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RESEARCH ARTICLE

Emotion regulation mediates relationships between mindfulness facets and aggression dimensions

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Abstract

Recent years have witnessed an increase of research on socio-affective factors that can explain individual differences in aggressive tendencies across community and offender populations. Specifically, mindfulness and emotion regulation have emerged as important factors, which could also constitute important prevention and treatment targets. Yet, recent studies have advanced the possibility that mindfulness may also have a “dark” side, being associated with increased levels of aggression-related variables, especially when accounting for the variance associated with emotion regulation. The present study sought to elucidate relationships among mindfulness, emotion regulation, and aggression dimensions (i.e., verbal and physical aggression, anger, and hostility) across violent offender ($N = 397$) and community ($N = 324$) samples. Results revealed expected associations between both mindfulness and emotion regulation and aggression dimensions, such that greater impairments in mindfulness and emotion regulation were related to increased levels of aggression across samples. Further, analyses of indirect effects revealed that a latent emotion dysregulation factor accounted for (i.e., mediated) relationships between mindfulness facets and aggression dimensions in both samples. Previously reported positive associations between the residual variance in mindfulness scales (i.e., controlling for emotion regulation) and aggression-related variables were not replicated in the current samples. Taken together, findings suggest that mindfulness and emotion regulation have unequivocal relations with lower levels of aggression, and should therefore be considered as relevant targets for prevention and treatment programs aimed at reducing aggressive tendencies.

KEYWORDS

anger, emotion dysregulation, hostility, mindfulness, violence

1 | INTRODUCTION

Aggression is a natural disposition of the human species (McCall & Shields, 2008) that, at its most extreme, poses a huge burden on society (Waters et al., 2004). Recent years have witnessed an increase in research on socio-affective factors and processes that can help to explain individual differences in aggressive tendencies, and that can in

turn represent useful targets for prevention and treatment efforts in community, mental health, forensic, and correctional settings (e.g., Gillespie, Mitchell, Fisher, & Beech, 2012). Among these factors, accumulating evidence suggests that mindfulness and emotion regulation are crucial for reducing aggression, as well as for taming and channeling natural aggressive dispositions toward adaptive purposes (e.g., self-preservation and protesting against injustice; Fonagy, 2003). In

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contrast, impairments in mindfulness and emotion regulation (i.e., emotion dysregulation) have shown robust associations with different forms of aggression, spanning across anger, hostility, physical aggression, and violent behavior (Garofalo, Holden, Zeigler-Hill, & Velotti, 2016; Garofalo, Velotti, & Zavattini, 2018; Robertson, Daffern, & Bucks, 2014; Scott, DiLillo, Maldonado, & Watkins, 2015; Velotti et al., 2016). As a result, treatments aimed at improving mindfulness and emotion regulation have been proposed and applied in offender populations (Garofalo et al., 2018; Gillespie & Beech, 2018; Gillespie et al., 2012; Robertson, Daffern, & Bucks, 2015), with some promising results (Shonin, Van Gordon, Slade, & Griffiths, 2013).

The concept of mindfulness derives from Buddhism, and in psychological science and practice it is typically defined as "a kind of nonelaborative, nonjudgmental, present-centered awareness in which each thought, feeling, or sensation that arises in the attentional field is acknowledged and accepted as it is" (Bishop et al., 2004, p. 232). More specifically, a mainstream operational definition of the construct includes a range of inter-related skills, namely: (a) attending to external and internal sensory stimuli and related thoughts and feelings; (b) ease in describing internal states; (c) acting while maintaining ongoing awareness of personal motives; (d) assuming a nonjudgmental stance about personal thoughts and feelings when they occur; (e) and perceiving even intense thoughts and feelings without being overwhelmed or compelled to react to them (Baer, 2011; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Impairments in some of these domains have been linked with greater levels of physical aggression, anger, and hostility in an offender sample, with stronger effect sizes for impairments in the abilities to describe internal states, act with awareness, and assume a nonjudgmental stance (Velotti et al., 2016). Similar negative associations between dispositional mindfulness and aggression have been documented in other populations (e.g., men seeking substance use treatment; Shorey, Anderson, & Stuart, 2015), as well as in longitudinal designs (Eisenlohr-Moul, Peters, Pond, & DeWall, 2016). In undergraduate samples, Heppner et al. (2008) reported evidence of robust negative relationships between mindfulness and aggression, both at the trait-level, and during a social-rejection paradigm.

Previous work has suggested that one possible mechanism linking mindfulness and aggression may involve emotion regulation processes, to the extent that aggressive tendencies may be reduced in individuals with higher levels of dispositional mindfulness because of their better ability to regulate emotions (Bishop et al., 2004; Gillespie et al., 2012). Broadly, emotion regulation entails the use of strategies to reduce negative emotions and increase or maintain positive ones (Gross, 2015). For example, two commonly cited strategies for regulating emotions include cognitive reappraisal, the tendency to construct an emotion-eliciting situation in such a way that the emotional impact of the situation is altered; and expressive suppression, referring to the inhibition of ongoing emotionally expressive behaviors (Gross, 1998). However, adaptive emotion regulation requires a broader set of skills – including executive resources and goal setting – that enable the effective use of emotion regulation strategies (e.g., cognitive reappraisal and expressive suppression) to pursue individual goals as appropriate given contextual demands. For the purpose of this study, emotion

regulation is defined as a set of abilities that includes: the awareness, acceptance, and understanding of emotional responses; the reliance on effective emotion regulation strategies to cope with negative emotions; distress tolerance in the pursuit of personal goals; and the ability to inhibit impulsive acts when distressed (Gratz & Roemer, 2004). Difficulties in these domains are considered indicative of emotion dysregulation. Notably, impairments across domains tend to co-occur at the person-level (rather than differentiating individuals based on distinct profiles of emotion regulation deficits; e.g., Garofalo, Neumann, & Velotti, 2018; John & Eng, 2014).

