

Do Aggression and Rule-Breaking Have Different Interpersonal Correlates? A Study of Antisocial Behavior Subtypes, Negative Affect, and Hostile Perceptions of Others

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There is mounting evidence that physical aggression and nonaggressive, rule-breaking delinquency constitute two separable though correlated subtypes of antisocial behavior. Even so, it remains unclear whether these behavioral subtypes have meaningfully different interpersonal correlates, particularly as they are subsumed within the same broad domain of antisocial behavior. To evaluate this, we examined whether hostile perceptions of others (assessed via exposure to a series of neutral unknown faces) were linked to level and type of antisocial behavior aggression vs. rule-breaking, and moreover, whether this association persisted even when also considering the common association with negative affect (as manipulated via written recollection of one's best and worst life experiences). Analyses revealed that aggression, but not rule-breaking, was uniquely tied to hostile perceptions of others. Furthermore, this association persisted over and above the common association of both hostile perceptions and aggression with negative affect (at both trait and state levels). Such results provide additional support for clinically meaningful differences between the behavioral subtypes of aggression and nonaggressive rule-breaking and for the independent role of hostile perceptions in aggressive behavior. *Aggr. Behav.* 35:453–461, 2009. © 2009 Wiley-Liss, Inc.

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INTRODUCTION

Although antisocial behaviors are generally defined as actions that violate societal norms and the personal or property rights of others (e.g., vandalism, theft, and assault), the specific manifestation of these behaviors varies markedly from individual to individual [Lahey and Waldman, 2003; Loeber and Stouthamer-Loeber, 1998; Offord and Bennett, 1994; White et al., 2001]. There are at least two moderately correlated behavioral factors—an “overt” or aggressive/oppositional factor and a “covert” or nonaggressive/rule-breaking factor [Frick et al., 1993; Loeber and Schmalting, 1985; Tackett et al., 2003]. Moreover, these two behavioral dimensions appear to have different developmental trajectories. Physical aggression is the most prevalent during the toddler years [Tremblay, 2003], after which mean levels steadily decrease [Stanger et al., 1997; Tremblay, 2003]. Rule-breaking, by contrast, is quite infrequent during childhood and increases dramatically over the course of adolescence, only to fall off again by

adulthood [Stanger et al., 1997]. Furthermore, aggression exhibits unusually high levels of rank-order stability across development [Tremblay, 2003], whereas rule-breaking does not. Consistent with the latter point, there is strong meta-analytic evidence that physical aggression is more heritable than rule-breaking, whereas RB is influenced more by the shared environment than is aggression [Burt, 2009a]. Aggression and rule-breaking also appear to be influenced by different genes [Burt and Mikolajewski, 2008]. In short, there is mounting evidence that physical aggression and nonaggressive, rule-breaking delinquency constitute two separable though correlated subtypes of antisocial behavior.

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Despite evidence of developmental and etiological differences, however, it remains unclear whether these behavioral subtypes have meaningfully different interpersonal correlates, particularly as they are subsumed within the same broad domain of antisocial behavior. In other words, is there reason to expect that aggression and rule-breaking would be differentially relevant for important social and interpersonal outcomes? Evidence to date suggests, albeit circumstantially, that there is. Aggression and rule-breaking demonstrate unique associations with particular personality/affective traits: impulsivity is more strongly associated with rule-breaking [Burt and Donnellan, 2008; DeMarte, 2008], whereas negative affect is more characteristic of aggression [Burt and Donnellan, 2008; Burt and Larson, 2007; Cohen and Strayer, 1996; DeMarte, 2008; Pardini et al., 2003]. The latter results in particular are tied to the possibility of different interpersonal correlates, as there is evidence that negative affect may be linked to hostile attribution biases [Knyazev et al., 2008; Weiss et al., 2007], which in turn predict subsequent hostility and aggression towards others [Dodge and Coie, 1987; Dodge et al., 1990b; Rabiner and Coie, 1989]. Moreover, hostile attribution biases have also been seen in children with depression [Quiggle et al., 1992], a disorder that is linked to antisocial behavior primarily via common associations with negative affect [Krueger, 1999]. In sum, given the association of negative affect with aggression but not rule-breaking, and the link between negative affect and hostile attribution biases, it seems likely that hostile attribution biases could be uniquely tied to the aggressive form of antisocial behavior.

