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RESEARCH ARTICLE

WILEY AGGRESSIVE BEHAVIOR

Breaking the link: Distraction from emotional cues reduces the association between trait disinhibition and reactive physical aggression

Olivia S. Subramani | Dominic J. Parrott | Robert D. Latzman | David A. Washburn

Department of Psychology, Georgia State University, Atlanta, Georgia

Correspondence
Dominic J. Parrott, Department of Psychology, Georgia State University, P.O. Box 5010, Atlanta, Georgia 30302-010.
Email: parrott@gsu.edu

Research has implicated biased attention allocation toward emotional cues as a proximal mechanism in the association between trait disinhibition and physical aggression. The current study tested this putative cognitive mechanism by incentivizing a shift of attention from a provoking stimulus to a neutral stimulus during a laboratory aggression paradigm. Participants were 119 undergraduate men. They completed a questionnaire that assessed trait disinhibition, were randomly assigned to a distraction or no-distraction control condition, and completed a shock-based aggression task in which they received low and high provocation from a fictitious opponent. A significant positive association between trait disinhibition and physical aggression was found among non-distracted participants exposed to high, but not low, provocation. Distraction from provoking cues significantly attenuated this association. This study is among the first to provide experimental evidence of (a) the positive relation between trait disinhibition and laboratory-based physical aggression, and (b) a potential method for attenuating this association.

KEYWORDS
aggressive behavior, attention, trait disinhibition

1 | INTRODUCTION

Trait disinhibition is a neurobehavioral construct broadly defined as a highly heritable predisposition to deficient impulse control. This deficiency is characterized by difficulties monitoring and inhibiting behavior, regulating maladaptive emotional responses, and planning for the future (Patrick, Fowles, & Krueger, 2009). Not surprisingly, trait disinhibition is a well-established risk factor for a variety of diagnosable disorders (e.g., antisocial personality disorder, borderline personality disorder) and pathological forms of behavior (e.g., alcohol and drug use) (Krueger et al., 2005; Latzman, Vaidya, Clark, & Watson, 2011; Sharma, Markon, & Clark, 2014). Likewise, trait disinhibition has been associated with various types of aggression, including physical aggression (Krueger, Markon, Patrick, Benning, & Kramer, 2007), reactive (Latzman et al., 2011) and proactive aggression (Miller & Lynam, 2006; Raine et al., 2006), and intimate partner aggression (Derefinko, DeWall, Metze, Walsh, & Lynam, 2011). To date, the association between disinhibition and physical aggression has been demonstrated utilizing physiological (Bernat, Hall, Steffen, & Patrick, 2007; Patrick, 2008; Venables, Patrick, Hall, & Bernat, 2011), cognitive-performance (Barker et al., 2011; Hecht & Latzman, 2018; Ogilvie, Stewart, Chan, & Shum, 2011) and self-report (Latzman et al.,

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2011; Latzman & Vaidya, 2013) indicators of disinhibition. Despite the consistency of this association across various operationalizations of both trait disinhibition and aggression, extant studies are largely cross-sectional and have relied almost exclusively on self-report measures of aggression. Thus, while these structural studies have made significant progress in identifying and measuring transdiagnostic risk factors such as trait disinhibition (Clark & Watson, 2008; Krueger et al., 2007), methodological limitations preclude investigation of mechanisms that engender aggression as a behavioral expression of trait disinhibition.

In contrast, laboratory studies are ideal for examining proximal mechanisms and testing causal hypotheses. Several studies have examined the relation between constructs related to impulse control (e.g., negative urgency, Scott, DiLillo, Maldonado, & Watkins, 2015) and laboratory-based physical aggression and yielded mixed findings; some research did not detect associations between facets of impulsivity as measured by the UPPS-R (Lynam, Smith, Whiteside, & Cyders, 2006; Whiteside & Lynam, 2001) and laboratory-based physical aggression (Seibert, Miller, Pryor, Reidy, & Zeichner, 2010), whereas other research has shown that facets of impulsivity as measured by the Barratt Impulsiveness Scale-11 (BIS-11; Patton, Stanford, & Barratt, 1995), namely attentional impulsiveness and motor impulsiveness, are associated with laboratory-based physical aggression (Miller et al., 2009). For this reason, additional laboratory studies that examine the association between biobehavioral constructs, such as trait disinhibition, and variation in observable behavior, such as physical aggression, are sorely needed (Insel et al., 2010; Patrick & Hajcak, 2016). To answer this call, we used laboratory-based methods to test a proximal mechanism underlying trait disinhibition, whereby biased attention allocation toward emotional cues facilitates reactive physical aggression.

