Are mindful people less aggressive? The role of emotion regulation in the relations between mindfulness and aggression

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Are mindful people less aggressive? The role of emotion regulation in the relations between mindfulness and aggression

by

El-Lim Kim

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Psychology

Program of Study Committee:
Craig A. Anderson, Co-major Professor
Douglas A. Gentile, Co-major Professor
Brooke J. Arterberry

The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this thesis. The Graduate College will ensure this thesis is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University
Ames, Iowa
2021
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Mindfulness has shown a promising effect on reducing aggression in both clinical and non-clinical populations, possibly because mindfulness can improve emotion regulation. There is no theoretical model, however, that explains the specific mechanisms by which mindfulness might reduce aggression via better emotion regulation functioning. A comprehensive model that explains the mindfulness-aggression link is required to evaluate the effectiveness of mindfulness on reducing aggression. Thus, the present study examined the association between mindfulness and aggression with a focus on the mediating effect of different emotion regulation strategies. University and community samples of U.S. adults completed questionnaires on mindfulness, emotion regulation strategies, and aggression. Results indicate that mindfulness was associated with less use of maladaptive emotion regulation strategies (e.g., rumination, expressive suppression), which mediated the relationship between mindfulness and aggression. Mindfulness was not related to increased use of adaptive emotion regulation strategies (e.g., reflection, cognitive reappraisal). The nonjudging of experience facet of mindfulness predicted lower aggression through rumination and expressive suppression, such that highly nonjudging people were less likely to engage in rumination and expressive suppression and reported lower levels of aggression. In contrast, people high on observing facet reported more verbal aggression, anger, and hostility than those who are lower on this facet; these relations were mediated by the use of more rumination and expressive suppression.
CHAPTER 1. INTRODUCTION

Mindfulness is defined as the mental state whereby one brings his or her attention to the current experiences (e.g., thoughts and feelings) in a nonjudgmental and accepting manner (Brown & Ryan, 2003). Mindful people are more willing to accept negative emotions and experiences without reacting strongly to them than are less mindful people (Arch & Craske, 2006). There are many known benefits to mindfulness. For example, mindfulness is positively associated with greater life satisfaction, positive mood, and lower perceived stress (Brown & Ryan, 2003; Shapiro et al., 2008). Mindfulness is negatively related to neuroticism and psychological symptoms such as anxiety and depression (Baer et al., 2006; Ramel et al., 2004).

Other than improved psychological well-being (Harrington et al., 2014), it has been proposed that mindful people are less reactive or defensive upon provocation (Heppner et al., 2008) because they are able to perceive negative emotions and experiences with equanimity. Indeed, preliminary evidence from earlier studies shows that mindfulness was associated with lower aggression (Borders et al., 2010). Furthermore, with the assumption that mindfulness could be trained and developed through meditation practices, there are currently many available mindfulness-based intervention programs that aim to reduce aggression in various populations, such as Soles of the Feet meditation (e.g., Roberts et al., 2020) and Anapanasati meditation (e.g., Sivaramappa et al., 2019).

Although mindfulness-based interventions are now considered one of the useful psychological interventions for decreasing aggressive tendencies and behaviors (Denson, 2015), the mechanisms through which mindfulness reduces aggression are still in need of investigation. It is not clear, for example, which sub-trait of mindfulness is most strongly associated with aggression measures. This is an important question because of the so-called “dark side of mindfulness,” where mindfulness moderates the relationship between
psychopathy and aggressive behaviors (Velotti et al., 2016; Velotti et al., 2019), such that the link between psychopathy and aggressive and anti-social behaviors is stronger at higher levels of dispositional mindfulness. This suggests that certain sub-trait(s) of mindfulness may be positively associated with aggression, or that the relation may be curvilinear.

Moreover, past studies have demonstrated that mindfulness predicted lower aggression via emotion regulation, such as less use of rumination, which is considered a maladaptive emotion regulation strategy (Borders et al., 2010). Other common emotion regulation strategies such as reflection, cognitive reappraisal, and expressive suppression have not been widely studied in the context of the mindfulness-aggression link.

Understanding the specific mechanisms through which mindfulness reduces aggression is important in developing and validating mindfulness-based interventions. Therefore, the goal of the present study is to explore the role of four common emotion regulation strategies (rumination, reflection, cognitive reappraisal, and expressive suppression) in the relations between different sub-trait of mindfulness (e.g., observing, describing, nonjudging, nonreactivity, and acting with awareness) on aggression.

**Mindfulness and Aggression**

Mindfulness is a mental state in which the individual can notice and observe the events and emotions associated with the present moment with equanimity. Specifically, Baer and her colleagues (2006) identified five different facets of mindfulness: (1) Nonreactivity, or being able to perceive the inner experience without reacting to it. People who are high on nonreactivity can take a step back from the current experience, as they are not overwhelmed or consumed by the thoughts and feelings. (2) Observing, or the ability to notice and attend to sensations, perceptions, thoughts, and feelings. It could involve being able to perceive bodily sensation (e.g., tensed up muscles) or awareness of the internal process (e.g., feeling sad). (3) Acting with awareness, or acting with deliberate thoughts and concentration so that one is not
mind-wandering. A person who does not act with awareness is likely to become an “auto-
pilot” where he or she acts without paying attention to what is happening in the environment
in the present moment – it could be reminiscing about a past event, or daydreaming about
what may happen in the future. (4) Describing, or the capability to verbally label the inner
experience. An individual good at describing is someone who can readily find words to report
how he or she is feeling at the moment. Alternatively, those who are not good at describing
would often have difficulty finding the right words to describe what they are experiencing.
(5) Nonjudging of experience, or the tendency not to evaluate certain feelings as good or bad.
People who are high on this trait do not criticize or reject themselves for what they are
experiencing; instead, they allow every process of inner experience without judging right or
wrong.

One main goal of mindfulness meditation is to increase compassionate behaviors such
as helping others (Condon et al., 2013). Mindfulness is associated with a lower level of
aggression, such as decreased physical aggression, verbal aggression, anger, and hostility
(Borders et al., 2010; Fresnics & Borders, 2016; Heppner et al., 2008). For example, in an
intervention study, a group of high school students was randomly assigned to either a
mindfulness-based intervention group where they practiced mindfulness skills for 10 weeks
or a waitlist control group. After completing the intervention, the researchers found that those
in the intervention group had a significant reduction in their self-reported impulsivity and
trait aggression, measured by physical aggression, verbal aggression, anger, and hostility
(Franco et al., 2016). Similar patterns were observed among primary school students, where
those who participated in mindfulness-based intervention later had reduced teacher-reported
aggression (Suárez-García et al., 2020).

Mindfulness decreases aggression among adults as well. In an experimental study,
undergraduate participants were randomly divided into one of two groups. In the mindfulness
group, the participants practiced mindfulness every day for three weeks. The participants in
the control group did other cognitive training tasks (e.g., solving logic problems). After three
weeks of training, participants were invited to the lab and were provoked with offensive
feedback on their in-lab task performance. They were then given a chance to retaliate against
the feedback provider by giving him or her a sample of spicy sauce, knowing that the
provider has a strong disinclination to spiciness. Participants in the mindfulness condition
provided a significantly less hot sauce than those in the control group, indicating that
mindfulness intervention contributed to reducing aggression (DeSteno et al., 2017). In
another study, participants were first asked to perform a highly demanding task that required
a great amount of self-control (e.g., ego depletion induction). Later, the ego-depleted
participants who practiced mindfulness behaved less aggressively than those who did not
practice mindfulness when there was either no provocation or when there was moderate
amount of provocation (Yusainy & Lawrence, 2015). In a similar vein, people with a lower
level of dispositional mindfulness were more likely to report using physical aggression
toward their romantic partners (Brem et al., 2015; Ngo et al., 2018).

Furthermore, mindfulness is associated with lower anger and hostility (Brown &
Ryan, 2003; Wright et al., 2009). It has been argued that mindfulness helps reduce anger-
related responses (Beames et al., 2019). For instance, those who reported higher state
mindfulness during a conflict discussion were less likely to show verbal aggression and anger
(Barnes et al., 2007). Mindfulness interventions effectively reduced anger during driving
(Deffenbacher, 2016) and aggressive driving behaviors (Stephens et al., 2018). Finally, after
practicing mindfulness-based meditation for six months, the participants reported a
significant reduction in verbal aggression compared to the control group (Sivaramamappa et al.,
2019).

Although there is a large body of research showing that mindfulness, in general,
reduces aggression in various forms (e.g., physical vs. verbal aggression), these studies often did not distinguish between proactive and reactive aggression. Proactive aggression is planned and goal-directed aggression where the person uses aggression as a means to obtain his or her goal. In contrast, reactive aggression is often a defensive and action-triggered form of aggression where the person reacts to the actual or perceived threat (Allen & Anderson, 2017). Because reactive aggression is closely related to impulsivity and the failure to properly regulate negative emotions, it is theoretically plausible that mindfulness, which fosters an accepting and non-reactive attitude toward negative events, would provide greater protection against reactive aggression than against proactive aggression (e.g., Denson, 2015; Miller et al., 2020).