This study sought to empirically evaluate this possibility in a sample of 588 undergraduates. We examined whether changes in hostile perceptions of others (as assessed via exposure to a series of neutral unknown faces) were linked to level and type of antisocial behavior aggression vs. rule-breaking. Moreover, given their common association with negative affect, we also examined whether this association persisted even when considering (and thereby controlling for the effects of) negatively valenced affect (as manipulated via written recollection of one's best and worst life experiences). We hypothesized that a history of aggression (but not rule-breaking) would predict hostile perceptions of others, and that this association would persist over and above trait or trait-like (i.e., baseline) and state (i.e., following positive and negative mood induction) levels of negative affect. Should our hypotheses prove correct, results would provide additional

support for clinically meaningful differences between the behavioral subtypes of aggression and rule-breaking.

METHODS

Participants

The sample consisted of 287 undergraduate males and 301 undergraduate females (average age 19.49 years, with a standard deviation of 1.56 years) at a large research university in Michigan who participated in exchange for course credit or extra credit. Data were collected over the department internet using an anonymous, web-based interface. Participants were representative of the ethnic composition of the area; approximately 83% were European-American, with the remaining participants consisting of African-American (7%), Asian or Pacific Rim (5%), Hispanic/Latino (1%), and other (4%) ethnicities. Results from this sample have not previously been reported. None of the participants have missing data. Research protocol was approved by the Michigan State University IRB. All participants provided informed consent.

Measures

Physical aggression. Participants reported on their history of aggressive behaviors using the Buss-Perry Aggression Questionnaire [Buss and Perry, 1992]. This study made use of the nine item physical aggression scale ($\alpha = .83$). Participants were asked to rate on a 5-point scale the extent to which a series of statements generally described them. Items were averaged to index physical aggression. Higher scores reflect endorsement of more aggressive behaviors.

Rule-breaking. Participants reported on their history of nonaggressive but delinquent behaviors using the Delinquent Behavior Index [Farrington and West, 1971], a 36-item inventory of minor (e.g., skipping school) and more serious (e.g., stealing a car) delinquent behaviors. Participants were asked how frequently they had engaged in that behavior in their lifetime (0 = never; 1 = once; 2 = more than once). Those Delinquent Behavior Index items assessing aggressive acts (e.g., using a weapon in a fight) were not included. The remaining 27 items ($\alpha = .84$) were averaged to index rule-breaking. Higher scores reflect endorsement of more rule-breaking behaviors.

Affect. Negative affect and positive affect were assessed at three time points using the 20-item Positive and Negative Affect Schedule [Watson

et al., 1988]. Positive and negative affect are each composed of ten affect states (e.g., irritability, guilt, and disgust for negative affect; excited, inspired, and proud for positive affect). Participants were asked to rate on a 5-point scale the extent to which they were experiencing each mood state “right now, that is, at the present time.” The ten items comprising each scale were averaged. Both scales demonstrated good internal consistency reliability ($\alpha > .85$) across all the three assessments.

Hostile perceptions of others. Perceptions of others were assessed at three time points using sixteen color photographs depicting individuals with neutral facial expressions. Photos were selected from the NimStim Face Stimulus Set [Tottenham et al., 2009], and were chosen to represent men and women (8 photos each), and African-Americans and European-Americans (4 photos and 12 photos, respectively). The selected photos demonstrated high (> 70%) inter-rater agreement on ratings of neutrality of expression in the original validation study [Tottenham et al., 2009]. Following the presentation of each photo, participants were asked the following questions: (1) How attractive is this person? (2) How likeable is this person? (3) How argumentative is this person? (4) How likely is this person to get into a fight? Answers to the final two questions were correlated .77 to .85 in these data, and thus were averaged to create a composite score of hostile perceptions of each face. Responses were then averaged across faces to compute the “hostile perceptions of others” index.