1.1 | A proximal mechanism: Attention to negative affectivity

Negative affectivity may be a key factor in the association between trait disinhibition and aggression. A wealth of literature indicates that individuals who are high in trait disinhibition display heightened reactivity to negative stimuli (Cyders & Smith, 2008; Foell et al., 2016; Patrick et al., 2013; Sher & Trull, 1994; Taylor et al., 1999). Moreover, common markers of trait disinhibition, including deficient inhibition of prepotent responses, have been associated with maladaptive expression of negative affect (Bridgett, Oddi, Laake, Murdock, & Bachmann, 2013; Carlson & Wang, 2007). This propensity to experience and maladaptively express negative affect increases a person's risk for aggression. Indeed, an extensive literature demonstrates that strong negative affect is associated with the expression of aggression (Anderson & Bushman, 2002; Berkowitz, 1990). More specifically, it is posited that heightened negative affect facilitates maladaptive behavior (e.g., physical aggression, substance use) that functions to immediately alleviate negative affect without consideration of the long-term consequences (Lynam & Miller, 2004; Miller et al., 2003). Not surprisingly, negative urgency, which is defined as the tendency to impulsively lash out in the context of negative affect, is especially predictive of reactive physical aggression (Berg, Latzman, Bliwise, & Lilienfeld, 2015; Carlson, Pritchard, & Dominelli, 2013; Miller et al., 2003; Miller, Zeichner, & Wilson, 2012).

Given robust support for heightened emotional reactivity as a mechanism that facilitates behavioral expressions of trait disinhibition, we posit restricted attention onto emotional cues as a potentially significant point of intervention for reducing the association between trait disinhibition and physical aggression. While no study has directly tested this premise, pertinent theory provides a useful framework. Metcalfe and Mischel (1999) posit a dual system of executive functioning as responsible for appropriate regulation of behavior. The first is a "hot" emotional system, responsible for quick reactions to aversive (e.g., pain, provocation) and appetitive (e.g., sexual pleasure, drugs) unconditioned stimuli (Metcalfe & Jacobs, 1996). The second is a "cool" cognitive system, responsible solely for cognitive processing of stimuli (e.g., processing implicit memories, metacognitive monitoring), which is crucial for overriding emotional responses that are maladaptive. Pertinent to aggressive behavior, elicitation of an intense emotional state (e.g., anger) may affect the synchronicity of the dual cognitive and emotional systems, limiting the ability of the "cool" cognitive system to override emotional responses. Metcalfe and Mischel (1999) predicted that reducing the salience of the emotional cue may attenuate the effect of a "hot" stimulus. One method to reduce cue salience, and thus increase likelihood that the "cool" cognitive system inhibits a maladaptive "go response," is to distract attention away from the "hot" stimulus (Mischel, 1974). Consistent with this hypothesis, attention allocation has been shown to be a crucial factor in self-regulation (Mann & Ward, 2007; Mischel, 1974; Rodriguez, Mischel, & Shoda, 1989).

Thus, an intervention that shifts attention to neutral or adaptive external and/or internal cues should inhibit aggressive responding. Indeed, recent work within the aggression literature has capitalized on attentional mechanisms in order to reduce physical aggression. In a study by Ward et al. (2008), participants exercised vigorously, as it was presumed that heightened physiological arousal, similar to a heightened emotional state, would narrow attention onto salient cues. Participants then completed a laboratory aggression task in the presence of aggression-promoting or aggression-inhibiting cues. Physiologically aroused individuals showed more physical aggression in the presence of salient provocative cues than non-physiologically aroused individuals. Further, when salient cues were peace-promoting and thus inhibiting, physiologically aroused individuals were less aggressive than non-physically aroused individuals. One purported explanation is that distraction away from aggression-promoting cues such as provocation disrupts emotional/cognitive neoassociationistic processing important for facilitating aggressive behavior. Indeed, distraction has been shown to reduce aggression when interfering with rumination about provocation (Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005; Wang et al., 2011) and sustained processing of emotion (Gummerum, Van Dillen, Van Dijk, & Lopez-Perez, 2016). In a similar vein, acute alcohol intoxication has been posited to restrict attention onto salient cues (Alcohol Myopia Theory; Steele & Josephs, 1990), leading to more physical aggression when salient external cues

