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A Preliminary Investigation of the Effects of Experimentally-Induced Mindfulness on Emotional Responding to Film Clips

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Abstract

Despite encouraging preliminary findings regarding the efficacy of mindfulness and acceptance-based treatments for a range of psychological presentations, we have yet to elucidate mechanisms of action within these treatments. One mechanism through which mindfulness may reduce psychological symptoms and promote functioning is through enhancing emotional responding and regulation. In this study, we used multimodal assessment to examine the effects of a brief mindfulness intervention in a laboratory setting on emotional experiences and regulation in response to distressing, positive, and affectively mixed film clips. Although there were no condition (mindfulness versus control) effects on reports of difficulties in emotional response or regulation after the distressing film clip, participants in the mindfulness condition reported significantly greater positive affect in response to the positive film. Additionally, participants in the mindfulness condition reported more adaptive regulation (approaching significance, medium to large effect size) in response to the affectively mixed clip, and also reported significantly less negative affect immediately following this clip, although not after a recovery period. No significant differences emerged between conditions on physiological measures (skin conductance and heart rate) throughout the study.

Keywords

Mindfulness; Emotion Regulation. Acceptance; Positive Emotions

The construct of mindfulness has its origins in Buddhist and other Eastern meditative traditions and has more recently been incorporated into psychological research and practice. Mindfulness can be defined as “an openhearted, moment-to-moment, non-judgmental awareness” (Kabat-Zinn, 2005, p. 24), and is thought of as a way of relating to oneself and the world that can be enhanced through training and practice. Research indicates a positive relationship between reports of mindfulness and well-being, and a negative relationship between reports of mindfulness and various aspects of mental health difficulties, such as neuroticism, thought suppression, dissociation, emotion regulation difficulties, depression, and anxiety (Brown & Ryan, 2003; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Mindfulness and acceptance-based interventions have been developed and evaluated for the treatment of a range of psychological difficulties, with promising results (Baer, 2003). Although these treatments have received some preliminary support, considerably more research is needed to determine

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the mechanisms through which mindfulness may promote adaptive functioning and reduce psychological distress (Bishop et al., 2004; Roemer & Orsillo, 2003).

One potential mechanism of action underlying mindfulness-based treatments may be its facilitation of more adaptive regulation of emotional responses. While emotion regulation is sometimes defined as the ability to reduce or control negative emotions (e.g., Kopp, 1989), we draw from definitions that emphasize monitoring, evaluating, and modulating a range of emotional experiences (e.g., Thompson, 1994). For instance, emotion regulation can be thought to include the awareness and acceptance of emotions, the ability to move toward desired goals in spite of difficult emotions, and the ability to flexibly and adaptively use different regulation strategies, depending on the situation (Gratz & Roemer, 2004).

Mindfulness may facilitate these aspects of adaptive emotional regulation by increasing the awareness and acceptance of emotional experiences, resulting in a more balanced engagement with those emotions (Hayes & Feldman, 2004). In contrast, those with difficulty regulating emotions may experience both over- and under-engagement with their emotions, perhaps vacillating between these two extremes in an attempt to manage overwhelming emotional experiences (Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007). Instead of attempting to change or alter emotional experiences, a mindful stance toward emotional experiences would involve noticing and observing emotions simply as they are, and bringing compassion and acceptance to emotional reactions as they arise. Importantly, a new relationship to difficult emotions may be learned through simply allowing and accepting distressing emotions rather than trying to avoid or escape from upsetting internal experiences, which are a challenging, yet unavoidable part of the human experience. As suggested in the thought suppression literature, engaging in active acceptance of even distressing emotions may result in a more rapid dissipation of those emotions, in contrast to the often paradoxical effects of attempts to suppress unwanted material (e.g., Wegner, 1994). Mindfulness skills may also enhance psychological processes related to emotion regulation, such as clarity of emotional experiences, which may both be a regulatory strategy itself and a means by which more adaptive emotion regulation could be achieved. Given that many life events elicit a range of emotional responses, mindfulness skills may help one navigate, clarify, and manage even complicated and confusing emotions. Lastly, mindfulness may serve as a mechanism through which automatic, rigid responding to emotions is reduced and replaced by flexible emotion regulation (Shapiro, Carlson, Astin, & Freedman, 2006).

Although few empirical studies currently exist, researchers are increasingly investigating the relationship between mindfulness and emotion regulation. Results from several studies indicate a correlational relationship between self-reports of these constructs (Baer, Smith, & Allen, 2004; Feldman et al., 2007). In one study, Coffey and Hartman found that emotion regulation mediated the inverse correlation between mindfulness and distress in a sample of undergraduate students (Coffey & Hartman, 2008). Of particular relevance to the current study, Arch and Craske conducted an experimental study examining the potentially causal relationship between mindfulness and emotion regulation. In this study, participants were randomly assigned to a mindfulness (focused breathing), worry, or control (unfocused breathing) condition, after which they viewed negative, positive, and neutral pictures (Arch & Craske, 2006). Results indicated that individuals in the mindfulness condition reported significantly less negative affect in response to the negative slides than participants in the worry condition, but did not differ significantly from individuals in the control (unfocused breathing condition), suggesting findings might be due to negative effects of worry rather than positive effects of mindfulness (Arch & Craske, 2006). The findings from this study regarding positive affect are reported below.

As noted above, mindfulness may facilitate a more adaptive relationship with one's emotional experiences. Cultivating a mindfulness practice may allow individuals to respond to emotions with equanimity, allowing them to rise and fall naturally, rather than engaging in maladaptive processes that often result in increased distress. Therefore, mindfulness may not affect immediate emotional responses to emotionally evocative stimuli, but may instead allow quicker recovery from distressing emotions by reducing reactivity to those emotions.

Experimental studies of the effects of acceptance (one important facet of mindfulness) manipulations and studies that evaluate the effects of longer interventions provide mixed findings regarding the effects of mindfulness and acceptance on self-reported and physiological recovery from responses to emotionally evocative stimuli. In one study that assigned anxious participants to either an acceptance or suppression condition, participants in the acceptance condition reported greater recovery (reduced self-reported negative emotion) after a distressing film, and evidenced decreased heart rate (HR) during the film (Campbell-Sills, Barlow, Brown & Hofmann, 2006). In another study, individuals participated in a 7-week mindfulness or relaxation training intervention, after which participants in the mindfulness condition demonstrated lower baseline skin conductance levels (SCL) and less interference in an emotional interference task, and participants in both conditions demonstrated lower skin conductance responses to unpleasant pictures from pre- to post-intervention (Ortner, Kilner, & Zelazo, 2007), suggesting the latter effect was not specific to mindfulness.