Procedure

Participants first established baseline levels of affect and hostile perceptions of others, respectively, via the Positive and Negative Affect Schedule and exposure to the faces. We then attempted to alter participants' affect by asking them to describe their most traumatic life experience in detail, a procedure developed and validated in Burt and Larson [2007]. To ensure adequate description and a more thorough recollection, we followed the free response with specific follow-up questions (e.g., “What were the circumstances surrounding this experience?” and “Did you think you might die or be seriously injured during this experience?”).¹ We then asked

participants to complete the Positive and Negative Affect Schedule and exposed them to the faces to assess hostile perceptions of others for a second time. We next repeated this process for their best or most rewarding life experience, again following the free response with specific follow-up questions. Participants then completed the Positive and Negative Affect Schedule and the hostile perceptions face rating task for a third and final time. After that, they completed the aggression and rule-breaking questionnaires.

In order to minimize the interpretative difficulties across assessments, we elected to use the same set of faces, presented in the same order, for each of the three presentations (baseline, worst experience, best experience). This decision is advantageous as it ensures that changes in the hostility ratings are a function of the affective manipulation rather than changes in the facial stimuli themselves. However, there is one potential difficulty resulting from this decision. There is a well-established familiarity effect when viewing faces, such that faces are described more negatively during the first exposure, and are described more positively during repeated presentations [Claypool et al., 2007; Harmon-Jones and Allen, 2001; Moreland and Zajonc, 1982]. We accommodated these familiarity effects during the second and third exposures by counterbalancing the order of the best and worst experience inductions. As a result, even though we expected faces to be viewed less negatively after baseline, this difference was not linked to a particular order of affect induction. Roughly half the sample ($n = 296$; 50% female) completed the experiment in the above order (i.e., baseline, worst experience, best experience). For the remaining participants ($n = 292$; 50% female), affect induction was reversed (i.e., baseline, best experience, worst experience). Moreover, for each affect induction ordering, approximately half of the sample was exposed to one order of faces, whereas the other half was exposed to different order (i.e., the same faces but in a different order). In other words, 25% of the participants were exposed to each of the four possible orderings: (1) facial order #1 negative–positive induction;

(footnote continued)

Categories spanned a broad range of possible life events (e.g., settling into the university, sexual assault, physical assault, death of a loved one). Negative affect following one's worst memory had no association with any category of life events, suggesting that affective responses to one's worst memory are not a function of the type or severity of life event experienced. Such findings are thus thought to suggest that results obtained via this paradigm are not a function of differentially aversive recollections.

¹In validating this affect induction paradigm, Burt and Larson [2007] sought to ensure that results were not a function of the type or severity of life event recalled. Specifically, the content of each participant's worst story was evaluated by coders blind to the participants' other responses. Each story was assigned to one or more of 24 negative life event categories [Ferguson et al., 2000].

- (2) facial order #1, positive–negative induction; (3) facial order #2, negative–positive induction; (4) facial order #2, positive–negative induction.

Data Analyses

Two sets of analyses were performed. We first computed correlations to evaluate whether aggression and rule-breaking were associated with negative affect and hostile perceptions of others at each of the three assessments. Analyses were conducted for both full aggression and rule-breaking scores and their residuals (e.g., aggression and rule-breaking were entered as a predictor of the other in two regressions; the residuals are composed of that variance remaining in a given subtype once we statistically removed overlap with the other). The residuals are particularly important as they index variance unique to each subtype (because subtypes are correlated at $.46$, $P < .01$, the full scores are not as “pure”).

