy emotion regulation, it is possible that the strategy that we presented (i.e., EXPERIENCE) was not explicitly linked to such benefits. It may be that, on its face, the idea of sitting with the physical experience of emotion is too far removed from the emotion-regulating benefits of mindfulness to appear useful or effective to participants. In this case, individuals may need education around the benefits of paying attention to their emotion before focusing attention on one’s emotional experience can be understood as an emotion regulation strategy.
One clear advantage to focused attention is the ability to decenter, or defuse, the concept of the self from one’s emotional experience. Decentering refers to the metacognitive shift in perspective that is promoted through mindfulness training, and engenders a broad contextual awareness of mental events subjective and transient, rather than as truths of reality or the self (Bernstein et al., 2015; Teasdale, 1999). For example, a decentered approach to the thought, “I am worthless,” might be “I am having a thought that I am worthless, and my thoughts are not facts.” Decentering is a form of reappraisal, in the sense that it seeks to regulate emotion by changing the meaning of emotion-eliciting event. However, its focus is on changing the relationship between the individual and the emotion, not the content of the emotion itself. As such, decentering can be conceptualized as a mindfulness-based cognitive strategy to regulating emotion, which might be better suited for measurement in a behavioral task such as the WILTEX.

9 Limitations and Future Directions

There are several limitations to this work. We used exclusively online samples, and the extent to which participants understood the instructions and were actively engaged throughout the task is difficult to ascertain. However, if confusion surrounding the instructions was factoring into participants’ choices, it would likely be represented in their deck preference (and in general, participants did not have a clear preference). Similarly, while participants were asked to refrain from completing any other tasks for the duration of the study, environmental distractions are impossible to control or account for in an online setting. This is potentially problematic for a task such as the WILTEX, since it requires that participants make momentary judgments about their physical and emotional responses to stimuli (which often occur quickly and require one’s attention to notice).
In Studies 1 – 4 we used stimuli from the IAPS database – these images were normed to be negative, but it is possible that the nature of the generated emotion was too far removed from personal relevance to make the EXPERIENCE deck a viable strategy. That is, an image of a burning building might elicit a negative emotion (e.g., fear), but the experience of that emotion might differ considerably based on the viewer’s personal experience with fire or fire-related injury/loss. Since we did not include any explicit instruction to interpret the image in any particular context (e.g., in a way that makes it relevant to the viewer’s life), it is possible that the physical pangs naturally associated with personally relevant emotion (but less so with non-self-relevant emotion) were not available to participants during the study. If they were attempting to pay attention to diffuse emotion within their body (e.g., the physical experience of mild boredom), this may have served as a type of distraction, rather than focused attention to emotion. Future work might employ personally relevant information, such as self-generated memories or individually rated images, to investigate whether or not the personal salience of emotional stimuli is an important factor in strategy choice.

10 Conclusion

We attempted to develop a behavioral measure of mindfulness, as indexed by one’s willingness to experience emotion. Over 5 studies, individuals did not demonstrate an avoidance of emotional experience when compared to two other emotion regulation strategies (distraction and cognitive reappraisal). Perceived effort during emotional experience trials was not predictive of choice, nor was it consistently different from perceived effort during the comparison trials. Effort does not appear to be an effective index of emotional acceptance, as operationalized on the WILTEX.
References


measure for evaluating the severity of somatic symptoms. *Psychosomatic Medicine, 64*(2), 258-266.


Appendix A

Instructions from all versions of the WILTEX.

All studies began with a page describing the premise of the task. Each study then had different instructions about the content of each trial. Finally, all studies had a page describing rules about the task (e.g., that the participant can choose from either deck at anytime.) For all studies, the first page of instructions contained the following:

Please read these instructions carefully, and please avoid completing other tasks for the duration of the study.

In this task, you will complete a series of trials. On each trial, you will see two decks of cards. You should choose between these decks. Once you choose a deck, you will then see an image. Please note that some of these images contain distressing content. If you do not wish to view these images, please do not complete this HIT.

Depending on which deck you have chosen, you will be given one of two possible sets of instructions.

For all studies, the last page of instructions contained the following:

You are free to choose from either deck on any trial, and should feel free to move from one deck to the other whenever you choose. If one deck begins to seem preferable, feel free to choose that deck more often. Overall, this task will take the same amount of time regardless of which deck you choose.

Press next when you are ready to begin the practice trials.

Specific instructions for Study 1:

On some trials, you will be asked to distract yourself from the emotional reaction that you are having to the image. Try to move your attention away from the experience of the emotion. Instead, direct your attention toward some neutral feature of the image. For example, some people focus on a less upsetting feature of a photograph in order to prevent themselves from feeling sad or upset. There is no right or wrong way to distract yourself. Simply move your attention away from the aspects of the image that
are causing the emotion. After you view the picture for at least 10 seconds, you will be asked to write a few sentences describing your experience.

