State Emotion Regulation as a Mediator of the Relationship between State Attachment Security and State Mindfulness

by

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Abstract

Recent research has found associations between attachment security and mindfulness, such that individuals who are more secure in their relationships are more mindful, while those less secure in their relationships are less mindful. However, not much is known about the directionality and underlying mechanisms of this relationship. Recent research has suggested that emotion regulation is a mediator of this relationship. The present study tests if priming attachment security leads to an increase in state mindfulness, and if this relationship is mediated by state emotion regulation. Participants recruited using Amazon's Mechanical Turk (N = 205) were randomly assigned to complete one of two visualization and writing tasks: either an attachment security priming condition (experimental) or placebo task condition (control). They completed measures of state attachment security, state emotion regulation and state mindfulness pre and post-manipulation. Consistent with hypotheses, there was a significant indirect effect of condition on state mindfulness via state emotion regulation (b=.109, 95% CI [.015, .230]). These results suggest that increases in state attachment security lead to improvements in emotion regulation and thus decreases in state mindfulness. However, contrary to hypotheses, when looking at the total effect with a different measure of mindfulness, the state attachment security prime predicted *decreases* in state mindfulness (b= -.268, p=.041). Possible explanations for these findings, implications, and future directions are discussed.

Introduction

The benefits of mindfulness and attachment security in relationships have both demonstrated positive outcomes, including healthy emotion regulation. Recent research has also found associations between attachment security and mindfulness, bringing to light many similarities among defining characteristics between the two constructs. Most relevant to the current study, research has suggested that individuals who are more secure in their relationships are more mindful, while those less secure in their relationships are less mindful. However, not much is known about the directionality and underlying mechanisms of this relationship. Recent research has suggested that emotion regulation may be a mediator of this relationship. However, experimental and longitudinal designs are needed to further investigate the relationships mindfulness, attachment and emotion regulation.

Mindfulness

Mindfulness can be described as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" and "the self-regulation of attention and the non-evaluative acceptance of one's immediate experiences" (Kabat-Zinn, 1994, p.14). Generally, mindfulness as it is conceptualized and practiced in the scientific community is different from how it was first conceptualized and is currently practiced within the Buddhist community. This secularization of the practice has left behind some of the pro-social components of mindfulness, such as the Buddhist virtue "Brahmavihara." This virtue consists of four "immeasureables:" loving kindness, compassion, empathetic joy and equanimity (Wetlesen, 2002).

Researchers have also separated this mindfulness into five separate facets to allow for a more thorough understanding of the construct: observing (noticing internal and external stimuli), describing (labeling one's experiences), acting with awareness (attending fully to one's activity, without autopilot), nonjudging (refraining from evaluating one's experiences), and non-reacting (experiencing one's thoughts and feelings without needing to immediately respond) (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Breaking down mindfulness into individual facets allows researchers to examine the relative contribution of individual components of mindfulness to outcomes of interest.

State mindfulness. Different practices and interventions based on mindfulness have recently gained traction, in both public and clinical settings, and have been found to result in various positive outcomes (Keng, Smoski, & Robins, 2011), such as stress reduction and increases in well-being (R. A. Baer, 2006; Carmody & Baer, 2008). Promising results have also been shown in the treatment of various psychiatric disorders (R. Baer, 2003; R. A. Baer, 2006), such as depression, addiction and pain (Goldberg et al., 2018). In a recent meta-analysis, mindfulness-based interventions were found to be as effective as traditional evidence-based methods in the treatment of symptoms in various clinical disorders (Goldberg et al., 2018). Mindfulness-based interventions utilize increases in *state* mindfulness, which can be thought of as the degree an individual exhibit the concepts of mindfulness at the present moment. This is done most commonly through a variation of mindfulness meditation activities stemming from Buddhism. These mindfulness-based practices and interventions view mindfulness as a skill or ability to be learned or developed (Baer et al., 2006). This can lead individuals to embody and apply the concepts of mindfulness to their daily lives and increase levels of

trait or *dispositional* mindfulness from their naturally occurring baseline levels (Carmody & Baer, 2008).

Dispositional mindfulness. Dispositional mindfulness is the degree to which the individual naturally exhibits the concepts of mindfulness on a daily basis, rather than through intention, as seen in practices designed to increase state mindfulness (Stevenson, Emerson, & Millings, 2017). Higher levels of dispositional mindfulness as a whole have been linked to various positive outcomes such as improved stress response, ability to cope with stress, a reduction in addictive behaviors, alcohol abuse and disordered eating (Brown, Weinstein, & Creswell, 2012; Carmody & Baer, 2008; Farb et al., 2010; Tomlinson, Yousaf, Vitterso, & Jones, 2018; Weinstein, Brown, & Ryan, 2009). A recent meta-analysis revealed a positive relationship between dispositional mindfulness and psychological health, and an inverse relationship between dispositional mindfulness and negative cognitive patterns (Tomlinson et al., 2018). This protection against negative cognitive patterns is theorized to be mediated by increased protection against ruminating thoughts, which is facilitated by the increased awareness and changes in thought processing associated with increased mindfulness, specifically the ability to notice thoughts without judging them, rather than automatically engaging and emotionally reacting to them (Tomlinson et al., 2018). These positive processes and issues like thought rumination, emotional reactivity, emotional response and situational awareness are some of the key factors that also determine an individual's attachment security.

Adult attachment

According to Hazan & Shaver's (1987) extension of Bowlby's (1982) attachment theory, adult attachment style is determined by the sum of all close relationships throughout the life span. This style reflects the individual's views of themselves and others and explains

and predicts their behavior with other people and how they experience and manage stress. Individuals fit into one of four categories based on their security in relationships: secure, anxious, avoidant, and fearful (Bowlby, 1982). According to adult attachment theory, individuals with caregivers who were consistently available and nurturing, and who also had to positive experiences in close relationships throughout their life span, develop a secure attachment style. This style is characterized by comfort with intimacy, stable emotion regulation, openness, trust and neither over-seeking attachment figures or suppressing attachment needs (M. Mikulincer, Shaver, Gillath, & Nitzberg, 2005).

Insecurely attached individuals fit either the anxious or avoidant category based on how they manage their attachment needs and the relationship with their attachment figure (Hazan & Shaver, 1987). Both insecure styles are the result of the sum of an inconsistent caretaker experience and poor relationships throughout the lifespan. The distinction originates from their interaction with their caretaker when they are present. Anxious individuals experience inconsistently responsive caretaking, while avoidant individuals experience rejection or overzealous caretakers (Macaulay, Watt, MacLean, & Weaver, 2015). These differences in caretaking experiences create anxiously attached individuals, who experience a state of arousal, commonly referred to as “hyperactivation” or “hypervigilance.” When faced with distress, anxious individuals experience increased “activation” which results in an increase in effort to reconnect with their attachment figure and “calm” the over-activation of their attachment system (Macaulay et al., 2015). On the contrary, avoidant individuals handle distress in an overly defensive manner, by suppressing their attachment needs and distancing themselves from their attachment figure (Bowlby, 1982). While an individual’s attachment style usually does not change after reaching adulthood, there

is evidence suggesting that in rare cases attachment styles are not concrete and can change over time and exist on a spectrum instead of in distinctive categories (Berit, 2015)

Attachment insecurity is associated with higher levels of intimate partner violence (IPV), anti-social personality disorders, borderline personality disorders (Cameranesi, 2016), eating disorders (Abbate-Daga, Gramaglia, Amianto, Marzola, & Fassino, 2010), social anxiety (Manning, Dickson, Palmier-Claus, Cunliffe, & Taylor, 2017), lower empathy, higher rumination, higher thought suppression, higher judgment of thoughts and negative affectivity (Troyer & Greitemeyer, 2018).

In summary, attachment security is associated with well-being, positive affectivity and adaptive functioning (Mario Mikulincer and Shaver (2016). Securely attached individuals appear to be more empathetic, a process mediated by increased ability to reappraise emotions, which is associated with decreased rumination and suppression and a non-judgmental outlook (Troyer & Greitemeyer, 2018). Attachment security also appears to be associated with increased self-concept clarity and better decision making (Kvitkovičová, Umemura, & Macek, 2017).