promote, rather than inhibit, violence (Giancola, Duke, & Ritz, 2011). Accordingly, intoxicated participants who are distracted away from provocative stimuli show attenuated physical aggression (Gallagher & Parrott, 2011, 2016; Giancola & Corman, 2007; Phillips & Giancola, 2008; Zeichner, Pihl, Niaura, & Zacchia, 1982).

In sum, the extant literature implicates heightened emotional reactivity in the presence of salient emotional cues as a catalyst of maladaptive behavioral expressions of trait disinhibition. This process can be conceptualized within a broader literature that implicates restricted attention onto salient emotional cues as a key facilitator of maladaptive behavior, and namely physical aggression. In the current study, we examine this attentional mechanism indirectly via a distraction task that seeks to shift attention from emotional cues onto a neutral stimulus.

1.2 | The present study

The purpose of the current study was to (1) examine the association between trait disinhibition and reactive, physical aggression as measured by a laboratory-based paradigm, and (2) to examine emotional reactivity as one possible mechanism purported to mediate the trait disinhibition-physical aggression link. Although this purported mediator was not directly assessed, the aforementioned manipulation of emotional cues via a distraction task allowed for an indirect test of this mechanism. Given that attention allocation was not directly assessed, the current study did not allow for examination of how attentional processes were affected by the distraction task. As the current study is the first examination of the effect of distraction on the association between trait disinhibition and aggression, parsing attentional mechanisms underlying distraction's aggression-dampening effect is beyond the scope of this study.

To achieve these aims, the current study examined the independent and interactive effects of trait disinhibition, emotional cues, and a cognitive distraction manipulation on laboratory-based reactive physical aggression. Participants were randomly assigned to one of two distraction conditions (i.e., distraction, no-distraction control) and physically provoked via the receipt of low intensity and high intensity electric shocks from a fictitious opponent (i.e., weak and strong emotional cues, respectively). Reactive physical aggression was operationalized by the intensity and duration of shock participants deliver to their ostensible opponent. Based on the reviewed literature, the following hypotheses were advanced:

Hypothesis 1 Given research that has reliably demonstrated physical aggression as a behavioral expression of various indicators of trait disinhibition (e.g., Bernat, Hall, Steffen, & Patrick, 2007; Krueger et al., 2007) a positive association between trait disinhibition and laboratory-based physical aggression was expected.

Hypothesis 2 The extant literature has demonstrated a robust association between trait disinhibition and heightened emotional reactivity in the presence of emotionally salient cues (e.g., Sher & Trull, 1994). Given that restricted attention onto emotional cues may serve as a proximal mechanism underlying maladaptive behavior (Mann & Ward, 2007; Metcalfe & Mischel, 1999), an intervention that shifts attention away from emotional cues should reduce the association between trait disinhibition and physical aggression. Thus, a Trait Disinhibition × Distraction × Provocation interaction was predicted. Specifically, under conditions of high provocation, a positive association between trait disinhibition and physical aggression was expected among participants in the non-distraction condition. We predicted that this association would be significantly attenuated among participants in the distraction condition. Under conditions of low provocation, trait disinhibition and physical aggression was not expected to be associated in either distracted or non-distracted participants.

2 | METHOD

2.1 | Participants

Participants were 151 undergraduate males aged 18 and older. An undergraduate sample was deemed appropriate as trait disinhibition is especially likely to be high in early adulthood (Kessler et al., 2005, Slade, 2007). An exclusively male sample was recruited for several reasons. First, previous research has shown men to be more aggressive than women, especially when physical aggression is measured in the laboratory (Bettencourt & Miller, 1996; Giancola et al., 2009). Second, the effect of provocation on aggression has been reliably larger in men than women (Bettencourt & Miller, 1996; Eagly & Steffen, 1986). Third, men score higher on various indicators of trait disinhibition than women (Newman et al., 1996). Collectively, these data suggest that the effect of trait disinhibition on laboratory-based aggression will be strongest in men. Thus, men represent the ideal sample to examine a novel, distraction-based method to reduce laboratory-based physical aggression.