In contrast to the physiological findings from these studies, other studies did not find physiological differences in experimental evaluations of emotional responding to distressing stimuli. For instance, Eifert and Heffner found no group (acceptance versus control) differences among anxiety-sensitive participants in HR or SCL following an anxiety-provoking stimulus, although participants in the acceptance condition reported less fear in response to the stimulus than those in the control condition (Eifert & Heffner, 2003). In another study, researchers examined responses to a stressful writing task among participants assigned to an acceptance, control, or evaluative emotional processing condition, and found no group differences in HR, positive affect, or negative affect between the acceptance and control conditions during the recovery period. During a second administration of the stressful writing task one week later, participants in the evaluative processing condition demonstrated greater HR reactivity and slower HR recovery compared to the acceptance condition, although the acceptance condition did not significantly differ from the control condition on HR reactivity or recovery (Low, Stanton, & Bower, 2008).

In addition to decreasing negative affect and reactivity to emotional experiences, mindfulness may facilitate increased engagement with positive emotional experiences. The cultivation of a present-focused, nonjudgmental attitude towards emotional experiences may foster greater awareness and attention to positive events and positive emotional responses, thereby adding richness and depth to those experiences and perhaps contributing to a sense of greater well-being. There is some empirical support for the relationship between mindfulness, positive affect, and well being. For instance, Ortner and colleagues found that more extensive mindfulness meditation experience was positively correlated with reports of psychological well-being (Ortner et al., 2007), and findings from several other studies demonstrate a significant relationship between self-reported trait mindfulness and different aspects of well-being in various samples (Baer et al., 2006; Brown & Ryan, 2003; McCracken & Yang, 2008). In this study, we examined positive affect, which is closely related to well-being, and perhaps more responsive to a laboratory induction. Related work in this area includes a recent experimental study, in which participants reported significantly greater positive affect following a 7-week loving-kindness meditation (a type of meditation that focuses on feelings of warmth and care for yourself and others) intervention compared to the wait-list control condition (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). Another study examined

neurophysiological differences between a wait-list control group and individuals who participated in an 8-week mindfulness meditation course, and revealed more left-sided anterior activation in the meditation group, a pattern that is consistent with increased positive affect (Davidson et al., 2003). Returning to the results from Arch and Craske's study (mentioned above), although they did not find any condition effects regarding positive affect in response to positive slides, participants in the mindfulness condition did rate neutral slides significantly more positively than participants in the unfocused attention and worry conditions (Arch & Craske, 2006). Taken together, these findings provide some support for the relationship between mindfulness, positive affect, and well-being, yet there is little experimental research evaluating the causal effects of mindfulness on positive affect in response to a positive stimulus.

In order to examine the potential causal relationship between mindfulness and aspects of emotion regulation, we recruited an analogue sample of individuals who reported high levels of difficulties in emotion regulation and randomly assigned them to a mindfulness or control condition. All participants were exposed to emotionally evocative film clips twice – once prior to a laboratory mindfulness intervention (or control condition), and once after this manipulation, in order to examine the causal effects of the mindfulness manipulation, controlling for initial responding to the emotional film clips. We examined the effects of the intervention on multimodal emotional responding, captured by self-report and physiological assessments, and regulation immediately following a distressing, positive, and an affectively mixed film clip, as well as after brief recovery periods (in order to assess emotional recovery). We included the affectively mixed clip in order to evoke a range of emotional responses, given that mindfulness may affect clarity of emotions and consequent regulation, so its effects may emerge most notably in response to more affectively complicated stimuli. In response to the distressing film clip, we predicted that participants in the mindfulness condition would report less difficulty regulating emotions after the post-intervention distressing film clip, and would demonstrate lower levels of reported negative affect and physiological arousal at recovery, compared to participants in the control condition. Given theoretical work suggesting that mindfulness may facilitate a more adaptive relationship to one's emotional experiences rather than affect initial emotional responses, we did not predict that condition effects would emerge immediately following the post-intervention distressing film. In response to the positive film clip, we predicted that participants in the mindfulness condition would report greater awareness and clarity after the post-intervention positive film clip, as well as higher levels of positive affect, compared to participants in the control condition. Regarding the affectively mixed film clip, we hypothesized that participants in the mindfulness condition would respond to the post-intervention/control clip with less difficulty regulating emotions, and would also demonstrate less negative affect and physiological arousal at the recovery period compared to control participants.

Method

Study staff distributed questionnaire packets on the campus of an urban commuter college campus as part of a larger study. Participants who reported scores that were higher than the median for the entire sample ($N = 523$) on a measure of emotion regulation (Difficulties in Emotion Regulation Scale [DERS]; Gratz & Roemer, 2004), reported speaking English for at least five years, were over 18 years old, and had indicated an interest in participating in future studies were recruited to participate in the experimental study. Thirty-six individuals agreed to participate, but due to scheduling difficulties, only 33 participated in the laboratory session. One participant withdrew midway through the study due to feeling agitated during the mindfulness intervention, a second participant did not complete several items on each measure, and a third reported engaging in another activity (texting) throughout the second series of film clips, leaving a total of 30 participants (15 in each condition) whose data were used in subsequent analyses.

Participants were randomly assigned to condition (mindfulness or control), balanced on trait mindfulness (as measured by the Mindful Attention Awareness Scale; MAAS), racial minority status, and biological sex. There were no significant differences between conditions on trait mindfulness [MAAS; $t(28) = .49, p = .63$], difficulties in emotion regulation [DERS; $t(28) = -.05, p = .96$], biological sex [$\chi^2(1) = .13, p = .72$] or racial minority status [$\chi^2(1) = .83, p = .36$]. (See Table 1 for means and standard deviations of the first two variables.) Participants ranged in age from 18 to 50 years old ($M = 24.10, SD = 7.28$), and the sample included 15 men and 15 women. In response to a question about racial identity where more than one category could be selected, 3 participants identified as Asian, 2 as Latino/a, 24 as White, 1 as Multiracial (Middle Eastern, Mediterranean, and White) and 1 as Other (Middle Eastern and Mediterranean). One participant selected more than one category (Asian and White).