Second, we made use of multi-level regression to investigate the sources of hostile perceptions of others. In these analyses, an individual's hostile perception of others at a given assessment (level 1) is nested within the individual (level 2). The level 1 model thus attempts to explain variability in hostile perceptions of others *within persons* (i.e., what explains the variability in person A's perception of others across assessments?), whereas the level 2 model explains variability *between persons* (i.e., why does person A's perception of others differ from that of person B?). Trait measures of aggression and rule-breaking, as well as participant gender, order of pictures, and order of affect induction, were entered as fixed between-persons predictors of hostile perceptions (but not within-person predictors, as they were assessed only once). Positive affect and negative affect during particular assessments, as well as affective condition (i.e., baseline, best memory, worst memory), were entered as both random and fixed predictors of hostile perceptions, as these predictors could conceivably explain both the variability in hostile perceptions of others across *assessments* (i.e., within-persons) as well as the variability across *individuals* (i.e., between-persons). Based on our hypotheses, we expected trait aggression (but not rule-breaking) to emerge as a significant between-persons predictor of hostile perceptions of others. We also expected negative affect to predict both within- and between-person variability in hostile perceptions of others. Finally, we expected that the association with aggression would persist even while jointly considering negative affect.

RESULTS

Aggression and rule-breaking were both generally normally distributed in the current sample (see Table I), with some participants exhibiting very high levels of these behaviors. Note that trait levels of aggression and rule-breaking did not vary by affect induction ordering (both $P \geq .22$), nor the ordering of the pictures (both $P \geq .45$). The broad range of aggression and rule-breaking behaviors endorsed, along with their normality, suggests that we are able to meaningfully study these phenomena in our normative college sample. Moreover, these rates are consistent with the high frequency of these behaviors in late-adolescence (i.e., roughly 25% of late adolescents display clinically significant anti-social behavior; Moffitt, 2003).

There was also variability across ratings of hostile perceptions of others: male faces were rated as more hostile than female faces across all the three affective states (Cohen's d effect sizes ranged from $.54$ to $.58$), and black faces were rated as more hostile than white faces (Cohen's d effect sizes ranged from $.35$ to $.45$). Hostile perceptions of others also varied across affective condition, such that these ratings were significantly lower following recollection of one's best memory than following recollection of one's worst memory or following the baseline condition (Cohen's d effect sizes ranged from $.13$ to $.23$; t -test statistics ranged from 3.8 to 4.5 for men and 5.2 to 5.4 for women, all $P < .001$). However, there was no difference between baseline and recollection of one's worst memory (i.e., t -test statistic = 1.4 for men and 0.82 for women; $P = .17$ and $.42$, respectively). However, because of the “familiarity effect” observed in studies with repeated exposure to particular faces (as discussed in the Methods), *lower* ratings of hostile perceptions were expected for the worst memory condition, as it always followed the baseline condition. Given this, it could be argued that we were able to manipulate hostile perceptions of others in the worst memory condition by raising these ratings back to baseline.

Correlations

Associations between negative affect and hostile perceptions of others were robust to the various affective conditions. Both within and across affective state, we observed a significant association between negative affect and hostile perceptions of others (r 's ranged from $.15$ to $.24$, all $P < .01$). Such findings highlight, as expected, a small-to-moderate but robust association between negative

TABLE I. Descriptive Statistics

	Mean	SD	Observed range	Possible range	Skew
<i>Males</i>					
Aggression	2.25	0.74	1.0–4.3	1.0–5.0	0.53
Rule-breaking	1.49	0.31	1.0–2.6	1.0–3.0	1.02
Negative affect					
1. Baseline	1.68 ^a	0.62	1.0–4.2	1.0–5.0	1.14
2. After worst memory	1.73 ^b	0.68	1.0–4.3	1.0–5.0	1.16
3. After best memory	1.53 ^{a,b}	0.60	1.0–3.7	1.0–5.0	1.41
Hostile perceptions of others					
1. Baseline	2.36 ^c	0.45	1.1–3.6	1.0–4.0	–0.05
2. After worst memory	2.33 ^d	0.52	1.0–3.7	1.0–4.0	0.03
3. After best memory	2.26 ^{c,d}	0.53	1.0–3.5	1.0–4.0	–0.14
<i>Females</i>					
Aggression	1.81	0.62	1.0–4.2	1.0–5.0	1.07
Rule-breaking	1.30	0.20	1.0–2.1	1.0–3.0	1.16
Negative affect					
1. Baseline	1.70 ^{e,f}	0.64	1.0–3.9	1.0–5.0	1.16
2. After worst memory	1.77 ^{f,g}	0.67	1.0–3.9	1.0–5.0	0.96
3. After best memory	1.52 ^{e,g}	0.58	1.0–3.9	1.0–5.0	1.50
Hostile perceptions of others					
1. Baseline	2.39 ^h	0.45	1.0–3.5	1.0–4.0	–0.21
2. After worst memory	2.37 ⁱ	0.52	1.0–4.0	1.0–4.0	0.12
3. After best memory	2.28 ^{h,i}	0.51	1.0–3.6	1.0–4.0	–0.05