Participants were recruited from an online participant pool of undergraduate students enrolled in Introduction to Psychology courses. Participants completed a battery of questionnaires (Session 1) and an experimental session on a separate day (Session 2). All participants received course credit for their time. Of the 151 participants who completed Session 1, 133 presented to the laboratory for Session 2. Of these participants, 6 (5%) were not deceived (see below). In addition, there was also attrition related to an equipment malfunction ($n = 4$), participant withdrawal after providing informed consent ($n = 2$), and failure to follow task instructions ($n = 2$). Removal of these participants resulted in a final sample of 119 participants. The racial composition of this sample consisted of African Americans (35%), Caucasians (28%), Asians (22%), and individuals who identified as more than one race (8%). See Table 1 for other sample characteristics. This study was approved by the university's Institutional Review Board.

TABLE 1 Descriptive statistics and intercorrelations for key variables

		Descriptives				Correlations				
Variable	# items	Scale	α	*M*	*SD*	Range	1.	2.	3.	4.
1. ESI Disinhibition	20	0–3	.79	.64	.37	0.0–1.7	–			
2. BAQ—PA	9	1–5	.73	2.23	.74	1.0–4.4	.39**	–		
3. Age				20.32	3.43	18–35	−.05	.03	–	
4. Years of Education				14.52	1.88	12–24	−.19*	.04	.62**	–

N = 119. BAQ—PA = Physical Aggression as measured by the Buss- Perry Aggression Questionnaire; No significant differences between the distraction (*n* = 58) or no-distraction control (*n* = 61) condition were detected for any variables; *$p < .05$; ** $p < .01$.

2.2 | Measures

2.2.1 | Externalizing spectrum inventory—Brief form (ESI-BF; Patrick et al., 2013)

This 160-item self-report scale measures lifetime history of externalizing psychopathology in a hierarchical structure. For the current study, the 20-item general disinhibition subscale (*α* = .94) was used to measure trait disinhibition. Participants rate items on a 0 (*False)* to 3 (*True)* scale, with higher scores reflecting greater trait disinhibition (after reversing scores on false-keyed items). Sample items include: "I have had problems at work because I was irresponsible" and "I get in trouble for not considering the consequences of my actions." The general disinhibition scale has been repeatedly administered to undergraduate samples with high internal consistency (Meehan et al., 2013; Nelson, Patrick, & Bernat, 2011).

2.2.2 | Buss-perry aggression questionnaire (BAQ; Buss & Perry, 1992)

This 29-item, self-report measure assesses participants' disposition toward physical aggression, verbal aggression, anger, and hostility. Participants rate items on a scale of 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*) with higher scores reflecting higher trait aggression. Pertinent literature indicates that scores on the Physical Aggression subscale (α = .85) scores are positively related to laboratory-based physical aggression in men (Giancola, 2002). Thus, administration of this measure allowed for the identification of differences in trait physical aggression between distraction conditions that could potentially confound laboratory-based physical aggression.

2.3 | Taylor aggression paradigm

A modified version (Giancola & Zeichner, 1995) of the TAP (Taylor, 1967) was used to assess reactive, physical aggression. The hardware for the task was developed by Coulbourn Instruments (Allentown, PA) and the computer software was developed by Vibranz Creative Group (Lexington, KY). In the TAP, participants compete in a reaction time task in which electrical shocks are administered to and received from a "fictitious" opponent. Participants are seated at a table in a small room, facing a computer screen and keyboard. The numbers "1" through "10" on a computer keyboard are labeled from "low" to "high" to allow participants to determine the level of shock intensity to administer. The duration of the shock administered is dependent on the length of time participants press the key. Participants receive visual feedback on the computer monitor indicating whether they "won" or "lost" a trial as well as the shock level selected and received. The TAP and other similar shock-based laboratory paradigms have been repeatedly shown to be safe and valid measures of aggressive behavior (e.g., Anderson & Bushman, 1997; Parrott, Miller, & Hudepohl, 2015). Reactive, physical aggression was defined as the summation of standardized scores for the average intensity and duration of shocks selected (i.e., TAP physical aggression). This was carried out because previous research has demonstrated that shock intensity and shock duration are highly correlated and part of a more general construct of direct, physical aggression (Carlson, Marcus-Newhall, & Miller, 1990).