On other trials, you will be asked to sit with the emotional reaction that you are having to the image. **Try to stay present in the moment, and experience the physical nature of the emotion.** Notice how it feels in your body. For example, people often experience the emotion of frustration as tightness in their chest, and the emotion of embarrassment as heat on their face. Please sit with the emotion for at least 10 seconds, and try to notice what it feels like in your body. Again, there is no right or wrong way to do this, simply pay attention to your experience in the moment. Afterwards you will be asked to write a few sentences describing your experience.

**Specific instructions for Studies 2 and 3:**

On some trials, you will be asked to appraise the image by adopting a detached and unemotional attitude toward it. As you view the image, **try to think about what you are seeing objectively, as though you are a judge in a photography contest.** Keep your attention on the image, but try to focus on its technical composition. Take note of the sharpness and clarity of the photo, the lighting, the colour, etc. There is no right or wrong way to do this, just try to be as objective as possible while viewing the image. After you view the picture for at least 10 seconds, you will be asked to write a few sentences describing your experience.

On other trials, you will be asked to sit with the emotional reaction that you are having to the image. **Try to stay present in the moment, and experience the physical nature of the emotion.** Notice how it feels in your body. For example, people often experience the emotion of frustration as tightness in their chest, and the emotion of embarrassment as heat on their face. Please sit with the emotion for at least 10 seconds, and try to notice what it feels like in your body. Again, there is no right or wrong way to do this, simply pay attention to your experience in the moment. Afterwards you will be asked to write a few sentences describing your experience.

**Specific instructions for Study 4:**

On some trials, you will be asked to adopt a **detached and unemotional attitude** as you view the image. In other words, as you view the image, try to think about what you are seeing objectively. Look at the image carefully, but please try to **think about what you are seeing in such a way that you don't feel anything at all.** For example, people often change the way they think about an emotional situation so that it's less relevant to them (e.g., "This event doesn't involve me or my loved ones, so it's not that bad"). **On these trials, your goal is to feel less emotion overall.** Really focus your
thoughts on how to make sense of the emotion you are feeling, so that you feel it as little as possible.

**NOTE:** For some of the images, this might be hard to do. That's ok. Just do your best to change your thinking about so that you don't feel the emotion as much as possible. After you view the picture for at least 10 seconds, you will be asked to indicate how you feel.

On other trials, you will be asked to **pay attention to the emotional reaction that you are having** to the image. **Try to stay present in the moment, and experience the physical nature of the emotion.** Notice how it feels in your body. For example, people often experience the emotion of frustration as tightness in their chest, and the emotion of embarrassment as heat on their face. **On these trials, your goal is to pay close attention to your emotions, and feel them as much as you can.**

**NOTE:** Sometimes this may be hard to do. That's ok. There is no right or wrong way to do it, simply pay attention to your emotional experience in the moment. After you view the picture for at least 10 seconds, you will be asked to indicate how you feel.

**Specific instructions for Study 5 (WILTEX practice trials):**

On some trials, you will be asked to **distract yourself from the emotional reaction** that you are having to the video. **Try to move your attention away from the experience of the emotion.** Instead, direct your attention toward some neutral feature of the video. For example, some people look away from their screens, or cover their ears to distract from an upsetting sound. Please feel free to distract yourself in any way that you please. **On these trials, your goal is to simply move your attention away from the aspects of the video that are causing the emotion.**

**NOTE:** This might be hard to do. That's ok. Just do your best to distract yourself, so that your attention moves away from the upsetting features of the video. After you watch the video, you will be asked to indicate how you feel.

On other trials, you will be asked to **pay attention to the emotional reaction that you are having** to the video. **Try to stay present in the moment, and EXPERIENCE the physical nature of the emotion.** Notice how it feels in your body. For example, people often experience the emotion of frustration as tightness in their chest, and the emotion of embarrassment as heat on their face. **On these trials, your goal is to pay close attention to your emotions, and FEEL them as much as you can.**
**NOTE:** Sometimes this may be hard to do. That's ok. There is no right or wrong way to do it, simply pay attention to your emotional experience in the moment. After you watch the video, you will be asked to indicate how you feel.

Experiential discounting task instructions for Study 5:

Now that you are familiar with the task, you will be making choices about the relative value of each deck.

Remember, the DISTRACT deck asks you to move your attention away from the emotion, and the EXPERIENCE deck asks you to notice and attend to the EXPERIENCE of the emotion in your body.

You will see a bonus payment for completing a trial from each deck. Please select the option that you prefer.

There are no accurate or inaccurate answers, but your choices will have consequences. **Ten percent of participants will be randomly selected to complete 20 minutes worth of their final preference selection, for their preferred bonus rate.**

So be sure to choose carefully!

Press next when you are sure that you understand the instructions.