Means with the same superscript are significantly different from one another at $P < .05$, highlighting within-person changes across affective condition. Thus, for example, negative affect in men was significantly different across conditions 1 and 3 (i.e., superscript “a”) and conditions 2 and 3 (i.e., superscript “b”), but did not differ across conditions 1 and 2 (i.e., no common superscript). Mean levels of aggression and rule-breaking vary significantly across sex; mean levels of negative affect and hostile perceptions of others do not.

TABLE II. Correlations of Negative Affect and Hostility with Aggression (AGG) and Rule-breaking (RB) and the Residuals of AGG/RB and RB/AGG

	AGG	RB	Diff. in r	AGG/RB	RB/AGG	Diff. in r
1. NA at baseline	.20	.13	n. s.	.16	.05	$P < .10$
2. NA after worst memory	.19	.08	$P < .10$	.18	–.01	$P < .01$
3. NA after best memory	.24	.13	$P < .10$	.20	.03	$P < .01$
4. Hostility at baseline	.16	.08	n. s.	.14	.01	$P < .05$
5. Hostility after worst memory	.21	.08	$P < .05$	.19	–.01	$P < .01$
6. Hostility after best memory	.17	.07	$P < .10$	.15	.00	$P < .01$

Hostility refers to hostile perceptions of others, whereas NA refers to Negative affect. All correlations $\geq .08$ are significantly greater than zero at $P < .05$.

affect and hostile perceptions of others. The correlations of aggression and rule-breaking with negative affect and hostile perceptions of others at each of three affective conditions are presented in Table II. Aggression was moderately and positively associated with negative affect and hostile perceptions of others, such that the higher an individual’s trait aggression, the more likely he or she was to report negative affect and hostile perceptions of others. Further, this association persisted across all the three affective conditions and when controlling for the overlap between aggression and rule-breaking. Rule-breaking, by contrast, was inconsistently associated with

negative affect and hostile perceptions of others, and these associations did not persist once we controlled for overlap with aggression. Indeed, statistical comparisons of the correlations (using Fisher’s Z tests of differences) suggest that associations between aggression and hostile perceptions of others are, in general, statistically larger than associations between rule-breaking and hostile perceptions of others (particularly once we control for the overlap between aggression and rule-breaking). In short, these results suggest that negative affect and hostile perceptions of others are linked to aggression but not rule-breaking.

Multilevel Regression Model

We fit an unconditional model without predictors to the data to examine variance in hostile perceptions of others at the within-person and between-person levels. If a participant tends to report similar perceptions of others across affective condition, the proportion of variance in hostile perceptions of others at the within-person level will be low. Using the formula provided by Snijders and Bosker [1999], we computed the proportion of variance in hostile perceptions of others that varies between subjects (76.4%; raw estimate = .191, SE = .012, Wald $Z = 15.50$, $P < .001$), and that which varies within subjects (23.6%; raw estimate = .059, SE = .002, Wald $Z = 24.25$, $P < .001$). In short, hostile perceptions of others varied both within and between persons.

