

## RESEARCH ARTICLE

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

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**Abstract**

Inducing mindfulness has shown a promising effect on reducing aggression in both clinical and nonclinical populations, possibly because mindfulness can improve emotion regulation. The present study examined the association between mindfulness and aggression through potential mediating effects of several emotion regulation strategies. University and community samples of U.S. adults completed questionnaires on mindfulness, emotion regulation strategies, and trait aggression. Results indicate that mindfulness was associated with rumination and expressive suppression, which mediated the mindfulness-aggression relationship. Most facets of mindfulness were unrelated to the use of reflection and cognitive reappraisal. The nonjudging of experience facet of mindfulness was negatively related to hostility through rumination and expressive suppression. In contrast, the observing mindfulness facet was positively related to verbal aggression and hostility; these relations were mediated by rumination and expressive suppression.

**KEYWORDS**

emotion regulation, expressive suppression, hostility, mindfulness, rumination, trait aggression

## 1 | INTRODUCTION

The popularity of mindfulness meditation has increased in recent years, with at least 2500 mindfulness meditation apps launched since 2015 (Goodwin, 2020). More people are expressing interest in mindfulness meditation to achieve commonly expected benefits of mindfulness-based interventions, such as enhanced response flexibility, decreased reactivity, and improved interpersonal relationships (Davis & Hayes, 2011). Indeed, mindfulness-based interventions are now used in the field to reduce aggression among various populations (e.g., Bauer et al., 2019; Christopher et al., 2018; Felver et al., 2013; Ribeiro et al., 2019).

However, some studies have raised the concern that mindfulness may have an iatrogenic effect. For example, Tangney et al. (2017) found that there was a positive association between mindfulness and criminogenic thinking (thought patterns that are used to rationalize deviant behaviors, which is a risk factor for a criminal offense, i.e., closely related to hostility). Specifically, they found that the nonjudgment of self facet of mindfulness, measured using the Mindfulness Inventory: Nine Dimensions (Harty et al., 2009), was the main contributor to the positive association between mindfulness and criminogenic thinking, while controlling for emotion regulation. On the basis of this finding, Tangney et al. (2017, p. 1424) suggested that "caution should be utilized in discouraging self-judgment"

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through mindfulness interventions, especially among the inmates. Given this contradictory finding that mindfulness could promote antisocial tendencies, it is important to further examine whether mindfulness is associated with aggression (a construct closely related to criminogenic thinking), and if so, what factors could be responsible for their association.

## 1.1 | Mindfulness and aggression

Most studies on the effectiveness of mindfulness-based intervention have found a negative association between mindfulness and trait aggression. For example, Franco et al. (2016) randomly assigned 27 high school students either to an intervention group (e.g., participants practice mindfulness skills for 10 weeks) or to a waitlist control group. The postintervention evaluation showed that participants in the intervention group reported a significant reduction in their self-reported impulsivity and trait aggression. Similar patterns were observed among different age groups: primary school students who participated in mindfulness-based interventions later had lower teacher-reported aggression (Suárez-García et al., 2020). Mindfulness-based interventions also reduced self-reported anger during driving (Deffenbacher, 2016) and aggressive driving behaviors (Stephens et al., 2018) among adults. Finally, DeSteno et al. (2017) randomly assigned undergraduate participants to either practice mindfulness (e.g., mindfulness group) or complete cognitive training tasks such as solving logic problems (e.g., control group) for 3 weeks. Afterward, participants came into 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 hot sauce, knowing that the provider has a strong disinclination to spiciness. Results showed that participants who practiced mindfulness gave significantly less hot sauce than those in the control group, indicating that mindfulness intervention could have contributed to a reduction in aggression (DeSteno et al., 2017).

Likewise, research focused on trait mindfulness and aggression demonstrates a consistent negative association between dispositional mindfulness and trait aggression, as measured by physical aggression, verbal aggression, anger, and hostility (Borders et al., 2010; Brown & Ryan, 2003; Fresnic & Borders, 2016; Heppner et al., 2008; Wright et al., 2009). For example, a longitudinal study showed that trait mindfulness was related to more constructive responses during a relationship conflict (Study 1, Barnes et al., 2007). In contrast, people with lower levels of dispositional mindfulness were more likely to report using physical aggression toward their romantic partners (Brem et al., 2015; Ngo et al., 2018).

## 1.2 | How does mindfulness reduce aggression?

There are many possible explanations for the negative relation between mindfulness and aggression. One possibility is that dispositional mindfulness is related to more effective regulation of

negative emotions (Modinos et al., 2010). One goal of mindfulness meditation is to enable individuals to accept “uncomfortable” emotional information in a nondefensive manner (Carson & Langer, 2006), and trait mindfulness is positively related to adaptive emotion regulation (Bishop et al., 2006; Gillespie et al., 2012; Murphy et al., 2012). People with higher levels of mindfulness are also less reactive or defensive upon provocation perhaps because they can perceive negative emotions and experiences with greater equanimity (Heppner et al., 2008). For example, undergraduate students with a higher level of dispositional mindfulness had better cognitive flexibility and self-awareness (Jimenez et al., 2010).

### 1.2.1 | Emotion regulation

Many mindfulness-based intervention programs have shown efficacy in improving emotion regulation processes (Carmona i Farrés et al., 2018). Specifically, people with a higher level of trait mindfulness can effectively regulate their affect by making an unbiased identification of mood so that they do not overreact to adverse or unpleasant emotions. People who received mindfulness-based stress reduction intervention later reported less fear of emotions, anger expression, and emotion regulation difficulties compared to the control group (Keng et al., 2012; Robins et al., 2011). In another study, undergraduates who practiced mindfulness meditation for 7 weeks were able to disengage their attention from negative emotional stimuli (e.g., a 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). Similarly, Barlett and Anderson (2011) showed that reappraisal training over an 8-week period reduced trait vengeance.

A more recent study conducted by Garofalo et al. (2019) found there was an indirect effect between mindfulness and aggression through emotion dysregulation in both offender and community samples. In this study, difficulties in emotion regulation mediated the relations between all facets of mindfulness (except observing) and physical aggression, verbal aggression, anger, and hostility in the community sample. Nonjudging facet of mindfulness was negatively associated with verbal aggression. For the offender sample, difficulties in emotion regulation mediated the relations between all facets of mindfulness (except observing) and physical aggression, anger, and hostility. Contrary to the community sample, describing a facet of mindfulness was positively associated with verbal aggression in the offender sample. Garofalo et al. (2019, p. 68) suggested that the ability to describe one's inner experience (e.g., thoughts and feelings) could represent “a form of assertiveness or tendency to speak up,” but also pointed out that this interpretation should be taken with caution. Regardless, the overall results of the study support the evidence that impaired mindfulness, together with emotion dysregulation, could be a risk factor for aggression.

Finally, neurological studies also support the finding that mindfulness is related to better emotion regulation. Mindfulness meditation was associated with a decreased activation of the

amygdala in response to emotional stimuli (Goldin & Gross, 2010; Lutz et al., 2013). Similarly, mindful attention resulted in higher activation in brain areas that are associated with executive processing and inhibitory control, indicating that mindfulness can play a role in self-regulation processes (Lebois et al., 2015). Studies also showed that this kind of emotional reduction was more prominent among beginner mindfulness meditators (Tang et al., 2015), suggesting a promising effect of mindfulness on reducing emotional dysregulation and aggression.