Emotion dysregulation has shown robust links with aggressive tendencies (i.e., physical aggression, anger, and hostility) across a variety of samples (e.g., offenders, psychiatric patients, and community), explaining substantial portions of variance in aggression measures (Garofalo et al., 2016, 2018; Robertson et al., 2014, 2015).¹ There is a clear overlap between mindfulness and emotion regulation as currently defined, and indeed the two have been found to share neurobiological correlates (Gillespie & Beech, 2018; Tang, Hölzel, & Posner, 2015). However, mindfulness and emotion regulation are not one and the same. Conceptually, mindfulness is distinct from emotion regulation in that it encompasses the ongoing attitude to be attentive and aware in the present moment, whereas emotion regulation refers to a set of processes that are activated in the presence (or in anticipation) of intense emotional arousal. In support of this point, an abundance of developmental, clinical, and neuroimaging findings suggest that emotion regulation and mindfulness represent distinct constructs that only share moderate amounts of variance (Dixon, Thiruchselvam, Todd, & Christoff, 2017; Nigg, 2017; Wheeler, Arnkoff, & Glass, 2017). For example, it has been shown that groups engaged in mindfulness and cognitive reappraisal during expectation of negative stimuli engaged overlapping and distinct neuroanatomical regions (Opialla et al., 2015). Further, experimental evidence provides some support for the causal effect of mindfulness in reducing rumination (i.e., a maladaptive emotion regulation strategy), and treatment studies have shown that mindfulness-based interventions reduce emotion dysregulation (e.g., Carmona i Farrés et al., 2019). In contrast, existing studies have not investigated or reported evidence for the reversed causal effect (i.e., from emotion regulation to mindfulness).²

In support of the proposed relationship between mindfulness and aggression through emotion regulation, cross-sectional mediation effects have shown that an inability to attend to and describe feelings (i.e., alexithymia) is indirectly related to aggression through emotion dysregulation, across offender, psychiatric, and community samples (Garofalo et al., 2018; Velotti et al., 2016). Additional indirect evidence emerges from studies that have focused on constructs that are intimately linked to emotion regulation, such as anger rumination. In particular, a mediating role of anger regulation in the association between dispositional mindfulness and aggression was reported both cross-sectionally (Peters et al., 2015) and longitudinally (Eisenlohr-Moul et al., 2016).

To this date, only one study has examined the mediating effect of emotion dysregulation on the relationship between mindfulness and aggression-related tendencies. In this study with both offenders and college students, Tangney, Dobbins, Stuewig, and Schrader (2017)

used criminogenic cognitions, a construct that shares some overlap with the hostility dimension of aggression and is considered a risk factor for (violent) offending, as a proxy for aggressive tendencies. Results showed that there was a negative indirect effect of mindfulness skills on criminogenic cognitions, through a latent emotion regulation factor that encompassed poor distress tolerance, emotion-driven impulsivity (i.e., negative urgency), and maladaptive emotion regulation strategies (i.e., experiential avoidance). Taken together, although mediation findings based on nonexperimental, cross-sectional designs do not allow inferences about causal mediation to be drawn, the convergence of cross-sectional (e.g., Peters et al., 2015; Tangney et al., 2017) and longitudinal (Eisenlohr-Moul et al., 2016) findings provide some support for the conceptual idea that mindfulness could increase emotion regulation, which in turn could reduce aggression (Peters et al., 2015).

However, the findings reported by Tangney et al. (2017) also included an untheorized direct positive association between mindfulness – and specifically the “nonjudgment of the self” facet – and criminogenic cognitions. That is, when controlling for emotion regulation in the mediation analysis, mindfulness was related to greater levels of criminogenic cognitions, and this effect was driven by the mindfulness facet measuring nonjudgment of the self. Based on these findings, Tangney et al. (2017) suggested that some degree of self-criticism of one’s own thoughts and actions may help to protect against criminal tendencies, and that in contrast, nonjudging (and, by extension and mindfulness) may have a “dark side.” In addition, it was suggested that, if replicable, these findings could have dramatic implications for the criminal justice system, as it may suggest that mindfulness-based treatments for reducing aggressive and criminal behavior could actually have iatrogenic effects, hence increasing the risk of offending. Respectfully, we dispute this conclusion, and we believe that this interpretation does not come without conceptual and methodological problems. On a conceptual level, it is important to note that one of the key aspects of mindfulness is that

it emphasizes the nonjudgmental nature of mindfulness as a state of awareness that allows for an observation of mental states without over-identifying with them so as to create an attitude of acceptance that can lead to greater curiosity and better self-understanding. This provides a way to disengage from the habitual patterns of discursive and affective reactivity so as to allow a more reflective response to the difficult circumstances of one’s life rather than remain prisoner of one’s own habits and compulsions. (Dreyfus, 2011, p. 43)

Therefore, it is clear that the nonjudgmental stance promoted in mindfulness practice is one that serves adaptive behavior, rather than one that would endorse maladaptive, or even criminal, patterns of thoughts and behaviors. Accordingly, mindfulness-based intervention studies have supported the beneficial effect of nonjudging in promoting prosocial, rather than antisocial tendencies (Samuelson, Carmody, Kabat-Zinn, & Bratt, 2007). Overall, the lack of theoretical and clinical reasons to

hypothesize a “dark size” of mindfulness seems to warrant caution before recommendations for clinical practice can be safely made.

Additional concerns exist on a methodological level, which also have conceptual implications. An emerging literature on the “perils of partialing” (Lynam, Hoyle, & Newman, 2006; Sleep, Lynam, Hyatt, & Miller, 2017) has made the convincing point that caution should be paid in interpreting the meaning of the relationship between a predictor and an outcome variable when controlling for correlated predictors that share substantive content. In this case, complications may arise when considering that a direct effect of mindfulness, while controlling for emotion regulation, would indicate that these effects are only achievable via mechanisms that do not invoke emotion regulatory processes. However, mindfulness and emotion regulation are almost intrinsically linked, and while such separation of mindfulness and emotion regulation may be achievable by means of statistical techniques, these relationships may not truly exist in nature. In short, it is not clear what the conceptual meaning would be of a statistical variable that captures residualized mindfulness scores after the variance shared with emotion regulation is removed.

Relatedly, an alternative explanation offered by Tangney et al. (2017) for this seemingly counterintuitive finding is that it reflects a statistical suppression effect (MacKinnon, 2000), because at the bivariate level, the “nonjudgment of the self” facet of mindfulness had negative relations with criminogenic cognitions, in line with theoretical expectations. Untheorized suppression effects can be difficult to interpret, especially because suppression effects rarely replicate (Paulhus, Robins, Trzesniewski, & Tracy, 2004). The risk of this being a spurious finding was partly addressed by Tangney et al. (2017) because the finding replicated across two independent samples drawn from two different populations (i.e., inmates and college students). However, it should be noted that across the two samples, the same measures were used, and the mindfulness and emotion regulation scales were derived from the same instrument. This could have increased the risk that correlations among these scales were unduly inflated by shared method variance, along with their conceptual overlap, which in turn could increase the risk of a measure-specific (as opposed to sample-specific) suppression effect.

