

# Exploring the Cognitive and Emotional Correlates to Proactive and Reactive Aggression in a Sample of Detained Girls

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**Abstract** The current study examined the distinction between reactive and proactive aggression in a sample of detained girls ( $N=58$ ) aged 12 to 18. This study employed a self-report measure of aggression that was designed explicitly to assess both the forms that aggression takes (i.e., relational and overt), as well as the functions that aggression serves (i.e., reactive and proactive). Reactive aggression was uniquely associated with poorly regulated emotion and anger to perceived provocation, whereas proactive aggression was uniquely associated with callous–unemotional (CU) traits and biased outcome expectations for aggression. While overt aggression appeared to largely account for these associations, relational aggression showed strong and unique associations with CU traits. The current findings highlight the importance of assessing reactive and proactive aggression, as well as both overt and relational aggression, in detained girls.

**Keywords** Proactive aggression · Reactive aggression · Relational aggression · Delinquency · Girls

Aggression is generally defined as behaviors that are intended to hurt or harm others (e.g., Berkowitz 1993). It has become increasingly clear that there are several different types of aggressive behavior that can be displayed by children and adolescents. One distinction frequently examined in research is between reactive and proactive aggression (Dodge 1991;

Dodge and Coie 1987). Reactive aggression is generally defined as aggression that occurs as an angry response to a perceived provocation or threat (e.g., Berkowitz 1993), whereas proactive aggression is conceptualized as aggression that is unprovoked and is used for instrumental gain or dominance over others (Dodge 1991; Dodge and Coie 1987). In support of this distinction, separate factors have been obtained using teacher (Day et al. 1992; Dodge and Coie 1987), parent (Poulin and Boivin 2000a), and peer ratings of aggression (Salmivalli and Nieminen 2002). However, these two types of aggression are frequently moderately to substantially correlated in samples of youth ( $r$ s ranging from approximately 0.40 to 0.90) suggesting that some children display both types of aggressive behavior and leading some to question the utility of this distinction (Bushman and Anderson 2001; Walters 2005).

Clearly, theories of aggression that distinguish between reactive and proactive aggression must explain their frequent co-occurrence in the same individual (Frick and Marsee 2006). However, these theories also need to explain the consistent findings of distinct correlates to the two types of aggression (see Poulin and Boivin 2000b). Consistent differences in the correlates of reactive and proactive aggression have been seen in both cognitive and emotional domains. Specifically, reactive but not proactive aggression has been consistently linked to a tendency to misinterpret ambiguous behaviors as hostile provocation (Crick and Dodge 1996; Day et al. 1992; Dodge and Coie 1987; Dodge et al. 1990; Hubbard et al. 2001). In contrast, proactive but not reactive aggression has been associated with the tendency to view aggression as an effective means to reach goals that is unlikely to result in punishment (Crick and Dodge 1996; Dodge et al. 1997; Schwartz et al. 1998). In terms of emotional correlates, reactive aggression has been associated with low frustration tolerance and poorly

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regulated responses to emotional stimuli (Vitaro et al. 2002), while proactive aggression has been associated with reduced levels of emotional reactivity (i.e., skin conductance and heart rate acceleration; Hubbard et al. 2002) and with callous and unemotional (CU) personality traits, which are defined as a failure to show prosocial emotions such as empathy or guilt (Frick et al. 2003; Kruh et al. 2005).

These cognitive and emotional differences provide one piece of evidence supporting the distinction between reactive and proactive aggression. However, one limitation of this research is that most studies have focused on male samples. A few notable exceptions using mixed-gender samples suggest that the findings may generalize to girls. For example, Crick and Dodge (1996) found that both boys and girls who were classified as reactively aggressive using teacher ratings were more likely to exhibit a hostile attributional bias than children classified as proactively aggressive. Further, they found that proactively aggressive boys and girls were more likely than reactively aggressive children to evaluate aggressive behavior in a positive way and to expect positive outcomes for their aggressive behavior. Similarly, two studies reported that reactively aggressive boys and girls exhibited more anger and anxiety than proactively aggressive children (Hubbard et al. 2002; Vitaro et al. 2002). Thus, available research suggests that the correlates to reactive and proactive aggression are similar for boys and girls. This conclusion, however, is based on a limited number of studies.