### 1.2.2 | Rumination

Several specific emotion regulation strategies could be related to the mindfulness-aggression link. Many studies have focused on the role of rumination. For example, rumination mediated the negative relations between mindfulness and some trait aggression measures (e.g., 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 an anger-related associative network (Miller et al., 2003). Self-reported state mindfulness of industry workers was negatively correlated with state rumination; however, rumination did not moderate the relationship between hostility against the supervisor and supervisor-directed aggression (Study 3, Liang et al., 2018). At last, both trait and state mindfulness were associated with lower aggression, and these relations were mediated by anger rumination, demonstrating that rumination may play a role in the negative relation between mindfulness and aggression (Eisenlohr-Moul et al., 2016; Peters et al., 2015).

### 1.2.3 | Other emotion regulation strategies

In contrast, there is a relative lack of studies examining whether other commonly used emotion regulation strategies might mediate the relation between dispositional mindfulness and trait aggression. For instance, cognitive reappraisal is one of the most used emotion regulation strategies; it includes a thoughtful reconstruction of the emotional stimuli, such that the perceived emotional outcome of the event is altered (Gross, 1998). Such cognitive control is often identified as a part of the mindfulness-based emotion regulation process (Opialla et al., 2014). Considering that mindfulness is related to cognitive flexibility (Gallagher et al., 2010), it is plausible that mindfulness could be positively correlated with cognitive reappraisal. In support, past studies reported that dispositional mindfulness was positively associated with the use of cognitive reappraisal among Western industry workers (Hawkes & Neale, 2020; Study 1, Kay & Skarlicki, 2020). Likewise, a positive relation between dispositional mindfulness and trait cognitive reappraisal was also reported in the sample of young adults from Hong Kong (Cheung & Ng, 2020), as well as in

the sample of undergraduate students from the diverse ethnic backgrounds (Brockman et al., 2017). As noted earlier, reappraisal training that contained elements of mindfulness can reduce feelings of vengeance (Barlett & Anderson, 2011).

There are other emotion regulation strategies that could potentially mediate the association between mindfulness and aggression, such as *expressive suppression* and *reflection*. In one study, state mindfulness was negatively correlated with surface acting, which is related to expressive suppression (Liang et al., 2018). A high level of dispositional mindfulness was related to less use of expressive suppression among the sample of Western industry workers (Hawkes & Neale, 2020) and Chinese adolescents (Ma & Fang, 2019). However, no association was observed between mindfulness and expressive suppression among Chinese (Chen & Cheung, 2021) and Hispanic young adults (Cano et al., 2020), as well as among prison inmates in Nigeria (Ifeagwazi et al., 2019).

Reflection is an emotional regulation strategy through which people bring full awareness to their thoughts via self-focus, allowing them to make more precise judgments of their emotions and to adjust their affective states. Initial evidence suggests that reflection could be positively correlated with dispositional mindfulness (Harrington et al., 2014) because mindfulness is related to metacognitive insight (Teasdale, 1999; Teasdale et al., 2002). No published studies, however, have yet examined whether expressive suppression and reflection could mediate the mindfulness-aggression link.

In sum, mindfulness theoretically allows people to accept the negative emotions at their face value. This enables people to make more constructive behavioral responses to negative events that befall them because mindfulness in general can reduce the biased perception of the negative event (Kiken & Shook, 2012; Roemer et al., 2015). In turn, if mindfulness in general (or most specific facets of mindfulness) reduces aggression-related cognitive and affective risk factors for aggression, then they also should reduce aggressive behavior (e.g., the general aggression model (GAM), Anderson & Bushman, 2002). For example, the observing facet of mindfulness (Baer et al., 2006) might be positively (instead of negatively) associated with rumination over provocative events. If so, the GAM might predict a positive association between the observing facet and aggressive behavior, depending on the direction and size of "observing" on other risk and protective factors in the model.

However, some specific facets of mindfulness (described in Study 2) might not yield the intended changes in known aggression-producing mediating processes. As discussed previously, Tangney et al. (2017) reported that nonjudgement of self facet was related to more criminogenic thinking while controlling for emotion regulation. Yet some scholars (e.g., Garofalo et al., 2019) pointed out that the finding from Tangney et al. (2017) could be due to the measure-specific suppression effect derived from using the same instrument to measure mindfulness and emotion regulation (e.g., the high correlation between the

two constructs due to shared method). This suggested that further studies are needed to confirm the hypothesis that mindfulness could be associated with aggression, a proxy for criminogenic thinking.

### 1.3 | Goals of the present studies

The overarching goal of the two cross-sectional studies reported in this article was to explore the roles of different emotion regulation strategies in the relations among various aspects of mindfulness and aggression. In other words, these two studies were designed to test the viability of hypotheses that link mindfulness to aggression through several emotion regulation strategies. More specifically, we asked the following three questions: (1) Are all facets of mindfulness negatively associated with trait aggression? (2) What specific types or aspects of aggression are associated with mindfulness? (3) Do different emotion regulation strategies mediate the relations between mindfulness and aggression measures?

To answer the research questions, two studies were conducted. The first study tested whether dispositional mindfulness is negatively associated with trait aggression, and if so, whether rumination and cognitive reappraisal mediate that effect. These two emotion regulation strategies were of primary interest in Study 1 because they are commonly used emotion regulation strategies with empirical support.

The second study was designed to replicate and expand on Study 1, using a more diverse sample of participants and additional potential mediators. Study 2 used the Five-Facet Mindfulness Questionnaire (FFMQ) to capture five different facets of mindfulness. Four emotion regulation strategies (e.g., rumination, cognitive reappraisal, expressive suppression, reflection) were included as possible mediating variables to explore the role of emotion regulation in the relations between mindfulness and aggression. Study 2 also distinguished proactive and reactive modes of aggression to determine whether mindfulness relates differently to different modes of aggression, given that mindfulness is related to less reactive and defensive reactions to adverse emotions (Heppner et al., 2008).

We expected that mindfulness (and some facets of mindfulness) would be negatively associated with aggression measures. Cognitive reappraisal and reflection were expected to be positively correlated with mindfulness and negatively correlated with aggression, whereas rumination and expressive suppression were expected to have a negative association with mindfulness and positive relation with aggression. However, because of a lack of prior research on the exact direction and size of the associations for different mindfulness facets on known mediators of aggressive behavior, we consider these more specific tests (in Study 2) as exploratory. Finally, because of known sex differences in aggression (e.g., Björkqvist, 2018), additional multigroup analyses were conducted to check for possible sex differences in the variables of interest.

## 2 | STUDY 1

One primary goal of Study 1 was to replicate the previous research studies, which found 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<sup>1</sup> decreased aggression.

### 2.1 | Method

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

### 2.2 | Measures

#### 2.2.1 | 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 of 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 reliability in the current study was good (Cronbach's  $\alpha = .84$ ).

#### 2.2.2 | Rumination

Rumination was measured using the Rumination and Reflection Questionnaire (RRQ; 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 indicating greater rumination. A sample item is, "Sometimes it is hard for me to shut off thoughts about myself." The reliability in the current study was excellent (Cronbach's  $\alpha = .90$ ).

#### 2.2.3 | Cognitive reappraisal

The cognitive reappraisal subscale of the Emotion Regulation Questionnaire (Gross & John, 2003) was used. There are six items

in this subscale (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 the reappraisal measure in this study was good (Cronbach's  $\alpha = .84$ ).

## 2.2.4 | Aggression

Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992) was used to assess trait aggression. The four subscales of BPAQ yielded acceptable scale reliabilities: physical aggression (nine items; Cronbach's  $\alpha = .87$ ), verbal aggression (five items;  $\alpha = .79$ ), anger (eight items;  $\alpha = .85$ ), and hostility (eight items;  $\alpha = .85$ ). Higher scores indicate higher trait aggression levels.

