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Negative Emotionality and Aggression in Violent Offenders: The Moderating Role of Emotion Dysregulation

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Abstract

Purpose: The present study sought to examine the independent and interactive contribution of negative emotionality and emotion dysregulation in predicting levels of physical aggression among violent offenders. *Methods:* A sample of 221 male violent offenders incarcerated in Italian prisons completed self-report measures of trait emotionality, emotion dysregulation, and trait aggression. Hierarchical multiple regression analyses and bootstrap analysis were used to test the study hypotheses. *Results:* Negative emotionality was positively linked to physical aggression, whereas positive emotionality had a negative relation with physical aggression. Emotion dysregulation explained incremental variance in physical aggression, with a unique contribution of negative urgency. Negative urgency moderated the relation between negative emotionality and physical aggression, such that the positive association between negative emotionality and physical aggression was significant only at medium and high levels – but not at low levels – of negative urgency. *Conclusions:* These findings provide empirical evidence for, and possible ground for integration of, traditional and modern theories of aggression and criminal behavior, corroborating the hypotheses of DeLisi and Vaughn's (2014) temperament-based theory of antisocial behavior. Further, these findings suggest that treatments for violent offenders should target emotion regulation skills to reduce aggressive tendencies in the presence of negative emotionality.

Keywords: negative emotions, emotion regulation, physical aggression, violence, negative urgency, effortful control

Negative Emotionality and Aggression in Violent Offenders: The Moderating Role of Emotion Dysregulation

Emotions are an important driver of human behavior, and the way we regulate them contributes to subjective and interpersonal well-being (Balzarotti, Biassoni, Villani, Prunas, & Velotti, 2016; Barrett, Lewis, & Haviland-Jones, 2016; Baumeister, 2016). Therefore, it is not surprising that emotion has been one of the individual differences constructs most often studied to understand human destructiveness, including aggression and violent behavior (DeLisi, 2011; DeLisi & Vaughn, 2016; Mesquita, 2016). Negative emotions are a central tenet in the influential framework of the general strain theory (Agnew, 1992, 2001; Ganem, 2010). General strain theory posits that strains and stressors increase the likelihood of experiencing negative emotions, which in turn can trigger criminal behavior (Agnew, 2001, 2013), including violent acts (Ousey, Wilcox, & Schreck, 2015). Accordingly, research has consistently reported links between high levels of negative emotionality – and low levels of positive emotionality – and offending in general (Day, 2009; DeLisi & Vaughn, 2015; Garofalo, Velotti, Crocamo, & Carrà, 2017; Hollist, Hughes, & Schaible, 2009; Mazerolle, Burton Jr., Cullen, Evans, & Payne, 2000; Moon, Morash, McCluskey, & Hwang, 2009; Nestor, 2002), as well as between negative emotionality and aggressive behavior in particular (Connolly & Beaver, 2015; Donahue, Goranson, McClure, & Van Male, 2014; Ganem, 2010; Jones, Miller, & Lynam, 2011; J. D. Miller & Lynam, 2006; J. D. Miller, Zeichner, & Wilson, 2012).

Traditionally, studies that have investigated the link between negative emotions and aggression have almost exclusively focused on anger (Agnew, 2001; Berkowitz, 2012; Novaco, 2011). However, the link may well extend to other negative emotions, although it has been argued that it is less intuitive to understand why other negative emotions could be associated with aggressive behavior (Howells, Day, & Wright, 2004). A fitting example is the emotion of shame, which is typically related to internalizing symptoms and behavioral tendencies such as avoidance or withdrawal (Howells et al., 2004). However, research shows that shame feelings can also elicit

externalizing reaction and aggressive acting out (Elison, Garofalo, & Velotti, 2014; Ribeiro da Silva, Rijo, & Salekin, 2015; Tangney, Stuewig, & Hafez, 2011; Tangney, Stuewig, & Martinez, 2014; Velotti, Elison, & Garofalo, 2014). Based on these considerations, several scholars have argued that one way to make sense of the relation between negative emotions (including but not limited to anger) and offending is to explore possible mechanisms of their relation (Day, 2009; Wolff & Baglivio, 2016). Indeed, it was proposed that – while negative emotions are certainly an important dynamic risk factors for offending – other criminogenic factors related to negative emotionality should be considered to refine theories of offending and treatment of offenders, including self- and emotion regulation (Day, 2009; DeLisi & Vaughn, 2014; Velotti et al., 2014).