**Emotion Regulation Strategies as Potential Mediators**

The past literature provides a solid ground for the mindfulness-aggression link. There are many possible explanations for this association. One argument is that mindful people are better at inhibitory control, such that they are better at controlling impulsivity that is closely related to anger and reactive aggression (e.g., Allen et al., 2012; Fetterman & Robinson, 2010). In fact, one of the common causes of behavioral dysregulation, such as aggression, is the failure to regulate negative emotions (Wupperman et al., 2012). People who have more difficulties in regulating their emotions with high trait negative affect are more likely to engage in physical aggression than those who are better at emotion regulation (Donahue et al., 2014). Likewise, people who reported that they lacked adequate emotional regulation skills also had more frequent intimate partner abuse history (Gratz & Roemer, 2004).

There is research demonstrating that mindfulness is related to adaptive emotion regulation (Bishop et al., 2006; Gillespie et al., 2012; Murphy et al., 2012). Similarly, mindful people had enhanced cognitive flexibility and self-awareness (Jimenez et al., 2010), which enabled them to accept “uncomfortable” emotional information in a non-defensive
manner (Carson & Langer, 2006). One cross-sectional study showed that dispositional mindfulness is positively correlated with the perceived ability to repair one’s disrupted negative affect state (Jimenez et al., 2010). A higher dispositional mindfulness was also linked with more effective regulation of negative emotion (Modinos et al., 2010). Finally, another study on inmates and community samples indicated that emotional dysregulation, or the maladaptive pattern of emotion regulation strategies, mediated the relation between mindfulness and aggression (Garofalo et al., 2019).

Many mindfulness-based intervention programs have shown efficacy in improving emotion regulation processes (Carmona i Farrés et al., 2019). Specifically, mindfulness practices led to better self-awareness, attentive control, and emotion regulation (Tang et al., 2015). In other words, mindful people can effectively regulate their affect by making unbiased identification of the mood so that they do not overreact to adverse or unpleasant emotions. For example, people who received mindfulness-based stress reduction intervention later reported less fear of emotions, anger expression, and emotion regulation difficulties (Keng et al., 2012; Robins et al., 2011). In a similar vein, undergraduate students who practiced mindfulness meditation for seven weeks were able to disengage their attention from negative emotional stimuli (e.g., picture of an injured person in pain) more quickly than those in the relaxation meditation or waitlist control group (Study 2, Ortner et al., 2007). People who practiced mindfulness meditation for 10 minutes prior to social rejection also recovered from the negative mood more quickly than those who either practiced other types of meditation or did not practice any meditation (Keng & Tan, 2018).

In addition, neurological studies also confirmed that mindfulness could reduce emotional arousal. Mindfulness meditation was associated with a decreased activation of the amygdala in response to emotional stimuli (Goldin & Gross, 2010; Lutz et al., 2013). In fact, the amygdala (part of the limbic system responsible for processing emotion) of the
mindfulness meditation practitioner was less activated even at the non-meditative state (Desbordes et al., 2012). Mindful attention also resulted in higher activation in brain areas associated with executive processing and inhibitory control, indicating that mindfulness can play a role in self-regulation processes (Lebois et al., 2015). Studies also suggest that this kind of emotional reduction effect was more prominent among beginner mindfulness meditators (Tang et al., 2015), suggesting a promising effect of mindfulness on reducing emotional dysregulation and aggression.

As documented, mindfulness enhances adaptive emotion regulation. Mindfulness allows people to accept the negative emotions at their face value. This enables people to make more constructive behavioral responses to the negative events because mindfulness further helps to reduce the biased perception of the negative event and intensity of the emotions (Kiken & Shook, 2012; Roemer et al., 2015), as reflected in the findings from the experimental studies that mindfulness is correlated with decreased reactivity to the emotional stimuli (Bauer et al., 2019; Britton et al., 2012). Therefore, it could be argued that people who cannot accept the negative emotions at their face value may have a more difficult time regulating their emotions, which is more likely to be escalated into aggression (Davidson et al., 2000). In sum, mindful people are better at regulating their emotions, which subsequently reduces impulsive behavioral dysregulation such as aggression (Gillespie et al., 2018).

Although studies have shown that emotion regulation could reduce aggression in relation to mindfulness, less attention has been paid to the role of specific emotion regulation strategies. Past studies are limited in the sense that they have primarily focused on the role of rumination in the mindfulness-aggression link. Rumination is defined as the repetitive self-focused thoughts on negative experiences, with a focus on the causes, consequences, and solutions to the negative experiences as well as the current feelings associated with the experience (Lyubomirsky & Nolen-Hoeksema, 1995). Previous research studies have
confirmed that rumination can mediate the negative relations between mindfulness and verbal aggression, anger, and hostility (Borders et al., 2010), possibly because high ruminators are more likely to react to provocation (Caprara et al., 2007; Collins & Bell, 1997), as they readily maintain anger-related associative network (Miller et al., 2003). It is not yet clear, however, which specific type of rumination is responsible for the mindfulness-aggression link (e.g., anger rumination vs. depressive rumination).

In addition, there is a relative lack of studies examining whether other commonly used emotion regulation strategies could mediate the relations between mindfulness and aggression. For example, reflection is one of the commonly used emotion regulation strategies which people bring full awareness to their thoughts via self-focus, which allows them to make a more precise judgment of their emotions and make adjustments to their affective state. Initial evidence suggests that reflection could be positively correlated with dispositional mindfulness (Harrington et al., 2014) because mindfulness improves metacognitive insight (Teasdale, 1999; Teasdale et al., 2002). No studies, however, have yet examined whether reflection could mediate the mindfulness-aggression link.

Likewise, it is not clear whether mindfulness influences cognitive reappraisal, which, in turn, may reduce aggressive behaviors. Cognitive reappraisal includes a thoughtful reconstruction of the emotional stimuli so that the perceived emotional outcome of the event is changed (Gross, 1998). Such cognitive control is often identified as a part of the mindfulness-based emotion regulation process (Opialla et al., 2014). Still, it has not yet been studied in the context of the mindfulness-aggression link. Considering the fact that mindful people are better at cognitive flexibility (Gallagher et al., 2010), it is plausible that mindfulness could be associated with increased cognitive reappraisal, which is related to reduced reactive aggression (Jiang et al., 2018).

Similarly, no known studies have yet examined whether expressive suppression can
mediate the relationship between mindfulness and aggression. Mindfulness is negatively correlated with alexithymia, a clinical condition in which the patient cannot perceive or label the experienced emotions (Baer et al., 2006). That is, mindful people can recognize and label their emotional experiences well. Thus, expressive suppression could be influenced by the degree of mindfulness of an individual, which could further relate to aggression.

**Research Gap**

Although the past literature has established that mindfulness as a comprehensive construct could decrease aggression by enhancing emotion regulation, we currently do not know the specific mechanisms or which types of emotion regulation strategies mediate the relationship between mindfulness and aggression. Specifically, it is not clear whether all facets of mindfulness could reduce aggression. In the same line, we do not know whether all aspects of aggression (e.g., type vs. function) are influenced by different facets of mindfulness. It is possible that the effect of mindfulness on aggression is not unidimensional in that one facet could be effective in reducing the specific type of aggression (e.g., hostility) but not the other (e.g., physical aggression). It is crucial to identify which specific mindfulness facet influences specific aggression measures so that mindfulness-based intervention programs can target individuals with specific behavioral dysregulation problems.

In addition, the current literature on the role of emotion regulation as the mediator between mindfulness and aggression is still limited in that it did not examine specific types of emotion regulation. Most studies either measured the perceived efficacy of emotion regulation in general or one specific strategy (e.g., rumination). Knowing how different facets of mindfulness have an impact on different emotion regulation strategies will be useful to develop programs that aim to reduce maladaptive emotion regulation strategies while enhancing the adaptive ones.
The Present Study

The goal of the present study is to answer the following three questions: (1) Are all facets of mindfulness negatively associated with aggression? (2) What aspects of aggression are associated with mindfulness, specifically? (3) Do different emotion regulation strategies mediate the relationship between mindfulness and aggression measures?

The current paper describes three studies conducted to examine the link between mindfulness and aggression, with emotion regulation as a mediator. We predicted that mindfulness (and facets of mindfulness) would be negatively associated with aggression measures. Adaptive emotion regulation strategies such as reflection and cognitive reappraisal were expected to be positively correlated with mindfulness and negatively with aggression, whereas maladaptive regulation strategies such as rumination and expressive suppression were expected to have a negative association with mindfulness and a positive relationship with aggression. Because there are few research studies that examined the role of specific emotion regulation strategies (e.g., rumination, reflection, cognitive reappraisal, expressive suppression) on the mindfulness-aggression association, this study used an exploratory approach where no specific hypotheses were formed concerning the magnitude of the mediators.

Because the effect of mindfulness on emotion regulation is stronger among non-meditators (Tang et al., 2015), Study 1 used a sample drawn from a pool of undergraduate students, who are less likely to be long-term meditation practitioners. In addition, to extend the past research findings on mindfulness and aggression that were based primarily on clinical samples (Gao et al., 2016), Studies 2a and 2b used a non-clinical sample to increase further the generalizability.
CHAPTER 2. STUDY 1

The goal of Study 1 was to replicate the previous finding that rumination mediates the relations between mindfulness and four trait aggression measures: anger, hostility, verbal aggression, and physical aggression (Borders et al., 2010). In addition, Study 1 also tested whether mindfulness would be related to a higher level of cognitive reappraisal use, which should predict\(^1\) decreased aggression.