Measures

The *Difficulties in Emotion Regulation Scale* (DERS; Gratz & Roemer, 2004) was used as a screening measure, as described above. This measure assesses six facets of difficulties in regulating emotion: nonacceptance of emotional responses, difficulties engaging in goal-directed behavior (when upset), impulse control difficulties (when upset), lack of emotional awareness, limited access to effective emotion regulation strategies, and lack of emotional clarity. Five of these scales have consistently shown significant relationships to measures of psychological symptoms (all except lack of emotional awareness, e.g., Salters-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006; Tull, Barrett, McMillan, & Roemer, 2007, Tull & Roemer, 2007). The scale consists of 36 items, with preliminary findings indicating good reliability and validity (Gratz & Roemer, 2004).

The *Mindful Attention Awareness Scale* (MAAS; Brown & Ryan, 2003) is a 15 item self-report measure of present moment attention and awareness. Items reflect inattention across several domains (e.g., cognitive, emotional, physical, general), such as “I find it difficult to stay focused on what’s happening in the present” and “I rush through activities without being really attentive to them.” Participants are asked to endorse how frequently they have the experience described in each item on a 6 point Likert-type scale, with 6 indicating “almost never” and 1 indicating “almost always,” so that high scores reflect higher levels of present moment attention. Items are averaged for an overall score. A single factor model for the scale, along with good internal consistency (.82 – .87) has been supported in both a college and a non-college, adult sample (Brown & Ryan, 2003). Internal consistency was also good in this study ($\alpha = .88$).

The following assessments were administered during the experimental session to measure physiological and self-reported emotional responding, emotion regulation, and state mindfulness among participants.

Heart rate (HR) and skin conductance levels (SCL) were continuously assessed during each film and recovery period. Participants placed electrocardiogram (ECG) electrodes on the left and right abdomen, as well as a grounding electrode on the inner left ankle to assess HR. The experimenter placed SCL electrodes on the first and middle fingers of the participants’ non-dominant hand. Physiological data were collected with a Biopac encoder unit and AcqKnowledge 3.9 software, with a sampling rate of 1000 samples per second. We analyzed the mean levels of HR (beats per minute) and SCL during a baseline period, each film clip, and 3-minute recovery periods after each clip.

The *Positive and Negative Affect Scale – State version* (PANAS; Watson, Clark, and Tellegen, 1988) consists of 20 items, in which participants rate both positive and negative affective experiences. In this scale, positive affect measures the extent to which participants report feeling energized, happy, and active, and negative affect assesses feelings of general distress, such as anger, guilt, fear, and nervousness. This version asks participants to indicate the degree

to which they are experiencing each emotion “right now” (Watson et al., 1988). Participants completed this measure following a 5-minute baseline period, and immediately after each film clip and recovery period, in order to assess affective responses to stimuli at each of these time points. Internal consistency was adequate to good in this sample at baseline, with $\alpha = .74$ for the negative affect scale and $\alpha = .88$ for the positive affect scale.

The *State Difficulties in Emotion Regulation Scale* (DERS-S; McLaughlin, Mennin, & Farach, 2006) is a modified version of the DERS that assesses current emotion dysregulation, in contrast to dispositional emotional regulation. The DERS-S is composed of 25 items, and participants are instructed to indicate how they feel “right now” on a 5-point scale, from 1 (not at all) to 5 (completely). The DERS-S consists of four subscales (nonacceptance, lack of awareness, limited access to strategies, and lack of clarity). In this study, we examined the total DERS-S scores to assess overall difficulties in emotion regulation and analyzed responses on the lack of awareness and lack of clarity subscales in response to the positive film clip. The DERS-S demonstrated adequate overall internal consistency in this study, $\alpha = .79$, as well as on the two subscales of interest, lack of awareness ($\alpha = .80$) and lack of clarity ($\alpha = .77$). Participants completed this measure after each film clip to assess regulation of their affective state in the moment.

The *Toronto Mindfulness Scale* (TMS; Lau et al., 2006) is a two-factor state measure of mindfulness that was used as a manipulation check in this study. This measure consists of 13 items assessing the factors *curiosity* and *decentering*, and asks participants to rate what they just experienced on a scale from 0 (not at all) to 4 (very much). The TMS is designed to capture the extent to which the participant experienced a feeling of heightened awareness, as well as a quality of that awareness that consists of openness and curiosity (curiosity factor), and the ability to be aware of one’s thoughts and feelings without becoming entangled in them (decentering factor; Lau et al., 2006). Internal consistency in this sample was good for the curiosity scale, $\alpha = .90$, and adequate for the decentering scale, $\alpha = .69$.

Procedure

Participation consisted of two and a half hours in the laboratory, after which participants were compensated \$30 for their time. Participants were assigned to condition (mindfulness or control) using block randomization, balancing groups on trait mindfulness scores (as measured by the MAAS in the screening packet), biological sex, and racial minority status.

After the experimenter obtained written informed consent, s/he communicated with the participant through a two-way intercom for the duration of the experiment, in order to minimize social desirability effects. Once the heart rate and skin conductance electrodes were properly placed, the participant rested quietly for five minutes to habituate to the room and produce baseline physiological and self-report ratings.

Immediately after each film clip, participants completed the PANAS and the DERS-S, followed by a 3-minute recovery period. After the recovery period, participants filled out another PANAS.

The three film clips used in this study were selected specifically to elicit three types of emotional responses that might be affected by mindfulness. The first film, an 8-minute clip depicting combat-related violence from *Saving Private Ryan* (Film D1), was chosen to elicit distress. A lengthier clip was selected in order to represent the kind of prolonged distress that can require regulation when it occurs outside the lab. The second clip was a 155-second excerpt from the film *When Harry Met Sally* that depicts a humorous exchange in a café (Film P1). Research indicates the effectiveness of this clip in eliciting strong ratings of amusement in laboratory setting (Gross & Levenson, 1995). We chose a standardized clip to represent this

emotion, because amusement has been better represented in laboratory studies than the more complex emotions of prolonged distress and affectively mixed responses. In order to assess emotional responses to more emotionally complicated stimuli, we selected a 125-second excerpt from *Life is Beautiful* for the third, affectively mixed film clip (Film M1), which depicts a conversation between a father and his son in a concentration camp, where the father is attempting to conceal the gravity of the situation to the boy through the use of humor. We used a fixed order of presentation for these film clips in order to minimize variability that might emerge from carry-over effects and mask between group differences. We chose to present the positive film clip after the distressing one, because this would allow us to assess how much participants were able to experience positive affect after they had been distressed, a particularly clinically relevant phenomenon. We placed the affectively mixed film last because carryover emotions would only add to the complex nature of the film clip, which was the goal in presenting it.