## 2.3 | Results

### 2.3.1 | Descriptive statistics

Table 1 presents the descriptive statistics for all variables. Maximum likelihood estimation was used for the missing values.<sup>2</sup> 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 ( $r = -0.40$ ,  $p < .01$ ), but was not significantly correlated with cognitive reappraisal. Mindfulness was also significantly negatively related to all four trait aggression subscales: physical aggression ( $r = -.13$ ), verbal aggression ( $r = -0.25$ ), anger ( $r = -0.26$ ), and hostility ( $r = -0.36$ ), all  $ps < .01$ .

### 2.3.2 | Main analysis

Structural equation modeling was used to test the proposed mediation model,<sup>3</sup> as depicted in Figure 1. Latent modeling is used because of its advantage in adjusting the measurement errors and reflecting the true score variance from each indicator (Seo et al., 2015). 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 0.30 was chosen as the cutoff for acceptability (Kline, 2015), and no items were removed following this standard. In the final model, most indicators had a factor loading greater than 0.50, which met the recommended standards by Fornell and Larcker (1981). The overall fit of the model was assessed using  $\chi^2$  statistic, comparative fit index (CFI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA). According to past literature, a model is considered to have a good fit if CFI > 0.95, SRMR < 0.08 (Hu & Bentler, 1999), and RMSEA < 0.08 (Brown & Cudeck, 1998). The results indicated that the model for the present study achieved a good fit, with  $\chi^2(149) = 301.329$ ,  $p < .001$ , CFI = 0.96, SRMR = 0.05, RMSEA = 0.06 (90% confidence interval [CI] = 0.05, 0.07).

Mindfulness was associated with lower levels of rumination ( $\beta = -.47$ , SE = 0.07,  $p < .001$ ). The path between mindfulness and cognitive reappraisal, however, was not significant ( $\beta = .10$ , SE = 0.11,  $p = .37$ ).

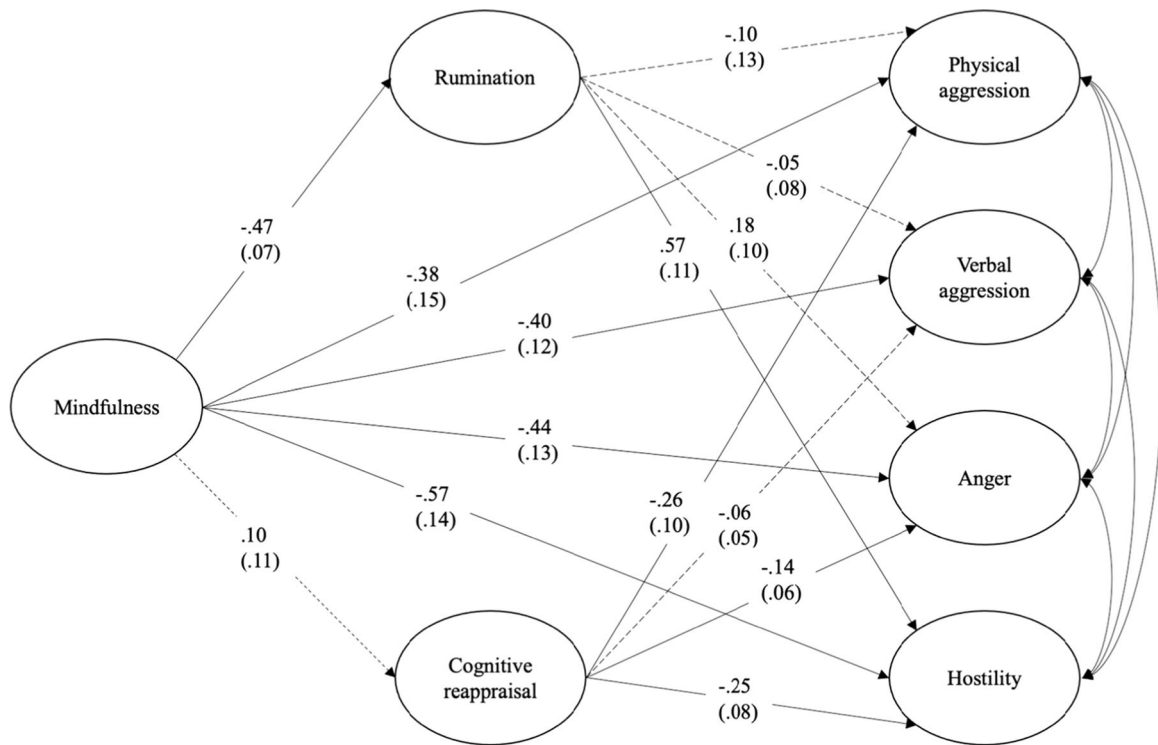
Bootstrapped CIs (95%) were computed using Mplus for mediation analysis, with 10,000 samples. Results indicated that rumination mediated the relation between mindfulness and hostility,  $\beta = -.15$ , SE = 0.03, 95% CI (-0.21, -0.08). Cognitive reappraisal did not mediate the relations between mindfulness and any of the four trait aggression measures. Table 2 shows the summary of the mediation analysis.

**TABLE 1** Correlations and descriptive statistics for study 1 ( $n = 313$ )

	1	2	3	4	5	6	7
1. Mindfulness	-						
2. Rumination	-.40**	-					
3. Cognitive reappraisal	.06	-.17**	-				
4. Physical agg.	-.13**	.07	-.19**	-			
5. Verbal agg.	-.25**	.10	-.06	.50**	-		
6. Anger	-.26**	.26**	-.14*	.66**	.56**	-	
7. Hostility	-.36**	.44**	-.22**	.40**	.39**	.54**	-
M	3.82	3.55	5.13	2.62	3.32	2.54	2.98
(SD)	(0.71)	(0.68)	(0.91)	(1.20)	(1.22)	(1.12)	(1.22)
Skewness	-0.54	-0.34	-0.53	0.88	0.46	1.34	0.37
Kurtosis	0.79	0.18	1.25	0.59	-0.27	2.31	-0.58

\* $p < .05$ .

\*\* $p < .01$ .



**FIGURE 1** Model for Study 1, with path coefficients. Significant paths ( $p < .05$ ) are marked with solid lines. Standardized estimates and standard errors (in brackets) are given for each path.

**TABLE 2** Mediation analysis results for Study 1

Path	$\beta$	SE	95% CI
<i>Predicting physical aggression (PA)</i>			
Mindfulness → rumination → PA	.024	0.032	[-0.039, 0.088]
Mindfulness → cognitive reappraisal → PA	-0.014	0.016	[-0.044, 0.017]
<i>Predicting verbal aggression (VA)</i>			
Mindfulness → rumination → VA	.022	0.034	[-0.046, 0.089]
Mindfulness → cognitive reappraisal → VA	-0.006	0.008	[-0.022, 0.011]
<i>Predicting anger</i>			
Mindfulness → rumination → anger	-0.058	0.031	[-0.118, 0.002]
Mindfulness → cognitive reappraisal → anger	-0.009	0.010	[-0.029, 0.010]
<i>Predicting hostility (Hos)</i>			
Mindfulness → rumination → Hos	<b>-0.149***</b>	0.033	[-0.213, -0.084]
Mindfulness → cognitive reappraisal → Hos	-0.014	0.015	[-0.042, 0.015]

Abbreviation: CI, confidence interval.

\*\*\* $p < .001$ .