**Method**

A total of 313 undergraduate students (\(M_{\text{age}} 19.16, SD_{\text{age}} = 3.51\)) from a large Midwestern university in the United States completed the study in exchange for course credit. Of the recruited participants, 191 identified themselves as females (61.02\%), 117 as males (37.38\%), and 5 (1.60\%) did not specify their gender. After giving informed consents, the participants completed an online survey in the enclosed laboratory cubicles. The study was approved by the university’s IRB and all participants were treated in accordance with APA ethical guidelines.

**Measures**

**Mindfulness**

The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) is a 15-item, 6-point scale (1 = almost always, 6 = almost never) that measures the attention and awareness to the present, using items such as “I find it difficult to stay focused on what's happening in the present.” A greater score indicates a higher level of mindfulness. The Cronbach’s alpha for MAAS in the present sample was .84, demonstrating a good scale reliability.

**Rumination**

Rumination was measured using the Rumination and Reflection Questionnaire (RRQ;

\(^1\) I clarify that the term “predict” in the paper is used in a loose sense, not meant to imply a causal relationship.
Trapnell & Campbell, 1999). RRQ consists of two subscales: rumination and reflection. The rumination subscale (12 items) was used for this study. The participants rated the degree to which they agree with each statement regarding rumination (1 = strongly disagree, 5 = strongly agree), with a higher score reflecting greater rumination. Sample items are “Sometimes it is hard for me to shut off thoughts about myself” and “Often I’m playing back over in my mind how I acted in a past situation.” The reliability of the data in the current study was excellent (Cronbach’s $\alpha = .90$).

**Cognitive Reappraisal**

The cognitive reappraisal subscale of Emotion Regulation Questionnaire (Gross & John, 2003) was used. There are 6 items in this scale (sample item: “When I want to feel less negative emotion, I change the way I’m thinking about the situation”), which assesses the level of cognitive reappraisal on a 7-point Likert type scale (1 = strongly disagree, 7 = strongly agree). The internal consistency of reappraisal measure in this study was adequate (Cronbach’s $\alpha = .84$).

**Aggression**

Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992) was used to assess trait aggression. The four subscales of BPAQ yielded an acceptable scale reliability: physical aggression (9 items; Cronbach’s $\alpha = .87$), verbal aggression (5 items; $\alpha = .79$), anger (8 items; $\alpha = .85$), and hostility (8 items; $\alpha = .85$). A higher score indicates a greater aggression level.

**Results and Discussion**

**Descriptive Statistics**

Table 1 presents the descriptive statistics for all variables. Maximum likelihood estimation was used for the missing values. The results indicate that all seven variables met...
normality assumptions, as recommended by Kline (2015) on skewness and kurtosis (not exceeding the absolute value of 3 and 10, respectively).

As hypothesized, mindfulness was negatively correlated with rumination \((r = -0.40, p < 0.01)\), which replicated findings from previous research studies that mindfulness was related to decreased rumination (e.g., Borders et al., 2010). Rumination, in turn, was positively correlated with anger \((r = 0.26, p < 0.01)\) and hostility \((r = 0.44, p < 0.01)\), partially supporting the hypotheses that rumination would be positively associated with trait aggression measures. Rumination, however, was not significantly related to behavioral measures of trait aggression such as physical aggression \((r = 0.07, p = 0.23)\) and verbal aggression \((r = 0.10, p = 0.10)\).

Cognitive reappraisal, a form of adaptive emotion regulation strategy, was expected to be positively correlated with mindfulness and negatively correlated with aggression. This hypothesis was also partially supported. Cognitive reappraisal was negatively associated with physical aggression \((r = -0.19, p < 0.01)\), anger \((r = -0.14, p < 0.05)\), and hostility \((r = -0.22, p < 0.01)\), but not verbal aggression \((r = -0.06, p = 0.32)\). Contrary to the hypothesis, cognitive reappraisal was not significantly correlated with mindfulness \((r = 0.06, p = 0.32)\).

Finally, as hypothesized, mindfulness was also negatively related to all four trait aggression subscales: physical aggression \((r = -0.13)\), verbal aggression \((r = -0.25)\), anger \((r = -0.26)\), and hostility \((r = -0.36)\), all \(ps < 0.01\). This replicated and re-confirmed the notion that mindfulness is related to reduced aggression (e.g., Denson, 2015; Heppner et al., 2008).
Table 1. Correlations and Descriptive Statistics for Study 1 \((n=313)\)

<table>
<thead>
<tr>
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<th>1</th>
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<th>6</th>
<th>7</th>
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</thead>
<tbody>
<tr>
<td>1. Mindfulness</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Rumination</td>
<td>-.40**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. Cognitive reappraisal</td>
<td>.06</td>
<td>-.17**</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>4. Physical agg.</td>
<td>-.13**</td>
<td>.07</td>
<td>-.19**</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5. Verbal agg.</td>
<td>-.25**</td>
<td>.10</td>
<td>-.06</td>
<td>.50**</td>
<td>-</td>
<td></td>
<td></td>
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<tr>
<td>6. Anger</td>
<td>-.26**</td>
<td>.26**</td>
<td>-.14*</td>
<td>.66**</td>
<td>.56**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>7. Hostility</td>
<td>-.36**</td>
<td>.44**</td>
<td>-.22**</td>
<td>.40**</td>
<td>.39**</td>
<td>.54**</td>
<td>-</td>
</tr>
</tbody>
</table>

\(M\) (SD) | 3.82 (1.71) | 3.55 (.68) | 5.13 (.91) | 2.62 (1.20) | 3.32 (1.22) | 2.54 (1.12) | 2.98 (1.22)  
Skewness  | -.54 | -.34 | -.53 | .88 | .46 | 1.34 | .37 |
Kurtosis  | .79 | .18 | 1.25 | .59 | -.27 | 2.31 | -.58 |

* \(p < .05\), ** \(p < .01\)

**Main Analysis**

Structural equation modeling was used to test the proposed mediation model, as depicted in Figure 1. The factorial algorithm method (Rogers & Schmitt, 2004) was used for item parceling. At most three indicators were created for the latent variables to reduce the measurement error (Little et al., 2013). The factor loading of .30 was chosen as the cut-off for acceptability (Kline, 2015), and no items were removed following this standard. In the final model, most indicators had a factor loading greater than .50, which met the recommended standards by Fornell and Larcker (1981).

Overall fit of the model was assessed using Chi-square statistic, CFI, SRMR, and RMSEA. According to past literature, a model is considered to have a good fit if CFI > .95, SRMR < .08 (Hu & Bentler, 1999), and RMSEA < .08 (Brown & Cudeck, 1998). The results indicated that the model for the present study achieved a good fit, with \(\chi^2(149) = 301.329, p < .05\), CFI = .96, SRMR=.05, and finally RMSEA = .06 (90% CI = .04 -.07).
Figure 1. Model for Study 1

Significant paths ($p < .05$) are marked with solid arrows, with unstandardized estimates and standard errors (standard errors in the brackets).

Mindfulness was associated with lower levels of rumination ($\beta = -.47$, SE = .07, $p < .001$). That is, highly mindful people were less likely to report that they use rumination as an emotion regulation strategy. The path between mindfulness and cognitive reappraisal, however, was not significant ($\beta = .10$, SE = .11, $p = .37$). This result suggests that mindful people do not necessarily use more adaptive emotion regulation strategies, at least for the undergraduate student sample in this study.

Rumination was related to increased hostility only ($\beta = .57$, SE = .11, $p < .001$). In other words, rumination was not associated with other trait aggression measures, such as physical aggression, verbal aggression, and trait anger. This is similar to the results of Borders and her colleagues’ first study (2010) using an undergraduate sample, which also
found that rumination was not associated with physical and verbal aggression among undergraduate students.

On the other hand, cognitive reappraisal was associated with decreased aggression for the most part, which replicated the past studies that cognitive reappraisal could reduce aggression (Jiang et al., 2018). For example, cognitive reappraisal predicted less physical aggression ($\beta = -.26, \ SE = .10, p = .007$), anger ($\beta = -.14, \ SE = .06, p = .031$), and hostility ($\beta = -.25, \ SE = .08, p = .003$). Cognitive reappraisal, however, was not related to reduced verbal aggression. It could be because cognitive reappraisal is particularly effective for reducing anger derived from reacting to negative stimuli (Beames et al., 2019), whereas verbal aggression may be more likely to be used in both proactive and reactive manners, so that cognitive reappraisal may not be specifically effective in reducing verbal aggression.