Next, participants listened to a 10-minute mindfulness intervention (mindfulness condition) or neutral educational information (control condition). The mindfulness intervention consisted of audiotaped information about mindfulness, an experiential exercise where the participant practiced mindful awareness of her/his breath, information about the application of mindfulness principles to emotional experiences, and another experiential exercise, in which participants practiced mindfulness of emotions. (See Appendix for a more detailed description.) This manipulation was drawn directly from mindfulness interventions that are commonly used in mindfulness-based interventions (e.g., Mindfulness-based Cognitive Therapy; Segal, Williams, & Teasdale, 2002). Participants in the control condition listened to two educational excerpts from a public radio station and completed a word search puzzle.

After the mindfulness/control tasks, participants in both conditions completed the self-report state mindfulness measure (TMS), followed by a second series of film clips. The procedure for the second series of film clips was similar to that of the first series of clips, although the content of two clips in the second series varied slightly. Specifically, the distressing and affectively mixed film clips were slightly different excerpts (of similar length) taken from the same respective films that evoked similar emotional responses. The second positive film clip was identical to the clip in the first series. We were unable to find a comparable, but slightly different clip for this second viewing, so this particular clip was used twice in this study in order to provide a consistent, well-validated, humorous stimulus. Participants in the mindfulness condition heard an additional brief mindfulness prompt preceding each clip: "If you notice any emotions during the film, try to just acknowledge and accept them as they are, without trying to change your experience in any way." Similar to the first series of film clips, participants completed self-report measures directly after viewing the clips (PANAS and DERS-S), as well as after a 3-minute recovery period (PANAS). At the completion of the study, participants completed a second TMS to assess whether state mindfulness was maintained at the end of the study, after which they were debriefed by the experimenter and provided with a debriefing form.

Results

Data transformations and manipulation checks

All data were screened for skewness and kurtosis in order to test assumptions of normality (Tabachnick & Fidell, 2000). The following variables were skewed and corrected using square root transformation (P1DERS-clarity, M1PANAS-pa, M2PANAS-pa, D1-recovPANAS-na). HR and SCL data were inspected and artifacts were manually cleaned using running mean replacement. Due to technical problems, physiological data (HR and SCL) from two participants was excluded, and SCL was removed prior to analyses for another participant.

We conducted a series of analyses to confirm equivalence of groups at baseline and to evaluate the effectiveness of each film clip to elicit the anticipated physiological and subjective response and the effectiveness of the mindfulness intervention. Analyses (independent *t*-tests) confirmed initial equivalence of groups, in that there were no significant differences between conditions at baseline on skin conductance level (SCL) [$t(25) = .81, p = .43$], heart rate (beats per minute; BPM), [$t(26) = .74, p = .47$], and on the positive [$t(28) = -.21, p = .83$] and negative [$t(28) = -1.44, p = .16$] affect scale of the PANAS (see Table 1 for means and standard deviations). We conducted a series of repeated measures ANOVAs to examine whether viewing film clips prior to the intervention affected self-reported affect and physiological arousal in predicted ways (see Table 2 for means and standard deviations). In response to the distressing film clip, participants' SCL [$F(1, 26) = 14.53, p < .01, \eta_p^2 = .36$] and negative affect [$F(1, 29) = 8.52, p < .01, \eta_p^2 = .23$] significantly increased from baseline, while there was no significant change in BPM [$F(1, 27) = 2.67, p = .11, \eta_p^2 = .09$]. Participants reported significant increases in positive affect from before the positive clip (recovery period after the distressing clip) to immediately after the positive film clip [$F(1, 29) = 22.09, p < .01, \eta_p^2 = .43$]. Participants' SCL [$F(1, 26) = 8.64, p = .36, \eta_p^2 = .03$] and BPM [$F(1, 27) = .06, p = .81, \eta_p^2 = .00$] did not significantly change from the recovery period immediately before the affectively mixed clip (recovery from the positive film clip) to after the affectively mixed film clip. However, participants did report significant increases in negative affect following the affectively mixed film clip [$F(1, 29) = 17.90, p < .01, \eta_p^2 = .38$]. Finally, to examine the effects of the mindfulness intervention, an independent sample *t*-test indicated that, immediately following the intervention/control condition, participants in the mindfulness condition reported significantly higher scores with a large-sized effect on the TMS-decentering scale [$t(28) = 2.53, p = .02, d = .92$] compared to participants in the control condition, while no significant differences emerged on the TMS-curiosity scale [$t(28) = .78, p = .44, d = .29$]. Similar results emerged at the end of the study, with participants in the mindfulness condition reporting significantly higher scores on the TMS-decentering scale [$t(28) = 2.81, p = .01, d = 1.03$] and no significant differences on the TMS-curiosity scale [$t(28) = .74, p = .47, d = .27$]. (See Table 1 for these means and standard deviations.)

Effects of mindfulness intervention on responses to the distressing, positive, and affectively mixed film clips

In order to test our hypotheses regarding the effects of the mindfulness intervention on self-report affect, difficulties with emotion regulation, and physiological responding, we conducted a series of ANCOVAs. In each analysis, we controlled for responses to the film clip prior to the intervention/control condition, and examined the effects of the manipulation on responses to the post-intervention/control condition film clip. This provided an indication of experimental effects on changes in responses to the film clip after the intervention and also provided a control for any nonsignificant differences in affective responding between conditions prior to the experimental manipulation. In addition, we analyzed effect size for each analysis due to the small sample size ($\eta_p^2 = .06$ is considered a medium effect size, and $\eta_p^2 = .14$ is considered a large effect size, Cohen, 1977).

Our first prediction was that participants in the mindfulness condition would report fewer difficulties with emotion regulation in response to the second (post-intervention or control) distressing film clip, compared to participants in the control condition. To test this, an ANCOVA examined the effect of condition (mindfulness or control) on self-reported state difficulties in emotion regulation (DERS-S) after the post-intervention (or control) distressing film clip (Film D2), while controlling for self-reported state difficulties in emotion regulation after the first distressing film clip (Film D1). Condition assignment did not have a significant effect on overall state difficulties in emotion regulation [$F(1, 27) = .30, p = .59, \eta_p^2 = .01$].