### 2.3.3 | Sex effects

Although sex differences are not of primary interest, a multigroup analysis was conducted to test whether there were significant differences in path coefficients for males and females. The  $\chi^2$  difference between constrained and unconstrained models revealed that there were no sex differences in path coefficients ( $\Delta\chi^2 = 11.524$ ,  $\Delta df = 10$ ,  $p = .32$ ).

### 2.4 | Discussion

As hypothesized, there was a negative association between mindfulness and rumination, which replicated the findings from previous research studies that mindfulness was related to lower rumination (e.g., Borders et al., 2010). Mindfulness, however, was not related to cognitive reappraisal. Replicating past research

findings that mindfulness is related to less aggression (e.g., Denson, 2015; Heppner et al., 2008), the present study found that mindfulness was negatively related to all trait aggression measures (e.g., physical aggression, verbal aggression, anger, and hostility).

Higher scores on the mindfulness scale were associated with less use of rumination, which suggests that people who have a higher level of mindfulness are less likely to report that they use rumination as an emotion regulation strategy. Rumination partially mediated the relation between mindfulness and hostility, similar to past studies (e.g., Borders et al., 2010).

Although cognitive reappraisal was negatively associated with three of the four trait aggression subscales, it was not a significant mediator of the relations between mindfulness and trait aggression measures. It may be, however, that the MAAS is not particularly sensitive to the full range of attributes that constitute mindfulness, so the failure of mediation through cognitive reappraisal cannot definitively be established. Study 2 provides additional tests.

### 3 | STUDY 2

There were several goals of Study 2. The first goal was to conceptually replicate the results of Study 1 using a community sample with a broader age range and demographic characteristics than the Study 1 college student sample. It also used a different tool to measure facets of mindfulness. This was done to address potential problems of the mindfulness instrument used in Study 1 (e.g., MAAS), which has been criticized by some scholars for its lack of sensitivity (Brown et al., 2011; Grossman, 2011; Van Dam et al., 2010). Finding similar results across the two studies would also increase the generalizability.

The second goal was to test whether all facets of mindfulness would be associated with lower aggression through the same mediators. Specifically, Study 2 examined the relations between five facets of mindfulness and trait aggression measures. In addition, Study 2 expanded the possible role played by mindfulness on emotion regulation by further considering reflection and expressive suppression, two other commonly used emotion regulation strategies.

Study 2 further explored the role of rumination on the mindfulness-aggression link by focusing on whether anger rumination, is defined as a specific type of rumination where one focuses on reiterating past events related to anger (Sukhodolsky et al., 2001), would mediate the relation between mindfulness and aggression. Furthermore, Study 2 differentiated aggression by its function (e.g., proactive vs. reactive) in addition to 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).

### 3.1 | Method

U.S. adults proficient 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 ( $M_{\text{age}} = 32.78$ ,  $SD = 11.79$ ). About 54% of the participants were females ( $n = 250$ ). Most 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 (\$2.50) for their participation. The study was approved by the university's IRB; all participants were treated in accordance with APA ethical guidelines.

### 3.2 | Measures

#### 3.2.1 | Mindfulness

The FFMQ (Baer et al., 2006) was used to measure mindfulness. The FFMQ is a 39-item scale composed of five subscales: (1) observing (e.g., the ability to notice and attend to bodily sensations, perceptions, cognitions, and feelings), (2) describing (e.g., the ability to verbally label the inner experience), (3) acting with awareness (e.g., the ability to act with deliberate thoughts and concentration, or not to mind-wander), (4) nonjudging of inner experience (e.g., the tendency not to evaluate certain feelings as good or bad), and (5) nonreactivity to inner experience (e.g., the ability to perceive the inner experience without objecting to it). 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 scores 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 good scale reliability (Cronbach's  $\alpha = .91$ ). The reliability of each subscale was also acceptable (observing = 0.81, describing = 0.89, acting = 0.91, nonjudging = 0.93, and nonreactivity = 0.84).

#### 3.2.2 | Rumination

The same rumination subscale from the Rumination and Reflection Questionnaire (Trapnell & Campbell, 1999) used in Study 1 was used. The scale reliability was 0.95.

#### 3.2.3 | Reflection

The reflection subscale (12 items) from the Rumination and Reflection Questionnaire (Trapnell & Campbell, 1999) was used to measure reflection. This subscale uses a Likert-type format, in which

participants rate the extent to which they agree with each statement (e.g., "I'm very self-inquisitive by nature") on a 5-point scale (1 = strongly disagree, 5 = strongly agree). The reliability for the reflection subscale was 0.93.

### 3.2.4 | Cognitive reappraisal

Cognitive reappraisal was measured using the same scale used in Study 1. For this sample, the Cronbach's  $\alpha$  was .84.

### 3.2.5 | Expressive suppression

Expressive suppression was measured using the subscale by the same name from the Emotion Regulation Questionnaire (Gross & John, 2003). This subscale was composed of four 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."

### 3.2.6 | 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, (2) thoughts of revenge, (3) angry memories, and (4) understanding of causes. The scale is rated on a 4-point Likert type scale (1 = almost never, 4 = almost always). A higher score means higher trait anger rumination. The scale showed good reliability in this study with Cronbach's  $\alpha$  = .95.

### 3.2.7 | Aggression

As in Study 1, the BPAQ (Buss & Perry, 1992) was used to measure four aspects of trait aggression: physical aggression (Cronbach's  $\alpha$  = .85), verbal aggression ( $\alpha$  = .80), hostility ( $\alpha$  = .84), and anger ( $\alpha$  = .85).

Proactive and reactive aggression was measured by the aggressive behavior subscales from the Aggressive and Prosocial Behavior Questionnaire (APBQ; Boxer et al., 2004). 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 hit 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 consistencies were adequate, with Cronbach's  $\alpha$  of .86 for proactive and .90 for reactive aggressive behavior.

## 3.3 | Results

### 3.3.1 | 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 the observing subscale, which was negatively related to the nonjudging subscale ( $r = -.11$ ,  $p < .01$ ).

### 3.3.2 | Main analysis

A structural equation model (shown in Figure 2) 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).<sup>4</sup> Five facets of mindfulness were allowed to correlate with one another, and so were trait aggression measures. The model fit the data adequately,  $\chi^2(593) = 1128.21$ ,  $p < .05$ , CFI = 0.96, SRMR = 0.05, and RMSEA = 0.044 (90% CI = 0.040, 0.048).

*Facets predicting trait aggression:* The nonjudging facet of mindfulness was significantly associated with all trait aggression measures. Specifically, nonjudging predicted lower levels of physical aggression ( $\beta = -.21$ , SE = 0.08,  $p = .008$ ), verbal aggression ( $\beta = -.19$ , SE = 0.09,  $p = .034$ ), anger ( $\beta = -.22$ , SE = 0.10,  $p = .022$ ), and hostility ( $\beta = -.31$ , SE = 0.07,  $p < .001$ ). For other facets of mindfulness, acting with awareness predicted less anger ( $\beta = -.28$ , SE = 0.09,  $p = .002$ ). Interestingly, the observing facet of mindfulness was positively associated with hostility ( $\beta = .16$ , SE = 0.07,  $p = .025$ ).

*Facets predicting emotion regulation mediating variables:* Most facets of mindfulness predicted rumination. Nonjudging ( $\beta = -.41$ , SE = 0.05), nonreactivity ( $\beta = -.30$ , SE = 0.05), and acting with awareness ( $\beta = -.23$ , SE = 0.05) predicted less rumination (all  $ps < .001$ ). Contrary to other facets of mindfulness, observing was associated with higher levels of rumination use,  $\beta = .18$ , SE = 0.05,  $p < .001$ . The path between describing and rumination was not significant,  $\beta = -.08$ , SE = 0.04,  $p = .056$ .