A possible example of the role of emotion regulation in the link between negative emotions and aggression can be drawn from Baumeister's theory of self-regulation (Baumeister, 1990; Baumeister, Heatherton, & Tice, 1994). This theory suggests that some individuals can experience diminished cognitive control under states of negative emotional arousal. In these circumstances, these individuals tend to disengage from self-awareness (including emotional awareness), and focus on immediate or short-term considerations that can either be hedonic (i.e., feel better, or numbing the negative emotional experience) or instrumental (i.e., getting revenge) (Baumeister et al., 1994; see also Tamir, 2016). Accordingly, it could be not only the experience of negative emotions (e.g., anger, shame), but also the way people regulate them that might increase the likelihood of aggressive behavior (Day, 2009). Based on similar considerations, some authors have found that factors other than negative emotions can explain individual differences in the tendency to act aggressively, including low self-control (Joon Jang & Song, 2015).

The emphasis on studying self-control and self-regulation (used interchangeably here) to understand aggression and criminal behavior is not new (Day, 2009; DeLisi & Vaughn, 2016; Denissen, Thomaes, & Bushman, 2017; Gottfredson & Hirschi, 1990; Vazsonyi, Mikuška, & Kelley, 2017), though the literatures on self-control and negative emotions have largely grown separately. Deficits in self-control are robustly linked to aggression (Caspi, Moffitt, Newman, &

Silva, 1996; de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Denissen et al., 2017; Denson, DeWall, & Finkel, 2012; DeWall, Finkel, & Denson, 2011; Farrington, 2005; Moffitt et al., 2011), and play a pivotal in both traditional (Gottfredson & Hirschi, 1990) and modern comprehensive theories of aggression and violent behavior, such as the general aggression model (DeWall, Anderson, & Bushman, 2011). Although the construct of self-control or self-regulation subsumes individual differences in the ability to regulate emotions, only in recent years has the study of emotion regulation seen an increase of scholar publications in the field of forensic psychology and aggression research (García-Sancho, Salguero, & Fernández-Berrocal, 2014; Garofalo, Holden, Zeigler-Hill, & Velotti, 2016; Robertson, Daffern, & Bucks, 2012).

For the purpose of this study, we define emotion regulation as encompassing: the awareness, clarity, and acceptance of emotional experience; the ability to tolerate distress and engage in goal-directed behavior when upset; the ability to refrain from impulsive behavior when experiencing upsetting emotions; and the ability to rely on effective emotion regulation strategies (Gratz & Roemer, 2004). In the last few years, impairments in these domains have been consistently linked with aggressive tendencies across a variety of populations, including undergraduates, community-dwelling individuals, psychiatric patients, juvenile and adult offenders (Donahue et al., 2014; Garofalo et al., 2016; D. J. Miller, Vachon, & Aalsma, 2012; Robertson, Daffern, & Bucks, 2014, 2015; Velotti et al., 2016). Specifically, findings seem consistent in linking all of the emotion dysregulation domains mentioned above with physical aggression at a bivariate level. However, when examining the unique contribution of emotion dysregulation dimensions in predicting levels of physical aggression, negative urgency (i.e., difficulties in controlling impulsive behavior when upset) typically emerged as independent significant predictor, with somewhat less consistent evidence for the role of emotional nonacceptance and lack of emotional awareness (Garofalo et al., 2016; Robertson et al., 2014, 2015; Velotti, Casselman, Garofalo, & McKenzie, in press; Velotti et al., 2016). The centrality of negative urgency in explaining the individual tendency to behave aggressively is consistent with the self-regulation theory proposed by Baumeister and mentioned

above, according to which behavioral control can be diminished under states of negative emotional arousal (Baumeister et al., 1994). Notably, scales assessing negative urgency are also included in some measures of impulsivity, and also in that context negative urgency shows consistent associations with indices of aggression (J. D. Miller et al., 2012)

It is worth noting that a focus on emotion dysregulation is not mutually exclusive with the propositions of the general strain theory (Joon Jang & Rhodes, 2012). Indeed, strains, stress, and adversities may constitute distal and proximal risk factors contributing not only to negative emotions, but also to difficulties in regulating emotions, which in turn can partly explain (or increase) the relation between strain and aggressive behavior (Day, 2009; Gratz, Paulson, Jakupcak, & Tull, 2009; Herts, McLaughlin, & Hatzenbuehler, 2012). Of note, general strain theory also postulates that a possible function of aggression and crime is to alleviate negative emotions (Agnew, 2001; see also Berkowitz, 1993). That is, already general strain theory posited that aggression may constitute a maladaptive way of coping with – or regulating – the chronic or intense experience of negative emotions (Agnew, 2013; Joon Jang, 2007; Joon Jang & Song, 2015).