Mindfulness and Attachment

There is a large body of correlational research connecting different levels of attachment security and trait mindfulness. In a recent meta-analysis examining 33 studies, most revealed a significant positive relationship between mindfulness and attachment security. Additionally, the majority found a significant negative relationship between mindfulness and attachment insecurity of either kind (Stevenson et al., 2017). An anxious style was found to be significantly negatively correlated with four out of the five mindfulness subscales (i.e., describe, act with awareness, non-judge, non-

react) while an avoidant style was significantly negatively correlated with each of the five mindfulness subscales. In addition, anxious attachment was more significantly negatively associated with mindfulness as a whole than avoidant attachment. Anxious attachment was associated with lower scores then avoidant attachment on the act with awareness, non-judge and non-react subscales. Hypervigilance and hyperactivation are theorized to interfere more with these facets of mindfulness than deactivation and separation (Stevenson et al., 2017). Avoidant attachment was most significantly negatively correlated with the describe and non-react subscales. (Stevenson et al., 2017).

Causality and underlying mechanisms. Researchers have recently begun investigating the underlying mechanisms of the relationship between attachment security and mindfulness. It has been theorized that a responsive, available, loving and supporting caretaker will provide an environment conducive to the simultaneous development of attachment security and mindfulness, with individuals raised by abusive and unavailable caretakers losing the capacity for both (Ryan, Brown, & Creswell, 2007). Recognizing overlap in key traits defining both of these constructs, it has been theorized that the development of one of these traits will lead to the development of the other, creating a back and forth mechanism resulting in the increased capacity for both attachment security and mindfulness (Ryan et al., 2007).

It has also been suggested that attachment security on its own is a possible antecedent of the development of mindfulness (Ryan et al., 2007; Shaver, Lavy, Saron, & Mikulincer, 2007). It is theorized that secure individuals are better able to foster mindfulness because they are free from processes that interfere with its development that are characteristic of individuals lower in security, including thought suppression, rumination, attentional control and difficulties with emotional regulation (Caldwell &

Shaver, 2013; Ryan et al., 2007; Shaver et al., 2007). Emotion regulation refers to an individual's ability to influence, experience and express emotions in a manner conducive to their well-being (Gross, 1998).

Experimental Findings

To better understand the relationship between attachment security and mindfulness, researchers have used experimental designs. In a two-part study, state mindfulness did not predict state security and state attachment security did not predict state mindfulness, however, indirect effects were not examined (Pepping, Davis, & O'Donovan, 2015).

In a similarly designed study, research found that priming state attachment anxiety predicted decreases in state mindfulness via increases in state emotion regulation, while priming attachment avoidance had no effect (Melen, Pepping, & O'Donovan, 2016).

Research has also indirectly shed some light on the directionality of this relationship. Utilizing a quasi-experimental design, researchers found that patients retrospective pre-therapy security predicted post-therapy mindfulness (Ma, 2008). In another study, researchers found that priming attachment security and self-compassion resulted in an increased rate of individuals indicating that they would continue mindfulness training (Rowe, Shepstone, Carnelley, Cavanagh, & Millings, 2016).

In summary, no longitudinal studies exist that have directly examined the relationship between attachment security and mindfulness. There are only two experimentally designed studies that have examined this relationship using priming and measures of state mindfulness and state attachment security as proxies of the trait versions of these variables (Melen et al., 2016; Pepping et al., 2013).

The Role of Emotion Regulation

To date, two studies have found emotion regulation be a mediator of the relationship between attachment security and mindfulness. Researchers examining the association between attachment security and mindfulness cross-sectionally have found difficulties with emotion regulation to be a mediator of the relationship between low attachment security and low mindfulness (Pepping, Davis, & O'Donovan, 2013). In an experimentally designed study, it was found priming attachment anxiety led to decreases in state mindfulness via decreases in state emotion regulation (Melen et al., 2016).

Attachment and emotion regulation. There is research linking high attachment security with adaptive emotion regulation, and low security with maladaptive emotion regulation (Mario Mikulincer & Shaver, 2010; Shaver & Mikulincer, 2007). Individuals who are low in security and characterized by avoidant tendencies, struggle with emotion regulation via suppression of emotions and avoidance of emotionally intensive situations. Insecure individuals, characterized by anxious traits, struggle with emotion regulation via an over-activation of their emotional system, resulting in negative consequences such as rumination, regret and anxiety.

Mindfulness and emotion regulation. Among other traits, individuals who are high in mindfulness are characterized by an un-biased, non-judgmental, detached acceptance and awareness of experiences, thoughts, and emotions. This allows them to avoid maladaptive processes such as becoming overwhelmed or suppressing thoughts, characteristic of those with insecure attachment. Instead they experience a variety of adaptive outcomes associated with healthy emotion regulation (Arch & Craske, 2006; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007).

Other possible mediators. Additional cross-sectional research has found thought suppression and poor attentional control to be mediators between avoidant attachment and mindfulness, as well as rumination and poor attentional control as mediators between anxious attachment and mindfulness (Caldwell & Shaver, 2013).

Current Gaps in the Literature and the Present Study

In order to better understand the relationship between attachment security and mindfulness, several gaps in the current body of literature need to be addressed. In a two-part study, it was found that priming state attachment security did not result in increases in state mindfulness and that priming state mindfulness did not result in increases in state attachment security. However, indirect effects were not examined (Pepping et al., 2015). More recent research has found that priming state attachment anxiety predicted decreases in state mindfulness, via increases in state emotion regulation (Melen et al., 2016). The present study revisits the relationship tested by Pepping (2015), by re-testing if priming state attachment security predicts increases in state mindfulness, and builds on it by testing for indirect effects, and was inspired by two previous studies finding emotion regulation as a mediator between attachment security and mindfulness (Melen et al., 2016; Pepping et al., 2013).

The current study is the only study to examine the causal positive relationship between state attachment security and state mindfulness, while also examining the indirect effects mediating this relationship. While previous studies have examined this relationship without considering indirect effects (Pepping et al., 2015) and have looked at the relationship between state attachment security and state mindfulness by priming attachment anxiety (Melen., et al 2016), this will be the first to examine the relationship between state attachment and mindfulness using an attachment security prime.

Ultimately, this research will help the field move toward a more complete understanding of the directionality, causality, and underlying mechanisms of the relationship between attachment security and mindfulness.

Not much is known about the impact of individual differences or what factors lead to the development of trait mindfulness (Melen et al., 2016; Pepping et al., 2015; Ryan et al., 2007; Shaver et al., 2007). Recently, researchers have suggested looking at this topic in a social context, revisiting the aspect of mindfulness that has been left behind due to the secularization of the practice (Shaver et al., 2007). Attachment theory has been proposed as the medium to examine mindfulness in this manner, which led to its implication as a possible antecedent of the development of mindfulness (Shaver et al., 2007). While additional longitudinal research will be needed to support the "social origins" theory of the development of trait mindfulness, it is important to note that measures of state attachment and state mindfulness have been shown to be representative measures of trait attachment and trait mindfulness, suggesting research using these state conceptualizations is a reasonable pursuit (Brown & Ryan, 2003; O. Gillath, Hart, Noftle, & Stockdale, 2009). Considering the positive outcomes associated with dispositional mindfulness, this study has important implications for individuals who wish to become more mindful but have had attachment-related issues that inhibit the fostering of this trait.

The current study will establish causality in the relationship between state attachment security and state mindfulness while examining indirect effects mediating this relationship. A conceptual figure is provided in Figure 1. This study will be conducted using an attachment security prime in the experimental group, comparing the results to a placebo activity in the control group, while measuring state attachment security and state mindfulness pre

and post-manipulation, then testing for indirect effects. It is hypothesized that the experimental manipulation (the attachment security prime) will result in increased state attachment security which will lead to increased state mindfulness via mediation by improved emotion regulation (higher mood regulation). No increases in state attachment security are expected from the control group.

Method

Participants

Utilizing effect sizes from two prior studies with similar designs (Melen et al., 2016; Pepping et al., 2015), it was calculated (using GPower), that 24 participants would be needed for a power of .80 and 36 would be needed for a power of .95 (Faul, Erdfelder, Buchner, & Lang, 2009). Participants over 18 years of age (N=252) submitted surveys via *Amazon's Mechanical Turk*, which has been validated as a reliable platform to recruit participants and gather data (Buhrmester, Kwang, & Gosling, 2011). Participant responses (n=24) were removed if the respondent did not finish the survey or did not adhere to the instructions for the writing portion of either the experimental or control tasks. Subsequent submissions by participants who took the survey more than once (n=6) were removed from the final data pool. Of the remaining 218 submissions, only participants who answered all three attention check questions correctly were kept, resulting in a final total of 205 participants who were used in analyses. Each of the final submissions had 100% completed data due to the use of forced responses as a survey requirement. Full participant demographics are provided in Table 1.