In extending this literature to girls, it is also important to consider another distinction that has been made within aggressive behaviors. Several studies have shown that when girls behave aggressively, they are more likely to choose relational aggression<sup>1</sup> (rather than physical or overt aggression) as a strategy for use within the peer group (Crick 1996; Crick et al. 1997; Crick and Grotpeter 1995; Lagerspetz et al. 1988; Ostrov and Keating 2004). Overt and relational forms of aggression can be descriptively distinguished by their method of harm and the goals they serve (Crick and Grotpeter 1995). Overt aggression (also referred to as “physical aggression” in some studies) harms others by damaging their physical well-being and

includes physically and verbally aggressive behaviors such as hitting, pushing, kicking, and threatening (Coie and Dodge 1988; Parke and Slaby 1983). In contrast, relational aggression harms others by damaging social relationships, friendships, or feelings of inclusion and acceptance in the peer group (Crick et al. 1999). Relational aggression consists of behaviors such as gossiping about others, excluding target children from a group, spreading rumors, or telling others not to be friends with a target child (Crick and Grotpeter 1995; Lagerspetz et al. 1988).

Overt and relational aggression show moderate correlations in past research, ranging from approximately 0.50 to 0.70 in both normative and clinical samples (e.g., Crick 1996; Moretti et al. 2001). Despite these correlations, factor analyses of teacher (Crick 1996; Rys and Bear 1997), self (Prinstein et al. 2001), and peer ratings (Crick and Grotpeter 1995) provide some support for the distinctiveness of relational and overt aggression. Further, many studies have found that relational aggression predicts social-psychological maladjustment above and beyond overt aggression, especially for girls (e.g., Crick 1996; Crick and Grotpeter 1995; Prinstein et al. 2001).

With a few notable exceptions, past research on relational aggression has generally not considered whether youth use this type of aggression both reactively and proactively. However, in recent years researchers have begun to examine this hypothesis in samples of children and adolescents (e.g., Little et al. 2003; Prinstein and Cillessen 2003). In a unique and sophisticated examination of aggressive behavior in German youth (grades 5 through 10), Little et al. (2003) developed a measurement system that allowed them to disentangle the overriding forms of aggression (i.e., overt and relational), from the underlying functions (i.e., reactive and proactive) using structural equation modeling. While this study did not test hypotheses related to the cross-products of the four dimensions (e.g., reactive relational, proactive relational, reactive overt, and proactive overt), it did provide evidence for the existence of these subtypes and the ability to validly measure them in youth. Subsequent research examining these four dimensions has indicated that they are internally consistent and show differential associations with internalizing disorder symptoms (Marsee et al. 2007a) and peer status (Prinstein and Cillessen 2003). However, past research has not tested the question of whether, similar to past findings for overt or physical aggression, these four dimensions show differences in their cognitive and emotional correlates.

The purpose of the current study is to expand on past research in two important ways. First, this study includes cognitive (e.g., hostile attributional bias; outcome expectations for aggressive behavior) and emotional (e.g., callous–unemotional traits; anger to provocation) characteristics that have not been examined in previous research, but

<sup>1</sup>While Crick and colleagues use the term “relational” aggression, other researchers have used different terminology to refer to this type of behavior (i.e., “indirect” aggression; Lagerspetz et al. 1988 and “social” aggression; Cairns et al. 1989; Galen and Underwood 1997). These three labels have often been used interchangeably in the literature, with some researchers claiming that “the same phenomenon is referred to by these three concepts” (Björkqvist 2001, p.272; see also Underwood et al. 2001). While the three types are measured in somewhat different ways, they are virtually indistinguishable in terms of their basic characteristics and goals, in that they all focus on harming others through social manipulation strategies. Therefore, in order to maintain parsimony, the current investigation uses the term relational aggression to refer to this type of behavior.

that may be uniquely associated with reactive and proactive forms of relational aggression. Second, the current study examined the distinctions between both reactive and proactive aggression and overt and relational aggression in a sample of detained adolescent girls. This sample was chosen due to the high rates of aggressive behavior in detained girls, as well as the lack of appropriate gender-based treatments for problem behavior among girls involved in the juvenile justice system (Chamberlain and Moore 2002). Distinguishing among subtypes of aggression in such high-risk samples could be especially important for designing interventions for incarcerated girls based on the cognitive and emotional processes that may be leading to or maintaining their problem behaviors (Frick 2006).