Taking these considerations together, further investigation of this pattern of findings appears warranted before strong conclusions can be drawn that can influence the management and treatment of offenders. A form of conceptual replication may serve this purpose, and the present study sought to pursue this aim. Specifically, the present investigation examined the mechanisms linking mindfulness and emotion regulation using different measures, as well as the mechanisms that link both mindfulness and emotion regulation with the broader construct of aggression, which includes hostility (akin to criminogenic cognition) as well as anger and both physical and verbal aggression. In keeping with Tangney’s et al. (2017) study, the present study employed structural equation modeling to test the mediating role of a latent emotion regulation factor in the relationships between mindfulness facets and domains of aggression across two samples, consisting of adult male violent offenders and community participants.

Mindfulness facets were considered individually (as opposed to focusing on a higher-order mindfulness factor) in light of the differential associations with crime-related variables reported in previous studies (Tangney et al., 2017; Velotti et al., 2016). For example, it has been reported that the nonjudgement, describe, and act with awareness facets of mindfulness are significantly associated with aggression (Velotti et al., 2016), while differential relationships of mindfulness facets with criminogenic cognitions have been reported in samples of offenders and nonoffenders (Tangney et al., 2017). Similarly, one previous study has shown that only the nonjudgement, observe, and act with awareness facets of mindfulness are able to differentiate between different offender subgroups and community participants (Gillespie, Garofalo, & Velotti, 2018). Thus, by examining mindfulness facets separately, we are able to provide a more nuanced description of the inter-relationships between mindfulness, emotion regulation, and aggression, and we allow for comparisons to be made between our own results and those reported by Tangney et al. (2017).

2 | MATERIALS AND METHODS

2.1 | Participants and procedures

We recruited a sample of 397 incarcerated male offenders from a population of men who were admitted to 15 jail facilities across Northern and Central Italy. Potential participants were randomly recruited from the prison lists during the period beginning March 2013 and ending July 2015. Exclusion criteria included not being fluent in the Italian language, or having taken psychotropic medications in the past 3 months. Formal approval for this study was received from the ethics review board of the local university and the Italian Ministry of Justice. All participants provided written informed consent. Questionnaires were completed during individual or small-group sessions in a quiet room where the men usually met with prison educators. When possible, small-group sessions were preferred to limit the burden on prison staff. Some participants required additional sessions to complete all measures, and a researcher was present during each session to ensure that participants completed the measures independently. Participants in the offender sample had a mean age of 40.26 years ($SD = 11.96$), and education level was distributed as follows: no education, $N = 7$ (1.8%); low education (i.e., elementary or middle school), $N = 206$ (50.9%); high school, $N = 141$ (35.5%); bachelor's degree, $N = 10$ (2.5%); master's degree, $N = 8$ (2%); and postgraduate degree, $N = 2$ (0.5%); with 27 missing data (6.8%). The (self-reported) socioeconomic status of participants in the offender sample was distributed as follows: less than 36,000 €/year, $N = 268$ (67.5%); between 36,000 € and 70,000 €/year, $N = 13$ (3.3%); more than 70,000 €/year, $N = 7$ (1.8%); with 109 missing data (27.5%).

We also recruited a community sample of adult males from two metropolitan areas in Northern and Central Italy so that we could repeat all analyses in a sample of nonoffenders. A convenience sampling method was used whereby undergraduate psychology students were asked to recruit participants from their acquaintances

as part of their research internship or dissertation work. Participation was voluntary and participants provided written informed consent before taking part. Each participant completed the questionnaires individually and returned their responses to the researcher in a sealed envelope. Participants in the community sample were 324 Italian male participants with a mean age of 37.87 years ($SD = 12.06$). Education level was distributed as follows: low education (i.e., elementary or middle school), $N = 55$ (17%); high school, $N = 161$ (49.7%); bachelor's degree, $N = 37$ (11.4%); master's degree, $N = 55$ (17%); postgraduate degree, $N = 12$ (3.7%); with 4 missing data (1.2%). The (self-reported) socioeconomic status (SES) of participants in the nonoffender sample was distributed as follows: less than 36,000 €/year, $N = 238$ (73.5%); between 36,000 € and 70,000 €/year, $N = 62$ (19.1%); more than 70,000 €/year, $N = 5$ (1.5%); with 19 missing data (5.8%).³

2.2 | Measures

2.2.1 | Mindfulness

We used the Italian translation (Giovannini et al., 2014) of the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) to measure individual differences in dispositional mindfulness. The FFMQ is a self-report scale that consists of 39 items rated on a five-point Likert scale (ranging from 1 = *never true* to 5 = *always true*). Scores on the FFMQ reflect an individual's tendency to be mindful in daily life, across five distinct domains. "Observe" measures the tendency to attend to internal and external stimuli, and to related cognitions and emotions; "Describe" assesses the ability to describe one's own emotional experience; "Act with Awareness" measures the tendency to pay ongoing attention to present activities while being aware of personal motives; "Non Judge" assesses the tendency to adopt a nonevaluative stance (rather than a critical stance) towards one's own thoughts and feelings, when focusing on inner experiences; "Non React" measures the ability to perceive one's own emotions and thoughts without feeling overwhelmed or compelled to react to them. On each scale, higher scores correspond to higher levels of dispositional mindfulness. Internal consistency coefficients for the individual subscales of the FFMQ in the current samples (offender and community, respectively) were adequate: Observe, $\alpha = 0.78, 0.81$; Describe, $\alpha = 0.75, 0.84$; Act with Awareness, $\alpha = 0.86, 0.88$; Non Judge, $\alpha = 0.83, 0.82$; and Non React, $\alpha = 0.73, 0.72$.