To test our next prediction, that mindfulness would improve recovery following a distressing film clip, we conducted ANCOVAs with the negative affect scale of the PANAS and SCL and BPM at the recovery period after Film D2 as the dependent variables, and entered those variables at the recovery period after Film D1 as covariates. Contrary to predictions, no evidence for an effect of condition on recovery following the distressing film clip was revealed for physiological arousal [SCL: $F(1, 24) = 0.03, p = .87, \eta_p^2 = .00$; BPM: $F(1, 25) = 0.26, p = .62, \eta_p^2 = .01$] or negative affect [$F(1, 27) = 0.16, p = .69, \eta_p^2 = .01$]. We also examined condition effects on negative emotional responses immediately after FilmD2, while controlling for negative emotions reported after Film D1. No significant effect emerged [$F(1, 27) = 1.15, p = .29, \eta_p^2 = .04$], although participants in the mindfulness condition reported nonsignificantly lower levels of negative affect than those in the control group. No condition effects were found on physiological measures during the second distressing clip, while controlling for the first clip [SCL: $F(1, 24) = 0.09, p = .76, \eta_p^2 = .00$; BPM: $F(1, 25) = 0.26, p = .61, \eta_p^2 = .01$]. (See Table 3 for means and standard deviations for all variables in response to the distressing film clip.)

In response to the post-intervention/control positive film clip, we predicted that participants in the mindfulness condition would report fewer difficulties with emotional awareness and clarity, and greater positive affect than participants in the control condition. First, we conducted ANCOVAs examining the effect of condition assignment on the awareness and clarity subscales of the DERS-S after the second positive film clip (Film P2), controlling for scores after the first positive clip (Film P1). Results were nonsignificant for lack of awareness, $F(1, 27) = 1.30, p = .27, \eta_p^2 = .05$, and lack of clarity, $F(1, 27) = .39, p = .54, \eta_p^2 = .01$. Another ANCOVA was conducted to determine whether condition assignment affected reports of positive affect (assessed by PANAS-pa in response to Film P2, while controlling for reported positive affect after Film P1). Results were significant, $F(1, 27) = 7.20, p < .05, \eta_p^2 = .21$, with participants in the mindfulness condition reporting higher levels of positive affect after the post-intervention amusing film clip than participants in the control condition, consistent with predictions. (See Table 4 for means and standard deviations for all variables in response to the positive mixed clip.)

The last series of ANCOVAs examined participants' responses to the affectively mixed clip. We predicted that participants in the mindfulness condition would report less overall difficulty regulating their emotions post-intervention/control compared to participants in the control condition. The effect of condition on reported difficulties regulating emotion approached significance, with a medium to large effect size, $F(1, 27) = 3.50, p = .07, \eta_p^2 = .11$. In our last hypothesis, we predicted that participants in the mindfulness condition would report similar emotional responses (negative affect) immediately after viewing the post-intervention affectively mixed film clip, yet would report less physiological arousal and negative affect at recovery compared to participants in the control condition. Contrary to these predictions, participants in the mindfulness condition reported significantly less negative affect immediately after the post-intervention affectively mixed clip [$F(1, 27) = 5.62, p < .05, \eta_p^2 = .17$], yet did not report significantly different responses compared to control participants at the recovery period on physiological arousal [SCL: $F(1, 24) = .01, p = .91, \eta_p^2 = .00$; BPM: $F(1, 27) = .13, p = .73, \eta_p^2 = .01$] or negative affect [$F(1, 27) = .05, p = .82, \eta_p^2 = .00$]. There were no significant effects on physiological arousal during the film clip [SCL: $F(1, 24) = .19, p = .67, \eta_p^2 = .01$; BPM: $F(1, 25) = .00, p = .97, \eta_p^2 = .00$]. (See Table 5 for means and standard deviations for all variables in response to the affectively mixed film clip.)

Discussion

The purpose of this study was to directly test the causal effects of mindfulness on reported difficulties in emotion regulation, as well as physiological and emotional responses to

emotionally evocative stimuli. Results partially support our hypotheses. While the brief mindfulness intervention did not affect reported difficulties in emotion regulation after the distressing film clip, the intervention did have a significant effect on enhancing reported positive affect in response to the positive film clip and reducing reported negative affect immediately following the affectively mixed film clip, as well as a near-significant, medium-to large-sized effect on reported difficulties in emotion regulation after the affectively mixed film clip. There were no significant differences between conditions on physiological responding (skin conductance level or heart rate) at any assessment point.

Results from this study indicate that it is possible to produce the phenomenon of mindfulness in an experimental situation, although it is likely a modest representation of mindfulness that is better achieved through more extensive practice. Participants in the mindfulness condition reported significantly higher levels of decentering on the state mindfulness measure than participants in the control condition both immediately after the intervention and again later in the study, suggesting a prolonged effect of the brief intervention. In a study of the effects of mindfulness-based stress reduction on state mindfulness and psychological symptoms, increases in the decentering subscale, but not the curiosity subscale, predicted reductions in psychological symptoms (Lau et al., 2006). Thus the aspect of mindfulness targeted by this experimental manipulation may be particularly relevant to psychological symptoms, suggesting it represents a useful analogue of the phenomenon.

There are several important limitations to consider. Most notably, this study is significantly limited by a small sample size, which reduced the statistical power of the analyses. For this reason, effect sizes were reported in order to meaningfully examine nonsignificant findings and to obtain information about which findings may be important to pursue in future studies. The small sample size, coupled with the number of analyses conducted, raises the possibility that the findings that emerged could be due to chance. Clearly, studies with larger sample sizes are needed before firm conclusions can be drawn about the effects of mindfulness on emotion regulation.

Further, even though the experimental manipulation did have a significant effect on self-report of decentering, a central element of mindfulness, as noted above, it did not have a significant effect on the curiosity dimension of mindfulness. This suggests that the brief intervention likely did not reproduce the full experience of mindfulness among participants. In addition, mean levels of state mindfulness reported by participants in the mindfulness condition were lower than those reported by individuals following more extensive (15 minutes) mindfulness practice (19.46 [SD = 9.74] for *curiosity*, 19.15 [SD = 8.41] for *decentering*) and following an 8-week intervention (23.37 [SD = 8.88] for *curiosity*, 24.01 [SD = 7.91] for *decentering*), suggesting that the level of mindfulness achieved in this study is lower than in clinical applications. This is not surprising, given that mindfulness is thought of as a skill that can be improved with practice, such as through regular meditation (Baer et al., 2006). As such, findings should be considered an underestimate of the potential effects of practice of longer duration. In addition, while the control condition controlled for important potential confounds such as passage of time and repeated exposure to the film clips, it did not control for potential expectancy and demand effects. For instance, the mindfulness manipulation included instructions about ways of responding to emotions that could have led to responses due to social desirability, rather than actual effects of the practice. The pattern of findings (no reported effects following the distressing film clip, when demand and expectancy would likely be highest) limits the likelihood that these confounds account for the results. Nonetheless, future studies should employ active control conditions to examine the specificity of the observed effects.