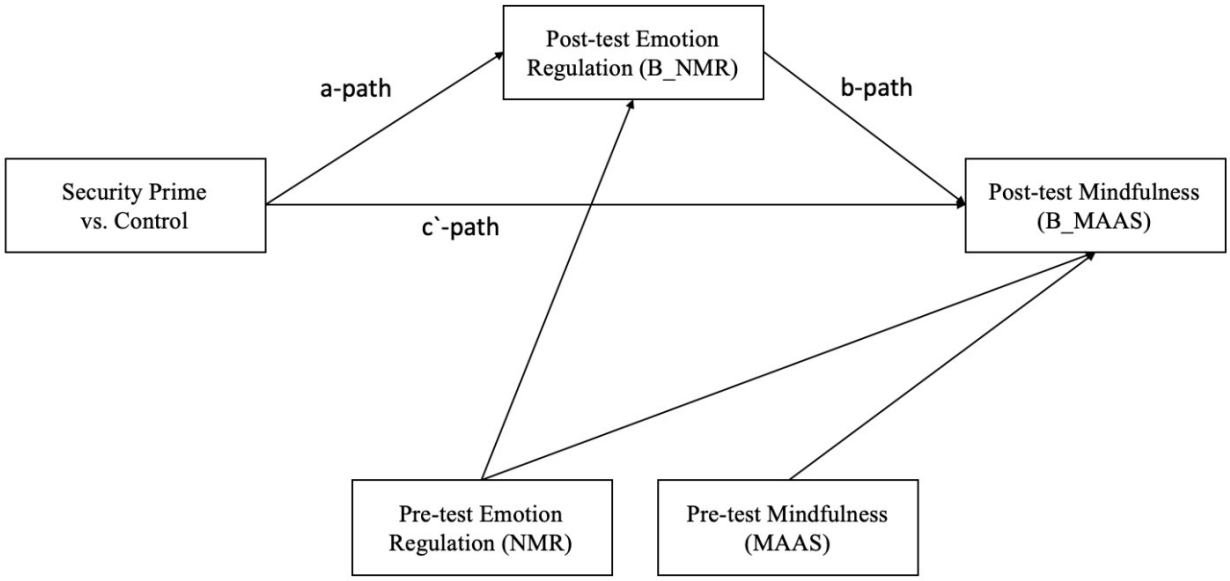

Figure 1. Conceptual mediation figure - total, direct and indirect effects.

Notes.

- Path c' is the direct effect, or the effect of state attachment security (x) on state mindfulness (y) controlling for state emotion regulation.
- Path a is the effect of state attachment security (x) on state emotion regulation (m)
- Path b is the effect of state emotion regulation (m) on state mindfulness (y)
  - The indirect effect, or the product of path a and path b, is the measure of state emotion regulation (m) as a mediator of the relationship between state attachment security (x) and state mindfulness (y)

Table 1: Participant Demographics

Question	**Variable**				
Gender	Male (*n*= 122)	Female (*n*=83)			
Race	White/Caucasian (*n*=144)	Black/African American (*n*=17)	Asian (*n*=42)	Indian (*n*=1)	Preferred not to say (*n*=1)
Ethnicity	Hispanic (*n*=9)	Non-Hispanic (*n*=196)			
Socio-economic status	Low-SES (*n*=16)	Working class (*n*=62)	Middle class (*n*=106)	Upper class (*n*=4)	
Relationship status	Married (*n*=92)	Engaged (*n*=5)	Serious relationship (*n*=41)	Casual relationship (*n*=5)	Single (*n*=62)
Work status	Over full time (*n*=72)	Full time (*n*=98)	Part time (*n*=21)	Unemployed (*n*=14)	
Student status	Full time (*n*=10)	Part time and working (*n*=7)	Part time (*n*=1)	Not a student (*n*=187)	
Psychological disorder status	Living with a disorder (*n*=17)	Not living with a disorder (*n*=188)			
Mediation	Never meditate (*n*=79)	Rarely Meditate (*n*=103)	Regularly meditate (*n*=23)		
Mind-body therapy	Engaged in a similar activity to meditation (*n*=22)	Not engaged in a similar activity (*n*=183)			

Procedure

After participants found and accessed the study using Mechanical Turk, they electronically indicated their consent to the terms of the study. Participants were then randomly assigned to either an experimental or control group and completed the demographics questionnaire (Appendix A1), the State Adult Attachment Measure (SAAM) (Appendix A2), the modified Mind Attention Awareness Scale (MAAS-State) (Appendix A3), the Modified Negative Mood Regulation Scale (MNMR) (Appendix A4), and the Five Facets Mindfulness Questionnaire – State (FFMQ-State) (Appendix A5). Then, participants in the experimental group completed the attachment security prime manipulation (Appendix B1), while those in the control group completed the placebo manipulation (Appendix B2). Post-manipulation, participants in both groups completed the State Adult Attachment Measure, the modified Mind Attention Awareness Scale, the modified Negative Mood Regulation Scale, and the Five Facets Mindfulness - State questionnaires again. The SAAM, MAAS-State and the MNMR were used in both Pepping and colleague's (2015) study and Melen and colleague's (2016) study. The FFMQ-State was added to this study in order to measure each facet of mindfulness. Participants were compensated $2.00 for completing survey, which took an average of 27 minutes to complete. *Amazon's Mechanical Turk* was paid a fee of $0.50 per participant, resulting in a cost of $2.50 per participant.

Security prime manipulation. The experimental and control manipulations were given using an online format. Participants in the experimental group completed a security prime in order to induce a state of felt security, while participants in the control group completed a corresponding placebo prime (Mario Mikulincer & Shaver, 2001). This type of attachment security prime is meant to induce a state that brings forth a symbolic

representation of a secure attachment (Hazan & Shaver, 1987) figure through a reading, visualization, and writing prompt developed and successfully utilized by Bartz and Lydon (2004)(Appendix B1). This type of technique has been demonstrated to temporarily increase individuals' levels of state attachment security, regardless of style (Mario Mikulincer & Shaver, 2001; Mario Mikulincer & Shaver, 2010). These particular procedures were chosen because they are able to be used in an online format and have proven to be successful (Bartz & Lydon, 2004; Omri Gillath & Karantzas, 2019; Mario Mikulincer, Hirschberger, Nachmias, & Gillath, 2001; Mario Mikulincer & Shaver, 2001; Pepping et al., 2015).

Measures

State attachment. The State Adult Attachment Measure (SAAM)(Appendix A2) was used to measure participants level of attachment security (O. Gillath et al., 2009). This scale was created to measure temporary fluctuations in attachment security caused by situational factors and comprises 21 items, with seven each measuring levels of attachment security, anxious insecurity and avoidant insecurity. Items were scored on a one to seven scale based on how much the participant agreed with the statement as it relates to themselves (1= "strongly disagree"; 4 = "neutral"; 7 = "strongly agree").Example items include: "I feel loved," "I feel like I have someone to rely on," and "I feel secure and close to other people." Three scores are calculated by summing the responses within each subscale. This scale was developed and subsequently validated (*a*=.81) by Gillath and colleagues (2009) and has been used successfully since (*a*= .88; Pepping et al., 2015 and *a*=.86; Melen et al., 2016). The scale was also shown to demonstrate good internal consistency in the present study for the secure ($\alpha_{baseline}$ = .97; $\alpha_{post\text{-}test}$= .97), anxious ($\alpha_{baseline}$ = .95; $\alpha_{post\text{-}test}$ = .96) and avoidant subscales ($\alpha_{baseline}$ = .93; $\alpha_{post\text{-}test}$ = .94).

State mindfulness. The modified Mindfulness Attention Awareness Scale-State (MAAS-state; Appendix A3) was used to measure state mindfulness (Pepping et al., 2015). The scale was created to measure present levels of mindfulness in response to fluctuations created by experimental manipulations such as priming or mindfulness-based practices. The scale comprises five altered items taken from the original MAAS to measure the present expression of the core facets of mindfulness (Brown & Ryan, 2003). Participants were instructed to indicate on a one to seven scale the degree to which the statement relates to their present state, with a response of 1 representing "Strongly disagree," a response of 4 representing "Somewhat disagree" and a response of 7 representing "Strongly agree," with lower scores representing higher levels of state mindfulness. Example items include, "I was finding it difficult to stay focused on what was happening" and "I was doing something without paying attention." A single score for the scale is calculated by taking the average of each response. The original scale was developed and validated (α = .92) by Brown and Ryan (2003) and has been used as a measure of state mindfulness successfully since (α = .81 Pepping et al., 2015 and (α = .84 Melen et al., 2016. The scale demonstrated good internal consistency in the present study at baseline (α = .93) and post-test (α = .93).