2.4 | Provocation

All participants in the present study received low and high physical provocation from their opponent. During the first block, participants received shocks that were one second in duration and ranged from 55% (a "1") to 60% (a "2") of the highest tolerated shock intensity. During the second block, participants received shocks that were one second in duration and ranged from 95% (a "9") to 100% (a "10") of the highest tolerated shock intensity. Each block consisted of 16 trials (eight wins and eight loses). There were two "transition trials" between the blocks. Participants lost both of the transition trials and received respective shock intensities of "5" and "6." Thus, there were a total of 34 trials. This sequence of trials was intended to give the appearance of an increasingly provoking aggressive interaction.

2.5 | Distraction task

Upon arrival to the laboratory for Session 2, participants were randomly assigned to a distraction (*n* = 58) or no-distraction control (*n* = 61) condition. The validated distraction task was employed to shift attention away from provocation, ostensibly allowing for activation of non-dominant adaptive responses. During the TAP, participants in the distraction condition were instructed to attend to a computerized memory-sequencing task (i.e., the "Tile Game"). This task was presented on a laptop computer located on the participants' desk,

on the side of the dominant hand. In this task, a 3 × 3 matrix of 2-cm light-gray squares were presented on a white computer screen. On each trial, four squares illuminated (in black) in a random sequencing order. Participants were asked to attend to and memorize the sequencing order of each trail. Directly following the sequencing presentation, participants used a computer mouse to click on the squares in the order in which they illuminated. The trials proceeded continuously regardless of whether the participant responded to the sequence. In order to prevent confounding emotional responses, performance feedback was not provided. To ensure participants actively engaged in the task, distraction condition participants were told that they would receive a bonus of $10 or 1.0 extra credits if they performed better than 80% of subjects who had already been tested. In reality, all participants in the Distraction condition received the preferred form of compensation. This task has successfully been used as a distractor in previous studies of laboratory-based physical aggression (e.g., Gallagher & Parrott, 2011; Giancola & Corman, 2007).

2.6 | Procedure

The study was completed on two separate days. During Session 1, participants completed a questionnaire battery. Upon arrival to the laboratory for Session 2, participants were given a fictitious cover story. They were informed that the purpose of the study was to examine the relation between personality and reaction time. Participants then received instructions for the TAP. For each trial, participants were informed that shortly after the words "*Get Ready*" appeared on the computer screen, the words "*Press the Spacebar*" would appear at which time they would press, and hold down, the spacebar. Following this, the words "*Release the Spacebar*" appeared at which time they were told to release the spacebar as quickly as possible. A "win" was signaled by the words "*You Won. You Get to Give a Shock*" and a "loss" was signaled by the words "*You Lost. You Get a Shock*." Thus, participants were told that a winning trial allowed them to deliver a shock to their opponent and a losing trial resulted in receiving a shock from their opponent. They were told that they had a choice of 10 different shock intensities to administer at the end of each winning trial. Participants could not elect to not shock their opponent. However, participants were told about the possibility of pressing shock button "1" (out of ten), which would deliver a "hardly noticeable" low intensity shock to their opponent that was "definitely not painful." Following receipt of instructions for the TAP, participants in the Distraction condition partook in the "practice" trials of the Distraction Task until they demonstrated an understanding of the task.

To account for individual differences in sensitivity to electric shock, participants' subjective pain ratings were assessed before the TAP. This procedure was conducted via an intercom while participants were seated in the testing room and the experimenter was in an adjacent control room. Pain thresholds were assessed via administration of 1-sec electric shocks in an increasing stepwise intensity from the lowest available shock setting, which was imperceptible, until the shocks reached a reportedly painful level. All shocks were administered through two electrodes that were attached to the index and middle fingers of the non-dominant hand using Velcro straps. Participants were asked to inform the experimenter when the shocks were "first detectable" and then when they reached a "painful" level. Immediately before assessing their pain thresholds, participants were informed that their male opponent would undergo the threshold assessment first and that they would be able to hear his responses to the procedure over an intercom. In actuality, a male confederate answered the experimenter's questions regarding the testing of his pain thresholds in accordance with a list of predetermined responses. The overall pain threshold procedure lasted approximately 2–3 min.