Bootstrap confidence intervals (95%) were computed using Mplus for mediation analysis, using 1,000 samples. Results indicated that rumination mediated the relation between mindfulness and hostility, $\beta = -.27, \ SE = .06, \ 95\% \ CI [-.39, -.14]$, which replicated the previous findings (Borders et al., 2010). Cognitive reappraisal did not mediate the relations between mindfulness and any of the four trait aggression measures, suggesting that trait levels of mindfulness may not be related to cognitive reappraisal for the undergraduate students. It is also likely, however, that the Mindful Attention Awareness Scale is not particularly sensitive to the full range of attributes that constitute mindfulness. Table 2 shows the summary of the mediation analysis.
**Table 2. Mediation Analysis Results for Study 1**

<table>
<thead>
<tr>
<th>Path</th>
<th>$\beta$</th>
<th>SE</th>
<th>95% CI</th>
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</thead>
<tbody>
<tr>
<td><strong>Predicting physical aggression (PA)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mindfulness → Rumination → PA</td>
<td>.05</td>
<td>.06</td>
<td>[-.0.073, .163]</td>
</tr>
<tr>
<td>Mindfulness → Cognitive reappraisal → PA</td>
<td>-.03</td>
<td>.03</td>
<td>[-.0.085, .035]</td>
</tr>
<tr>
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*** $p < .001$
CHAPTER 3. STUDY 2a

There were three goals of Study 2a. The first goal was to conceptually replicate the results of Study 1 using a community sample with a broader age range and more diversity, using a different tool to measure mindfulness. This step was taken to alleviate the potential insensitivity of the instrument used in Study 1 (MAAS), which has been criticized by some scholars (Brown et al., 2011). MAAS was criticized for conceptualizing mindfulness as a how poorly one pays attention to daily functioning (Grossman, 2011), and the reverse-scoring nature of the MAAS (e.g., defining mindfulness as a lack of mindlessness) did not reflect intentional attentional process of mindfulness (Van Dam et al., 2010). The second goal of Study 2a was to determine whether all facets of mindfulness would be associated with lower aggression. Specifically, Study 2a examined the relations between five facets of mindfulness and aggression measures. Finally, Study 2a expanded the possible role played by mindfulness on affect regulation by further considering reflection and expressive suppression, which are two other commonly used emotion regulation strategies.

Method

U.S. adults aged above 18 who are fluent in English were invited to participate in the study through an online survey platform (Prolific.co). A sample of 460 participants took part in the study ($M_{age} = 32.78, SD = 11.79$). About 54% of the participants were females ($n = 250$). Majority of the participants identified themselves as White (70.7%), followed by Asian (8.9%), African American (8.3%), Hispanic/Latino (7.0%), Native Americans (0.9%), and others (4.2%). Participants were paid a small amount ($1.50) for their participation. The study was approved by the university’s IRB and all participants were treated in accordance with APA ethical guidelines.
Measures

Mindfulness

The Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) was used to measure mindfulness. FFMQ is a 39-item scale composed of five subscales: (1) Observing, (2) Describing, (3) Acting with awareness, (4) Non-judging of inner experience, and (5) Non-reactivity to inner experience. Items are measured on a 5-point Likert-type scale, 1 = never or very rarely true and 5 = very often or always true, with higher score indicating a higher trait level of mindfulness. Sample items include “I’m good at finding words to describe my feelings (Describing)” and “When I do things, my mind wanders off and I’m easily distracted (Acting with awareness; reverse scored).” For this sample, the overall scale yielded a good scale reliability (Cronbach’s \( \alpha = .91 \)). The reliability of each subscale was also acceptable (Observing = .81, Describing = .89, Acting = .91, Non-judging = .93, Non-reactivity = .84).

Rumination

The same rumination subscale from Rumination and Reflection Questionnaire (Trapnell & Campbell, 1999) used in Study 1 was used. The scale reliability was .95.

Reflection

The reflection subscale from Rumination and Reflection Questionnaire (Trapnell & Campbell, 1999) was used to measure reflection. As in rumination subscale, reflection subscale asks the participants to rate to what extent they agree with the given statement (e.g., “I’m very self-inquisitive by nature”) on a 5-point scale (1 = Strongly disagree, 5 = Strongly agree). The reliability score for the reflection subscale was .93.

Cognitive Reappraisal

Cognitive reappraisal was measured using the same scale used in Study 1. For this study, the Cronbach’s alpha was .84.

Expressive Suppression

Expressive suppression was measured using the subscale by the same name from
Emotion Regulation Questionnaire (Gross & John, 2003). This subscale was composed of 4 items measured on a 7-point Likert-type scale, ranging from 1 (Strongly disagree) and 7 (Strongly agree), with the Cronbach’s alpha of .82. Sample items include “I keep emotions to myself” and “When I am feeling negative emotions, I make sure not to express them.”

Aggression

As in Study 1, Buss-Perry Aggression Questionnaire (Buss & Perry, 1992) was used to measure four types of trait aggressive measures: physical aggression (Cronbach’s $\alpha = .85$), verbal aggression ($\alpha = .80$), hostility ($\alpha = .84$), and anger ($\alpha = .85$).

Results and Discussion

Descriptive Statistics

Table 3 presents the descriptive statistics and correlations for all variables included in the study. All facets of mindfulness (measured by FFMQ) were positively correlated with one another except for observing subscale, which was negatively related to nonjudging subscale ($r = -.11, p < .001$). This negative correlation is not surprising, considering the fact that other studies have also found a negative association between observing and nonjudging (e.g., Siegling & Petrides, 2016). The observing facet showed correlational patterns that are different from other facets of mindfulness. For example, rumination was negatively associated with all subscale of FFMQ except for observing ($r = .05, p = .27$).

Reflection was positively correlated with observing ($r = .44$), describing ($r = .24$), and nonreactivity ($r = .16$) facet of mindfulness (all $ps < .01$). Cognitive reappraisal was positively correlated with all facets of mindfulness, with the $r$ ranging from .19 to .49. At last, expressive suppression showed a negative relationship with all facets of mindfulness except for the nonreactivity facet, which had the correlation coefficient of .05 ($p = .29$).

For aggression measures, observing showed an unexpected positive correlation with verbal aggression ($r = .15, p < .01$). No other facets of mindfulness were positively correlated
with any trait aggression measures (e.g., physical aggression, verbal aggression, anger, hostility), which was in alignment with the previous studies that mindfulness was associated with reduced aggression (Gillions et al., 2019)
**Table 3. Correlations and Descriptive Statistics for Study 2a**  
\( (n=460) \)

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* \( p < .05, \) ** \( p < .01 \)
Main Analysis

First, simple linear regression analysis was used to determine whether general mindfulness (e.g., mean score of all five facets of mindfulness) would be associated with trait aggression (e.g., mean score of four trait aggression measures). As in Study 1, mindfulness was significantly associated with lower trait aggression, $F(1, 457) = 59.52$, $\beta = -.34$, $p < .001$.

Subsequently, a model with five facets of mindfulness predicting aggression measures was fitted, without the mediators. The model fit summary shows that the proposed model fits the data well, $X^2(216) = 497.66$, $p < .05$, CFI = .96, SRMR = .05, and RMSEA = .05 (90% CI = .05 - .06). The results showed that nonjudging facet of mindfulness was significantly related to all trait aggression measures. Specifically, nonjudging predicted lower level of physical aggression ($\beta = -.17$, SE = .06, $p < .01$), verbal aggression ($\beta = -.14$, SE = .07, $p < .05$), anger ($\beta = -.47$, SE = .07, $p < .001$), and hostility ($\beta = -.49$, SE = .06, $p < .001$).

For other facets of mindfulness, acting with awareness predicted diminished anger ($\beta = -.24$, SE = .06, $p < .001$). Describing predicted decreased hostility ($\beta = -.21$, SE = .07, $p = .003$). Nonreactivity predicted reduced anger ($\beta = -.23$, SE = .07, $p < .01$), but not lower hostility ($\beta = -.14$, SE = .07, $p = .054$). Observing was the only facet of mindfulness that predicted a higher level of verbal aggression ($\beta = .20$, SE = .08, $p = .01$), which was a pattern distinct from other facets of mindfulness. This result is surprising in that mindfulness as a whole typically predicted reduced aggression, yet taken apart the observing facet would rather predict increased aggression. The summary of the path analysis results is shown in Table 4.

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I also tested whether there is a curvilinear relationship between mindfulness facets and trait aggression measures; there was no such relationship.
### Table 4. Path Analysis (Without Mediators) Results for Study 2a

<table>
<thead>
<tr>
<th>Path</th>
<th>β</th>
<th>SE</th>
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<td><strong>Predicting physical aggression (PA)</strong></td>
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<tr>
<td>Observing → PA</td>
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<td>.07</td>
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<tr>
<td>Describing → PA</td>
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<td>.06</td>
</tr>
<tr>
<td>Nonjudging → PA</td>
<td>-.17**</td>
<td>.06</td>
</tr>
<tr>
<td>Nonreactivity → PA</td>
<td>.01</td>
<td>.07</td>
</tr>
<tr>
<td>Acting with awareness → PA</td>
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<td>.06</td>
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<tr>
<td><strong>Predicting verbal aggression (VA)</strong></td>
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<tr>
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<td>Nonreactivity → Hos</td>
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<td>.07</td>
</tr>
<tr>
<td>Acting with awareness → Hos</td>
<td>-.02</td>
<td>.07</td>
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</tbody>
</table>

* p < .05, ** p < .01, *** p < .001
Figure 2. Structural Equation Model for Study 2a

Note for abbreviations: FFMQ - O is observing, D is describing, Nj is nonjudging, Nr is nonreactivity, and A is acting with awareness. Rumin is rumination, Reflect is reflection, Cog. Reapp. is cognitive reappraisal, and Exp. Supp. is expressive suppression. Finally, PA is physical aggression, and VA is verbal aggression.

Next, a structural equation model was fitted with five facets of mindfulness predicting trait aggression measures with four emotion regulation strategies as mediators (e.g., rumination, reflection, cognitive reappraisal, and expressive suppression), as shown in Figure 2. The model fit the data adequately, $X^2(613) = 1216.862, p < .05$, CFI = .95, SRMR = .06, and RMSEA = .05 (90% CI = .04 - .05).