Faceted state mindfulness. The Five Facets Mindfulness Questionnaire - State was used to measure state mindfulness in a faceted manner. It is a modified version of the original scale, which was created to measure five different aspects of trait mindfulness (Baer et al., 2006). It was later shortened to 15 items (Baer et al., 2008). Facets include: observe, act with awareness, describe, non-judge and non-react. The scale has been validated (Gu, Strauss, Crane, Barnhofer, Karl, Cavanagh & Kyuken., 2016). A state version of this scale was created for this study because the current scale being utilized in

this line of research does not take into account the current faceted conceptualization of mindfulness, which has been shown to be relevant in this line of research (Stevenson et al., 2017). The state version used in the present study consists of 15 items altered to assess participants' state mindfulness. Example items include: "During the previous task I noticed changes in my body, such as whether my breathing slows down or speeds up," and "At the present moment, I find that I am able to stay focused on what I am doing, without daydreaming, worrying or getting distracted." The scale is calculated as a sum on the total scale and for each subscale. As a whole, this scale exhibited satisfactory internal consistency ($\alpha_{baseline}$ = .71; $\alpha_{post\text{-}test}$ =. 72). The "observe" subscale was also satisfactory ($\alpha_{baseline}$ = .70; $\alpha_{post\text{-}test}$ =. 74), while the "describe" subscale was higher at baseline (α = .74) than at post-test (α =. 63). The "awareness" subscale showed a similar pattern ($\alpha_{baseline}$ = .73; $\alpha_{post\text{-}test}$ =. 63). The "non-judge" ($\alpha_{baseline}$ = .64; $\alpha_{post\text{-}test}$ =. 58) and "non-react" subscales were not reliable at baseline nor follow-up ($\alpha_{baseline}$ = .53; $\alpha_{post\text{-}test}$ =.51).

State emotion regulation. The Negative Mood Regulation scale (NMR, Appendix A4) was used to assess participants' state emotion regulation (Catanzaro & Mearns, 1990; Melen et al., 2016). The scale is composed of 30 items, separated as three sub-scales with 10 items each, measuring general, cognitive, and behavioral mood regulation strategies. Example items include, "I can usually find a way to cheer myself up," and "I'll feel ok if I think about the pleasant times." Participants were asked to rate how much they agree with the statement on a five-point scale with a response of one indicating "strong disagreement," a three indicating "neither agree nor disagree" and a five indicating "strong agreement." Scores for the scale were calculated as means for the total scale and for each subscale. The scale was modified by asking participants to respond based on how they were feeling at the present moment, in order to assess state

emotion regulation. The original (α = .87, Catanzaro & Mearns, 1990) and modified version of the scale have demonstrated high internal consistency α = .90 (Melen et al., 2016). The total scale ($\alpha_{baseline}$ = .94; $\alpha_{post\text{-}test}$ = .94) and the general ($\alpha_{baseline}$ = .87; $\alpha_{post\text{-}test}$ = .89), cognitive ($\alpha_{baseline}$ = .82; $\alpha_{post\text{-}test}$ = .84), and behavioral ($\alpha_{baseline}$ = .81; $\alpha_{post\text{-}test}$ = .84) subscales displayed good internal consistency in the present study.

Analysis Plan

After the data were collected, descriptive statistics were used to examine normality and preliminary associations (e.g., zero-order correlations). Only participants who answered three of three careless responding questions correctly were included in the data analysis. SAS 9.4 along with the PROCESS macro (Hayes, 2013) were used to test hypotheses. Total effects, direct effect of the state attachment security prime (IV) on state mindfulness (DV), and the indirect effect of the state attachment security prime on state mindfulness via state emotion regulation (mediator), were examined using PROCESS. Guidelines for bootstrapping (10,000 bias-corrected samples) were followed according to Hayes (2013). A manipulation check was done to ensure that the attachment security prime was successful by testing whether those in the experimental condition were scored higher in attachment security compared with those in the control condition at post-test.

Results

Descriptive Statistics and Preliminary Associations

Means by condition are presented in Table 1. Zero-order correlations for all variables at each time point are presented in Table 2. State attachment security was significantly positively related to state mindfulness (FFMQ-State and the MAAS-State) and each facet of state emotion regulation, along with the total scale pre- and post-test. State anxious attachment was negatively associated with each measure of state

Table 2: Means for Overall Sample and By Condition at Baseline

Variable	Overall M(SD)	Experimental condition (*n*=103)	Control condition (*n*=102)	*t*	*p*
Attachment security	38.86(10.23)	38.97(10.38)	38.75(10.14)	-.15	.8804
Attachment anxiety	28.49(12.08)	26.68(12.07)	30.32(11.87)	2.18	.0305
Attachment avoidance	19.38(10.45)	19.86(10.65)	18.90(10.29)	-.66	.5114
Mindfulness (MAAS)	5.96(1.33)	5.91(1.40)	6.01(1.27)	.58	.5602
Mindfulness (FFMQ)	52.44(8.04)	52.29(7.88)	52.60(8.24)	.28	.7789
Emotion regulation	11.11(2.08)	11.14(2.05)	11.08(2.12)	-.21	.8361
General emotion regulation	3.85(.72)	3.87(.78)	3.83(.80)	-.38	.7018
Cognitive emotion regulation	3.66(.70)	3.65(.66)	3.66(.74)	.09	.9321
Behavioral emotion regulation	3.60(.73)	3.62(.75)	3.59(.71)	-.26	.7967

Table 3: Zero-order Correlations among All Study Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.	T1 Attachment security	--																	
2.	T1 Attachment anxiety	.04	--																
3.	T1 Attachment avoidance	.-.52***	.08	--															
4.	T2 Attachment security	.82***	.01	-.44***	--														
5.	T2 Attachment anxiety	-.08	.80***	.12†	.06	--													
6.	T2 Attachment avoidance	-.45***	.08	.87***	-.47***	.09	--												
7.	T1 Mindfulness (MAAS)	.22**	-.28***	-.57***	.13†	-.31***	-.52***	--											
8.	T2 Mindfulness (MAAS)	.16*	-.24***	-.54***	.09	-.29***	-.54***	.72***	--										
9.	T1 Mindfulness (FFMQ)	.45***	-.20**	-.43***	.38***	-.21**	-.45***	.42***	.40***	--									
10.	T2 Mindfulness (FFMQ)	.30***	-.16*	-.36***	.36***	-.15*	-.44***	.36***	.40***	.74***	--								
11.	T1 General emotion regulation	.56***	-.27***	-.57***	.47***	-.28***	-.55***	.55***	.48***	.69***	.53***	--							
12.	T1 Cognitive emotion regulation	.60***	-.12†	-.45***	.53***	-.13†	-.46***	.36***	.35***	.67***	.53***	.73***	--						
13.	T1 Behavioral emotion regulation	.66***	-.01	-.61**	.57***	-.07	-.59***	.43***	.35***	.62***	.45***	.52***	.47***	--					
14.	T1 MNMR	.65***	-.15*	-.58***	.56***	-.17*	-.57***	.48***	.42***	.71***	.54***	.44***	.46***	.71***	--				
15.	T2 General emotion regulation	.52***	-.27***	.46***	.55***	-.24***	-.61***	.51***	.55***	.66***	.63***	.33***	.35***	.21***	.18**	--			
16.	T2 Cognitive emotion regulation	.55***	-.12†	.19**	.63***	-.09	-.51***	.34***	.40***	.60***	.63***	.30***	.24***	.27***	.29***	.51***	--		
17.	T2 Behavioral emotion regulation	.59***	-.08	-.61***	.65***	-.05	-.67***	.37***	.42***	.57***	.58***	.74***	.82***	.79***	.79***	.80***	.86***	--	
18.	T2 MNMR	.59***	-.17*	-.58***	.65***	-.14†	-.63***	.43***	.49***	.65***	.77***	.79***	.78***	.83***	.95***	.93***	.95***	.94***	--

Notes.

□ *** $p < .001$ ** $p < .01$ * $p < .05$ † $p < .10$

mindfulness and only general and total state emotion regulation pre- and post-test. State avoidant attachment was significantly negatively associated with each measure of state mindfulness and each measure of state emotion regulation pre- and post-test. Interestingly, those with avoidant insecure attachment showed more consistent and stronger negative association with state mindfulness and state emotion regulation when compared to those with state anxious attachment. When comparing measures of state mindfulness, it was found that the MAAS-State was less correlated to state attachment security when compared to the FFMQ-State at both time points.