Following the pain threshold assessment, participants proceeded immediately to the experimental TAP trials. The distraction group was reminded to concurrently play the "Tile Game" (i.e., the distraction task) on the adjacent laptop computer. The sequence of TAP trials was the same for both the distraction and no-distraction conditions. A specially designed "volt meter" and the illumination of one of the 10 "shock lights" [ranging from 1 (low) to 10 (high)] on the computer screen signaled to the participant the shock that he or the opponent selected. A randomly generated win/loss sequence was predetermined and incorporated into the computer program that executed the task. All participants received the same sequence. A computer controlled the initiation of trials, administration of shocks to participants, and recording of their responses. Again, the purpose of the competitive task was to lead participants to believe that they were engaging in an adversarial interaction with another individual.

3 | RESULTS

3.1 | Manipulation checks

3.1.1 | Aggression task checks

Prior to debriefing, participants were interviewed to confirm their belief that they were competing against a male participant on a "reaction time" task and that this task was not a measure of aggression. First, participants were asked whether or not they thought the task was a good measure of reaction time. Second, they were asked about their overall impression of their "opponent." The main criteria for exclusion were participants' beliefs that they were not actually competing against another person or that the task was a measure of aggression. As noted above, of the 133 participants who presented to the laboratory session, 6 (5%) indicated that the task was not a measure of reaction time and/or that they were not actually competing against another participant.

3.1.2 | Distraction task check

Participants in the distraction condition displayed longer reaction times during the TAP ($M = 664.94$, $SD = 56.89$) than participants in the no-distraction control condition ($M = 583.82$, $SD = 59.88$), $t(117) = 7.57$, $p < .001$. This suggests that the distraction task sufficiently drew attention away from provocatory cues. Reaction time on the TAP has been previously used as a manipulation check of

distraction (Giancola & Corman, 2007). Accuracy of performance on the distraction task was positively associated with average reaction time on the TAP (β = .535, p < .001). Thus, participants who performed better on the distraction task had longer (i.e., slower) reaction times on the TAP. In addition, accuracy of performance on the distraction task was negatively associated with TAP aggression under conditions of low provocation (β = −.361, p = .017) and high provocation (β = −.480, p = .001). Thus, participants who performed better on the distraction task were less aggressive on the TAP.

3.2 | Linear mixed model

Because provocation level was repeated within subjects, we used linear mixed modeling to test hypotheses. Linear mixed modeling adjusts for non-independence among the repeated measures (i.e., aggression at low and high provocation) within each participant. Physical aggression on the TAP was analyzed as a function of the Level 2 (between-subjects) and Level 1 (within-subjects) variables. The Level 2 predictors were trait disinhibition and distraction condition, and the Level 1 predictor was provocation level. Mean centering and dummy coding was used to standardize trait disinhibition and condition (i.e., distraction condition = 0; no-distraction control = 1), respectively. Significant interaction terms were explicated by testing whether the slope of the regression line was significantly different from zero (Aiken & West, 1991). The omnibus interaction term showed whether the simple slopes were different from each other. All results are presented in Table 2.

In contrast to Hypothesis 1, the main effect of trait disinhibition on physical aggression was not significant, F (1, 119) = 0.13, p = .724. Hypothesis 2 was examined in a two-level model. The Level 1 predictor was provocation level, and the Level 2 predictors were disinhibition and distraction condition. The cross-level Disinhibition × Distraction × Provocation interaction was significant F(1, 119) = 4.76, p = .031. To explicate this interaction, we conducted simple slopes analyses for the Disinhibition × Distraction interaction at low and high provocation, respectively (see Figure 1). Under conditions of low provocation, trait disinhibition was not associated with physical aggression among non-distracted (b = .08, p = .70) or distracted men (b = −.006, p = .98). Under conditions of high provocation, trait disinhibition was positively and significantly associated with physical aggression among non-distracted (b = .40, p = .045) but not among distracted men (b = −.11, p = .55).