Among the five facets of mindfulness, observing ( $\beta = .49$ , SE = 0.07,  $p < .001$ ) and describing ( $\beta = .13$ , SE = 0.06,  $p = .04$ ) were significantly positively related to reflection. Nonjudging, nonreactivity, and acting with awareness did not predict reflection (all  $ps > .05$ ).

Only the nonreactivity facet of mindfulness was significantly associated with cognitive reappraisal,  $\beta = .53$ , SE = 0.05,  $p < .001$ . The other facets (e.g., observing, describing, nonjudging, and acting with awareness) yielded nonsignificant associations with cognitive reappraisal.

Expressive suppression was predicted by all facets of mindfulness, though the direction of the relation was not uniform. Observing ( $\beta = -.18$ , SE = 0.07,  $p = .011$ ), describing ( $\beta = -.52$ , SE = 0.06,  $p < .001$ ), and nonjudging ( $\beta = -.36$ , SE = 0.07,  $p < .001$ ) predicted less expressive suppression. In contrast, nonreactivity ( $\beta = .33$ , SE = 0.07,



**TABLE 3** Correlations and descriptive statistics for Study 2 ( $n = 460$ )

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Observing	-															
2. Describing	.25**	-														
3. Nonjudging	-.11*	.24**	-													
4. Nonreactivity	.31**	.26**	.23**	-												
5. Acting with awareness	.10*	.43**	.51**	.21**	-											
6. Rumination	.05	-.31**	-.62**	-.38**	-.52**	-										
7. Reflection	.44**	.24**	-.02	.16**	.08	.08	-									
8. Cognitive reappraisal	.29**	.27**	.19**	.49**	.23**	-.27**	.21**	-								
9. Expressive suppression	-.11*	-.42**	-.24**	.05	-.15**	.14**	-.01*	-.01	-							
10. Anger rumination	.12**	-.20**	-.54**	-.26**	.38**	.64**	.14**	-.14**	.15**	-						
11. Physical agg.	.04	-.12*	-.23**	-.04	-.18**	.13**	.00	-.05	.14**	.45**	-					
12. Verbal agg.	.15**	-.05	-.21**	.01	-.13**	.17**	.16**	-.05	-.02	.34**	.44**	-				
13. Anger	.06	-.16**	-.37**	-.15**	-.36**	.34**	-.03	-.14**	.02	.51**	.48**	.43**	-			
14. Hostility	.08	-.28**	.52**	-.22**	-.34**	.48**	-.02	-.20**	.30**	.64**	.48**	.32**	.54**	-		
15. Reactive agg.	-.06	-.08	-.18**	-.07	-.20**	.04	-.05	-.10*	.01	.29**	.49**	.33**	.35**	.32**	-	
16. Proactive agg.	.01	-.08	-.29**	-.16**	-.22**	.19**	-.05	-.16**	.01	.49**	.67**	.51**	.57**	.48**	.66**	-
M	3.29	3.39	3.24	3.01	3.40	3.47	3.37	4.77	3.91	2.17	2.13	2.62	2.67	2.58	1.38	1.87
(SD)	(0.68)	(0.78)	(0.95)	(0.70)	(0.83)	(0.93)	(0.85)	(1.06)	(1.37)	(0.72)	(0.83)	(0.89)	(0.49)	(0.96)	(0.74)	(0.93)
Skewness	0.05	0.05	-0.16	0.09	-0.10	-0.50	-0.25	-0.75	-0.20	0.18	0.64	0.31	0.30	0.20	2.75	1.15
Kurtosis	.19	-.49	-.46	.28	-.42	-.34	-.44	.99	-.66	-.87	-.35	-.31	-.41	-.67	1.00	9.02

\* $p < .05$ .\*\* $p < .01$ .

$p < .001$ ) and acting with awareness ( $\beta = .23$ ,  $SE = 0.08$ ,  $p = .003$ ) predicted more expressive suppression. The full results can be found in the Supporting Information (see Supporting Information: Figures x.1-x.5).

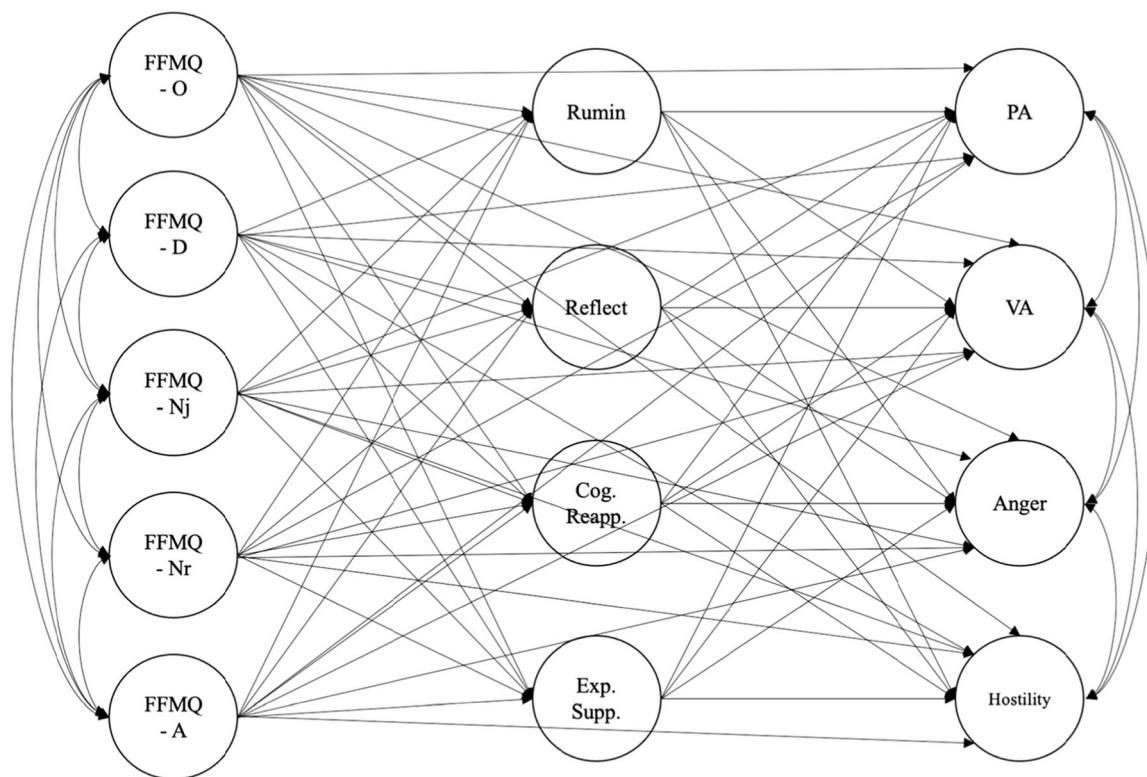
### 3.3.3 | Mediation analyses

As in Study 1, a mediation analysis was conducted using a bootstrap of 10,000 samples, with emotion regulation strategies mediating the relations between mindfulness facets and aggression measures. The observing facet of mindfulness predicted more verbal aggression through reflection ( $\beta = .07$ ,  $SE = 0.03$ , 95% CI [0.001, 0.133]). It also predicted more hostility ( $\beta = .04$ ,  $SE = 0.02$ , 95% CI [0.006, 0.070]) through rumination. Observing further predicted less hostility through expressive suppression ( $\beta = -.04$ ,  $SE = 0.02$ , 95% CI [-0.078, -0.002]).