Conclusions that can be drawn are also limited by the nature of the sample. We used an analogue sample of individuals who reported difficulty with emotion regulation, rather than a clinically

diagnosed sample. Findings may have been more pronounced in a clinical sample, or, conversely, a clinical sample might not be as affected by a mindfulness manipulation. However, it is worth noting that the mean DERS scores in the current sample are comparable to those found in a clinical sample of individuals diagnosed with GAD ($M = 96.88$, $SD = 21.49$; Roemer et al., 2009) and much higher than individuals without anxiety or mood disorders in the same study ($M = 55.37$, $SD = 13.82$). We were also unable to determine whether demographic variables such as gender, ethnicity or race play a role in the effects observed here; future studies should use larger, diverse samples and explore the potential moderating role of these variables.

Condition effects on reported emotion regulation were only evident (although nonsignificant) following the affectively mixed film clip. There are many potential explanations for the emergence of emotion regulation findings after the affectively mixed clip, yet not after the distressing clip. The distressing film clip may have been too evocative to be affected by such a brief mindfulness intervention; a more developed practice may be necessary to influence the regulation of such intense affect, particularly among individuals selected for high levels of difficulty regulating their emotions. It may be that the affectively mixed film clip led to more variability in responding, which allowed differences in emotion regulation due to the mindfulness induction to emerge. The complicated nature of the evoked emotions in response to the affectively mixed clip may have allowed participants in the mindfulness condition more opportunities to practice mindfulness skills, leading to a greater increase in adaptive regulation in response to this clip. Also, clarity of emotional responding (which is likely to be facilitated by mindfulness) may have a more regulatory effect on complex stimuli.

In direct contrast to our predictions, mindfulness participants reported less negative affect immediately following the affectively mixed film clip, yet there were no condition effects at the recovery period after the negative or affectively mixed film clips. This was an unexpected pattern of findings, as we expected mindfulness to have its impact in regulating and recovering from emotional responses, rather than on initial responding. However, in a recent neuroimaging study, participants with lower trait mindfulness demonstrated more neural reactivity while viewing emotionally threatening stimuli, which suggests that mindfulness-related differences in emotional responding may emerge during and immediately after emotionally evocative stimuli, rather than at recovery, as we predicted in the current study (Creswell, Way, Eisenberger, & Lieberman, 2007). The current findings regarding responses to the affectively mixed clip are thus consistent with this research and suggest that mindfulness might facilitate regulation by reducing initial reactivity to an emotionally complicated stimulus. The findings regarding reduced reported difficulties in emotion regulation and negative affect following this film clip, yet no differences in physiological arousal, suggest that this is not solely an effect of relaxation or reduced arousal, but is instead evidence of an effect on subjective experience of distress distinct from arousal. This is consistent with the suggestion that mindfulness practice alters subjective responses to physiological reactions. This pattern is similar to Eifert and Heffner's (2003) findings that an acceptance manipulation affected self-reported affect, but not physiological arousal.

There were no significant differences between conditions in physiological or affective responding at recovery following the negative or affectively mixed film clips. These findings were contrary to prediction; several considerations may explain them. First, the negative and affectively mixed film clips may not have been sufficiently emotionally evocative to induce a long-lasting emotional impact. In addition, participants were immediately asked to complete three measures after the clip was finished, which may have employed enough attentional resources to help all participants regulate their emotional responses. Also, as mentioned above, individuals may engage in regulation of emotion more instantaneously, on a moment-to-moment basis, rather than solely in an effortful or intentional way after one has become aware of emotions that they wish to regulate. It may also be that mindfulness does not facilitate faster

recovery from emotional experiences – and that instead, an individual's initial response to their internal experiences is more responsive to intervention and provides more information about the regulation strategies in which they engaged than is currently indicated in the literature.

We also examined the effects of mindfulness on the experience and regulation of positive affect in this study. Mindfulness may enhance the experience of positive emotion by increasing awareness of and engagement with pleasurable internal experiences, as well as the pleasant event itself (e.g., an amusing film). Consistent with predictions, there was a significant difference between conditions on reported positive affect following the second (post-intervention) film clip, controlling for responses to the first positive film clip. These results suggest that even a brief mindfulness intervention may enhance the experience of positive affect in the laboratory. Participants viewed the same positive film clip twice, and results may have been even more pronounced if the participants viewed a novel positive film clip after the mindfulness intervention. However, the current findings may be explained by the mindfulness concept of beginner's mind, which refers to an expansive awareness in which previously held beliefs and preconceptions are put aside, and the environment is re-experienced, as if for the first time. Mindfulness participants may have experienced the second positive film clip as though they were experiencing it for the first time, and therefore were better able to maintain a positive emotional response to the familiar film clip, while the control participants reported less positive affect after the second positive film clip compared to their responses to the first positive clip. Mindfulness may also facilitate more flexible responding to stimuli, allowing participants to shift from negative affect following the distressing film to positive affect after the positive film clip. These findings, coupled with Arch and Craske's findings that a mindfulness condition increased positive responses to neutral slides, provide evidence for a causal role of mindfulness in the experience of positive affect (Arch & Craske, 2006).

This study provides important preliminary support for the role of mindfulness in emotion regulation, and the ways in which mindfulness may facilitate adaptive responses to emotional experiences. Additional experimental studies, with larger sample sizes to ensure sufficient power, are necessary to continue to explore the effect of mindfulness on emotional responding, regulation, and recovery. Using briefer self-report measures so as to minimally disrupt emotional processing, as well as non self-report indicators of emotional effects such as performance on cognitive tasks following emotional provocation, will be important. These studies should also include a range of stimuli (e.g., pictures, individualized vignettes) in an attempt to provide more ecologically valid emotionally evocative events, which may elicit stronger emotions, and in turn, a greater effort to regulate those responses. As mentioned above, studies should also use active control conditions, in order to better determine the specific effects of mindfulness interventions. Future studies should also examine the ways in which mindfulness practice affects these variables, such as looking at novice versus experienced mindfulness practitioners, or providing a longer mindfulness intervention. The findings regarding the effects of the mindfulness intervention on positive affect illuminates an exciting new avenue of research, suggesting that even brief mindfulness training may change the way positive affect is experienced, even in the laboratory.