Most facets of mindfulness predicted rumination. Nonjudging ($\beta = -.43$, SE = .05), nonreactivity ($\beta = -.45$, SE = .09) and acting with awareness ($\beta = -.25$, SE = .05) predicted less
rumination (all $ps < .001$). The path between describing and rumination was not significant, $\beta = -.10$, SE = .05, $p = .051$. Observing was associated with higher levels of rumination use, $\beta = .25$, SE = .07, $p < .001$. That is, people who scored higher on the observing facet of mindfulness also reported more use of rumination to regulate their emotions.

Among the five facets of mindfulness, observing and describing were significantly related to reflection, a type of adaptive emotion regulation strategy. Specifically, observing predicted increased reflection, $\beta = .62$, SE = .10, $p < .001$. Describing also was related to more use of reflection, $\beta = .15$, SE = .08, $p < .05$. Nonjudging ($\beta = .03$, SE = .06), nonreactivity ($\beta = .62$, SE = .10), and acting with awareness ($\beta = -.04$, SE = .07) did not predict reflection (all $ps > .05$). In short, only two facets of mindfulness (observing and describing) were significantly related to increased use of reflection.

For cognitive reappraisal, only nonreactivity facet of mindfulness was significantly associated with it, $\beta = .65$, SE = .10, $p < .001$. Other facets of mindfulness were not related to cognitive reappraisal: Observing ($\beta = .06$, SE = .09, $p = .51$), describing ($\beta = .05$, SE = .06, $p = .40$), nonjudging ($\beta = .05$, SE = .06, $p = .35$), and acting with awareness ($\beta = .07$, SE = .06, $p = .25$). This lack of association between cognitive reappraisal and most facets of mindfulness could indicate that not all aspects of mindfulness enhance the use of adaptive emotion regulation strategies such as cognitive reappraisal.

Finally, expressive suppression was predicted by all facets of mindfulness, though the direction of the relationship was not uniform. Observing ($\beta = -.17$, SE = .07, $p < .05$), describing ($\beta = -.52$, SE = .07, $p < .001$) and nonjudging ($\beta = -.37$, SE = .07, $p < .001$) predicted reduced expressive suppression, which is in alignment with the hypothesis that mindfulness would predict less use of maladaptive emotion regulation. In contrast, nonreactivity ($\beta = .33$, SE = .08,
and acting with awareness ($\beta = .24, \ SE = .08, \ p < .05$) predicted more expressive suppression. It could be that people who are less reactive to the emotions are also likely to “subdue” the emotions by not allowing the present affect state to influence themselves. Similarly, it is possible that people who are better at acting deliberately are also more purposeful in dissipating the emotions being experienced.

For trait aggression measures, physical aggression was predicted by rumination ($\beta = .11, SE = .06$) and expressive suppression ($\beta = .12, SE = .06$), all $ps < .05$. Reflection and cognitive reappraisal were not associated with physical aggression, $\beta = .02, SE = .04, p = .04$ and $\beta = -.07, SE = .06, p = .06$, respectively, with all $ps > .05$. That is, more use of maladaptive emotion regulation (rumination and expressive suppression) predicted increased physical aggression.

Rumination and reflection also predicted increased verbal aggression, $\beta = .16, SE = .06$ and $\beta = .17, SE = .06$, respectively, all $ps < .01$. Although reflection is considered a type of adaptive emotion regulation strategy, it still predicted more verbal aggression, suggesting that some emotion regulation strategies could be both beneficial in inhibiting certain aggressive behavioral tendency while facilitating the others. Cognitive reappraisal and expressive suppression were not related to verbal aggression, $\beta = -.04 \ SE = .06$ and $\beta = -.01, SE = .03$, respectively, with all $ps > .05$.

Furthermore, increased anger was predicted by higher rumination ($\beta = .38, SE = .05, p < .001$) and lower cognitive reappraisal ($\beta = -.15, SE = .06, p < .01$). Reflection and expressive suppression, however, did not predict anger, $\beta = -.04, SE = .05, p = .41$ and $\beta = -.05, SE = .03, p = .12$, respectively.

At last, hostility was predicted by higher rumination ($\beta = .47, SE = .05, p < .001$), less cognitive reappraisal ($\beta = -.10, SE = .05, p < .05$) and more expressive suppression ($\beta = .27, SE$
Reflection was the only variable that did not predict hostility, $\beta = -.01$, SE = .05, $p = .79$.

As in Study 1, a mediation analysis was conducted using a bootstrap of 1,000 samples. Expressive suppression mediated the relationship between describing and physical aggression, $\beta = -.07$, SE = .03, 95% CI [-.131, -.003], such that people with higher trait describing used less expressive suppression, which was associated with lower levels of physical aggression.

The observing facet of mindfulness predicted more verbal aggression via rumination, $\beta = .04$, SE = .02, 95% CI [.004, .066]. Observing also predicted more verbal aggression through reflection, $\beta = .10$, SE = .04, 95% CI [.024, .176]. One possible explanation is that people who use reflection are also more capable of understanding the negative event and how it affected them, thus giving them more opportunities to engage in it. This is supported by the finding that mindfulness predicted more verbal defensiveness (Lakey et al., 2008). In contrast, nonjudging ($\beta = -.06$, SE = .02, 95% CI [-.106, -.014]), nonreactivity ($\beta = -.06$, SE = .03, 95% CI [-.113, -.013]), and acting with awareness ($\beta = -.04$, SE = .02, 95% CI [-.065, -.006]) predicted less verbal aggression via rumination. That is, people who are higher at these mindfulness facet also used less rumination, which predicted lower verbal aggression.

Likewise, nonjudging ($\beta = -.14$, SE = .03, 95% CI [-.187, -.086]), nonreactivity ($\beta = -.14$, SE = .03, 95% CI [-.208, -.079]), and acting with awareness ($\beta = -.08$, SE = .02, 95% CI [-.121, -.041]) predicted decreased trait anger, and these relations were mediated by rumination. Nonreactivity predicted diminished anger through cognitive reappraisal ($\beta = -.10$, SE = .04, 95% CI [-.184, -.020]), such that people with a higher nonreactivity facet of mindfulness used more cognitive reappraisal, which was associated with less trait anger. Observing, however, predicted increased anger, mediated by rumination ($\beta = .08$, SE = .02, 95% CI [.033, .128]), which was
consistent with the finding that observing was correlated with both anger rumination and anger (Peters et al., 2015).

Additionally, rumination mediated the relations between most facets of mindfulness (e.g., observing, nonjudging, nonreactivity, acting with awareness) and hostility. Observing was related to more hostility via rumination ($\beta = .12$, SE = .04, 95% CI [.047, .187]), whereas nonjudging ($\beta = -.20$, SE = .03, 95% CI [-.262, -.135]), nonreactivity ($\beta = -.21$, SE = .04, 95% CI [-.294, -.124]), and acting with awareness ($\beta = -.12$, SE = .03, 95% CI [-.170, -.066]) were associated with reduced hostility via rumination. These results suggest that, once again, the observing facet of mindfulness may not contribute to lower aggression when rumination is taken into account. Expressive suppression was another significant mediator for the mindfulness-hostility association. Specifically, expressive suppression mediated the negative association between observing ($\beta = -.06$, SE = .03, 95% CI [-.115, -.010]), describing ($\beta = -.17$, SE = .04, 95% CI [-.247, -.096]), nonjudging ($\beta = -.10$, SE = .03, 95% CI [-.156, -.045]) and hostility. It also mediated the nonreactivity-hostility path ($\beta = .13$, SE = .04, 95% CI [.058, .200]) and acting with awareness-hostility path ($\beta = .07$, SE = .03, 95% CI [.019, .120]). Detailed path coefficients with standard errors and 95% confidence intervals are shown in Table 5.

<table>
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<tr>
<th>Path</th>
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<th>SE</th>
<th>95% CI</th>
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<td>.028</td>
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<td>.008</td>
<td>[-.020, .012]</td>
</tr>
<tr>
<td>Observing $\rightarrow$ Expressive suppression $\rightarrow$ PA</td>
<td>-.024</td>
<td>.016</td>
<td>[-.055, .006]</td>
</tr>
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<td>.007</td>
<td>[-.024, .005]</td>
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<td>.007</td>
<td>[-.012, .017]</td>
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<td>.006</td>
<td>[-.016, .009]</td>
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### Table 5. Continued

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#### Predicting verbal aggression (VA)

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<td>[.004, .066]</td>
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<td>.039</td>
<td>[.024, .176]</td>
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<td>.007</td>
<td>[-.017, .012]</td>
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<td>.012</td>
<td>[.002, .026]</td>
</tr>
<tr>
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<td>.009</td>
<td>[-.033, .004]</td>
</tr>
<tr>
<td>Describing $\rightarrow$ Reflection $\rightarrow$ VA</td>
<td>.024</td>
<td>.015</td>
<td>[-.006, .054]</td>
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<tr>
<td>Describing $\rightarrow$ Cognitive reappraisal $\rightarrow$ VA</td>
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<td>.006</td>
<td>[-.013, .009]</td>
</tr>
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<td>.032</td>
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<td>.019</td>
<td>[-.034, .040]</td>
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<td>.026</td>
<td>[-.113, -.013]</td>
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<tr>
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<td>.017</td>
<td>[-.043, .024]</td>
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<td>.041</td>
<td>[-.108, .052]</td>
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<tr>
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<td>.025</td>
<td>[.052, .045]</td>
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<td>.015</td>
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<td>.012</td>
<td>[-.030, .016]</td>
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<td>.006</td>
<td>[-.015, .009]</td>
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#### Predicting anger