2.2.2 | Emotion dysregulation

We used the Italian translation (Girromini, Velotti, de Campora, Bonalume, & Cesare Zavattini, 2012) of the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) to assess individual differences in trait emotion dysregulation. The DERS consists of 36 items. For each item participants were asked to indicate how often a particular statement applied to them on a five-point Likert scale (ranging from 1 = *almost never* to 5 = *almost always*). Scores on the DERS reflect levels of emotion dysregulation across six domains. "Nonacceptance" assesses a tendency toward being nonaccepting of emotional responses; "Goals" measures difficulties engaging in goal-

directed behavior when distressed; "Impulse" measures difficulties controlling impulsive behavior under negative emotional arousal; "Awareness" measures poor emotional awareness; "Strategies" assesses limited access to effective emotion regulation strategies; "Clarity" assesses poor emotional clarity. For each scale, higher scores indicate greater levels of emotion dysregulation. Both the original DERS and the Italian translation show good psychometric properties and construct validity (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006). Because the Awareness scale was found to be problematic in previous studies for both the English and Italian version of the DERS, both in terms of low internal consistency and nonsignificant loading on a superordinate DERS factor (Bjureberg et al., 2016; Garofalo, Neumann et al., 2018), it was not included in the present study. Internal consistency coefficients for the individual subscales of the DERS in the current samples (offender and community, respectively) were adequate: Nonacceptance, $\alpha = 0.82, 0.85$; Goals, $\alpha = 0.74, 0.84$; Impulse, $\alpha = 0.80, 0.83$; Strategies, $\alpha = 0.84, 0.88$; and Clarity, $\alpha = 0.73, 0.84$. Internal consistency for the DERS total score was $\alpha = 0.91$ and 0.92 , respectively.

2.2.3 | Aggression

We used the Italian translation (Fossati, Maffei, Acquarini, & Di Ceglie, 2003) of the Aggression Questionnaire (AQ; Buss & Perry, 1992) to measure individual differences in trait aggressiveness. The AQ contains 29 items that participants are asked to rate on a five-point Likert scale (ranging from 1 = *extremely uncharacteristic of me* to 5 = *extremely characteristic of me*) to indicate how much each statement was characteristic of them. The AQ measures aggressiveness across four domains: Physical Aggression, Verbal Aggression, Anger, and Hostility. Higher scores indicate a greater propensity for trait aggression. The Italian adaptation of the AQ shows good psychometric properties (Fossati et al., 2003). Internal consistency coefficients for the individual subscales of the AQ in the current samples (offender and community, respectively) were generally adequate, with the partial exception of the Verbal Aggression scale: Physical Aggression, $\alpha = 0.79, 0.81$; Verbal Aggression, $\alpha = .55, 0.69$; Anger, $\alpha = 0.67, 0.76$; and Hostility, $\alpha = .73, 0.81$.

2.3 | Data analytic plan

Descriptive statistics and zero-order correlations were computed in SPSS version 22 (IBM, 2013). The main analyses were conducted in Mplus version 7.2 (Muthén & Muthén, 2013). Model fit indices were interpreted according to commonly accepted benchmarks for adequate model fit (Brown, 2015; Kline, 2015; Little, 2013). The root mean square error of approximation (RMSEA) was considered acceptable if < 0.08 , the comparative fit index (CFI) and Tucker Lewis Index (TLI) were considered acceptable if > 0.90 , and the standardized root mean square residual (SRMR) was considered acceptable if < 0.08 . In keeping with Tangney's et al. (2017) study, we specified a partial mediation model with the five FFMQ facets entered as observed indicators as independent variables, a latent emotion dysregulation factor comprising the five DERS scales (i.e.,

excluding Awareness) as mediator, and the four AQ scales entered as observed indicators as dependent variables. In brief, testing of measurement models for the FFMQ and the AQ supported this conceptual, a-priori choice to use them as observed indicators. The DERS measurement model showed adequate model fit, offender sample: RMSEA = 0.076, CFI = 0.929, TLI = 0.922, community sample: RMSEA = 0.083, CFI = 0.921, TLI = 0.913, supporting the viability of a latent variable approach. In contrast, the FFMQ measurement model did not show adequate model fit, offender sample: RMSEA = 0.111, CFI = 0.621, TLI = 0.594, community sample: RMSEA = 0.103, CFI = 0.708, TLI = 0.687, suggesting that it may not equally fit a latent approach. Finally, the AQ measurement model fit was relatively acceptable, offender sample: RMSEA = 0.054, CFI = 0.922, TLI = 0.914, community sample: RMSEA = 0.075, CFI = 0.893, TLI = 0.883. Although a latent approach might have been used with the AQ, doing so did not alter the key findings in the offender sample, but created problems with model convergence in the community sample. Taken together, these results support our a-priori modeling approach with regard to the DERS and the FFMQ. A graphical depiction of the partial mediation model is reported in Figure 1. Indirect effect tests were conducted using a bootstrapping approach, computing 5,000 bootstrapped resamples with replacement to generate 95% bias-corrected confidence intervals (CIs) for the indirect effects. The completely standardized indirect effect (ab_{cs}) was employed as an estimate of effect size (0.01 = small effect size; 0.09 = medium effect size; and 0.25 = large effect size; Preacher & Kelley, 2011).

3 | RESULTS

Descriptive statistics and zero-order correlations are reported in Table 1. In both samples, the pattern of bivariate associations was largely in line with the expectations. Mindfulness and emotion dysregulation facets were negatively related, and both had significant associations with aggression dimensions. Specifically, higher levels of mindfulness were associated with lower levels of aggression, and higher levels of emotion dysregulation were associated with higher levels of aggression. Three notable exceptions to this pattern should be noted. First, the FFMQ Observe facet was positively associated with emotion dysregulation and aggression, and was negatively associated with two of the other FFMQ scales in the offender sample (in line with poor construct validity of this scale in previous studies; e.g., Baer et al., 2008; Gillespie, Brzozowski, & Mitchell, 2018; Giovannini et al., 2014; Rudkin, Medvedev, & Siegert, 2018). Second, the FFMQ Non React facet was largely unrelated to emotion dysregulation and aggression, although when significant associations occurred, they were in the expected direction. Third, the AQ Verbal aggression scale had smaller – and often nonsignificant associations – with mindfulness and emotion dysregulation, especially in the offender sample (see Footnote 1). A graphical depiction of the main hypothesis testing using SEM that includes only significant paths and corresponding standardized coefficients is reported in Figure 1a,b (for the offender and community samples, respectively). For the sake of clarity, we report the SEM results separated by sample.