An integration of negative emotionality and emotion regulation has recently been proffered by DeLisi and Vaughn's (2014) temperament-based theory of antisocial behavior. Based on a comprehensive review of extant theories and research from a variety of fields (e.g., developmental psychology, psychiatry, criminology, neuroscience, and genetics), this model posits that negative emotionality and effortful control represent the main temperamental precursor for the development of antisocial behavior and predict subsequent involvement with the criminal justice system (DeLisi & Vaughn, 2014). Of note, DeLisi and Vaughn (2014) made explicit reference to emotion regulation as one component of the broader effortful control construct that – fueled by negative emotionality – may give rise to aggressive manifestations. Furthermore, this temperament-based theory postulates that a focus on negative emotionality and effortful control as independent constructs may not be sufficient to understand the complexity of antisocial behavior. Rather, it was argued that these two constructs "work in tandem to increase antisocial behavior" (DeLisi &

Vaughn, 2014, p. 14) and that their interaction increase the likelihood of antisocial outcomes. This theory was grounded on evidence of a joint and interactive effect of negative emotionality and effortful control in predicting externalizing behavior both concurrently and prospectively in children and adolescents (Eisenberg et al., 1993; Eisenberg et al., 1996; Laible, Carlo, Panfile, Eye, & Parker, 2010). However, only few studies have tested this theory in offender populations, and have mostly been focused on juvenile offenders. These studies provided rather consistent evidence that both negative emotionality and low effortful control predicted a greater likelihood of antisocial behavior, and that levels of antisocial behavior were greater among youth with present both high levels of negative emotionality and low levels of effortful control (Baglivio, Wolff, DeLisi, Vaughn, & Piquero, 2016; Wolff, Baglivio, Piquero, Vaughn, & DeLisi, 2016).

Notably, studies that have examined the joint role of negative emotions and emotion dysregulation in explaining aggression are surprisingly rare. In a sample of undergraduate students, emotion dysregulation mediated the association between negative emotionality and physical aggression. Notably, negative urgency emerged as a unique mediator in the relation that negative emotionality had with physical aggression in male participants (Donahue et al., 2014). In another study, both negative emotionality and negative urgency explained a significant portion of the variance in violent behavior in a sample of juvenile offenders. Further, emotion dysregulation moderated the association between negative emotionality and violent behavior, such that the positive relation between negative emotionality and violent behavior was stronger at higher levels of emotion dysregulation (D. J. Miller et al., 2012). Moreover, a diary study with undergraduate students revealed that emotion regulation skills (in particular, emotion differentiation) moderated the relation between the experience of anger and aggressive behavior, such that emotion regulation buffered the propensity to engage in aggressive behavior when experiencing anger (Pond et al., 2012).

Studies conducted with adult samples of violent offenders – who are likely characterized by a more severe or chronic history of aggressive behavior – provide only indirect evidence for a joint

role of negative emotionality and emotion dysregulation in explaining aggression. Specifically, recent studies showed that poor emotional awareness explained incremental variance in aggressive behavior above and beyond the influence of anger experience and expression (Robertson et al., 2015). Indirect support for a mediating role of emotion dysregulation in the relation between negative emotionality and aggression comes from a study that reported an indirect effect of low self-esteem (which is tightly linked with negative emotionality) on aggression through the mediating role of emotion dysregulation (Garofalo et al., 2016). In particular, negative urgency mediated the link between low self-esteem and physical aggression. This body of findings seems consistent with the possibility that aggression serves a maladaptive self-regulatory function in individuals who experience chronic or intense negative emotions and lose control over behavior (Agnew, 2001; Elison et al., 2014; Gratz & Roemer, 2004; Velotti et al., 2014). Further, the possibility that emotion dysregulation moderates the relation between negative emotionality and aggression has important clinical implications. By identifying potential factors that not only explain incremental variance, but that may also buffer the positive relation between negative emotionality and aggression, research might offer useful insights on potential treatment targets for interventions in forensic settings (Day, 2009; DeWall, Anderson, et al., 2011; Robertson et al., 2015).

The current study aimed at contributing novel knowledge on the role of negative emotionality and emotion dysregulation in explaining aggressive tendencies in violent offenders. Specifically, we tested whether emotion dysregulation explained an additional portion of variance in a measure of trait disposition toward physical aggression in a sample of male incarcerated violent offenders, above and beyond the influence of trait negative emotionality. Further, we examined whether emotion dysregulation moderated the link between negative emotionality and aggression, such that difficulties in emotion regulation would strengthen the negative relation between negative emotionality and physical aggression, whereas good emotion regulation skills would buffer (i.e., weaken) their relation.