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<td>.024</td>
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<td>.028</td>
<td>[-.079, .033]</td>
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### Table 5. Continued

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<td>.014</td>
<td>[-.010, .045]</td>
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<td>.018</td>
<td>[-.069, .002]</td>
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<td>-.006</td>
<td>.008</td>
<td>[-.021, .010]</td>
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<tr>
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<td>.011</td>
<td>[-.030, .013]</td>
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<td>.032</td>
<td>[-.014, .111]</td>
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<td>.026</td>
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<td>.004</td>
<td>[-.008, .006]</td>
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<td>Nonjudging → Cognitive reappraisal → Anger</td>
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<td>.010</td>
<td>[-.028, .011]</td>
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<td>[-.032, .011]</td>
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<td>.015</td>
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**Predicting hostility (Hos)**

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<td>[-.029, .015]</td>
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<td>[.007, .006]</td>
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<td>[-.023, .010]</td>
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<td>.004</td>
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Table 5. Continued

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<td>.026</td>
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</table>

* $p < .05$, ** $p < .01$, *** $p < .001$
CHAPTER 4. STUDY 2b

Study 2a demonstrated that rumination plays an importance role in the relations between five facets of mindfulness and four trait aggression measures. The goal of Study 2b was to further explore the role of rumination on mindfulness-aggression link. Specifically, Study 2b focused on whether anger rumination, defined as a specific type of rumination where one focuses on re-iterating past events related to anger (Sukhodolsky et al., 2001), would mediate the relation between mindfulness and aggression. In addition, Study 2b differentiated aggression by its function (e.g., proactive vs. reactive) instead of its type, allowing us to test the hypothesis provided by past studies that mindfulness is more effective in decreasing reactive than proactive aggression (DeSteno et al., 2017)

Method

The sample for Study 2b was the same as Study 2a.

Measures

Mindfulness

As in Study 2a, mindfulness was measured using the Five-Facet Mindfulness Questionnaire (Baer et al., 2006).

Anger Rumination

Anger rumination was measured by the anger rumination scale (ARS; Sukhodolsky et al., 2001). There are 19 items in the ARS, with four subscales: (1) Angry afterthoughts (e.g., “After an argument is over, I keep fighting with this person in my imagination”), (2) Thoughts of revenge (e.g., “I have difficulty forgiving people who have hurt me”), (3) Angry memories (e.g., “I keep thinking about events that angered me for a long time”), and (4) Understanding of causes (e.g., “I think about the reasons people treat me badly”). The scale is rated on a 4-point Likert
type scale (1 = Almost never, 4 = Almost always), and a higher score means higher trait anger rumination. The scale showed a good reliability in this study, Cronbach’s alpha = .95.

**Aggression**

Study 2b used the aggressive behavior subscale from the aggressive and prosocial behavior questionnaire (APBQ; Boxer et al., 2004) to measure reactive and proactive aggression. The aggressive behavior subscale of APBQ asks the participants to rate to what extent they believe each given statement is characteristic of them, ranging from 1 = definitely not like me and 6 = definitely like me. Sample questions are “I often say mean things to people to get what I want” (proactive aggressive behavior) and “When someone makes me angry or upset, I will often hit them for it” (reactive aggressive behavior). The internal consistency reliability of the scale was adequate, with Cronbach’s alpha of .86 for proactive and .90 for reactive aggressive behavior.

**Results and Discussion**

**Descriptive Statistics**

Table 6 provides descriptive statistics and correlations for Study 2b. Anger rumination was negatively correlated with all facets of mindfulness except for observing ($r = .12, p < .01$). Anger rumination was positively correlated with both reactive ($r = .49, p < .001$) and proactive aggression ($r = .29, p < .001$).
Table 6. Correlations and descriptive statistics for Study 2b

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</tbody>
</table>

* p < .05, ** p < .01

Main Analysis

As in Study 2a, a simple linear regression is used to examine whether mindfulness in general would predict aggression (proactive vs. reactive). Mindfulness predicted lower level of both proactive ($F(1, 457) = 30.40, \beta = -.25, p < .001$) and reactive aggression ($F(1, 457) = 18.10, \beta = -.20, p < .001$).

The structural equation model with trait anger rumination as the mediator between five facets of mindfulness and aggression (proactive vs. reactive) was fitted (see Figure 3). The model fit indicates that the model fits the current study data adequately, $X^2(181) = 507.31, p < .05$, CFI = .95, SRMR = .05, and RMSEA = .06 (90% CI = .059 - .072).
Figure 3. Structural Equation Model for Study 2b

Significant paths ($p < .05$) are marked with solid arrows, with unstandardized estimates and standard errors (standard errors in the brackets).

Trait anger rumination was predicted by observing ($\beta = .20$, SE = .06, $p < .01$), nonjudging ($\beta = -.37$, SE = .05, $p < .001$), and nonreactivity ($\beta = -.26$, SE = .06, $p < .001$) facet of mindfulness. It is interesting that observing predicted more trait anger rumination, which was also demonstrated in other studies (e.g., Peters et al., 2015). On the other hand, describing ($\beta = -.03$, SE = .05, $p = .56$) and acting with awareness ($\beta = -.10$, SE = .05, $p = .08$) did not predict trait anger rumination.

The paths between trait anger rumination and proactive aggression ($\beta = .36$, SE = .08, $p$
< .001) and reactive aggression ($\beta = .69$, $SE = .09$, $p < .001$) were both significant, suggesting that anger rumination is associated with both types of aggression. Observing ($\beta = -.18$, $SE = .07$, $p < .05$) and acting with awareness ($\beta = -.14$, $SE = .07$, $p < .05$) predicted less proactive aggression. No facets of mindfulness, however, predicted lower reactive aggression.

A mediation analysis was conducted with a bootstrap of 1,000 samples. Observing predicted proactive aggression via trait anger rumination, $\beta = .07$, $SE = .03$, 95% CI [.019, .127], such that people who are high on the observing facet of mindfulness were more likely to engage in anger rumination and proactive aggression. The relation between the nonjudging facet of mindfulness and proactive aggression was fully mediated by trait anger rumination, $\beta = -.13$, $SE = .03$, 95% CI [-.196, -.070]. That is, highly nonjudging mindful people are less likely to be involved with anger rumination as well as proactive aggression. Similarly, the path from nonreactivity to proactive aggression was also fully mediated by trait anger rumination, $\beta = -.09$, $SE = .03$, 95% CI [-.153, -.033]. Trait anger rumination did not mediate the relation between describing and proactive aggression ($\beta = -.01$, $SE = .02$, 95% CI [-.050, .028]), or the relation between acting with awareness and proactive aggression ($\beta = -.03$, $SE = .02$, 95% CI [-.073, .006]).

For reactive aggression, the observing-reactive aggression path was fully mediated by trait anger rumination ($\beta = .14$, $SE = .05$, 95% CI [.048, .230]). It appears that high observing individuals are more likely to use anger rumination, which in turn is associated with more reactive aggression. The relation between nonjudging and reactive aggression was also fully mediated by the trait anger rumination, $\beta = -.25$, $SE = .05$, 95% CI [-.341, -.165], as was the relation between nonreactivity and reactive aggression, $\beta = -.18$, $SE = .05$, 95% CI [-.272, -.083]. Nonjudging and nonreactive people are less likely to be reactively aggressive, as they are also
less likely to use anger rumination. The describing-reactive aggression path and acting with awareness-reactive aggression path were not mediated by trait anger rumination, with $\beta = -.02$, SE = .04, 95% CI [-.094, .052] and $\beta = -.07$, SE = .04, 95% CI [-.136, .009], respectively. A summary of the mediation analysis is presented in Table 7.

**Table 7. Mediation Analysis Results for Study 2b**

<table>
<thead>
<tr>
<th>Path</th>
<th>$\beta$</th>
<th>SE</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predicting proactive aggression (Pro)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observing → Anger Rumination → Pro</td>
<td>.07**</td>
<td>.03</td>
<td>[.019, .127]</td>
</tr>
<tr>
<td>Describing → Anger Rumination → Pro</td>
<td>-.01</td>
<td>.02</td>
<td>[-.050, .028]</td>
</tr>
<tr>
<td>Nonjudging → Anger Rumination → Pro</td>
<td>-.13***</td>
<td>.03</td>
<td>[-.196, -.070]</td>
</tr>
<tr>
<td>Nonreactivity → Anger Rumination → Pro</td>
<td>-.09***</td>
<td>.03</td>
<td>[-.153, -.033]</td>
</tr>
<tr>
<td>Acting with awareness → Anger Rumination → Pro</td>
<td>-.03</td>
<td>.02</td>
<td>[-.073, .006]</td>
</tr>
<tr>
<td><strong>Predicting reactive aggression (Re)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observing → Anger Rumination → Re</td>
<td>.14**</td>
<td>.05</td>
<td>[.048, .230]</td>
</tr>
<tr>
<td>Describing → Anger Rumination → Re</td>
<td>-.02</td>
<td>.04</td>
<td>[-.094, .052]</td>
</tr>
<tr>
<td>Nonjudging → Anger Rumination → Re</td>
<td>-.25***</td>
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</tr>
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<td>-.18***</td>
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<td>[-.272, -.083]</td>
</tr>
<tr>
<td>Acting with awareness → Anger Rumination → Re</td>
<td>-.07</td>
<td>.04</td>
<td>[-.136, .009]</td>
</tr>
</tbody>
</table>

* $p < .05$, ** $p < .01$, *** $p < .001$
CHAPTER 5. GENERAL DISCUSSION

Summary of Findings

As with the past studies on mindfulness and aggression, all three studies demonstrated that trait mindfulness in general is associated with lower trait aggression. Specifically, in Study 1 using a young adult sample, mindfulness as a whole was associated with less physical aggression, verbal aggression, anger, and hostility. When each specific facet of mindfulness was taken into account, certain facets of mindfulness were revealed be more strongly related to aggression than others. Nonjudging predicted less physical aggression, anger, and hostility (Study 2a), demonstrating that the nonjudging facet may be responsible for reduced aggression among mindful individuals. In Study 2b, nonjudging also predicted less proactive and reactive aggression via anger rumination. Other studies have indicated that nonjudging is the strongest predictor of lower aggressiveness among five facets of mindfulness (e.g., Brem et al., 2019; Hesse et al., 2019). In fact, one study has reported that violent offenders had significantly lower levels of nonjudging than a community sample (Gillespie et al., 2018). In short, the nonjudging facet of mindfulness appears to be the most important aspect of mindfulness that explains the mindfulness-driven aggression reduction process, possibly because highly nonjudging people are less likely to allow the negative emotion to arise and pass without much resistance and thus brood over it less frequently (e.g., Elsenlohr-Moul et al., 2016).