In an effort to better understand the variability in hostile perceptions of others, we then added fixed and random predictors to our model. Predictors were added in a step-wise fashion, so as to more clearly ascertain the role of negative affect in the association between aggression and hostile perceptions of others (Model A: intercept, picture order, order of affect manipulation, sex, aggression, delinquency, and affective condition; Model B: intercept, picture order, order of affect manipulation, sex, aggression, delinquency, affective condition, positive affect, and negative affect). The model was fit using restricted maximum likelihood estimation. Results are presented in Table III. As seen there, neither the order of the pictures, nor the order of affective manipulation (i.e., positive-negative vs. negative-positive) predicted hostile perceptions of others. Participant sex did predict hostile perceptions of others, such that hostile perceptions of others were somewhat more common in men vs. women. Perhaps not surprisingly given the nature of the experimental task, affective condition emerged as both a between-persons predictor (i.e., mean hostile perceptions varied across affective condition; as seen in Table I), as well as a within-persons predictor (i.e., affective condition predicted variability in hostile perceptions of others across assessments or within-person). More substantively, however, positive affect and rule-breaking had little-to-no association with hostile perceptions of others. By contrast, aggression and negative affect emerged as independent between-persons predictors of hostile perceptions of others, such that higher levels of both aggression and negative affect were independently associated with more hostile perceptions of others. Negative affect also emerged

TABLE III. Using Multilevel Regression to Predict Hostile Perceptions of Others

	Model A Estimate (SE)	Model B Estimate (SE)
Fixed effects		
Intercept	2.370 (.037)**	2.204 (.062)**
Picture order	-0.015 (.036)	-0.025 (.036)
Order of affective manipulation	-0.049 (.036)	-0.032 (.036)
Participant sex	0.099 (.039)*	0.091 (.039)*
Aggression	0.094 (.021)**	0.085 (.020)**
Rule-breaking	0.015 (.021)	0.010 (.021)
Affective condition	-0.051 (.007)**	-0.043 (.007)**
Positive affect	—	0.004 (.014)
Negative affect	—	0.089 (.019)**
Random effects		
Intercept	0.157 (.012)**	0.269 (.082)**
Affective condition	0.008 (.002)**	0.009 (.002)**
Positive affect	—	0.009 (.006)
Negative affect	—	0.004 (.010)**
Residual	0.048 (.003)**	0.040 (.003)**

Unstandardized estimates are presented to allow for the comparison of fixed and random effects. Sex was dummy-coded such that 0 = women and 1 = men. ** and * indicate that the estimate is significant at $P < .01$ and $P < .05$, respectively.

as a within-persons predictor of hostile perceptions of others, such that more negatively valenced affective reactions to the affective manipulation precipitated more hostile perceptions of others. Such results highlight the robust association between negative affect and hostile perceptions of others, while also suggesting that hostile perceptions of others are independently linked to aggression.

DISCUSSION

This study examined whether hostile perceptions of others were linked to level and type of antisocial behavior. We specifically anticipated that hostile perceptions of others would be linked to aggression but not rule-breaking, and that this association would persist over and above the common association with negative affect. Results fully supported these hypotheses. Trait levels of aggression (but not rule-breaking) were uniquely tied to negative affect and to hostile perceptions of others. That said, the association between aggression and hostile perceptions of others was not solely a function of negative affect, suggesting that the common association of hostile perceptions of others and aggression with negative affect is not driving this association (at least not entirely). In this way, our results provide support for clinically meaningful differences

between the behavioral subtypes of aggression and nonaggressive rule-breaking.

Importantly, these findings both replicate and extend earlier work [Dodge and Coie, 1987; Dodge and Frame, 1982; Dodge et al., 1990b]. Similar to the earlier findings demonstrating that aggressive individuals are more likely to label a neutral face as depicting anger [Knyazev et al., 2008; Weiss et al., 2007], we found that individuals high on trait aggression had a greater tendency to perceive a person posing a neutral facial expression as potentially aggressive. We also found that hostility ratings were slightly heightened following negative as compared with positive mood induction (a small, but statistically significant difference; $P < .001$). This finding is in keeping with past work indicating that current affective state influences the perception of ambiguous or neutral facial expressions [Niedenthal et al., 2001; Schiffenbauer, 1974] and that negative mood reduces the perceived genuineness of facial expressions [Forgas and East, 2008.]