Manipulation Check

A manipulation check was done for experimental (n = 103*)* and control (n = 102) participants to measure the effect of the attachment security prime on the experimental group and the placebo task on the control group. The attachment security prime significantly increased attachment security by condition (b = 3.007, SE = .808, t(202) = 3.72, p = <.0003).

The Attachment Security Prime's Effect on Mindfulness

The total effect of the attachment security prime on mindfulness was tested controlling for baseline values of state mindfulness (Figure 2). Contrary to hypotheses, compared to control, the attachment security prime in the experimental group resulted in a *decrease* in state mindfulness via the MAAS (b =-.268, SE = .130, t(202) = -2.06, p = .041). When examining changes in the FFMQ-state (Figure 3), results were not significant, but were in the expected direction (b = 1.307, SE = .742, t(202) = 1.76, p = .080). Evaluating effects on the subscales of the FFMQ-state revealed that the observe, non-judge, non-react, and awareness subscales were not different by condition. However, the describe subscale did significantly increase as a result of the attachment security prime (b = .602, SE = .262, t(202) = 2.30, p = .023).

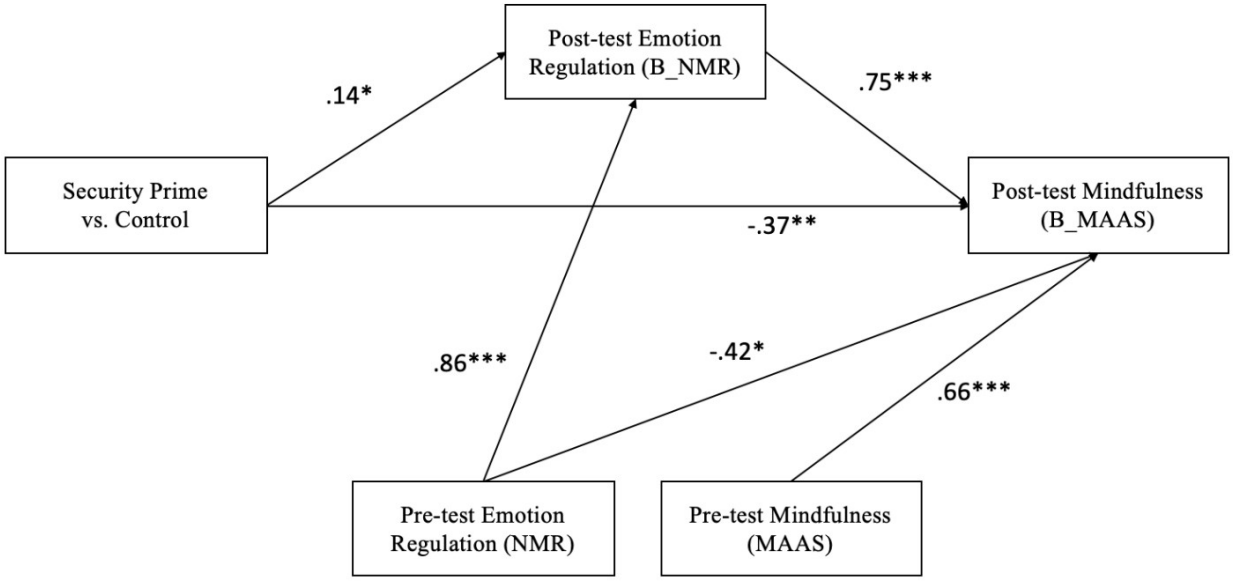

Figure 2. Statistical mediation model with MAAS-state.

Notes.

- Unstandardized b coefficients are used
- The indirect effect is (*b* = .109, *SE* = .056, 95% CI[.0166, .2315])

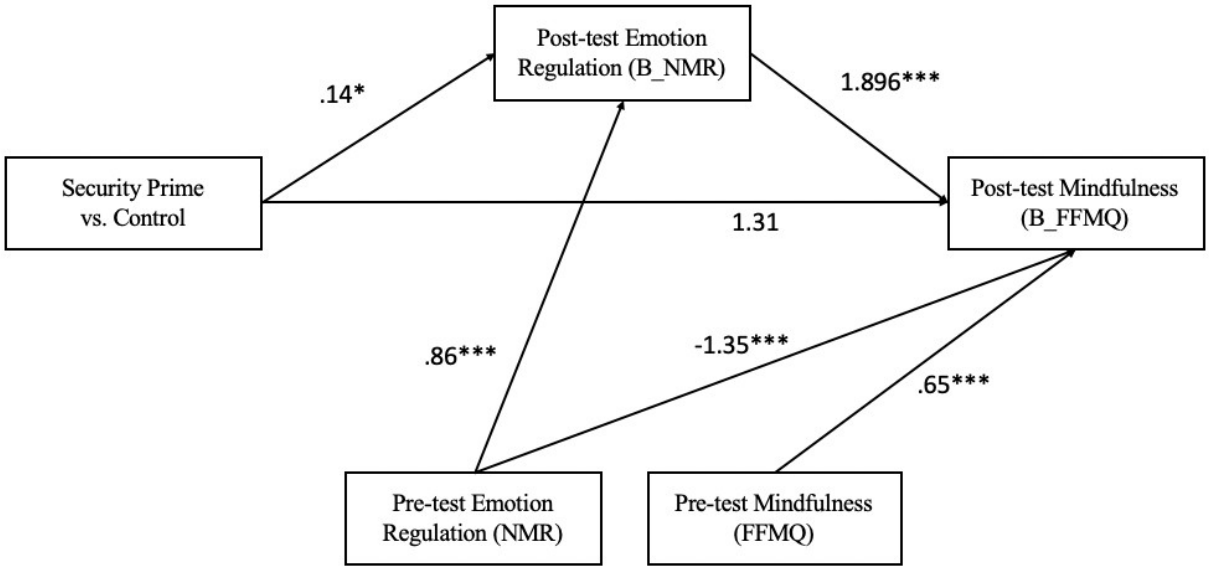

Figure 3. Statistical mediation model with FFMQ-state.

Notes.

- Unstandardized b coefficients are used
- The indirect effect is (b = .836, SE = .429, 95% CI[.1069, 1.756]

Mediation by Emotion Regulation

The attachment security prime's effect on emotion regulation was also tested controlling for baseline values of state emotion regulation. The attachment security prime resulted in a significant increase in state emotion regulation, as measured by the MNMR scale (b = .141, SE = .055, t(202) = 2.55, p = .012). When examining the sub-scales, it was found that the general state emotion regulation did not increase (p =.305), while the cognitive subscale (b = .181, SE = .069, t(202)= 2.61, p = .010) and behavioral subscale (b = .180, SE = .059, t(202) = 3.02, p = .003) did.

When examining the effect of emotion regulation on mindfulness controlling for baseline values of state emotion regulation and state mindfulness (Figure 2), increases in state emotion regulation significantly predicted increases in state mindfulness as measured by the MAAS-state (b = .250, SE = .052, t(202) = 4.80, p < .001). This was true for the general emotion state regulation subscale (b = .665, SE = .141, t(202) = 4.73, p < .001), the cognitive subscale (b = .430, SE = .131, t(202) = 3.29, p = .001) and the behavioral subscale (b = .693, SE = .147, t(202) = 4.74, p < .001).

When examining the FFMQ-state as the measure of state mindfulness (Figure 3), changes in state emotion regulation significantly predicted increases in state mindfulness (b = 1.90, SE = .291, t(202)= 6.52, p <.001). This also held true for the general emotion state regulation subscale (b = 4.26, SE = .291, t(202) = 5.22, p < .001), the cognitive subscale (b = 3.94, SE = .72, t(202) = 5.46, p < .001) and the behavioral subscale (b = 5.09, SE = .819, t(202) = 6.22, p < .001).

Mediation analyses were carried out to test the indirect effect of increased attachment security on mindfulness controlling for baseline values of state emotion

regulation and state mindfulness. Analyses on changes in MAAS mindfulness scores revealed a significant indirect effect of the state attachment security prime on *decreased* state mindfulness via state increased state emotion regulation (b = .109, SE = .056, 95% CI[.0166, .2315]. The direct effect indicated that the attachment security prime predicted decreases in state mindfulness (b = -.3861, SE = .1250, t(202) = -3.08, p = .002). When looking at the subscales of state emotion regulation, this relationship held true for the cognitive subscale (b = .0793, SE = .0478, 95% CI[.0041, .1863) and the behavioral subscale (b = .1329, SE = .0576, 95% CI[.0333, .2568), but not for the general subscale (b = .0466, SE = .0454, 95% CI[-.0291, .1486).