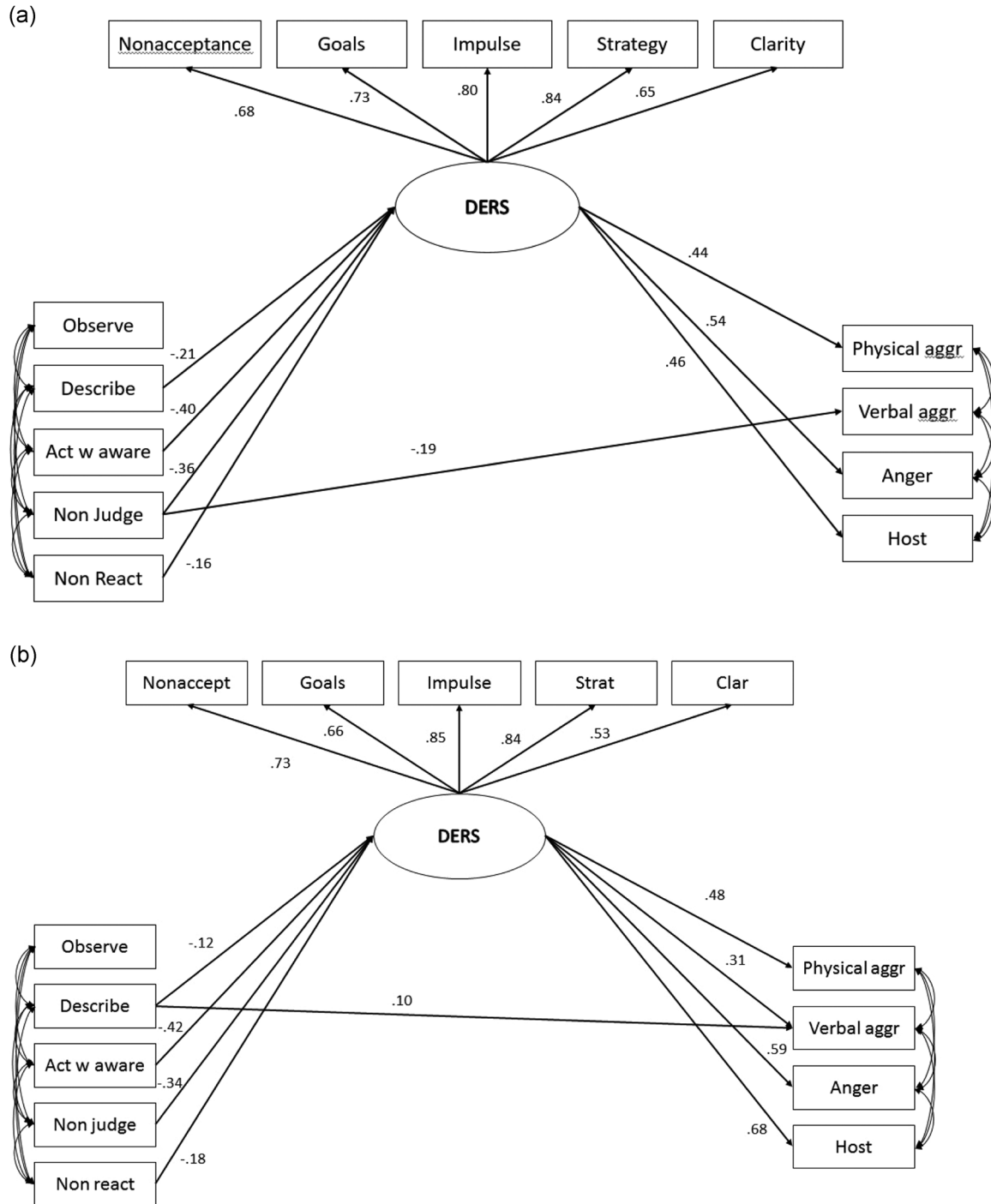


FIGURE 1 Graphical depiction of the SEM analysis conducted in the offender (a) and in the community samples (b), including standardized path coefficients. For ease of readability, only significant coefficients are reported. See Table 1 for the correlations among mindfulness facets and among aggression dimensions, and Table 2 for a summary of the indirect effects

3.1 | Offender sample

A first model was tested in the offender sample, which estimated all possible paths, as we did not have specific a-priori hypotheses to fix any of the paths to zero (i.e., before knowing the pattern of zero-order correlations). The initial model yielded mixed support for acceptable model fit, $\chi^2(41) = 162.923$ ($p < .001$), RMSEA = 0.087; CFI = 0.933; TLI =

0.868; and SRMR = 0.037. Specifically, CFI and SRMR fell within acceptable ranges, whereas RMSEA was slightly above the 0.08 cutoff and the TLI slightly below the 0.90 cutoff. Next, we re-specified the model fixing nonsignificant paths to zero. With this re-specification, the model fit the data reasonably well, $\chi^2(61) = 181.793$ ($p < .001$), RMSEA = 0.071, CFI = 0.934, TLI = 0.912, and SRMR = 0.041. In this model, all FFMQ facets except Observe were significantly and negatively related to

TABLE 1 Mean, standard deviation (SD), and zero-order correlations among all study variables in the offender (above the diagonal; N = 397) and community (below the diagonal; N = 324) samples