Method

Participants and Procedures

Participants were 221 male Italian incarcerated offenders ($M_{age} = 40.9$, $SD = 9.40$). In total, 242 participants were recruited, but 21 (roughly 8% of the total) were excluded from the final sample due to the excessive number of missing items (i.e., over 20%). All inmates were serving sentence for violent crimes (i.e., involving physical violence toward others) in Italian prisons in two metropolitan areas (Rome and Genoa). Participants were recruited at random from a list of eligible inmates. Inmates were eligible if they were: aged between 25 and 60 years (which is the range with the vast majority of inmates, according to Italian official statistics); not taking psychotropic medications; already convicted; and of Italian nationality. They were then contacted by the researchers and given information about the study during individual or small-group sessions hosted in quiet rooms where inmates usually meet with social workers or prison educators. Potential participants were informed that they could withdraw at any from the study, that data would be analyzed anonymously, and that their decision to participate would not have any influence on their inmate status. In total, around 350 potential participants were invited to take part in the study, with a rejection rate of around 30%. All participants provided written informed consent to voluntary take part in the research, and they did not receive any compensation for their participations. Self-report questionnaires were administered in individual or small-group assessment sessions. A researcher was always present in the room to make sure that participants filled out their questionnaires individually, and to provide clarifications about item content when needed. The local university Ethics Review Board and the Italian Ministry of Justice formally approved all procedures.

Measures

Differential Emotions Scale-IV (DES-IV; Izard, Libero, Putnam, & Haynes, 1993). The DES-IV was used to assess trait emotionality. The DES-IV is a self-report checklist that contains 12 subscales assessing discrete emotions, namely: interest, enjoyment, surprise, sadness, anger, disgust, contempt, fear, guilt, shame, shyness, and inwardly-directed hostility. Each emotion is measured with three items, for a total of 36 items. Respondents had to indicate how often they

experience those emotions in their daily life on a 5-point Likert scale (ranging from 0 = *rarely or never*, to 5 = *very often*). For the purpose of this study, we used the two composite scales measuring positive (sum of interest, enjoyment, and surprise; $\alpha = .69$) and negative emotionality (sum of anger, contempt, disgust, fear, guilt, and inner-directed hostility; $\alpha = .91$). The Italian version of the DES-IV was provided by the authors of the scale (Izard et al., 1993). Although no formal validation was available, the Italian DES-IV demonstrated evidence of adequate reliability and validity in both community and offender samples (Garofalo, 2015; Garofalo et al., 2017; Somma, Borroni, Drislane, & Fossati, 2016).

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). Emotion dysregulation was measured using the DERS. The DERS is a widely used self-report questionnaire that measures impairments in the six domain of emotion regulation mentioned above, namely: nonacceptance of emotional responses (Nonacceptance, $\alpha = .83$); difficulties engaging in goal-directed behavior when upset (Goals, $\alpha = .75$); difficulties controlling impulsive behavior under negative emotional arousal (Negative Urgency,¹ $\alpha = .82$); poor emotional awareness (Awareness, $\alpha = .55$); limited access to effective emotion regulation strategies (Strategies, $\alpha = .85$); and poor emotional clarity (Clarity, $\alpha = .73$). The DERS includes 36 items, and participants had to indicate how often each statement applied to them on a 5-point Likert scale ranging from *almost never* to *almost always*. For each scale, higher scores indicate greater problems in the corresponding domain of emotion regulation. Previous research has found the DERS to have good internal consistency and construct validity (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006). In this study, we used the Italian translation of the DERS (Giromini, Velotti, de Campora, Bonalume, & Zavattini, 2012), which replicated evidence of reliability and validity across a variety of samples (Fossati, Gratz, Maffei, & Borroni, 2013; Garofalo et al., 2016; Velotti & Garofalo, 2015). A partial exception is typically found – in both the original and Italian versions – for the Awareness subscales, which

¹ This scale of the DERS was originally labeled Impulse. However, to avoid confusion with the broader construct of impulsivity – which falls outside the scope of the present study – we opted to use the term Negative Urgency.

often shows unsatisfactory internal consistency and construct validity (Fossati et al., 2013; John & Eng, 2014). Nevertheless, we included the Awareness scale for continuity with prior research.

Aggression Questionnaire (AQ; Buss & Perry, 1992). Physical aggression was measured with the corresponding scale of the AQ. The AQ contains a total of 29 items rated on a Likert scale ranging from 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*). Participants had to rate each item to indicate how much each statement was characteristic of them. Greater levels of the AQ subscale and total scores indicate a greater propensity for trait aggression. For the purpose of the present study, the nine items that make up the Physical Aggression subscale were used ($\alpha = .80$). However, the AQ also includes three other dimensions of aggression, which were used for our supplementary analyses: Verbal Aggression ($\alpha = .55$); Anger ($\alpha = .68$); and Hostility ($\alpha = .72$). The AQ is a reliable and valid self-report questionnaire commonly used to assess trait aggression. In the present study, we used the Italian adaptation of the AQ (Fossati, Maffei, Acquarini, & Di Ceglie, 2003), which in the validation study replicated the reliability and validity of the original version.