Analyses on changes in FFMQ-state scores supported hypotheses and revealed a significant indirect effect of the state attachment security prime on increased state mindfulness via increased state emotion regulation (b = .836, SE = .429, 95% CI[.1069, 1.756]). The direct effect was not significant, but was in the expected direction (b = .4600, SE = .6901, t(202) = .666, p = .5058). When looking at the subscales of state emotion regulation, this relationship held true for the cognitive subscale (b = .733, SE = .388, 95% CI[.1057, 1.603) and the behavioral subscale (b = .954, SE = .456, 95% CI[.1836, 1.963), but not for the general subscale (b = .312, SE = .310, 95% CI[-.1604, 1.037).

Discussion

Recently, research examining the cross-sectional relationship between attachment security and mindfulness have increased rapidly (Stevenson et al., 2017). Current literature in the field examining the causal relationship between state attachment security and state mindfulness consists of incomplete and seemingly contradictory results (Melen et al., 2016; Pepping et al., 2015). In a two-part study, it was found that priming state

attachment security did not result in increases in state mindfulness and that priming state mindfulness did not result in increases in state attachment security. However indirect effects were not examined (Pepping et al., 2015). More recent research has found that priming state attachment anxiety predicts decreases in state mindfulness, via increases in state emotion regulation (Melen et al., 2016). The present study attempts to add clarity to Pepping and colleagues' (2015) study, with the addition of emotion regulation, which has previously been shown to be a mediator in the relationship between attachment anxiety and mindfulness (Melen et al., 2016; Pepping et al., 2013).

Findings support the hypothesis that priming security attachment would lead to increased state mindfulness. Priming attachment security led to increases in state mindfulness as measured by the FFMQ-state (albeit non-significantly). However, when using the MAAS-state as the measure for state mindfulness, this hypothesis was not supported, priming attachment security led to significant decreases in state mindfulness.

The results from mediation analyses using the FFMQ-state suggest that increased attachment security leads to increased mindfulness via increased emotion regulation, supporting hypotheses. While the mediation analysis utilizing the MAAS-state also found a significant positive indirect effect, supporting hypotheses, when interpreting the results, the significant negative direct effect also needs to be considered. This suggests that the part of state attachment security that is not contributing to increased emotion regulation is making participants less mindful.

In summary, the primary measure of state mindfulness used in this study was the MAAS-state, for its reliability as a measure of trait mindfulness (the original MAAS), and its use in two previous studies examining the causal relationship between state attachment security and state mindfulness. Despite its history, the MAAS-state in the

present study has yielded results contrary to expectations, possibly misrepresenting the data. The alternative measure created for this study, the FFMQ-state, displayed a relationship more in line with current literature in the field, suggesting that priming attachment security state emotion regulation is a mediator of the positive relationship between state attachment security and state mindfulness.

Implications, Limitations and Future Directions

The present and the two previous studies (Melen et al., 2016; Pepping et al., 2015) examining the relationship between state attachment and state mindfulness, utilized the MASS-state as their primary measure of state mindfulness. Interestingly, two of the three studies that have examined this relationship using an attachment security prime (the present and Pepping et al., 2015), rather than examining this relationship by use of an attachment anxiety prime (Melen et al., 2016), did not find a significant increase in state mindfulness as measured by the MAAS-state. When considering that an alternative scale (the FFMQ-state) in the present study yielded results in line with existing research, perhaps the MAAS-state is not a suitable as a measure of mindfulness following attachment *security* primes. Future research should consider testing this scale with different types of security primes, looking for uniformity in results.

Since this is the first use of a faceted state mindfulness measure, not much is known about how the specific "describe" aspect of mindfulness behaves in this association. Future studies should consider implementing the FFMQ-state, not only to confirm or refute these results, but to ensure that non-significant results only using complete scale, when looking at the total effect, are not overlooked. Adopting this type of measure to this line of research using state variables is important in order to consider

results in the context of the mass of cross-sectional data already available using this faceted conceptualization (Stevenson et al. 2017). This will also be important for studies using the MAAS-state, where an additional measure of state mindfulness may serve as a check to ensure the data is not misrepresented.

It should also be kept in mind that state variables were used out of necessity to examine this relationship using an experimental design. While these variables do correlate highly with dispositional measures, they are still a proxy for studying the relationship of interest. As such, the results of this study cannot be directly generalized to the dispositional measures of interest. Longitudinal designs using dispositional measures are still needed.

It is possible that the present study was limited by the data collection method. While previous research has suggested that Amazon's Mechanical Turk data is of sufficient psychometric quality and more representative than data gained from some traditionally used methods (e.g., collection at college campuses) (Burhmester et al., 2011) it is possible this method posed some issues in the present study. It appeared many of the Mechanical Turk "workers" use the platform as a primary or secondary income in this study, based on high activity level on the platform, fast completion times and the manner of exchanges over email. While work status data was collected, this measure did not capture whether or not the Mechanical Turk workers considered their time on the platform as working, and if so, what percentage of their time working can be attributed to time on Mechanical Turk or an unrelated job. It possible that (and based on the present study seems likely) these workers try to complete tasks as quickly and efficiently as possible in order increase their hourly wages. While this may not be an overriding confound for some study designs, it may have been a factor in this study which required participants to take their time (see Appendix B1). This begs

the question of whether or not the task was having the intended effects, especially considering that 30 completion times were below 15 minutes, nearly half the estimated completion time (27 minutes). Future studies should consider alternative designs or implementation strategies to ensure proper completion of these types of tasks, such as utilizing a time or word minimum on tasks that may be vulnerable to being rushed.

Conclusion

Results suggest that state emotion regulation is a mediator of the relationship between state attachment and state mindfulness. However, whether the outcome of the total efffect is a decrease or increase of state mindfulness depends upon the measure used. Possible issues with the current methods of studying state attachment security and state mindfulness have been brought to light, along with suggestions for improving this line of research. The present study provides new information to be considered in the context of existing literature, while also informing future studies in this developing line of research examining the casual relationship between state attachment security and state mindfulness.

List of References

Abbate-Daga, G., Gramaglia, C., Amianto, F., Marzola, E., & Fassino, S. (2010). Attachment insecurity, personality, and body dissatisfaction in eating disorders. *The Jounral of Nervous and Mental Disease, 198*(7), 520-524. doi:10.1097/NMD.0b013e3181e4c6f7

Arch, J. J., & Craske, M. G. (2006). Mechanisms of mindfulness: Emotion regulation following a focused breathing induction. *Behaviour Research and Therapy, 44*(12), 1849-1858. doi:10.1016/j.brat.2005.12.007

Baer, Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27-45. doi:10.1177/1073191105283504

Baer, R. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science & Practice, 10*(2), 125-143.

Baer, R. A. (Ed.). (2006). Mindfulness-based treatment approaches: Clinician's guide to evidence base and applications. San Diego, CA, US: Elsevier Academic Press.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D. & Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329–342. doi:10.1177/1073191107313003

Bartz, J. A., & Lydon, J. E. (2004). Close relationships and the working self-concept: Implicit and explicit effects of priming attachment on agency and communion. *Personality and Social Psychology Bulletin, 30*(11), 1389-401.

Brogaard, Berit. (2015) Attachment styles can't change, can they? *Psychology Today.* Retrieved from https://www.psychologytoday.com/us/blog/the-mysteries-love/201502/attachment-styles-cant-change-can-they

Bowlby, J. (1982). Attachment and loss: Retrospect and prospect. *American Jounral of Orthopsychiatry, 52*(4), 664-678. doi:10.1111/j.1939-0025.1982.tb01456.x

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and Its role in psychological well-being. *The Jounral of Personality and Social Psychology*, *84* (4), 822-48.