Based on past research, we hypothesized that reactive and proactive aggression (used both overtly and relationally) would show differential correlates in a sample of detained girls. Specifically, we hypothesized that reactive aggression would be associated with poorly regulated emotions (i.e., emotional dysregulation), anger to perceived provocation, and a hostile attributional bias, while proactive aggression would be associated with callous unemotional (CU) traits, positive outcome expectations for aggression, and low punishment expectations for aggression. In this study, we examined both anger as a response to perceived provocation as well as poorly regulated emotional behaviors in general (i.e., inappropriate displays of negative emotions), but did not determine whether poorly regulated emotional behavior was due to high levels of physiological reactivity, deficient strategies to regulate this reactivity, or both. We chose to focus on the behavioral outcome as past research has consistently linked such behaviors to reactive aggression but has not conclusively determined which processes lead to these unregulated behaviors (Frick and Morris 2004). Given the expected correlation between reactive and proactive aggression, we tested both the overall association and the unique variance associated with these cognitive and emotional characteristics and each type of aggression. Further, given that (a) relational and overt aggression are frequently correlated (Crick 1996; Moretti et al. 2001), and (b) a detained sample is likely to have higher rates of overt aggression than a community sample, we also tested whether relational aggression was associated with theoretically important cognitive and emotional characteristics independently of the presence of overt aggression.

## Method

### Participants

The parents or legal guardians of 82 pre-adjudicated adolescent girls housed in three short-term detention

facilities in southeastern Louisiana were contacted by detention center staff and asked for permission for the researcher to contact them for potential participation. The participating detention facilities were locally operated and primarily housed pre-adjudicated youth awaiting trial. Approximately half (52%) of the participants were recruited from a facility in a large urban area of southeastern Louisiana, while the other half were recruited from two facilities serving surrounding suburban and rural areas. One youth was excluded based on parental report of an educational exceptionality of mild mental retardation and one youth was excluded based on parental refusal to consent. The parents/guardians of seven youth could not be contacted for consent purposes and 13 youth were released from detention before parental consent could be obtained. Data from two additional girls were excluded because of outlying scores (i.e., greater than three SD from the mean) on the aggression measures. The overall participation rate in this study was comparable to other self-report studies with detained adolescent females (e.g., Holsinger and Holsinger 2005).

The final sample consisted of 58 adolescent girls ranging in age from 12 to 18 ( $M=14.98$ ;  $SD=1.30$ ). The self-reported ethnic breakdown of the sample was 78% African-American and 22% Caucasian, which is largely representative of girls housed in detention centers across the state (Louisiana Youth Services Office of Youth Development 2004). Based on a review of their institutional records, the majority of participants had at least one prior detention (79%) with an average age of 14.21 ( $SD=1.34$ ) at first detention. In terms of offense history, 35% of the girls had committed at least one violent offense, most commonly assault/battery (33%). The majority of the girls had past arrests for nonviolent offenses such as public order offenses (59%), status offenses (22%), and theft (21%).

### Measures

*Peer Conflict Scale (PCS; Marsee et al. 2004, 2007b)* The PCS was developed based on items from existing rating scales assessing reactive, proactive, overt, and relational aggression (Björkqvist et al. 1992; Brown et al. 1996; Crick and Grotpeter 1995; Dodge and Coie 1987; Galen and Underwood 1997). The PCS was created to overcome certain limitations of past aggression measures, including narrowly worded items (e.g., proactive items assessing only aggression for gain but not for dominance or sadistic reasons) and items not directly assessing harm to a victim. All items were reworded to ensure that there was direct correspondence between overt and relational items, such that for each reactive overt item there was an analogous reactive relational item, and for each proactive overt item there was an analogous proactive relational item. This process led to the creation of a self-report measure

including ten items in each of four aggression categories: proactive overt (“I start fights to get what I want”), proactive relational (“I gossip about others to become popular”), reactive overt (“When someone hurts me, I end up getting into a fight”), and reactive relational (“If others make me mad, I tell their secrets”). Items are rated on a four-point scale (0=“not at all true,” 1=“somewhat true,” 2=“very true,” and 3=“definitely true”) and scores are calculated by summing the ten items separately for the four subscales (range=0–30 for each subscale). Scores for overall overt and relational aggression can also be calculated by summing the 20 items that comprise their respective subscales (range=0–60).