In conclusion, this study provided a multimodal, experimental investigation of the causal relationship between mindfulness and emotion regulation in response to a range of stimuli. Existing research indicates a relationship between mindfulness and emotion regulation, and results from this study partially support the existence of a causal relationship between these constructs. Participants in the mindfulness condition reported significantly less negative affect in response to an affectively mixed clip, and a trend toward less difficulty regulating emotion after this clip, with a medium-to large-sized effect. These findings suggest that mindfulness may have facilitated more skillful responding to complicated, emotionally evocative stimuli, which may be more ecologically valid than laboratory mood inductions that attempt to elicit

discrete emotional responses. The ability of participants in the mindfulness condition to maintain positive responding to the positive film clip immediately following a very distressing film clip demonstrates the potential usefulness of mindfulness interventions in increasing and enhancing positive affective experiences, and perhaps through the accumulation of those experiences, contributing to a greater sense of well-being and quality of life.

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Appendix

Basic Information

For the next several minutes, I'm going to ask you to think about, and try, a particular kind of awareness, called mindfulness. The term mindfulness comes from Eastern spiritual and religious traditions but psychology has begun to find that mindfulness (without the spiritual and religious context) can be helpful for people in many ways. Today I'm just going to tell you a little bit about this way of paying attention, and have you try it out, to see what it's like for you.

Mindfulness is paying attention in the present moment, with openness and curiosity, instead of judgment. We often focus on things other than what is happening in the moment – worrying about the future, thinking about the past, focusing on what is coming next, rather than what is right in front of us. And it is useful that we can do a number of things without paying attention

to them. However, sometimes it is helpful to bring our attention, particularly a curious and kind attention, to what we are doing in the moment.

Sometimes we do pay close attention to what we are thinking and feeling and we become very critical of our thoughts and feelings and we try to either change them or distract ourselves because this critical awareness can be very painful. For example, we might notice while we are talking to someone new that our voice is shaky, or we aren't speaking clearly, and think, "I'm such an idiot! What is wrong with me? If I don't calm down, this person will never like me!"

Being mindful falls between these two extremes – we pay attention to what is happening inside and around us, we see events and experiences as what they are, and we allow things we can't control to be as they are while we focus our attention on the task at hand. For example, when talking to someone new we might notice those same changes in our voice take a moment to reflect, "This is how it is now, there go my thoughts again", and gently bring our attention back to the person and our conversation. This second part of mindfulness, holding our judgments loosely and not trying to change our thoughts or feelings can be especially hard. In fact, often being mindful involves practicing not judging our tendency to have judgments!

Mindfulness is a process: We do not reach a final and total state of mindfulness. It is a way of being in one moment that comes and goes. Mindfulness is losing our focus 100 times and returning to it 101 times.

The best way to understand mindfulness is to practice it, so let's do that now.

MINDFULNESS EXERCISE I

First, just allowing your eyes to close gently, or to lower....and bringing yourself to sit in an upright position.... begin by noticing how you are sitting in the chair....noticing the places where you are touching the chair, the places where you are touching the floor....noticing where the air is touching your skin and what that feels like...and now gently drawing your attention to your breath.... noticing (without trying to change it) where your breath is coming from... noticing where it enters your body when you inhale... how it travels through your body before you exhale it.... Noticing how your body moves with each inhalation, each exhalation....allowing any thoughts or feelings that occur to naturally rise and fall, without trying to hold onto them or get rid of them.....just continue bringing your awareness to your experience in this moment.... and continuing to notice your breath...as you allow whatever comes to come and whatever goes to go and whatever stays to stay....and again bringing your awareness to the room, to the way you are sitting in the chair, and gradually opening your eyes when you are ready and letting the experimenter know you are ready to continue.

Mindfulness and Emotions

One of the hardest times to be mindful is when we are experiencing a strong emotion, like fear, or sadness, or joy. In those moments, we often want to either hold on to the emotion or get rid of it, rather than allowing it to rise and fall naturally. And sometimes it feels like we can make emotions stay or make them leave, but other times we may find that trying to make an emotion stay makes it leave even faster, while trying to get rid of it keeps it hanging around. Also, emotions can give us important information about our lives, a particular situation, or the way someone we care about is responding to us. So it can be useful for us to notice the emotions we are having, as they happen, rather than judging them or trying to change them. We can bring the same kind of awareness you just practiced to any emotional experience, noticing what we feel in our bodies, what thoughts we have, and just letting that experience happen without

getting caught up in it. Our feelings will change on their own when we let them be, rather than seeing them as bad or good or something to be changed.

This is also something that is easier to experience than it is to describe. Let's do another exercise to give you a sense of what I'm describing.

MINDFULNESS EXERCISE II

Mindfulness of Emotions—First, make yourself comfortable in your chair. Take a few moments to notice your breathing. Close your eyes, and focus on your breath... Noticing how breath travels into your body, through your body, and back out of your body... noticing any tension in your body... and gently letting it go... Spending a few moments just focusing your attention on your breath... Now I would like to read you a poem and have you notice any reactions to the poem that arise.

Read *The Guest House* by Rumi, from Barks & Moyne, 1995

Table 1

Comparison of Means and Standard Deviations of Untransformed Variables at Screening and Baseline Assessments for Participants in the Control and Mindfulness Conditions

	Control	Mindfulness
MAAS: Screening	51.33 (10.06)	53.62 (14.81)
DERS: Screening	100.05 (13.56)	99.80 (15.35)
BL – DERS-S	50.31 (8.10)	50.93 (10.10)
BL – PANAS-NA	13.80 (3.03)	12.27 (2.79)
BL – PANAS-PA	25.20 (8.05)	24.60 (7.26)
BL – Skin Conductance Level (SCL) ^a	5.96 (3.54)	7.16 (4.15)
BL – Heart Rate beats per minute (BPM)	72.56 (12.73)	76.25 (13.59)
TMS1 Curiosity	12.00 (6.88)	13.80 (5.65)
TMS1 Decentering	11.53 (4.32)	15.33 (3.89)
TMS2 Curiosity	14.13 (6.99)	15.73 (4.64)
TMS2 Decentering	13.33 (4.19)	17.80 (4.51)

Note. Screening = Larger questionnaire study administered before experimental session; MAAS = Mindful Attention Awareness Scale; DERS = Difficulties in Emotion Regulation Scale – Total score; BL = Baseline at experimental session; DERS-S = State Difficulties in Emotion Regulation Scale – Total score; PANAS-NA = Negative Affect subscale of the PANAS; PANAS-PA = Positive Affect subscale of the PANAS; TMS1 = Toronto Mindfulness Scale – Immediately post-intervention/control; TMS2 = Toronto Mindfulness Scale – End of experimental session.