Nonreactivity was another promising facet of mindfulness that predicted less aggression. In Study 2a, nonreactivity predicted less verbal aggression, anger, and hostility, and these associations were mediated by rumination. In a similar pattern, nonreactivity predicted reduced proactive and reactive aggression via anger rumination (Study 2b). These results are in alignment with previous literature that reported a negative relation between nonreactivity and aggression.
(Peters et al., 2015). As with nonjudging, nonreactivity could be useful in explaining why mindfulness is consistently related to lower aggression.

At last, acting with awareness was also related to reduced aggression. Specifically, acting with awareness was associated with less anger (Study 2a) and proactive aggression (Study 2b). It also predicted less verbal aggression and hostility through rumination and expressive suppression, respectively (Study 2a). It is plausible that people who are better at acting with awareness are less likely to behave impulsively, thus reacting less sporadically upon encountering negative stimuli.

As for emotion regulation strategies, it appears that the mindfulness-aggression link is primarily explained by less use of maladaptive emotion regulation rather than more use of adaptive emotion regulation. Study 1 did not find a significant regression path between mindfulness and cognitive reappraisal. In Study 2a, reflection and cognitive reappraisal did not mediate the mindfulness-aggression link. The only exception is the association between observing facet of mindfulness and verbal aggression, which was mediated by reflection. Yet this relation shows that more observing people are likely to use reflection, which is related to more verbal aggression, contrary to the conventional mindfulness-aggression link where mindfulness predicts lower aggression. It is possible that when observing people use reflection, they may experience increased rather than decreased negative affect because they are better at noticing and making sense of such negative affect (e.g., analyzing the antecedent events and causes of negative emotion like anger).

On the other hand, rumination and expressive suppression, which are generally considered maladaptive in the sense that it relates more with adverse outcomes such as psychological symptoms (Aldao et al., 2010), mediated most relations between mindfulness and
aggression measures (Study 2a). Moreover, trait anger rumination mediated the relation between most facets of mindfulness and pro- and reactive aggression (Study 2b). Mindfulness trains people to allow emotions to arise and pass without reactivity or spinning out a story (Brown & Ryan, 2003). In a sense, mindful people are less likely to use unhealthy patterns of emotion regulation because they neither strongly react to nor linger on the negative affect. They also do not attempt to reorganize or reconstruct the perceived emotion, as the core idea of mindfulness is to accept the internal experience at its face value – which could explain why reflection and cognitive reappraisal did not play an important role in the relationship between mindfulness and aggression.

The observing facet of mindfulness was a somewhat inconsistent component in these studies. Contrary to other facets of mindfulness, observing predicted more verbal aggression. It also predicted increased trait anger and hostility via rumination (Study 2a). Likewise, in Study 2b, observing predicted more proactive and reactive aggression, and these relations were mediated by anger rumination. Observing seems to be the oddball aspect of mindfulness in predicting increased rather than decreased aggression.

Why does observing show this unexpected pattern? One explanation would be on the “dark side” of mindfulness, where some researchers have pointed out that mindfulness could be positively correlated with aggression. Specifically, Gillespie and his colleagues (2018) found that violent offenders scored higher than the community sample on the observing facet of mindfulness. Observing was also positively correlated with emotion dysregulation and aggression (Garofalo et al., 2019). In this view, it could be argued that highly observing people are inadequate in emotion regulation, as the observing facet could be related to self-critical self-awareness where knowing the emotions being experienced may actually exacerbate the negative
emotion (e.g., “I notice I am depressed. Knowing this makes me even more depressed.” Or “I am angry. I didn’t deserve this. Therefore, you’re a bad person.”). In sum, observing may lead to “self-critical ruminative self-focus” (Lilja et al., 2012), which further contributes to increased aggression.

Another explanation lies in the problem of the questionnaire items. There have been some concerns on the poor construct validity of the observing subscale of the FFMQ (e.g., Baer et al., 2008). Observing subscale of the FFMQ has shown the unexpected positive correlations with psychological symptoms such as anxiety and depression (e.g., Baer et al., 2006). Likewise, the observing subscale was not significantly related to depression and difficulties in emotion regulation, whereas all other subscales of FFMQ were negatively related to depression (Baer et al., 2006; Desrosier et al., 2013; Soysa & Wilcomb, 2013). Observing was also positively correlated with thought suppression (Baer et al., 2006). Moreover, observing was not related to any other subscales of FFMQ in some studies (e.g., Petrocchi & Ottaviani, 2016), suggesting that observing subscale from FFMQ has poor convergent validity (Goldberg et al., 2016). Belzer and others (2013) argued that items for measuring observing facet in FFMQ might be interpreted differently for people who are not familiar with mindfulness. Indeed, most items for observing subscale is about external or bodily sensations (e.g., taking a shower or bath), with no reference to the emotion. It is also possible that observing is a first step taken as one gains mindfulness, but heightened observation alone without non-reactivity exacerbates problems until more progress has been made. Given these concerns, it is not suitable to draw a definite conclusion about the observing facet of mindfulness on aggression, as further improvements to the facet measurement are needed.

**Implications**

This is one of the first studies to examine the importance of emotion regulation in the
relation between mindfulness and aggression by focusing on specific aspects of mindfulness. It showed that the negative relation between mindfulness and aggression is mediated by less use of maladaptive emotion regulation strategies (e.g., rumination, expressive suppression) than by more use of adaptive emotion regulation strategies (e.g., reflection, cognitive reappraisal), and that not all facets of mindfulness is related to lower aggression. Specifically, considering the fact that nonjudging of inner experience facet of mindfulness was consistently related to lower trait aggression measures, future studies that examine the mindfulness-aggression link in evaluating mindfulness-based intervention such as mindfulness-based stress reduction (Chiesa & Serretti, 2009) could focus on different methods to foster specific facet of mindfulness.

Future Directions

There are a few limitations of this study that future researchers could improve on. First, as with most research studies on mindfulness and aggression, the present study relied on self-reported data. To reduce the potential biases, a behavioral measure of aggression could add to the validity of the finding (Fix & Fix, 2013). Second, this study focused on four specific emotion regulation strategies (e.g., rumination, reflection, cognitive reappraisal, and expressive suppression). There are other emotion regulation strategies people use in everyday life (e.g., distraction), and it would be helpful to examine whether those strategies will mediate the relationship between mindfulness and aggression. Because the current study found that maladaptive emotion regulation is the key mediator between mindfulness and aggression, future studies could focus on different types of unhealthy emotion regulation processes. Third, using other mindfulness measures will be essential in evaluating whether observing facet of mindfulness indeed relates to more aggression. Conceptual replication will be helpful in answering this question. Finally, because the present study is a cross-sectional study using questionnaire measures, it does not provide evidence for causality (e.g., mindfulness reducing
aggression via emotion regulation). Therefore, future researchers should consider using experimental and longitudinal studies to examine such causal relationship, which would further add to the validity of the mindfulness-driven aggression reduction hypothesis.
REFERENCES


APPENDIX A. MINDFULNESS ATTENTION AWARENESS SCALE

1. I could be experiencing some emotion and not be conscious of it until some time later.
2. I break or spill things because of carelessness, not playing attention, or thinking of something else.
3. I find it difficult to stay focused on what’s happening in the present.
4. I tend to walk quickly to get where I’m going without paying attention to what I experience along the way.
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
6. I forget a person’s name almost as soon as I’ve been told it for the first time.
8. I rush through activities without being really attentive to them.
9. I get so focused on the goal I want to achieve that I lose touch with what I’m doing right now to get there.
10. I do jobs or tasks automatically, without being aware of what I’m doing.
11. I find myself listening to someone with one ear, doing something else at the same time.
12. I drive places on “automatic pilot” and then wonder why I went there.
13. I find myself preoccupied with the future or the past.
15. I snack without being aware that I’m eating.
APPENDIX B. RUMINATION AND REFLECTION QUESTIONNAIRE