Data Analysis

Internal consistency coefficients, descriptive statistics, and Pearson's product-moment correlation coefficients among all study variables were calculated. A hierarchical multiple regression analysis was conducted to test the hypothesis that emotion dysregulation would explain incremental variance in physical aggression, above and beyond the influence of negative emotionality. To partial out the variance shared with positive emotionality, both scales of the DES-IV were entered in Step 1, whereas the six DERS scales were entered in Step 2. Based on regression results, a moderation analysis was conducted using a bootstrap approach (Hayes, 2013) with negative emotionality (mean-centered) as independent variable, the DERS scale(s) that exerted a significant contribution in regression analysis (mean-centered) as moderator, and physical aggression as dependent variable. Both hierarchical regression and moderation analyses were then repeated including the other AQ scales as dependent variables. Five-thousand bootstrap samples

with replacement were drawn to compute point estimates for the interaction effect with bias-corrected 95% confidence intervals (CI). Confidence intervals that do not include zero are considered evidence of significant effect (Hayes, 2013).

Results

Descriptive statistics and bivariate correlations among study variables are displayed in Table 1. Inspection of the correlation matrix revealed that negative emotionality was positively and significantly related with all emotion dysregulation dimensions, with the exception of the Awareness scale of the DERS. Negative emotionality was also positively related to physical aggression. Positive emotionality was largely unrelated with emotion dysregulation and physical aggression, with the exception of significant associations with the Nonacceptance (positively) and Awareness (negatively) scales of the DERS. Physical aggression was also positively related with all DERS scales. Finally, positive and negative emotionality were positively related to each other.

[Insert Table 1 about here]

Throughout all regression analyses, the Variance Inflation Factor values never exceeded 2.8, indicating that multicollinearity did not bias regression results. Results of hierarchical multiple regression analyses are displayed in Table 2 (first column on the left). Regression results revealed that – after partialing out the shared variance between positive and negative emotionality – positive emotionality was negatively related to physical aggression (albeit weakly), and negative emotionality was positively related to physical aggression. Trait emotionality explained roughly 10% of the variance in physical aggression. Further, the DERS scales significantly explained an additional portion of the variance (approximately 17%) in physical aggression. Specifically, negative urgency had a unique positive contribution on physical aggression. Conversely, the Strategies scale of the DERS emerged as a negative predictor. The overall model explained roughly 26% of variance in physical aggression. Of note, the effect of positive emotionality on physical aggression dropped to non-significance in the model including the DERS scales. In contrast, the effect of negative emotionality remained significant, albeit weakened.

[Insert Table 2 about here]

Based on regression results, a moderation analysis with negative emotionality (mean-centered) as independent variable, negative urgency (mean-centered) as moderator, and physical aggression as dependent variable. Both negative emotionality (point estimate = .05, $p < .05$, 95% CI [.01, .10]) and negative urgency (point estimate = .52, $p < .01$, 95% CI [.28, .76]) were significantly linked with physical aggression, explaining approximately 26% of variance. Further, the interaction term (point estimate = .02, $p < .001$, 95% CI [.01, .03]) explained a small but significant portion of incremental variance in physical aggression ($R^2_{change} = .03$, $p < .01$). The significant interaction was probed using simple slopes analysis (Aiken & West, 1991). Results revealed that negative emotionality was significantly and positively linked with physical aggression at medium (point estimate = .05, $p < .05$, 95% CI [.01, .10]) and high levels (point estimate = .12, $p < .001$, 95% CI [.06, .19]) of negative urgency. However, at low levels of negative urgency, the relation between negative emotionality and physical aggression was non-significant (point estimate = -.02, $p > .50$, 95% CI [-.09, .05]). The fact that the CIs for some estimates were close to 0 on one end (i.e., for the main effect of negative emotionality; for the interaction of negative emotionality and negative urgency; and for the conditional effect of negative emotionality at medium levels of negative urgency) indicates that those effects were relatively small in magnitude, though statistically significant. A graphical depiction of the interaction effect is displayed in Figure 1.