Nonjudging ( $\beta = -.09$ ,  $SE = 0.03$ , 95% CI [-0.146, -0.025]), nonreactivity ( $\beta = -.06$ ,  $SE = 0.02$ , 95% CI [-0.109, -0.018]), and acting with awareness ( $\beta = -.05$ ,  $SE = 0.02$ , 95% CI [-0.085, -0.013])

predicted lower hostility via rumination. Expressive suppression mediated the relations between describing and hostility ( $\beta = -.11$ ,  $SE = 0.04$ , 95% CI [-0.184, -0.043]). The association between nonjudging and hostility was also mediated by expressive suppression ( $\beta = -.08$ ,  $SE = 0.03$ , 95% CI [-0.131, -0.026]). At last, nonreactivity ( $\beta = .07$ ,  $SE = 0.03$ , 95% CI [0.0019, 0.125]) and acting with awareness ( $\beta = .05$ ,  $SE = 0.02$ , 95% CI [0.008, 0.092]) predicted more hostility via expressive suppression. None of the other mediation effects were significant. Detailed path coefficients with standard errors and 95% CIs are shown in Table 4 and Supporting Information (see Supporting Information: Table x).

Having confirmed that rumination plays an important role in the relations between five facets of mindfulness and four trait aggression measures, we further explored the role of rumination by focusing on anger rumination. Another structural equation model with trait anger rumination as the mediator between five facets of mindfulness and aggression (reactive vs. proactive) was fitted (see Figure 3). The model fit statistics indicated that the model fits the current study data adequately,  $\chi^2(181) = 534.33$ ,  $p < .05$ , CFI = 0.95, SRMR = 0.06, and RMSEA = 0.065 (90% CI = 0.059, 0.072).



**FIGURE 2** First model for Study 2, without path coefficients. A, acting with awareness; Cog. Reapp., cognitive reappraisal; D, describing; Exp. Supp., expressive suppression; FFMQ, Five-Facet Mindfulness Questionnaire; Nj, nonjudging; Nr, nonreactivity; O, observing; PA, physical aggression; Reflect, reflection; Rumin, rumination; VA, verbal aggression.

Trait anger rumination was predicted by the mindfulness facets observing ( $\beta = .20$ ,  $SE = 0.06$ ,  $p = .001$ ), nonjudging ( $\beta = -.37$ ,  $SE = 0.05$ ,  $p < .001$ ), and nonreactivity ( $\beta = -.26$ ,  $SE = 0.06$ ,  $p < .001$ ). Describing ( $\beta = -.03$ ,  $SE = 0.05$ ,  $p = .547$ ) and acting with awareness ( $\beta = -.10$ ,  $SE = 0.05$ ,  $p = .081$ ) did not predict trait anger rumination. Observing ( $\beta = -.16$ ,  $SE = 0.07$ ,  $p = .021$ ) and acting with awareness ( $\beta = -.12$ ,  $SE = 0.06$ ,  $p = .045$ ) predicted less proactive aggression. No facets of mindfulness, however, directly predicted lower reactive aggression.

A mediation analysis was conducted with a bootstrap of 10,000 samples. Observing predicted more reactive aggression via trait anger rumination,  $\beta = .09$ ,  $SE = 0.003$ , 95% CI (0.030, 0.140). The relation between the nonjudging facet of mindfulness and reactive aggression was mediated by trait anger rumination,  $\beta = -.20$ ,  $SE = 0.04$ , 95% CI (-0.282, -0.123). The path from nonreactivity to reactive aggression was also mediated by trait anger rumination,  $\beta = -.10$ ,  $SE = 0.023$ , 95% CI (-0.158, -0.048).

For proactive aggression, the observing-proactive aggression path was mediated by trait anger rumination ( $\beta = .06$ ,  $SE = 0.02$ , 95% CI [0.014, 0.095]). The relation between nonjudging and proactive aggression was also fully mediated by the trait anger rumination,  $\beta = -.13$ ,  $SE = 0.03$ , 95% CI (-0.192, -0.069), as was the relation between nonreactivity and proactive aggression,  $\beta = -.07$ ,  $SE = 0.02$ , 95% CI (-0.108, -0.024). A summary of the mediation analysis is presented in Table 5.

### 3.3.4 | Sex effects

As in Study 1, additional multigroup analysis was conducted to test for sex differences in paths analyzed in Study 2. There were some significant sex differences. For example, observing the facet of mindfulness was more strongly related to expressive suppression for females than for males ( $\Delta\chi^2 = 66.35$ ,  $\Delta df = 42$ ,  $p < .01$ ). On the other hand, acting with the awareness facet was more strongly related to expressive suppression for males ( $\Delta\chi^2 = 66.31$ ,  $\Delta df = 42$ ,  $p < .01$ ). Acting with awareness was more closely associated with reflection for females compared to males ( $\Delta\chi^2 = 64.68$ ,  $\Delta df = 42$ ,  $p = .013$ ). The relation between describing facet and reflection was, however, stronger for males than for females ( $\Delta\chi^2 = 64.49$ ,  $\Delta df = 42$ ,  $p = .014$ ).

In addition, the association between rumination and physical aggression was stronger for males than for females ( $\Delta\chi^2 = 64.03$ ,  $\Delta df = 42$ ,  $p = .016$ ). Females showed a stronger relation between expressive suppression and physical aggression ( $\Delta\chi^2 = 66.34$ ,  $\Delta df = 42$ ,  $p < .01$ ), as well as the relation between expressive suppression and anger ( $\Delta\chi^2 = 66.32$ ,  $\Delta df = 42$ ,  $p < .01$ ). Finally, females had a stronger association for the path between trait anger rumination and acting with awareness facet of mindfulness ( $\Delta\chi^2 = 64.84$ ,  $\Delta df = 42$ ,  $p = .013$ ).

Path	$\beta$	SE	95% CI
<i>Predicting hostility (Hos)</i>			
Observing → rumination → Hos	.038*	0.016	[0.006, 0.070]
Observing → reflection → Hos	-.034	0.027	[-0.086, 0.018]
Observing → cognitive reappraisal → Hos	-.003	0.008	[-0.018, 0.012]
Observing → expressive suppression → Hos	-.039*	0.020	[-0.078, -0.002]
Describing → rumination → Hos	-.017	0.011	[-0.040, 0.005]
Describing → reflection → Hos	-.009	0.008	[-0.025, 0.007]
Describing → cognitive reappraisal → Hos	-.004	0.006	[-0.015, 0.008]
Describing → expressive suppression → Hos	-.113**	0.036	[-0.184, -0.043]
Nonjudging → rumination → Hos	-.086**	0.031	[-0.146, -0.025]
Nonjudging → reflection → Hos	-.002	0.006	[-0.013, 0.009]
Nonjudging → cognitive reappraisal → Hos	-.004	0.007	[-0.018, 0.009]
Nonjudging → expressive suppression → Hos	-.079***	0.027	[-0.131, -0.026]
Nonreactivity → rumination → Hos	-.063**	0.023	[-0.109, -0.018]
Nonreactivity → reflection → Hos	.003	0.007	[-0.010, 0.016]
Nonreactivity → cognitive reappraisal → Hos	-.038	0.030	[-0.096, 0.020]
Nonreactivity → expressive suppression → Hos	.072**	0.027	[0.019, 0.125]
Acting with awareness → rumination → Hos	-.049**	0.018	[-0.085, -0.013]
Acting with awareness → reflection → Hos	.003	0.006	[-0.009, 0.015]
Acting with awareness → cognitive reappraisal → Hos	-.005	0.007	[-0.019, 0.008]
Acting with awareness → expressive suppression → Hos	.050*	0.021	[0.008, 0.092]

Abbreviation: CI, confidence interval.