4 | DISCUSSION

The aim of this study was to test a proximal mechanism underlying the association between trait disinhibition and physical aggression, whereby attention allocation in the presence of negative emotion facilitates reactive physical aggression. Inconsistent with Hypothesis 1, the main effect of trait disinhibition on physical aggression was not significant. Instead, this main effect was qualified by a higher order interaction. Consistent with Hypothesis 2, this interaction indicated that trait disinhibition was positively associated with physical aggression under high provocation among non-distracted, but not distracted, men. Moreover, trait disinhibition was not associated with physical aggression under low provocation regardless of distraction condition. Collectively, these findings with a racially diverse sample of men support previous research that indicates an association between trait disinhibition and maladaptive responding in the presence of emotional stimuli (Lynam & Miller, 2004; Miller et al., 2003).

Extant literature suggests that heightened reactivity to emotional stimuli is a key facilitator of disinhibited behavior (Carlson et al.,2013; Miller et al., 2012). Although state affect was not assessed in the current study, the present findings provide indirect, laboratory-based support of this putative mechanism and offer insight into methods that might attenuate it. Consistent with prior work (Foell et al., 2016), it is reasonable to presume that trait disinhibition facilitated heightened negative affect in response to high provocation. Given this, the fact that the distraction manipulation attenuated the positive association between trait disinhibition and aggression under high provocation carries important significance. Specifically, non-distracted participants, who were likely focused on this heightened negative affect, were highly aggressive; however, distracted participants, who were likely less focused on this heightened negative affect, were significantly less aggressive. Together, these data suggest that the focus of participants'

TABLE 2 Summary of linear mixed model testing the independent and interactive effects of disinhibition, condition, and provocation on physical aggression

Fixed effects	*b*	SE	df	*t*	*p*
Intercept	.286	.294	119	.976	.331
Disinhibition	.101	.284	119	.354	.724
Condition	−.580	.410	119	−1.415	.160
Provocation level	−.168	.139	119	−1.207	.230
Disinhibition × Condition	−.339	.411	119	−.825	.411
Disinhibition × Provocation level	−.107	.135	119	−.793	.429
Condition × Provocation level	.355	.195	119	1.824	.071
Disinhibition × Condition × Provocation level	.426	.195	119	2.181	.031

N = 119; Distraction Condition = 0; No-Distraction Control = 1.

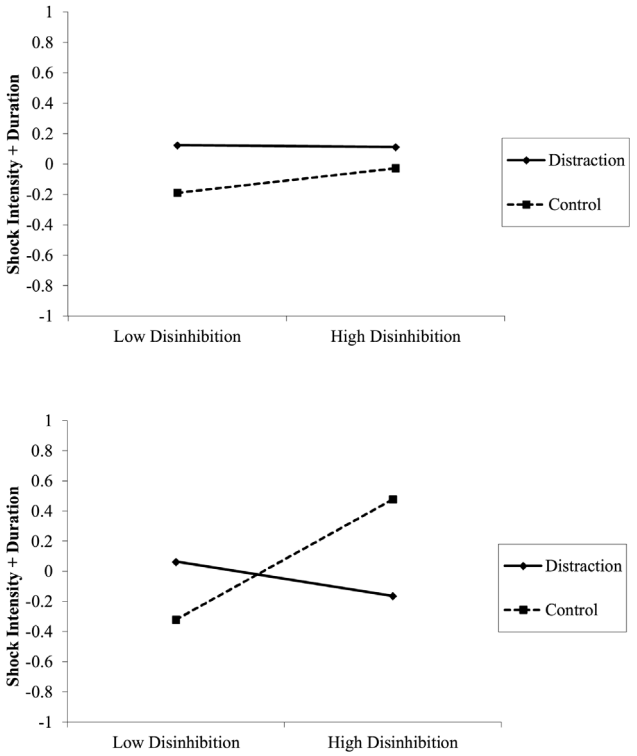

FIGURE 1 Top Panel: Distraction does not moderate the relation between trait disinhibition and physical aggression under low provocation; Bottom Panel: Distraction moderates the association between trait disinhibition and physical aggression under high provocation

attention in the presence of negative emotion dictates whether trait disinhibition will facilitate reactive physical aggression. This finding is consistent with previous research within the Dual Cognitive-Emotional Systems frameworks (Mischel, 1974; Rodriguez et al., 1989) that indicates that distraction from emotional cues leads to concomitant changes in behavior.