[Insert Figure 1 about here]

Supplementary Analysis

Follow-up analyses were conducted with the other five DERS subscales to test whether the interaction effect was specific to the DERS Negative Urgency scale or extended to other subscales. Bootstrap analyses showed that – when taken separately (i.e., one at a time) – all DERS subscales (except Nonacceptance) explained a significant portion of variance in physical aggression above and beyond negative emotionality, with higher scores on DERS subscales corresponding with greater level of physical aggression. Further, negative emotionality was significantly and positively

related to physical aggression in all of the five models. However, none of the interaction effects was significant. Finally, to test whether the effects detected in our main analyses were specific to physical aggression or applied to other aggression dimensions, we repeated all analyses including the other three subscales of the AQ as dependent variables (i.e., verbal aggression, anger, and hostility). Results of hierarchical multiple regression analyses are shown in Table 2. Negative emotionality was significantly and positively associated with anger and hostility, explaining roughly 17% and 29% of variance, respectively. In addition, the DERS subscales significantly explained incremental variance in anger and hostility (18% and 7%, respectively). Nonacceptance and negative urgency were significantly and positively related to anger, whereas only nonacceptance had an independent contribution on hostility. In both models, the effect of negative emotionality was weakened by the inclusion of the DERS subscales, but remained significant. The model predicting verbal aggression was non-significant. Moderation analyses were therefore conducted with nonacceptance and negative urgency as moderators of the link between negative emotionality and anger, and with nonacceptance only as moderator of the link between negative emotionality and hostility. In all three models, the interaction term did not explain significantly a portion of incremental variance in the dependent variables (due to space considerations, these results are not reported, but are available upon request from the corresponding author).

Discussion

Although negative emotionality and self-regulation have been linked to aggression and offending behavior both theoretically and empirically, the literature on each has grown largely separately. Furthermore, only in recent years has the role of emotion regulation in aggressive and violent behavior been subjected to systematic empirical scrutiny. The present study aimed at bridging these perspectives by examining the joint role of negative emotionality and emotion dysregulation in explaining individual differences in physical aggression in a sample of violent offenders. Overall, findings corroborated existing evidence of a substantial relation that both negative emotionality and emotion dysregulation have with aggressive tendencies. Moreover,

current findings extend prior knowledge by showing that emotion regulation skills – and specifically, the ability to control behavior under negative emotional arousal – may buffer the positive relation between negative emotionality and aggression.

At the bivariate level, findings of the present study showed that negative emotionality and emotion dysregulation shared a non-trivial portion of variance, yet clearly represented separable constructs (DeLisi & Vaughn, 2014; Derryberry & Rothbart, 1997; Laible et al., 2010). Conversely, levels of trait positive emotionality seemed largely independent from emotion dysregulation. This is not surprising, as the DERS is a measure explicitly developed to tap difficulties in the regulation of negative emotions (Gratz & Roemer, 2004). Importantly, negative emotionality and the six dimensions of emotion dysregulation were all positively related to physical aggression, with effect sizes mostly falling in the moderate range. Taken together, these results are in line with tenets of general strain theory (Agnew, 1992) and self-regulation theory (Baumeister et al., 1994), as well as with more recent works attesting to the role of emotion regulation in aggressive behavior (Day, 2009; Robertson et al., 2012). Positive emotionality was unrelated to physical aggression, though it was positively related to negative emotionality. The shared variance between negative and positive emotionality likely reflected a general tendency to experience emotions more frequently or intensely, regardless of their nature. However, when controlling for their overlap, results clearly revealed that the unique variance in negative emotionality was positively linked to physical aggression, whereas positive emotionality had a negative relation with physical aggression, possibly playing a protective role toward aggressive tendencies.

Previous studies have clearly supported the positive association between emotion dysregulation and aggression across different samples (Garofalo et al., 2016; Robertson et al., 2014; Velotti et al., 2016). However, it could have been argued that this association was redundant with previously reported associations between negative emotionality and aggression. Nevertheless, it is now widely accepted that – despite their relation – negative emotionality and emotion dysregulation are largely independent, and that their effect on relevant outcomes may hold after partialing out

their shared variance (Tamir, 2016). Accordingly, one prior study had shown that emotion dysregulation – and specifically, poor emotional awareness – was able to explain incremental variance in aggressive behaviour above and beyond the role of anger (Robertson et al., 2015). The current study extends those findings in a larger and independent sample, by showing that emotion dysregulation explained additional variance in physical aggression above and beyond the role of negative emotionality – including, but not limited to, anger. Of note, also the effect of negative emotionality on physical aggression remained significant. Specifically, in line with prior studies (Caspi et al., 1996; Farrington, 2005; Garofalo et al., 2016; D. J. Miller et al., 2012; Vaughn, Salas-Wright, Naeger, Huang, & Piquero, 2016), an inability to control behavior and refrain from impulsive acts when distressed emerged as the emotion dysregulation dimension that was uniquely related to physical aggression. This is not to say that the other dimensions of emotion dysregulation are unrelated to aggression (as also shown by our supplementary analyses), but rather that – besides the role of emotion dysregulation in general – there is something unique in negative urgency that may explain individual tendencies to act aggressively.²