^a SCL unit = microsiemens (μ S)

Table 2

Means and Standard Deviations of (Untransformed) Self-report and Physiological Measures Before and Immediately Following Pre-intervention Film Clips

	Pre	Post
Distressing		
PANAS-NA	13.03 (2.97)	15.00 (4.07)*
SCL	6.58 (3.84)	7.39 (4.22)*
BPM	74.53 (13.08)	73.58 (11.60)
Positive		
PANAS-PA	20.80 (8.64)	25.17 (8.23)*
Mixed		
PANAS-NA	11.53 (2.24)	14.43 (3.41)*
PANAS-PA	22.33 (9.16)	22.24 (8.11)
SCL	7.26 (4.06)	7.20 (3.94)
BPM	73.75 (11.56)	73.64 (11.92)

Note. Pre-Distressing Clip = Baseline; PANAS-NA = Negative Affect subscale of the PANAS; SCL = Skin Conductance Level; BPM = Heart Rate (beats per minute); Pre-Positive Clip = Recovery period from distressing film clip; PANAS-PA = Positive Affect subscale of the PANAS; Pre-Mixed Clip = Recovery period from positive film clip.

* Significant changes from pre to post, $p < .05$.

Table 3

Means and Standard Deviations of (Untransformed) Reported Negative Affect and Difficulties in Emotion Regulation in Response to Distressing Film Clips Before and After the Intervention

Mindfulness Condition				
	BL	Film-D1	Recov-D1	Recov-D2
PANAS-NA	12.27 (2.79)	13.87 (4.02)	11.80 (2.34)	13.73 (4.43)
DERs-S	50.93 (10.10)	51.19 (11.49)	--	48.13 (9.17)
SCL	7.16 (4.15)	8.18 (4.95)	8.00 (4.68)	7.60 (4.34)
BPM	76.25 (13.59)	76.07 (12.47)	75.23 (12.02)	72.38 (11.19)
Control Condition				
	BL	Film-D1	Recov-D1	Recov-D2
PANAS-NA	13.80 (3.03)	16.13 (3.93)	12.67 (2.77)	16.73 (4.54)
DERs-S	50.31 (8.11)	47.60 (6.76)	--	48.33 (10.05)
SCL	5.96 (3.54)	6.80 (3.79)	6.74 (3.74)	6.38 (2.78)
BPM	72.56 (12.73)	71.25 (12.31)	71.68 (11.27)	68.97 (10.51)

Note. BL = Baseline; Film-D1 = Immediately after the first (pre-intervention) distressing film clip; Recov-D1 = Three minutes after completion of measures following the first distressing film clip; Film-D2 = Immediately after the second (post-intervention) distressing film clip; Recov-D2 = Three minutes after completion of measures following the second distressing film clip; PANAS-NA = Negative Affect subscale of the PANAS; DERs-S = State Difficulties in Emotion Regulation Scale – Total score; SCL = Skin Conductance Level; BPM = Heart Rate (beats per minute).

Table 4

Means and Standard Deviations of (Untransformed) Reported Positive Affect and Emotion Regulation in Response to Positive Film Clips Before and After the Intervention

	Mindfulness Condition			
	Before Film-P1	After Film-P1	Before Film-P2	After Film-P2
PANAS-PA	20.00 (8.40)	24.47 (7.58)	20.47 (8.40)	24.93 (7.01)
DERS-aware	--	17.80 (3.93)	--	17.40 (4.53)
DERS-clarity	--	10.60 (4.01)	--	10.73 (2.79)
	Control Condition			
	Before Film-P1	After Film-P1	Before Film-P2	After Film-P2
PANAS-PA	21.60 (9.12)	25.87 (9.05)	19.00 (9.64)	21.20 (10.88)
DERS-aware	--	16.40 (5.22)	--	17.80 (4.71)
DERS-clarity	--	10.00 (2.54)	--	11.40 (4.08)

Note. Before Film-P1 = Recovery period from the first (pre-intervention) distressing film clip; After Film-P1 = Immediately following the first (pre-intervention) positive film clip; Before Film-P2 = Recovery period from the second (post-intervention) distressing film clip; After Film-P2 = Immediately after the second (post-intervention) positive film clip; PANAS-PA = Positive Affect scale of the PANAS; DERS-aware = State Difficulties in Emotion Regulation Scale -Lack of awareness of emotions subscale; DERS-clarity = State Difficulties in Emotion Regulation Scale - Lack of emotional clarity subscale.

Table 5

Means and Standard Deviations of (Untransformed) Reported Negative Affect and Difficulties in Emotion Regulation in Response to Affectively Mixed Film Clips Before and After the Intervention

	Mindfulness Condition			
	Film-M1	Recov-M1	Film-M2	Recov-M2
PANAS-NA	13.80 (2.68)	11.87 (2.07)	12.60 (2.32)	11.60 (1.96)
DERS-S	50.07 (9.48)	--	44.26 (6.28)	--
SCL	8.26 (4.66)	7.74 (4.42)	7.75 (4.61)	7.25 (4.44)
BPM	73.78 (11.95)	75.71 (12.19)	71.04 (11.24)	73.60 (12.19)
	Control Condition			
	Film-M1	Recov-M1	Film-M2	Recov-M2
PANAS-NA	15.07 (4.01)	14.20 (4.63)	15.27 (3.35)	12.53 (2.64)
DERS-S	49.33 (6.80)	--	47.80 (5.72)	--
SCL	7.11 (3.34)	6.62 (3.42)	6.52 (2.71)	6.22 (2.77)
BPM	68.52 (11.23)	71.25 (11.60)	66.20 (10.57)	69.02 (10.84)

Note. Film-M1 = Immediately after first (pre-intervention) affectively mixed film clip; Recov-M1 = Three minutes after completion of measures following the first affectively mixed film clip; Film-M2 = Immediately after the second (post-intervention) affectively mixed film clip; Recov-M2 = Three minutes after completion of measures following the second affectively mixed film clip; PANAS-NA = Negative Affect subscale of the PANAS; DERS-S = State Difficulties in Emotion Regulation Scale – Total score; SCL = Skin conductance level; BPM = Heart rate (beats per minute).