The present findings are also noteworthy given the use of experimental laboratory-based methods. There is robust support for the association between trait disinhibition and various forms of aggression. However, the extant literature is dominated by a reliance upon self-report measures of aggression (Derefinko et al., 2011; Krueger et al., 2007). These measures are subject to the classic limitations of retrospective self-report, including failure to and/or biases in recall of perpetration of aggressive acts. Laboratory-based aggression paradigms address these limitations via the direct elicitation and assessment of aggressive behavior (Anderson & Bushman, 1997; Giancola & Chermack, 1998). The present study is among the first to demonstrate an association between trait disinhibition and reactive physical aggression using these methods. In addition, because laboratory aggression paradigms are employed within the context of experiments, researchers can test the causal impact of risk factors for and mechanisms of aggression. In this regard, survey methods and correlational designs are at a clear disadvantage. Indeed, the use of experimental, laboratory-based methods allowed for a direct test of the effect of a distraction manipulation—and in turn an indirect test of the effect of attention allocation in the presence of strong negative affect—on the relation between trait disinhibition and on reactive physical aggression.

4.1 | Limitations and future directions

Some limitations of the present study merit attention. First, while these data indicate that the distraction task affected attentional processes, it is unclear exactly how attentional processes were affected because attention allocation was not directly assessed. Drawing from the extant literature, it is possible that the distraction task disrupted processing (1) of the opponent's shocks (i.e., participants were not aware of the shocks being administered to them); (2) of the opponent's shocks as provoking (i.e., participants were cognizant of the level of shocks received but were less able to process the emotional implications of the high shock level; see Van Dillen, Papies, & Hofmann, 2013); or (3) related to the expression of negative affect (i.e., participants experienced negative affect but were less able to behaviorally express their emotion) (Gummerum et al., 2016). To assess these possibilities, future studies could ask participants to report on their opponent's shock selections and assess state negative affect via standard self-report scales or, to minimize potential biases in responding, employ observational measures (Eckhardt, Parrott, & Sprunger, 2015).

Second, the experimental design may have confounded reward cues and condition. Specifically, the distraction task was financially incentivized to increase the likelihood of a shift in attention away from the provoking cues of the aggression paradigm. Given extant literature that links trait disinhibition with heightened sensitivity to rewards (Buckholtz et al., 2010), it is possible that the attenuating effect of distraction on the trait disinhibition-aggression association occurred because reward cues were more salient than provocatory cues. To disentangle this confound, future studies could manipulate the valence of salient emotional cues to include both negative (i.e., provocation) and positive (i.e., reward) cues.

Third, limitations of the laboratory aggression paradigm used in this study merit attention. For instance, although participants were informed that a shock intensity of "1" was "barely noticeable", a nonaggressive response option was not provided. To examine how participants respond to provocation if alternatives to physical aggression are available, researchers could use validated modifications of the TAP that include a nonaggressive response option (e.g., Zeichner, Parrott, & Frey, 2003). More broadly, laboratory paradigms allow for objective measurement of behavior and testing of causal hypotheses. However, researchers have called into question the construct validity of paradigms such as the TAP. For example, researchers have argued that these paradigms measure phenomena in addition to aggression (e.g., competitiveness) and fail to measure motivation for aggressive behavior (Tedeschi & Quigley, 1996). Of course, all measurement modalities possess strengths and limitations; thus, despite the extensive literature that demonstrates the validity of the TAP (Giancola & Parrott, 2008), it is important to consider its limitations when interpreting the present findings.

5 | CONCLUSION

This study is among the first to provide evidence of an experimental link between trait disinhibition and reactive physical aggression as well as a potential method for attenuating this association in a diverse sample of men. Results indicate that distraction from highly provoking cues reduces the robust association between trait disinhibition and aggression. These findings support future research that considers attention allocation as a putative mechanism, and thus a crucial intervention point, in the association between trait disinhibition and aggression.

ORCID

Dominic J. Parrott http://orcid.org/0000-0002-4893-123X

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