Overall, these findings fit nicely with traditional (Agnew, 1992; Baumeister et al., 1994; Gottfredson & Hirschi, 1990) and more recent (DeLisi & Vaughn, 2014, 2015; DeWall, Anderson, et al., 2011) theories of aggression and criminal behavior, suggesting that both negative emotionality and emotion dysregulation play an important role in contributing to the aggressive tendencies of violent offenders. Interestingly, both negative emotionality and emotion dysregulation made an independent contribution on aggression, suggesting that their relevance for understanding aggressive tendencies is not limited to some overlapping feature (e.g., neuroticism). The present study is also among the first in reporting evidence of an interaction between negative emotionality and emotion dysregulation (in particular, negative urgency) in explaining individual differences in

² The regression coefficient linking the DERS Strategies scale and physical aggression was negative (see Table 1). However, considering the high correlation between Strategies and the other DER subscales (especially negative urgency) as well as the positive bivariate relation between Strategies and physical aggression, this negative coefficient is likely indicative of a suppression effect, rather than of a ‘true’ negative relation.

physical aggression. The interaction effect appears to show that the relation between negative emotionality and aggression is substantial only at high levels of negative urgency, is weaker at medium levels of negative urgency, and is trivial and non-significant at low levels of negative urgency. This finding is consistent with Baumeister's self-regulation theory on the mechanisms underlying aggressive behavior, which posits that the experience of negative emotional arousal, coupled with diminished control over behavior, may increase the risk of violent behavior (Baumeister et al., 1994). Conversely, the ability to control behavior when upset may buffer the association between negative emotionality and aggression, such that offenders with better capacities to control behavior when upset may be less likely to resort to violence even in the presence of negative emotions. More generally, our findings are especially consistent with the propositions of DeLisi and Vaughn's (2014) temperament-based theory of antisocial behavior. Actually, the present study is among the first in corroborating DeLisi and Vaughn's (2014) hypotheses that: negative emotionality and effortful control (and, by extension, emotion regulation) exert an independent contribution on antisocial behaviour; and negative emotionality and effortful control/emotion regulation interact to exacerbate the likelihood of aggressive manifestations.

This result replicates previous findings obtained in juvenile offender samples (Baglivio et al., 2016; D. J. Miller et al., 2012; Wolff et al., 2016) and offers valuable information for clinical work with violent offenders. Indeed, these findings provide some preliminary evidence in support of the argument that treatments aimed at reducing aggressive tendencies in violent offenders should not only target negative emotionality and help offender reduce negative emotions (DeWall, Anderson, et al., 2011; Garofalo et al., 2016; Robertson et al., 2015). Rather, to be successful, such interventions should also include an emphasis on emotion regulation (Day, 2009). Accordingly, effective treatment targets might involve educating offenders on the functionality of emotions, that is, showing that negative emotions are not necessarily something bad that needs to be suppressed. Indeed, in line with a functionalistic approach to emotions, all emotional experiences can be healthy to the extent that they serve the purpose of guiding behavior in an adaptive manner (e.g., signaling

when something annoys us, or makes us happy). Therefore, treatments should aim at fostering the capacity to pay attention to – and accept – emotions, and let them unfold, rather than act upon them in an attempt to suppress them (Agnew, 2001) or detach from them (Baumeister et al., 1994) by means of violent behavior.

In short, treatments for violent offenders should help them acknowledge that all emotions – including painful ones – contain useful information for the self and should not be dismissed or fought but rather used to enhance introspection and guide social behavior. This is particularly important in the treatment of incarcerated violent offenders, who have often suffered from intense adverse experiences during the development, inevitably leading to the frequent experience of negative emotions (Wolff & Baglivio, 2016). It is also worth noting that the context of incarceration itself could amplify or elicit such negative emotional experiences, and the treatment process as well may expose offenders to deal with negative emotions stemming from past or current experiences (DeLisi & Vaughn, 2014). In this context, fostering the ability to reflect upon feelings instead of acting on them could reduce the risk of aggressive behavior, and increase prosocial tendencies.

Finally, our supplementary analyses showed that the effect of negative emotionality and emotion dysregulation also extended on other aggression dimensions, such as anger (as assessed with the AQ) and hostility – but not verbal aggression, which in turn may represent a less severe form of aggression, especially among violent offenders (Buss & Perry, 1992; Garofalo et al., 2016). At the facet-level, findings revealed that negative urgency had a unique contribution on AQ-assessed anger, whereas emotional nonacceptance had a unique contribution on both anger and hostility. These results appear to indicate that, although negative emotionality and emotion dysregulation are clearly relevant for a variety of aggressive tendencies besides physical aggression, different mechanisms may explain individual differences in the affective (i.e., anger) and cognitive (i.e., hostility) components of aggression, compared to its behavioral components that were the focus of the present study (i.e., physical aggression). Moreover, none of the interaction effects between negative emotionality and the other DERS dimensions predicting physical aggression were

significant. That is, negative emotionality and the other emotion dysregulation dimensions had an independent – rather than interactive – effect on levels of physical aggression. Future studies seem warranted to test whether the different role of emotion dysregulation dimensions in the association between negative emotionality is actually indicative of a specifically crucial role of negative urgency as a psychological (‘lift’) bridge buffering the relation between the trait tendencies to experience negative emotions and to engage in aggressive behavior.