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Observe	-	0.24***	-0.37***	-0.52***	0.44***	0.21***	0.12*	0.10	0.21***	0.04	0.12*	0.10	0.12*	0.12*	0.16*
2 Describe	0.26***	-	0.37***	0.10	0.39***	-0.23***	-0.29***	-0.40***	-0.36***	-0.40***	-0.46***	-0.22***	0.04	-0.26***	-0.20***
3 Act with Awareness	0.30*	0.26***	-	0.60***	-0.13*	-0.38***	-0.49***	-0.51***	-0.60***	-0.44***	-0.59***	-0.28***	-0.11*	-0.44***	-0.36***
4 Non Judge	0.41***	0.16*	0.57***	-	-0.36***	-0.44***	-0.35***	-0.39***	-0.52***	-0.31***	-0.46***	-0.26***	-0.22***	-0.41***	-0.35***
5 Non React	0.49***	0.35***	-0.21***	-0.18**	-	0.06	-0.07	-0.12*	-0.01	-0.08	-0.08	-0.04	0.13*	-0.03	0.03
6 Nonacceptance	0.17*	0.26***	-0.45***	-0.54***	-0.04	-	0.57***	0.48***	0.63***	0.43***	0.74***	0.21***	0.08	0.38***	0.41***
7 Goals	0.14*	-0.21***	-0.44***	-0.36***	0.01	0.47***	-	0.62***	0.58***	0.46***	0.77***	0.31***	0.11*	0.44***	0.32***
8 Impulse	0.09	-0.32***	-0.50***	-0.44***	-0.12*	0.59***	0.60***	-	0.67***	0.54***	0.83***	0.50***	0.11*	0.54***	0.34***
9 Strategy	0.19*	-0.27***	-0.52***	-0.44***	-0.01	0.64***	0.57***	0.71***	-	0.54***	0.84***	0.30***	0.05	0.43***	0.38***
10 Clarity	0.09	-0.32***	-0.44***	-0.32***	-0.04	0.40***	0.25***	0.46***	0.46***	-	0.74***	0.28***	0.02	0.35***	0.24***
11 DERS total	0.12*	-0.40***	-0.59***	-0.51***	-0.11	0.76***	0.69***	0.83***	0.85***	0.70***	-	0.40***	0.08	0.54***	0.40***
12 Physical aggression	0.05	-0.13*	-0.26***	-0.24***	-0.11	0.24***	0.25***	0.54***	0.35***	0.26***	0.41***	-	0.43***	0.69***	0.42***
13 Verbal aggression	0.02	0.03	-0.15**	-0.11*	-0.01	0.17*	0.18*	0.29***	0.20**	0.07	0.21***	0.43***	-	0.40***	0.34***
14 Anger	0.03	-0.19**	-0.33***	-0.30***	-0.14*	0.38***	0.36***	0.62***	0.45***	0.24***	0.50***	0.69***	0.57***	-	0.54***
15 Hostility	0.14*	-0.16**	-0.36***	-0.41***	-0.03	0.53***	0.42***	0.57***	0.61***	0.29***	0.59***	0.49***	0.44***	0.61***	-
$M_{Offender}$	22.39	27.61	32.08	29.13	2.14	13.59	11.74	11.05	14.76	9.06	74.36	20.47	14.34	16.38	20.37
$SD_{Offender}$	6.30	5.72	6.26	6.17	5.11	5.49	4.34	4.56	5.89	3.59	19.71	7.27	3.77	5.53	6.48
$M_{Community}$	21.32	27.16	31.05	3.68	2.14	11.89	12.42	11.08	14.65	9.52	74.12	18.54	14.97	15.97	17.97
$SD_{Community}$	6.22	5.71	5.86	5.64	4.62	4.85	4.45	4.43	5.87	3.94	19.56	6.64	3.78	5.31	6.26

Note: Observe to Non React are scales from the Five Facets Mindfulness Questionnaire. DERS, Difficulties in Emotion Regulation Scale. Nonacceptance to Clarity are scales from the DERS. Physical aggression to Hostility are scales from the Aggression Questionnaire.

the latent DERS factor, explaining approximately 58% of the variance ($R^2 = 0.576$). In turn, the latent DERS factor was significantly and positively related to physical aggression, anger, and hostility (R^2 s = 0.193, 0.346, and 0.213, respectively). All paths tested yielded significant indirect effects, such that the Describe, Act with Awareness, Non Judge, and Non React facets of the FFMQ had a significant indirect effect on physical aggression, anger, and hostility, through the latent DERS factor (i.e., the mediator). A summary of indirect effect coefficients is reported in Table 2. In this final model, the FFMQ Non Judge scale also showed a significant negative direct effect (i.e., controlling for DERS) on verbal aggression (see Figure 1a).

Because it may be argued that the DERS Nonacceptance scale contains some overlap in content with mindfulness items, as a robustness-check of our findings, we repeated the main SEM analyses excluding the DERS Nonacceptance scale. The results were unchanged, indicating that the findings were not due to predictor-mediator contamination.

3.2 | Community sample

Next, the same procedure was repeated in the community sample (see Figure 1b). The first, unconstrained model, yielded the following fit indices: $\chi^2(41) = 149.235$ ($p < .001$), RMSEA = 0.090, CFI = 0.934, TLI = 0.870, and SRMR = 0.037, and was used to specify a final model where nonsignificant paths were set to be equal to zero. This model fit the data reasonably well, $\chi^2(61) = 170.237$ ($p < .001$), RMSEA = 0.074, CFI = 0.934,

TLI = 0.912, and SRMR = 0.042. As in the offender sample, all FFMQ facets except Observe were significantly and negatively related to the latent DERS factor, explaining roughly 50% of the variance ($R^2 = 0.503$). In turn, the latent DERS factor was significantly and positively related to physical aggression, verbal aggression, anger, and hostility (R^2 s = 0.227, 0.082, 0.347, and 0.456, respectively). Again, all indirect paths yielded significant indirect effects, such that the four FFMQ facets that were related to DERS (Describe, Act with Awareness, Non Judge, and Non React) exerted a significant indirect effect through the latent DERS factor (i.e., the mediator). Path coefficients for the significant indirect effects are summarized in Table 2.⁴ In contrast to findings obtained in the offender sample, the only significant direct path in the model after accounting for emotion regulation positively linked the FFMQ Describe facet to verbal aggression (see Figure 1b).

As for the offender sample, we conducted a robustness-check of our main SEM analyses by repeating them excluding the DERS Nonacceptance scale, due to its likely content overlap with mindfulness items. Also in this sample, results were unchanged, indicating that the findings were not due to predictor-mediator contamination.