Next, the dissociation between aggression and rule-breaking observed in the current data also builds nicely on earlier work. Dodge et al. [1990a,b] found that hostile attribution biases among severely aggressive adolescent boys were specifically associated with the frequency of interpersonally violent crimes (e.g., murder, assault, robbery), but showed no association with nonviolent crimes (e.g., escape, fraud, negligence, theft) [Dodge et al., 1990b]. Similarly, the lack of an association between hostile perceptions of others and rule-breaking is consistent with recent work highlighting *socially advantageous* consequences of rule-breaking. During adolescence, high risk or rule-breaking behaviors are admired and encouraged among adolescents and, as a result, are generally (though not always; see Becker and Luthar [2007]) linked to increased popularity [Allen et al., 2005; Luthar and D'Avanzo, 1999; Moffitt, 1993; Sussman et al., 2007; Valente et al., 2005]. For example, Burt [2009b] examined small groups of previously unacquainted adolescent men and collected ratings of sociometric popularity (i.e., individuals were asked to rank the other members of their group by likeability). Results revealed that higher levels of rule-breaking were linked to significantly higher levels of popularity ($r = .21$ to $.26$) [Burt, 2009b]. Thus, during adolescence, rule-breaking appears to constitute a socially advantageous set of behaviors, findings that are not consistent with links to (socially disadvantageous) hostile perceptions of others.

Even so, there are limitations to this study. Affective responses were assessed via self-reports,

rather than direct observation, and were induced via recollection of one's worst memory, rather than standardized stimuli. Although this protocol has been validated in earlier research [Burt and Larson, 2007], future studies should seek to replicate these findings using standardized emotional stimuli. Similarly, although trait levels of aggression and rule-breaking did not vary by affect induction ordering (both $P \geq .22$), we cannot be sure whether the mood induction itself influenced participant responses on these antisocial behavior questionnaires (as the mood induction preceded their administration). Future work should seek to replicate these findings using other administration protocols (e.g., administering the trait questionnaires prior to the mood induction paradigm).

Next, although a number of participants exhibited high levels of antisocial behavior in these data, the present sample was selected from a normative undergraduate population, thus compromising generalizability to severe antisociality. Future research in an adjudicated sample would be useful in addressing this limitation. Similarly, there is a significant body of literature highlighting subtypes within aggression that were only indirectly considered here: proactive (i.e., premeditated, instrumental aggression) and reactive (i.e., impulsive, affective aggression) [Barratt et al., 1997; Davidson et al., 2000]. It would thus be important for future research to further consider these subtypes of aggression. Finally, our model treats hostile perceptions of others as a consequence of (rather than a cause of) physical aggression, an assumption that is not tested in our data. Moreover, the degree to which the aggression–hostile perceptions of others pathway results in the expression of physical aggression towards others is not clear, as actual aggressive behaviors were not assessed here. However, in light of the previous findings indicating greater frequency of aggressive acts following attributions of hostile intent, we would expect a similar association. That said, future work should examine whether the link between aggression and hostile attributions results in an increase in aggressive behaviors.

Despite these limitations, the current results have some key implications. The replication of the largely unique association between negative affect and aggression highlights the robust nature of this effect and suggests that the role of negative affect in parsing subtypes of antisocial behavior may be important for models of etiology and intervention. Moreover, these data suggest that hostile perceptions of others could function as a key mechanism through which high levels of “trait aggression”

ultimately lead to specific aggressive acts [Verona et al., 2002], and accordingly, would serve as suitable targets for interventions designed to reduce physical aggression. Importantly, however, these (largely independent) associations appear to be specific to the aggressive, rather than the nonaggressive rule-breaking, form of antisocial behavior. This study revealed little evidence for an association between rule-breaking and either negative affect or hostile perceptions of others, particularly once we controlled for the overlap between aggression and rule-breaking. Such findings highlight the presence of meaningful differences between aggressive and non-aggressive antisocial behavior, such that the clinical management of both negative affect and hostile attribution biases may be important points of intervention for reducing aggressive acts but would not be useful for the reduction of rule-breaking behaviors. Future treatment research should evaluate the need for different intervention strategies for aggressive and nonaggressive antisocial behaviors.

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