The present findings should be read considering the study limitations. First, we relied exclusively on self-report measures, calling for further replications adopting a multi-method assessment. Second, the cross-sectional and correlation nature of the research design does not allow us to draw inferences about the causal or temporal ordering of the study variables. Third, our sample included only Italian incarcerated male offenders. Therefore, the generalizability of the present findings to more diverse offender samples remains unclear. Finally, the internal consistency coefficients of the verbal aggression and anger subscales of the AQ were below the desirable threshold of .70. As shown in the supplementary analyses, these two subscales were also characterized by less robust results, which could be also due to the low reliability estimates. Indeed, low reliabilities attenuate correlation coefficients, thus placing our results on a conservative side. Nevertheless, we believe that this study has the merit to contribute new empirical support to influential theories of offending that have emphasized the relevance of negative emotionality and self- and emotion regulation for aggression and criminal behavior, such as general strain theory, self-regulation theory, and the general aggression model. Furthermore, the present study provides an attempt to integrate these theoretical models by showing that a comprehensive perspective might account for the specific predictions of each theory, as well as for the interactions between elements across different theories. Finally, and perhaps most importantly, the present study contributes to an increasing amount of theoretical and empirical works advocating the potential usefulness of interventions aimed at promoting a functionalistic view of emotions and improving emotion regulation skills as part of treatment programs for violent offenders.

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Highlights

- Negative emotionality (NE) is positively related to physical aggression
- Emotion dysregulation explains incremental variance in aggression beyond NE
- Negative urgency made a unique contribution on physical aggression
- Negative urgency moderated the relation between NE and aggression
- NE and aggression are not significantly related at low levels of negative urgency

Table 1

Mean, standard deviation (SD), and zero-order correlations for all study variables ($N = 221$).

	<i>M (SD)</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Positive emotionality	25.48 (5.16)	—								
2. Negative emotionality	58.84 (18.69)	.33***	—							
3. DERS Nonacceptance	12.88 (5.23)	.22**	.48***	—						
4. DERS Goals	11.40 (4.18)	.10	.43***	.57***	—					
5. DERS Negative Urgency	10.73 (4.43)	.10	.43***	.52***	.68***	—				
6. DERS Awareness	14.11 (3.79)	-.34***	-.18	-.11	.06	.19**	—			
7. DERS Strategies	14.21 (5.68)	.10	.57***	.62***	.59***	.71***	.04	—		
8. DERS Clarity	8.65 (3.33)	-.02	.36***	.42***	.45***	.49***	.30***	.46***	—	
9. AQ Physical aggression	20.47 (7.30)	-.02	.32***	.24***	.32***	.49***	.15*	.30***	.25***	—

Note. DERS = Difficulties in Emotion Regulation Scale. AQ = Aggression Questionnaire.

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

Table 2

Hierarchical multiple regression analyses predicting physical aggression (main hypothesis) and other aggression dimensions (supplementary analyses) with measures of positive and negative emotionality (Step 1) and emotion dysregulation dimensions (Step 2) (N = 221).

Step	Predictors	Physical Aggression	Verbal Aggression	Anger	Hostility
		β	β	β	β
1	Positive emotionality	-.14*			
	Negative emotionality	.36***		.44***	.56***
	$R^2_{adjusted}$	.11***	ns	.17***	.29***
2	Positive emotionality				
	Negative emotionality	.26**		.25**	.44***
	DERS Nonacceptance			.19*	.28**
	DERS Goals				
	DERS Negative Urgency	.55***		.32**	
	DERS Awareness				
	DERS Strategies	-.21*			
	DERS Clarity				
	$R^2_{adjusted}$	.26***	ns	.34***	.33***
		ΔR^2	.17***	ns	.18***
			ns	.18***	.07**

Note. DERS = Difficulties in Emotion Regulation Scale. For ease of presentation, only significant results are reported.

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

Figure 1. Simple slopes analysis probing the significant interaction effect of negative emotionality and negative urgency in predicting scores of physical aggression. Negative urgency moderated the link between negative emotionality and physical aggression, such that the positive relation between negative emotionality and physical aggression was significant only at medium and high levels of negative urgency.