\* $p < .05$ .; \*\* $p < .01$ .; \*\*\* $p < .001$ .

**TABLE 4** Mediation analysis results for Study 2 (predicting hostility), the first model

### 3.4 | Discussion

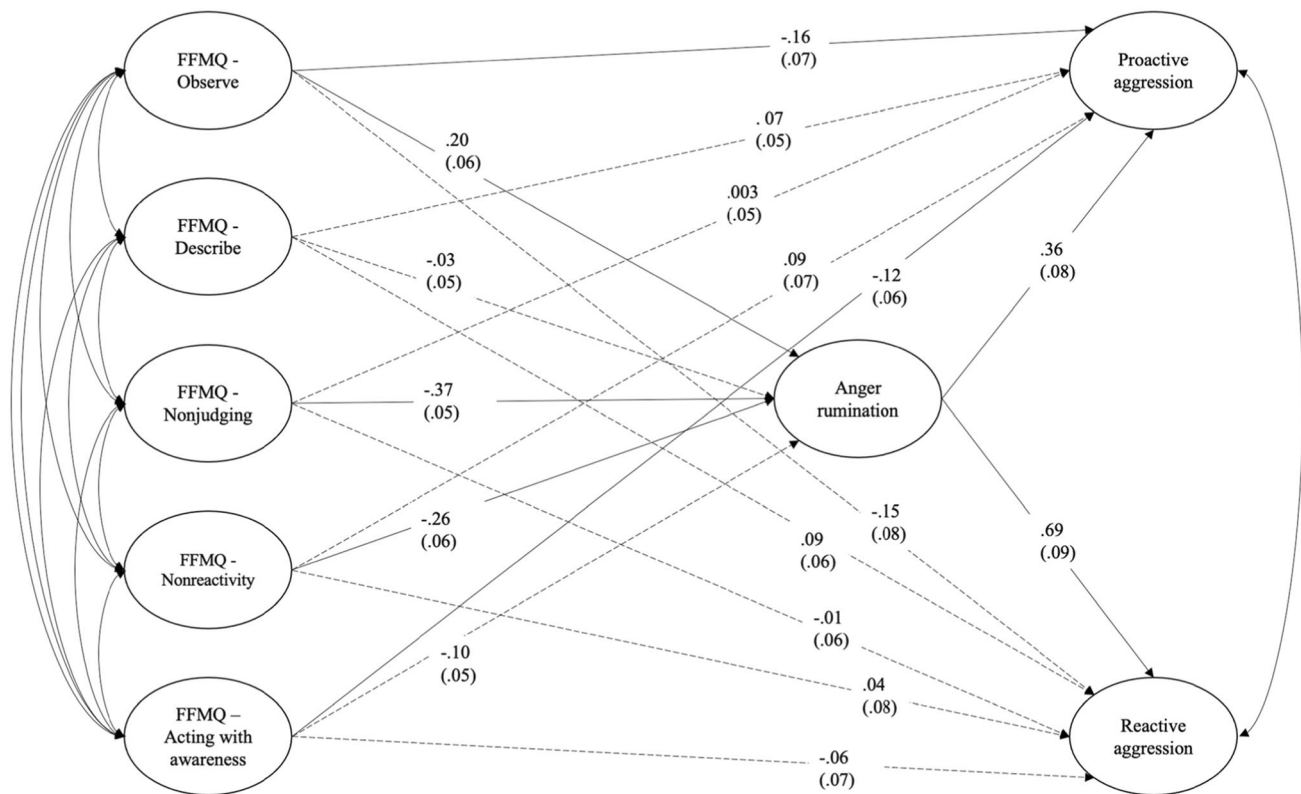
The observing facet of mindfulness has consistently shown correlational patterns that are different from other facets of mindfulness. For example, observing was negatively associated with nonjudging facet of mindfulness, which was also reported in previous studies (e.g., Siegling & Petrides, 2016). Rumination was negatively associated with most subscales of FFMQ except for observing. Observing was positively associated with verbal aggression, and this relation was mediated by reflection. One possible explanation is that people who use reflection are also more capable of understanding the negative event and how it affected them, thus allowing people to think more about the negative consequences that they may not deserve. This is supported by the finding that mindfulness predicted more verbal defensiveness (Lahey et al., 2008).

Similarly, observing again predicted more hostility via rumination. The results from the second model demonstrate that people who are high on the observing facet of mindfulness were more likely to engage in anger rumination, which is related to more reactive and proactive aggression, consistent with the finding that observing was correlated with both anger rumination and anger (Peters et al., 2015).

These results suggest that the observing facet of mindfulness may not contribute to lower trait aggression when rumination is taken into account.

Cognitive reappraisal was not associated with most facets of mindfulness. This lack of association could indicate that not all aspects of mindfulness enhance the use of emotion regulation strategies that are commonly considered adaptive, such as cognitive reappraisal. On the other hand, the correlations between mindfulness facets and expressive suppression were mixed. Some facets (e.g., observing, describing, and nonjudging) predicted less use of expressive suppression. However, nonreactivity and acting with awareness were associated with 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 them. Similarly, it is possible that people who are better at acting deliberately are also more purposeful in dissipating the emotions being experienced.

Finally, higher levels of nonjudging and nonreactivity facets of mindfulness were associated with less use of anger rumination, which was related to less reactive and proactive aggression. These results demonstrate that mindfulness is associated with not only less



**FIGURE 3** Second model for Study 2, with path coefficients. Significant paths ( $p < .05$ ) are marked with solid lines. Standardized estimates and standard errors (in brackets). FFMQ, Five-Facet Mindfulness Questionnaire.

reactive aggression, but also less proactive aggression. Mindfulness-based interventions were predominantly considered as a mean to reduce reactive aggression only (e.g., Denson, 2015; Miller et al., 2020), as many of these interventions proposed that mindfulness training can enhance self-control and behavioral regulation, which in turn will reduce reactivity (but not necessarily proactive) aggression. However, no facet of mindfulness was directly related to reactive aggression. Instead, several facets of mindfulness were associated with both low reactive and proactive aggression through anger rumination, suggesting that mindfulness could predict less aggression in general (e.g., both reactive and proactive) through emotion regulation. The results from Study 2 point to the possibility that mindfulness may decrease not only reactive aggression but also proactive aggression.

## 4 | GENERAL DISCUSSION

Both Studies 1 and 2 demonstrated that trait mindfulness is generally associated with lower trait aggression. When each facet of mindfulness was considered, certain subtraits of mindfulness were more strongly related to aggression than others. Nonjudging predicted less physical aggression, verbal aggression, anger, and hostility, demonstrating that the nonjudging may be primarily responsible for lower aggression among people with high dispositional mindfulness. Nonjudging also predicted less proactive and

**TABLE 5** Mediation analysis results for Study 2, the second model

Path	$\beta$	SE	95% CI
<i>Predicting reactive aggression (Re)</i>			
Observing → AR → Re	.085**	0.003	[0.030, 0.140]
Describing → AR → Re	-.014	0.024	[-0.060, 0.032]
Nonjudging → AR → Re	-.202***	0.040	[-0.282, -0.123]
Nonreactivity → AR → Re	-.103***	0.028	[-0.158, -0.048]
Acting with awareness → AR → Re	-.047	0.029	[-0.103, 0.009]
<i>Predicting proactive aggression (Pro)</i>			
Observing → AR → Pro	.055**	0.021	[0.014, 0.095]
Describing → AR → Pro	-.009	0.015	[-0.039, 0.021]
Nonjudging → AR → Pro	-.130***	0.032	[-0.192, -0.069]
Nonreactivity → AR → Pro	-.066**	0.022	[-0.108, -0.024]
Acting with awareness → AR → Pro	-.030	0.019	[-0.068, 0.007]

Abbreviation: AR, CI, anger rumination; confidence interval.