4 | DISCUSSION

The present study sought to replicate and extend previous findings linking mindfulness, emotion dysregulation, and aggression in offender and community samples. In short, our findings provide evidence for

TABLE 2 Summary of indirect effect tests in the offender ($N = 397$) and community ($N = 324$) sample, based on SEM model displayed in Figure 1

IV	M	DV	Offenders			Community		
			est.	ab_{cs}	95% CI	est.	ab_{cs}	95% CI
Describe	DERS	Physical aggression	-0.12	-0.09	-0.17, -0.07	-0.07	-0.06	-0.12, -0.02
Describe	DERS	Verbal aggression	<i>ns</i>		<i>ns</i>	-0.02	-0.04	-0.05, -0.01
Describe	DERS	Anger	-0.11	-0.11	-0.16, -0.07	-0.07	-0.07	-0.12, -0.02
Describe	DERS	Hostility	-0.11	-0.10	-0.16, -0.07	-0.09	-0.08	-0.17, -0.02
Act with Awareness	DERS	Physical aggression	-0.20	-0.18	-0.28, -0.14	-0.23	-0.20	-0.32, -0.16
Act with Awareness	DERS	Verbal aggression	<i>ns</i>		<i>ns</i>	-0.08	-0.13	-0.13, -0.05
Act with Awareness	DERS	Anger	-0.19	-0.22	-0.25, -0.14	-0.23	-0.25	-0.30, -0.16
Act with Awareness	DERS	Hostility	-0.19	-0.19	-0.25, -0.14	-0.30	-0.29	-0.39, -0.23
Non Judge	DERS	Physical aggression	-0.18	-0.16	-0.25, -0.13	-0.19	-0.16	-0.28, -0.12
Non Judge	DERS	Verbal aggression	<i>ns</i>		<i>ns</i>	-0.07	-0.10	-0.10, -0.04
Non Judge	DERS	Anger	-0.17	-0.19	-0.23, -0.12	-0.19	-0.20	-0.25, -0.13
Non Judge	DERS	Hostility	-0.17	-0.16	-0.23, -0.12	-0.25	-0.23	-0.34, -0.17
Non React	DERS	Physical aggression	-0.10	-0.07	-0.16, -0.05	-0.12	-0.09	-0.22, -0.05
Non React	DERS	Verbal aggression	<i>ns</i>		<i>ns</i>	-0.05	-0.06	-0.08, -0.02
Non React	DERS	Anger	-0.09	-0.09	-0.15, -0.04	-0.12	-0.11	-0.20, -0.05
Non React	DERS	Hostility	-0.09	-0.07	-0.14, -0.04	-0.16	-0.12	-0.26, -0.07

Note: IV, Independent Variable (i.e., Five Facets Mindfulness Questionnaire scales). M, Mediator. DV, Dependent Variable (i.e., Aggression Questionnaire scales). DERS, Difficulties in Emotion Regulation Scale. CI, bias-corrected confidence interval. ab_{cs} = completely standardized indirect effect (measure of effect size; 0.01 = small effect size; 0.09 = medium effect size; 0.25 = large effect size; Preacher & Kelley, 2011). For ease of readability, only significant coefficients are reported. The FFMQ Observe scale was not included in indirect effect testing due to a lack of significant associations with the proposed mediator.

associations between impairments in mindfulness and emotion regulation and aggressive tendencies. These findings are consistent with accumulating evidence that impairments in mindfulness and emotion regulation represent possible dynamic risk factors for aggression and violent behavior (Garofalo, Velotti et al., 2018; Robertson et al., 2015). Thus, they show support for recent proposals that treatments focused on improving mindfulness and emotion regulation may help to prevent and reduce offending behavior (Garofalo & Wright, 2017; Gillespie & Beech, 2018; Gillespie et al., 2012).

Notably, the findings presented here advance current knowledge by showing that the link between mindfulness and aggression was largely accounted for (i.e., mediated) by emotion dysregulation. Extending recent findings (Tangney et al., 2017), these results suggest that emotion dysregulation may represent one of the processes that helps to explain the link between mindfulness deficits and increased aggressive tendencies. Our results suggest that previously reported zero-order relationships between mindfulness and aggression may be better understood in light of emotion regulatory mechanisms that may mediate these associations. Specifically, individuals who have difficulties paying ongoing attention to their present experience with a nonjudgmental attitude may, in turn, have difficulties regulating emotions. Ultimately, these difficulties can then contribute to a greater propensity toward aggression. In contrast, greater mindfulness skills may increase resources to regulate negative emotions, in turn serving as protective factors toward aggression.

The inter-relationships observed here are consistent with both the results of other cross-sectional studies, and with neurobiological evidence showing that overlapping brain circuits are involved in mindfulness, emotion regulation, and aggression in response to provocation (Gillespie & Beech, 2018; Gillespie et al., 2018). However, the cross-sectional design of this study does not allow for conclusions to be drawn about the directionality of these effects. Nonetheless, a scenario in which mindfulness skills serve as the basis for effective emotion regulation, that can in turn bring about a reduction in aggressive tendencies, is consistent with developmental frameworks of aggression (Fonagy, 2003), and with proposals in clinical research and practice that the habitual tendency to attend to internal experiences (i.e., feelings and thoughts) can help individuals to deal with negative emotional experiences without externalizing through anger, hostility, or overt aggressive behavior (Garofalo, Velotti et al., 2018).

In contrast to a recent study that reported negative direct effects of mindfulness (and in particular the mindfulness facet capturing a nonjudgmental attitude toward the self; Tangney et al., 2017) on criminogenic cognitions, the findings reported here do not show evidence for a purported "dark" side of mindfulness. By and large, impairments in mindfulness skills across facets were all related to increased levels of physical aggression, anger, and hostility across offender and community samples, at both the bivariate level, and through the mediating role of emotion dysregulation. Because the hostility scale of the AQ captures the cognitive component of aggressive tendencies, findings showing an inverse relationship of

mindfulness with hostility are especially relevant to consider in conjunction with Tangney et al. (2017) study, given the conceptual overlap between hostility and criminogenic cognitions. In addition, as noted above, the interpretation of results from Tangney et al. (2017), which show a direct effect of mindfulness on aggression while controlling for emotion regulation, poses conceptual difficulties. It has been shown that substantial overlap exists between mindfulness and emotion regulation, and emotion regulation accounts for a large proportion of the shared variance between mindfulness and aggression. Thus, variants of mindfulness that do not impact on emotion regulatory processes (i.e., with emotion regulation statistically controlled for) are difficult to interpret conceptually (e.g., Lynam et al., 2006). Based on these arguments, we would call for caution before drawing conclusions about iatrogenic effects of mindfulness training on criminal tendencies; especially where these conclusions could have dramatic implications for clinical/forensic research and practice, including the design of offending behavior programs.