Brown, K. W., Weinstein, N., & Creswell, J. D. (2012). Trait mindfulness modulates neuroendocrine and affective responses to social evaluative threat. *Psychoneuroendocrinology, 37*(12), 2037-2041. doi:10.1016/j.psyneuen.2012.04.003

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's mechanical turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science, 6*(1), 3-5. doi:10.1177/1745691610393980

Caldwell, J. G., & Shaver, P. R. (2013). Mediators of the link between adult attachment and mindfulness. *Interpersona: An International Journal on Personal Relationships, 7*(2), 299–310. doi: 10.5964/ijpr.v7i2.133

Cameranesi, M. (2016). Battering typologies, attachment insecurity, and personality disorders: A comprehensive literature review. *Aggression and Violent Behavior, 28*, 29-46. doi:10.1016/j.avb.2016.03.005

Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a

mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31*(1), 23-33. doi:10.1007/s10865-007-9130-7

Catanzaro, S., & Mearns, J. (1990). Measuring generalized expectancies for negative mood regulation: initial scale development and implications. *54*(3-4), 546-63. doi:10.1080/00223891.1990.9674019

Farb, N. A., Anderson, A. K., Mayberg, H., Bean, J., McKeon, D., & Segal, Z. V. (2010). Minding one's emotions: Mindfulness training alters the neural expression of sadness. *Emotion, 10*(1), 25-33. doi:10.1037/a0017151

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J.-P. (2007). Mindfulness and emotion regulation: The development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment, 29*(3), 177-190. doi:10.1007/s10862-006-9035-8

Gillath, O., Hart, J., Noftle, E. E., & Stockdale, G. D. (2009). Development and validation of a state adult attachment measure (SAAM). *Jounral of Research in Personality, 43*(3), 262-373. doi:10.1016/j.jrp.2008.12.009

Gillath, O., & Karantzas, G. (2019). Attachment security priming: A systematic review. *Current Opinion in Psychology, 25*, 86-95. doi:10.1016/j.copsyc.2018.03.001

Goldberg, S. B., Tucker, R. P., Greene, P. A., Davidson, R. J., Wampold, B. E., Kearney, D. J., & Simpson, T. L. (2018). Mindfulness-based interventions for psychiatric disorders: A systematic review and meta-analysis. *Clinical Psychology Review, 59*, 52-60. doi:10.1016/j.cpr.2017.10.011

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

Gu, J., Strauss, C., Crane, C., Barnhofer, T., Karl, A., Cavanagh, K., & Kuyken, W.

(2016). Examining the factor structure of the 39-item and 15-item versions of the five-facet mindfulness questionnaire before and after mindfulness-based cognitive therapy for people with recurrent depression**.** *Psychological Assessment, 28*(7), 791-802. doi:10.1037/pas0000263

Hayes, A. F. (2013). *Methodology in the social sciences. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* New York, NY, US: Guilford Press.

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 52*(3), 511-524.

Kabat-Zinn, J. (1994). What is mindfulness? (1st ed.), *Wherever you go, there you are: Mindfulness meditation in everyday life* (p. 14). New York City, New York, US: Hachette Books

Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review, 31*(6), 1041-1056. doi:10.1016/j.cpr.2011.04.006

Kvitkovičová, L., Umemura, T., & Macek, P. (2017). Roles of attachment relationships in emerging adults' career decision-making process: A two-year longitudinal research design. *Journal of Vocational Behavior, 101*, 119-132. doi: 10.1016/j.jvb.2017.05.006

Ma, Y. (2008). Attachment security, mindfulness, and psychotherapy: Testing a mediational model. University of Maryland, College Park, Maryland, US.

Macaulay, C., Watt, M., MacLean, K., & Weaver, A. (2015). Mindfulness mediates associations between attachment and anxiety sensitivity. *Mindfulness, 6*(6), 1263-1270.

Manning, R. P. C., Dickson, J. M., Palmier-Claus, J., Cunliffe, A., & Taylor, P. J. (2017). A systematic review of adult attachment and social anxiety. *Journal of Affective Disorders, 15*(211), 44-59. doi:10.1016/j.jad.2016.12.020

Melen, S., Pepping, C. A., & O'Donovan, A. (2017). Social foundations of mindfulness: Priming attachment anxiety reduces emotion regulation and mindful attention. *Mindfulness, 8*(1), 136-143. doi:10.1007/s12671-016-0587-8

Mikulincer, M., Hirschberger, G., Nachmias, O., & Gillath, O. (2001). The affective component of the secure base schema: Affective priming with representations of attachment security. *Jounral of Personality and Social Psychology, 81*(2), 305-321.

Mikulincer, M., & Shaver, P. R. (2001). Attachment theory and intergroup bias: Evidence that priming the secure base schema attenuates negative reactions to out-groups. *Journal of Personality and Social Psychology, 81*(1), 97-115. doi: 10.1037/0022-3514.81.1.97

Mikulincer, M., & Shaver, P. R. (2010). *Attachment in adulthood: Structure, dynamics, and change*. New York CIty, New York, US: The Guilford Press.

Mikulincer, M., & Shaver, P. R. (2016). *Attachment in adulthood, second edition: Structure, dynamics, and change*. New York CIty, New York, US: The Guilford Press.

Mikulincer, M., Shaver, P. R., Gillath, O., & Nitzberg, R. A. (2005). Attachment, caregiving, and altruism: Boosting attachment security increases compassion and helping. *Jounrnal of Personality Social Psychology, 89*(5), 817-839. doi:10.1037/0022-3514.89.5.817

Pepping, C. A., Davis, P. J., & O'Donovan, A. (2013). Individual differences in attachment and dispositional mindfulness: The mediating role of emotion regulation. *Personality and Individual Differences, 54*(3), 453-456. doi: 10.1016/j.paid.2012.10.006

Pepping, C. A., Davis, P. J., & O'Donovan, A. (2015). The association between state attachment security and state mindfulness. *PLoS ONE, 10*(3). Article ID e0116779.

Rowe, A. C., Shepstone, L., Carnelley, K. B., Cavanagh, K., & Millings, A. (2016). Attachment security and self-compassion priming increase the likelihood that first-time engagers in mindfulness meditation will continue with mindfulness training. *Mindfulness, 7*(3), 642-650. doi:10.1007/s12671-016-0499-7

Ryan, R. M., Brown, K. W., & Creswell, J. D. (2007). How integrative is attachment theory? Unpacking the meaning and significance of felt security. *Psychological Inquiry, 18*(3), 177-182. doi:10.1080/10478400701512778

Shaver, P. R., Lavy, S., Saron, C. D., & Mikulincer, M. (2007). Social foundations of the capacity for mindfulness: An attachment perspective. *Psychological Inquiry, 18*(4), 264-271.

Shaver, P. R., & Mikulincer, M. (2007). Adult Attachment Strategies and the Regulation of Emotion. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 446-465). New York CIty, New York, US: The Guilford Press.

Stevenson, J. C., Emerson, L. M., & Millings, A. (2017). The relationship between adult attachment orientation and mindfulness: A systematic review and meta-analysis. *Mindfulness, 8*(6), 1438-1455. doi:10.1007/s12671-017-0733-y

Tomlinson, E. R., Yousaf, O., Vitterso, A. D., & Jones, L. (2018). Dispositional mindfulness and psychological health: A systematic review. *Mindfulness, 9*(1), 23-43. doi:10.1007/s12671-017-0762-6

Troyer, D., & Greitemeyer, T. (2018). The impact of attachment orientations on empathy in adults: Considering the mediating role of emotion regulation strategies and negative affectivity. *Personality and Individual Differences, 122*(1), 198-205. doi: 10.1016/j.paid.2017.10.033

Weinstein, N., Brown, K. W., & Ryan, R. M. (2009). A multi-method examination of the effects of mindfulness on stress attribution, coping, and emotional well-being. *Journal of Research in Personality, 43*(3), 374-385. doi: 10.1016/j.jrp.2008.12.008

Wetlesen, J. (2002). Did Santideva Destroy the Bodhisattva Path? *Journal of Buddhist Ethics*, *9*, 34-88.

Appendices

Appendix A1: Demographics

Please read each question carefully and select the most accurate response.