\* $p < .05$ .; \*\* $p < .01$ .; \*\*\* $p < .001$ .

reactive aggression via anger rumination. Other studies have similarly indicated that nonjudging is the strongest predictor of lower aggressiveness among the five facets of mindfulness (e.g., Brem et al., 2019; Hesse et al., 2019). This is somewhat different

from the finding that nonjudgment of self facet of mindfulness was associated with more criminogenic cognition (Tangney et al., 2017). In the present study, nonjudging appears to be the most prominent facet of mindfulness in the relation between mindfulness and aggression, which reflects the previous finding that 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., Eisenlohr-Moul et al., 2016).

The observing facet of mindfulness was a inconsistent component in both studies. Contrary to other facets of mindfulness, observing predicted more traits of verbal aggression and hostility, and these relations were mediated by reflection and rumination, respectively (Study 2), although observing was associated with lower hostility via expressive suppression. Observing also predicted more reactive and proactive aggression via anger rumination. Observing seems to be the oddball aspect of mindfulness in being associated with higher rather than lower aggression.

Why does observing show this unexpected pattern? It could be argued that highly observing people may have poor emotion regulation because they are aware of their own emotions in a self-critical manner, and observing may lead to "self-critical ruminative self-focus" (Lilja et al., 2012), which is further related to a higher level of aggression.

Another potential explanation for the positive link between observing facets of mindfulness and aggression lies in the questionnaire items. Other scholars have expressed some concerns about the construct validity of the observing facet of the FFMQ (e.g., Baer et al., 2008). Also, the observation has shown unexpected positive correlations with psychological symptoms such as anxiety and depression (e.g., Baer et al., 2006). Yet other studies found that the observing facet 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; Desrosiers 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 facets of FFMQ in some studies (e.g., Petrocchi & Ottaviani, 2016), suggesting that the observing facet in FFMQ may have poor convergent validity (Goldberg et al., 2016). Belzer et al. (2012) argued that items for measuring observing facets in FFMQ might be interpreted differently by people who are not familiar with mindfulness. Indeed, most items for observing subscale are about external or bodily sensations (e.g., taking a shower or bath), with no reference to emotion.

Yet another possibility is that observing is a first step taken as one gains mindfulness skills, but that heightened observation alone without improved nonreactivity skills exacerbates problems until more progress in mindfulness skills 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.

As for emotion regulation strategies, Study 1 did not find a significant regression path between mindfulness and cognitive

reappraisal. In Study 2, reflection and cognitive reappraisal did not mediate the mindfulness-aggression link. On the other hand, rumination and expressive suppression mediated the relations between mindfulness and trait hostility (Study 2). Moreover, trait anger rumination mediated the relations between observing, nonjudging, and nonreactivity and pro-and reactive aggression. Mindfulness trains people to allow emotions to arise and pass without reactivity or spinning out a story (Brown & Ryan, 2003). People with high dispositional mindfulness 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 might explain why reflection and cognitive reappraisal did not play an important role in the relation between mindfulness and aggression.

In terms of different types of trait aggression, it appears that hostility is the subset of trait aggression that is most often related to mindfulness facets as well as emotion regulation, similar to what previous studies have reported (e.g., Brown & Ryan, 2003; Wright et al., 2009). That is, people who scored higher on trait mindfulness reported lower levels of hostility, and these relations were often correlated with less use of rumination and expressive suppression. In contrast, more obvious and visible forms of aggression, such as physical and verbal aggression, are relatively less associated with mindfulness facets and emotion regulation strategies.

Furthermore, contrary to the initial hypotheses, Study 2 found that no facets of mindfulness were directly related to reactive aggression. Rather, people with higher levels of nonjudging and nonreactivity used less anger rumination and reported lower levels of both proactive and reactive aggression. Previous studies predominantly focused on the link between mindfulness and reactive aggression with a focus on self-regulation, and relatively less attention was paid to proactive aggression. However, Study 2 results demonstrate that mindfulness, through emotion regulation, can be associated with less reactive and proactive aggression. In sum, both Study 1 and Study 2 suggest that mindfulness is not limited to one specific mode of aggression when emotion regulation strategies are considered; that is, mindfulness is related to lower level of aggression in general when emotion regulation strategies are considered. Future studies should consider how mindfulness may be related to less proactive aggression in different context.

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 exclusively relied on cross-sectional self-reported data. To reduce the potential biases, a behavioral measure of aggression could add to the validity of the finding (Fix & Fix, 2013). In addition, because both studies are cross-sectional, weCr cannot draw conclusions on causality (e.g., mindfulness reducing aggression via emotion regulation) or the directionality of the model (e.g., mindfulness precedes emotion regulation). That is, the current study findings do not provide direct evidence for the effectiveness of mindfulness-based intervention in reducing aggression, as

inferences on causality cannot be drawn based on one-time questionnaire-based cross-sectional studies. Nonetheless, considering the fact that the nonjudging of inner experience facet of mindfulness was consistently related to lower trait aggression measures, future longitudinal and experimental studies should examine the mindfulness-nonjudging facet-aggression link to better test mindfulness-based interventions such as mindfulness-based stress reduction (Chiesa & Serretti, 2009). Further experimental and longitudinal studies examining other specific facets of mindfulness would also be profitable.

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. At last, 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.

Despite the acknowledged limitations of the study, this study has important implications for mindfulness training. We found that the negative relation between mindfulness and aggression is mediated by less use of rumination and expressive suppression, not by more use of reflection and cognitive reappraisal. Knowing which particular emotion regulation strategies are correlated with mindfulness and aggression will be helpful in identifying characteristics of people high on mindfulness as well as possible outcomes of mindfulness training.

In addition, we also found that not all facets of mindfulness are related to lower aggression, and that hostility is more closely associated with mindfulness than other forms of aggression. Reactive versus a proactive form of aggression are both related to a lower level of two facets of mindfulness (e.g., nonjudging and nonreactivity), which further support the previous finding that mindfulness is related to a lower level of aggression in general (Borders et al., 2010; Brown & Ryan, 2003; Fresnics & Borders, 2016; Heppner et al., 2008; Wright et al., 2009 et al., 2008; Wright et al., 2009). In sum, these findings point to the possibility that inducing mindfulness may be helpful in externalizing problems (e.g., aggression) via the utilization of certain emotional regulation strategies.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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## ENDNOTES

- <sup>1</sup> The term "predict" in this study is used in a statistical sense, not meant to imply a causal relationship.
- <sup>2</sup> About 0.06% of the data was missing.
- <sup>3</sup> A moderation (vs. mediation) model where rumination and cognitive reappraisal moderate the relations between mindfulness and aggression measures was also used as a competitive statistical model. The moderation model, however, yielded a poorer model fit, with CFI = 0.92, SRMR = 0.17, RMSEA = 0.05 (90% CI = 0.04, 0.05). Thus, the mediation model was considered most appropriate for the data.
- <sup>4</sup> As in Study 1, a moderation analysis where emotion regulation strategies (e.g., rumination, reflection, cognitive reappraisal, expressive suppression) moderate the relations between mindfulness and aggression measures was also conducted. The fit of the resulting model was rather poor, CFI < 0.90, SRMR = 0.29, and RMSEA = 0.45, providing additional support for our mediation hypothesis rather than moderation.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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