The study findings were largely consistent across offender and community samples, suggesting that similar mechanisms are likely to link mindfulness, emotion regulation, and aggression, despite the different nature of the samples. Two notable exceptions should be mentioned. First, mindfulness and emotion dysregulation had bivariate as well as indirect effects on verbal aggression in the community sample only. In line with previous findings (Garofalo et al., 2016; Garofalo, Velotti et al., 2018) and theoretical considerations (Infante & Rancer, 1996), this may suggest that verbal aggression is a form of aggression that is more maladaptive in community samples rather than among offenders, or at least that different mechanisms explain this form of aggression, as opposed to anger, hostility, and physical aggression.

Second, only two of the mindfulness facets maintained direct effects on aggression dimensions when accounting for emotion dysregulation, and these were different across samples. In the offender sample, the FFMQ Non Judge facet had a significant, negative direct effect on verbal aggression. That is, the same mindfulness facet that had direct, positive effects on criminogenic cognitions in a previous study (Tangney et al., 2017) was the only facet that predicted reduced levels of verbal aggression in our offender sample. This finding suggests that among offenders, verbal aggression may result from mindfulness impairments more so than from impairments in emotion regulation. In addition, because the scales measuring a nonjudgmental attitude toward the self yielded different patterns of results in Tangney et al. (2017) and in the present study, we would add a cautionary note about interpreting findings obtained with different measures of mindfulness. Conversely, the only direct effect observed in the community sample suggested that increasing scores on the FFMQ Describe facet were related to increases in verbal aggression after controlling for emotion regulation. This finding represented the only possible undesirable effect of mindfulness in the present study. Yet, we maintain that the shared variance between the ability to describe one's thoughts and feelings, net of emotion regulation, and verbal aggression (again, net of the indirect effects already specified in the model) could represent a form of assertiveness or tendency to speak up, and not necessarily

a maladaptive form of aggression. However, these considerations are mostly speculative at this stage, and conceptual difficulties with interpreting these results preclude any meaningful conclusions.

The current study presented some limitations that also represent directions for future research. First, an exclusive reliance on self-report measures, and a singular assessment of each construct, comes with clear methodological shortcomings, and extending this area of research with multimethod, multimeasurement studies would be of great value. It is also worth emphasizing that the present study only represents a conceptual replication of Tangney et al. (2017) study, rather than a direct replication, given the different dependent variables adopted. More cautiously, the extent to which it represents a conceptual replication is bound to the overlap between some of the AQ scales (e.g., hostility) and the dependent variable used by Tangney et al. (2017), namely, criminogenic cognition. Second, our samples were likely not representative of the populations from which they were drawn. Although the consistency of our findings with those of previous studies and with theoretical expectations may increase confidence in the robustness of our results, the generalizability of our findings remains uncertain. Third, given the correlational, cross-sectional design of this study, longitudinal or experimental designs are needed to corroborate our more speculative hypotheses about underlying mechanisms. Finally, our focus on socio-affective factors does not disregard the importance of other factors that could provide useful explanations of aggression, including cognitive or interpersonal functioning. Ideally, future studies should try to integrate these different domains into a more comprehensive framework for explaining aggressive tendencies.

Importantly, it is worth emphasizing that our findings do not represent evidence that mindfulness interventions that aim to improve emotion regulation will necessarily lead to reductions in aggressive tendencies, although such an effect can reasonably be hypothesized on the basis of these findings. Such conclusions about causal mechanisms can only be drawn from longitudinal, controlled studies that aim to assess the effects (positive or negative) of mindfulness-based interventions among those with a history of aggressive and antisocial behavior. We would suggest that future studies should pursue this aim to inform about the potential therapeutic effects of mindfulness for the management and rehabilitation of individuals in the criminal justice system. Indeed, the potential mechanisms studied here, and the extent to which any mindfulness intervention may prove effective, will be dependent on various biological, psychological, and social factors. Although beyond the scope of this paper, it is important for future work to consider the situational and interpersonal factors that can contribute to aggressive behaviors, and the ways in which mindfulness and strategies for emotion regulation may contribute to more adaptive responding, and managing perceived provocation while interacting with others (e.g., Infante & Rancer, 1996).

Despite these limitations, the present study relied on large samples, well validated measures of the key constructs, and robust statistical methods to advance our understanding of the connections between mindfulness, emotion regulation, and aggression. The present findings suggest that one likely mechanism for reducing aggression may involve

paying ongoing attention to thoughts, feelings and emotions that drive behavior, assuming a nonjudgmental stance and being able to translate thoughts and feelings into words, rather than activating behavioral responses to internal or external triggers. Developing these skills through mindfulness-based practice may strengthen one's capacity to effectively regulate emotions when experiencing negative arousal, allowing one to respond in more adaptive ways. In light of the present findings, we suggest that continued attention should be paid to investigating the precise mechanisms linking difficulties in attending to and managing internal experiences (and especially emotions) with aggression. Ultimately, this line of research has the potential to inform the design of effective interventions with a well-understood mechanism of change for preventing aggressive and violent behavior in the community and in forensic and correctional settings. It is also important that future research investigates the effectiveness of mindfulness-based interventions for improving emotion regulatory abilities and reducing aggressive and violent behavior.

ENDNOTES

- ¹ Of note, in prior studies emotion dysregulation was also related to verbal aggression but only in community samples, suggesting that verbal aggression may be more maladaptive in community samples and less so in offender populations (Garofalo et al., 2016, 2018).
- ² Current space constraints do not allow to report an in-depth review of the complex conceptual and methodological relations between mindfulness and emotion regulation in a manner that does justice to these important psychological constructs. Interested readers are encouraged to refer to Chiesa, Serretti, and Jakobsen (2013), or Roemer, Williston, and Rollins (2015) for in-depth reviews.
- ³ Thus, participants in the community sample were on average younger, $t(696) = -2.66$, $p < .01$, $d = 0.02$, reported higher level of education, $\chi^2(8) = 162.71$, $p < .001$, and higher SES, $\chi^2(5) = 96.39$, $p < .001$.
- ⁴ Notably, when the final, constrained model reported for the offender sample was also fit to the community sample it showed acceptable model fit indices, $\chi^2(61) = 192.263$ ($p < .001$), RMSEA = .081, CFI = .921, TLI = 0.895, and SRMR = 0.058. However, due to the relatively poorer fit indices compared to the constrained model obtained in the community sample, and due to some differences in the significant paths in the community sample (especially involving the verbal aggression scale of the AQ), we report and discuss only the model obtained directly in the community sample following the same procedure employed with the offender sample.

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