1. Are you at least 18 years of age?
    a. Yes
    b. No
2. What is your current gender identity?
    a. Female
    b. Male
    c. Transgender female
    d. Transgender male
    e. Gender queer/gender non-conforming
    f. Other identity- please state _
3. Which is the following best describing your current relationship status?
    a. Married
    b. Engaged
    c. In a serious relationship
    d. In a causal relationship
    e. Not in a relationship
4. Which of the following best describes your Race?
    a. White/ Caucasian
    b. Black/ African American
    c. Asian
    d. Hispanic
    e. Native Hawaiian/ Pacific islander
    f. Other – please specify_
5. Please indicate your ethnicity
    a. Hispanic
    b. Non-Hispanic
6. What is your work status?
    a. Over full time
    b. Full time
    c. Part time
    d. Unemployed
7. Are you a student ?
    a. Full time
    b. Part time and working
    c. Part time
    d. No
8. What best describes your socio-economic status now?

   a. Poor/ low
   b. Working class
   c. Middle class
   d. Upper class
9. Which of the following best represents your experience with meditation?
   a. I have never meditated
   b. I rarely meditate
   c. I regularly meditate
10. Do you regularly practice yoga, Tai-chi, or any similar activity?
   a. No
   b. Yes (please specify) _
11. Do you have any psychological disorders?
   a. No
   b. Yes (please specify)_

Appendix A2: Modified Negative Mood Regulation Scale (NMR)

Please respond by indicating 1-5 your agreement with each statement

(1) Strong agreement (2) *Agreement* (3) *Neither agree nor disagree* (4) *Disagree* (5) *Strong disagreement*

1. At this particular moment I believe that I can find a way to cheer myself up.
2. At this particular moment I believe that I can do something to feel better.
3. At this particular moment I believe that wallowing in it is all I can do. (n)
4. At this particular moment I believe that I'll feel ok if I think about more pleasant times.
5. At this particular moment I believe that being with other people will be a drag. (n)
6. At this particular moment I believe that I can feel better by treating myself to something I like.
7. At this particular moment I believe that I can feel better when I understand why I feel bad.
8. At this particular moment I believe that I won't be able to get myself to do anything about it. (n)
9. At this particular moment I believe that I won't feel much better by trying to find some good in the situation.
10. At this particular moment I believe that it won't be long before I can calm myself down.
11. At this particular moment I believe that it will be hard to find someone who really understands. (n)
12. At this particular moment I believe that telling myself it will pass will help me calm down.
13. At this particular moment I believe that doing something nice for someone else will cheer me up.
14. At this particular moment I believe that I'll end up feeling really depressed. (n)
15. At this particular moment I believe that planning how I'll deal with things will help.
16. At this particular moment I believe that I can forget about what's upsetting me pretty easily.
17. At this particular moment I believe that catching up with my work will help me calm down.
18. At this particular moment I believe that the advice friends give me won't help me feel better. (n)
19. At this particular moment I believe that I won't be able to enjoy the things I usually enjoy. (n)
20. At this particular moment I believe that I can find a way to relax.
21. At this particular moment I believe that trying to work the problem out in my head will only make it seem worse. (n)
22. At this particular moment I believe that seeing a movie won't help me feel better. (n)
23. At this particular moment I believe that going out to dinner with friends will help.
24. At this particular moment I believe that I'll be upset for a long time. (n)

25. At this particular moment I believe that I won't be able to put it out of my mind. (n)
26. At this particular moment I believe that I can feel better by doing something creative.
27. At this particular moment I believe that I'll start to feel really down about myself. (n)
28. At this particular moment I believe that thinking that things will eventually be better won't help me feel any better. (n)
29. At this particular moment I believe that I can find some humor in the situation and feel better.
30. At this particular moment I believe that if I'm with a group of people, I'll feel "alone in a crowd." (n)

Notes.

- Higher scores = higher mood regulation difficulties.
- Negative items are denoted by (n); scoring is reversed prior to computation of statistics.
- General items are 1,2,3,8,10,14,19,20,24 and 27. Cognitive items are 4,7,9,12,15,16,21,25,28 and 29. Behavioral items are 5,6,11,13,17,18,22,23,26 and 30.
- Survey will be administered via Qualtrics with the title omitted

Appendix A3: Mindfulness Attention Awareness Scale– State (MAAS-State)

To what degree were you having these experiences on the previous task?

Please indicate your response 0-6

(0) Not at all (1) *Very low* (2) *Moderately low (*3) *Moderately* (4) *Moderately high* (5) *High (*6) *Very high*

1. I found it difficult to stay focused on what was happening in the present.
2. I rushed through the task without being really attentive to it.
3. I did the tasks automatically, without being aware of what I was doing.
4. I found myself preoccupied with the future or the past.
5. I found myself doing things without paying attention.

Notes.

- All items are reversed scored, then averaged
- Higher scores reflect higher state mindfulness
- Survey will be administered via Qualtrics with the title omitted

Appendix A4: State Adult Attachment Measure (SAAM)

Please indicate 1-7 your agreement with the following statements based on how you are feeling in the present moment.

(1) *Strongly disagree* (2) *Disagree* (3) *Slightly disagree* (4) *Neutral* (5) *Slightly agree* (6) *Agree* (7) *Strongly agree*

1. I feel loved.
2. I feel like I have someone to rely on.
3. I feel secure and close to other people.
4. If something went wrong right now I feel like I could depend on someone.
5. I feel like others care about me.
6. I feel relaxed knowing that close others are there for me right now.
7. I feel I can trust the people who are close to me.
8. I feel a strong need to be unconditionally loved right now.
9. I really need to feel loved right now.
10. I want to share my feelings with someone.
11. I want to talk with someone who cares for me about things that are worrying me.
12. I wish someone close could see me now.
13. I wish someone would tell me they really love me.
14. I really need someone's emotional support.
15. If someone tried to get close to me, I would try to keep my distance.
16. The idea of being emotionally close to someone makes me nervous.
17. I'm afraid someone will want to get too close to me.
18. I feel alone and yet don't feel like getting close to others.
19. I have mixed feelings about being close to other people.
20. I would be uncomfortable having a good friend or a relationship partner close to me.
21. I feel like I am loved by others, but I really don't care.

Notes:

- Items 1-7 measure security, items 8-14 measure anxiety and items 15-21 measure avoidance
- Survey will be administered via Qualtrics, with the items randomized.

Appendix A5: Five facets Mindfulness Questionnaire 15 – State (FFMQ-State)

Please indicate your answer below in a way that represents your own opinion not what is generally true for true for you, but for what is true for you at the **present moment or on the previous task** (based on the directions).

1	2	3	4	5
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree

1. During the previous task I noticed changes in my body, such as whether my breathing slows down or speeds up.
2. At the present moment, I feel as though it would be easy to describe my feelings.
3. At the present moment, I find that I am able to stay focused on what I am doing, without daydreaming, worrying or getting distracted.
4. During the previous task, I found myself overanalyzing my thoughts and questioning why I think that way
5. During the previous task, I found myself being overtaken by certain thoughts, unable to take a step back and think clearly.
6. During the previous task, I paid attention to whether my muscles were tense or relaxed.
7. At the present moment, I would have trouble thinking of the right words to express how I feel about things.
8. During the previous task, at times I would say that I wasn't completely aware of what I was doing, running on auto-pilot
9. During the previous task, I recall feeling uneasy about having certain feelings or emotions
10. At the present moment, if a distressing thought were to pop into my head, I would be able to notice it without reacting
11. During the previous task, I paid attention to sounds, such as clocks ticking, birds chirping, or cars passing.
12. At the present moment, I think it would be easy to put how I feel into words, even if I suddenly received unpleasant news
13. During the previous task, at times, I found it hard to maintain my attention on task and found myself thinking about unrelated things
14. At the present moment, I am fine with the way I'm feeling, whether it is good or bad
15. At the present moment, if a distressing thought or image were to enter my head, I think I would be able just to notice it and let it go

Notes:

- Observing items: 1, 6, 11
- Describe items: 2, 7R, 12
- Acting with awareness items: 3, 8R, 13R
- Non-judging items: 4R, 9R, 14
- Non-reactivity items: 5R, 10, 15

- Reverse scored – 4, 5, 7. 8. 9, 13
- Refer to the background information regarding recommendations for omitting the observing subscale score from comparisons of total scale/subscale scores before and after mindfulness interventions.
- Some researchers divide the total in each category by the number of items in that category to get an average category score. The Total FFMQ can be divided by 39 to get an average item score.

Appendix B1: **Attachment Security Prime (Experimental Condition)**

Please spend a few minutes on each of the following tasks –

Please think about a relationship you have had in which you have found that it was relatively easy to get close to the other person and you felt comfortable depending on the other person. In this relationship you didn't often worry about being abandoned by the other person and you didn't worry about the other person getting too close to you.

Now, take a moment and try to get a visual image in your mind of this person. What does this person look like? What is it like being with this person? You may want to remember a time you were actually with this person. What would he or she say to you? What would you say in
return? How do you feel when you are with this person? How would you feel if they were here with you now?

Please write a sentence or two below describing your thoughts and feelings toward your chosen person.

Appendix B2: Placebo Visualization Task (Control Condition)

Please spend a few minutes on each of the following tasks –

"Imagine yourself going to a grocery store and buying products you need for your house, and imagine other persons who are also buying products, talking among themselves about daily issues, examining new brands, and comparing different products."

Please write a sentence or two below describing your thoughts and feelings toward your chosen person.