1. My attention is often focused on aspects of myself I wish I’d stop thinking about.
2. I always seem to be rehashing in my mind recent things I’ve said or done.
3. Sometimes it is hard for me to shut off thoughts about myself.
4. Long after an argument or disagreement is over with, my thoughts keep going back to what happened.
5. I tend to “ruminate” or dwell over things that happen to me for a really long time afterward.
6. I don’t waste time rethinking things that are over and done with.
7. Often I’m playing back over in my mind how I acted in a past situation.
8. I often find myself reevaluating something I’ve done.
9. I never ruminate or dwell on myself for very long.
10. It is easy for me to put unwanted thoughts out of my mind.
11. I often reflect on episodes in my life that I should no longer concern myself with.
12. I spend a great deal of time thinking back over my embarrassing or disappointing moments.
13. Philosophical or abstract thinking doesn’t appeal to me that much.
14. I’m not really a meditative type of person.
15. I love exploring my “inner” self.
16. My attitudes and feelings about things fascinate me.
17. I don’t really care for introspective or self-reflective thinking.
18. I love analyzing why I do things.
19. People often say I’m a “deep,” introspective type of person.
20. I don’t care much for self-analysis.
21. I’m very self-inquisitive by nature.
22. I love to meditate on the nature and meaning of things.
23. I often love to look at my life in philosophical ways.
24. Contemplating myself isn’t my idea of fun.
APPENDIX C. EMOTION REGULATION QUESTIONNAIRE

1. When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about.
2. I keep my emotions to myself.
3. When I want to feel negative emotion (such as sadness or anger), I change what I’m thinking about.
4. When I am feeling positive emotions, I am careful not to express them.
5. When I’m faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
6. I control my emotions by not expressing them.
7. When I want to feel more positive emotion, I change the way I’m thinking about the situations.
8. I control my emotions by changing the way I think about the situation I’m in.
9. When I am feeling negative emotions, I make sure not to express them.
10. When I want to feel less negative emotion, I change the way I’m thinking about the situation.
APPENDIX D. BUSS-PERRY AGGRESSION QUESTIONNAIRE

1. Once in a while I can't control the urge to strike another person.
2. Given enough provocation, I may hit another person.
3. If somebody hits me, I hit back.
4. I get into fights a little more than the average person.
5. If I have to resort to violence to protect my rights, I will.
6. There are people who pushed me so far that we came to blows.
7. I can think of no good reason for ever hitting a person.
8. I have threatened people I know.
9. I have become so mad that I have broken things.
10. I tell my friends openly when I disagree with them.
11. I often find myself disagreeing with people.
12. When people annoy me, I may tell them what I think of them.
13. I can't help getting into arguments when people disagree with me.
14. My friends say that I'm somewhat argumentative.
15. I flare up quickly but get over it quickly.
16. When frustrated, I let my irritation show.
17. I sometimes feel like a powder keg ready to explode.
18. I am an even-tempered person.
19. Some of my friends think I'm a hothead.
20. Sometimes I fly off the handle for no good reason.
21. I have trouble controlling my temper.
22. I am sometimes eaten up with jealousy.
23. At times I feel I have gotten a raw deal out of life.
24. Other people always seem to get the breaks.
25. I wonder why sometimes I feel so bitter about things.
26. I know that "friends" talk about me behind my back.
27. I am suspicious of overly friendly strangers.
28. I sometimes feel that people are laughing at me behind my back.
29. When people are especially nice, I wonder what they want.
APPENDIX E. THE FIVE-FACET MINDFULNESS QUESTIONNAIRE

1. When I’m walking, I deliberately notice the sensations of my body moving.
2. I’m good at finding words to describe my feelings.
3. I criticize myself for having irrational or inappropriate emotions.
4. I perceive my feelings and emotions without having to react to them.
5. When I do things, my mind wanders off and I’m easily distracted.
6. When I take a shower or bath, I stay alert to the sensations of water on my body.
7. I can easily put my beliefs, opinions, and expectations into words.
8. I don’t pay attention to what I’m doing because I’m daydreaming, worrying, or otherwise distracted.
9. I watch my feelings without getting lost in them.
10. I tell myself I shouldn’t be feeling the way I’m feeling.
11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
12. It’s hard for me to find the words to describe what I’m thinking.
13. I am easily distracted.
14. I believe some of my thoughts are abnormal or bad and I shouldn’t think that way.
15. I pay attention to sensations, such as the wind in my hair or sun on my face.
16. I have trouble thinking of the right words to express how I feel about things.
17. I make judgments about whether my thoughts are good or bad.
18. I find it difficult to stay focused on what’s happening in the present.
19. When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it.
20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
21. In difficult situations, I can pause without immediately reacting.
22. When I have a sensation in my body, it’s difficult for me to describe it because I can’t find the right words.
23. It seems I am “running on automatic” without much awareness of what I’m doing.
24. When I have distressing thoughts or images, I feel calm soon after.
25. I tell myself that I shouldn’t be thinking the way I’m thinking.
26. I notice the smells and aromas of things.
27. Even when I’m feeling terribly upset, I can find a way to put it into words.
28. I rush through activities without being really attentive to them.
29. When I have distressing thoughts or images I am able just to notice them without reacting.
30. I think some of my emotions are bad or inappropriate and I shouldn’t feel them.
31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
32. My natural tendency is to put my experiences into words.
33. When I have distressing thoughts or images, I just notice them and let them go.
34. I do jobs or tasks automatically without being aware of what I’m doing.
35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.
36. I pay attention to how my emotions affect my thoughts and behavior.
37. I can usually describe how I feel at the moment in considerable detail.
38. I find myself doing things without paying attention.
39. I disapprove of myself when I have irrational ideas.
APPENDIX F. ANGER RUMINATION SCALE

1. I re-enact the anger episode in my mind after it has happened.
2. When something makes me angry, I turn this matter over and over again in my mind.
3. Memories of even minor annoyances bother me for a while.
4. Whenever I experience anger, I keep thinking about it for a while.
5. After an argument is over, I keep fighting with this person in my imagination.
6. Memories of being aggravated pop up into my mind before I fall asleep.
7. I have long living fantasies of revenge after the conflict is over.
8. When someone makes me angry I can’t stop thinking about how to get back at this person.
9. I have day dreams and fantasies of violent nature.
10. I have difficulty forgiving people who have hurt me.
11. I ponder about the injustices that have been done to me.
12. I keep thinking about events that angered me for a long time.
13. I feel angry about certain things in my life.
15. I think about certain events from a long time ago and they still make me angry.
16. I think about the reasons people treat me badly.
17. When someone provokes me, I keep wondering why this should have happened to me.
18. I analyze events that make me angry.
19. I have had times when I could not stop being preoccupied with a particular conflict.
APPENDIX G. AGGRESSIVE AND PROSOCIAL BEHAVIOR QUESTIONNAIRE

1. When someone makes me angry or upset, I will often push or shove them for it.
2. When someone makes me angry or upset, I will often yell at them for it.
3. When someone makes me angry or upset, I will often insult them for it.
4. When someone makes me angry or upset, I will often hit them for it.
5. When someone makes me angry or upset, I will often say mean things to them for it.
6. I often insult people to get what I want.
7. I often hit people to get what I want.
8. I often push or shove people to get what I want.
9. I often say mean things to people to get what I want.
10. I often yell at people to get what I want.
APPENDIX H. INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

Date: 04/16/2020
To: Ei-Lim Kim
From: Office for Responsible Research
Title: Mindfulness and behaviors
IRB ID: 20-156
Submission Type: Initial Submission
Exemption Date: 04/16/2020

The project referenced above has been declared exempt from most requirements of the human subject protections regulations as described in 45 CFR 46.104 or 21 CFR 56.104 because it meets the following federal requirements for exemption:

2018 - 2 (i): Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) when the information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

The determination of exemption means that:

- You do not need to submit an application for continuing review. Instead, you will receive a request for a brief status update every three years. The status update is intended to verify that the study is still ongoing.

- You must carry out the research as described in the IRB application. Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, nature or duration of behavioral interventions, use of deception, etc.), any change in privacy or confidentiality protections, modifications that result in the inclusion of participants from vulnerable populations, removing plans for informing participants about the study, any change that may increase the risk or discomfort to participants, and/or any change such that the revised procedures do not fall into one or more of the Exempt categories. The purpose of review is to determine if the project still meets the federal criteria for exemption.

- All changes to key personnel must receive prior approval.

- Promptly inform the IRB of any addition of or change in federal funding for this study. Approval of the protocol referenced above applies only to funding sources that are specifically identified in the corresponding IRB application.

IRB 10/2019
Detailed information about requirements for submitting modifications for exempt research can be found on our website. For modifications that require prior approval, an amendment to the most recent IRB application must be submitted in IRBManager. A determination of exemption or approval from the IRB must be granted before implementing the proposed changes.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

Additionally:

- All research involving human participants must be submitted for IRB review. Only the IRB or its designees may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

- Please inform the IRB if the Principal Investigator and/or Supervising Investigator end their role or involvement with the project with sufficient time to allow an alternate PI/Supervising Investigator to assume oversight responsibility. Projects must have an eligible PI to remain open.

- Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.

- Approval from other entities may also be needed. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.

- Your research study may be subject to post-approval monitoring by Iowa State University’s Office for Responsible Research. In some cases, it may also be subject to formal audit or inspection by federal agencies and study sponsors.

- Upon completion of the project, transfer of IRB oversight to another IRB, or departure of the PI and/or Supervising Investigator, please initiate a Project Closure in IRBManager to officially close the project. For information on instances when a study may be closed, please refer to the IRB Study Closure Policy.

Please don’t hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.