Examination of the factor structure of the PCS in at-risk adolescents showed that a correlated four-factor model adequately fit the data for both boys and girls (Marsee et al. 2007b). Both relational and overt aggression scores on the PCS were significantly correlated with self-reported delinquency in a sample of adolescent boys and girls enrolled in an intervention program designed for youth who have dropped out of school (Barry et al. 2007). Further, in a sample of detained adolescent boys, reactive overt aggression scores on the PCS were associated with increased aggressive responding to low levels of provocation in a laboratory measure of aggression and with greater autonomic reactivity during provocation (Muñoz et al. 2007). Internal consistency for the PCS scales in this study was satisfactory: total overt=0.90; reactive overt=0.87; proactive overt=0.82; total relational=0.87; reactive relational=0.80; proactive relational=0.76.

*Inventory of Callous-Unemotional Traits (ICU; Frick 2004)* The ICU is a 24-item self-report scale designed to assess callous and unemotional traits in youth. The ICU was derived from the six-item callous-unemotional (CU) subscale of the Antisocial Process Screening Device (APSD; Frick and Hare 2001). The CU component of the APSD has emerged as a distinct factor in clinic and community samples of preadolescent boys and girls (Frick et al. 2000) and detained samples of adolescent boys and girls (Vitacco et al. 2003). It has been associated with more severe aggression and more proactive patterns of aggression and violence in detained male adolescents (Kruh et al. 2005). However, the self-reported CU scale has demonstrated only moderate internal consistency in many past studies (e.g., Loney et al. 2003), which is likely due to its small number of items ( $n=6$ ) and three-point rating system. Also, five out of the six items are worded in the same direction, increasing the possibility of response bias.

The ICU was developed to overcome these limitations and to provide a more extended assessment of CU traits. It was constructed using the four items (out of the original six) that loaded significantly on the CU scale in both clinic-

referred and community samples (Frick et al. 2000). For each item (“I am concerned about the feelings of others,” “I feel bad or guilty when I do something wrong,” “I care about how well I do at school or work,” and “I do not show my emotions to others”), three positively and three negatively worded variations were developed (including the original item in its exact wording), and these 24 items were placed on a four-point scale (0=“not at all true,” 1=“somewhat true,” 2=“very true,” and 3=“definitely true”). Scores are calculated by reverse-scoring the positively worded items and then summing the items to obtain a total score. The validity of this expanded self-report measure of CU traits was supported in a large community sample of adolescent boys and girls in which the ICU showed significant correlations with severity of antisocial behavior, impairment, and sensation-seeking (Essau et al. 2006). Internal consistency of the ICU in the current sample of detained girls was satisfactory ( $\alpha=0.79$ ).

*Abbreviated Dysregulation Inventory (ADI; Mezzich et al. 2001)* The Abbreviated Dysregulation Inventory (ADI) is a 30-item self-report measure designed to assess three aspects of dysregulation (emotional/affective, behavioral, and cognitive) in adolescents. The emotional/affective dysregulation subscale consists of ten items that measure poorly regulated emotional behavior (e.g., “I have trouble controlling my temper”). This was the only subscale used in the current study. Each item on the ADI is rated on a four-point scale from 0 (never true) to 3 (always true). The ADI is a shortened version of the original Dysregulation Inventory (DI) and was formed using item response theory to include only those items with the highest discriminant coefficients (A. C. Mezzich, personal communication, July 19, 2004). Both the full DI (Mezzich et al. 2001) and the ADI (Pardini et al. 2003) have shown significant correlations with established measures of emotional and behavioral distress in adolescent boys and girls. The ADI emotional/affective dysregulation subscale showed adequate internal consistency in this sample ( $\alpha=0.75$ ).

*Adolescent Stories (Conduct Problems Prevention Research Group 1999)* The Adolescent Stories interview assesses male and female adolescents’ attributional tendencies in response to ambiguous provocation. The version of Adolescent Stories used in the present study was modified to assess hostile intent attributions to both overt and relational provocation situations. The current measure consists of eight hypothetical stories in which youth find themselves targets of ambiguous provocation by a peer. Four of the vignettes describe overt provocation (e.g., books knocked on the floor by another student), and four describe relational provocation (e.g., not being invited to a party). Youth are asked to rate the likelihood that the an-



tagonist in the vignette had hostile intent (on a five-point scale, from “not at all likely” to “very likely”), and also to rate how angry they would feel in the situation (on a five-point scale, from “not at all” to “very angry”). Scores for Adolescent Stories were calculated by summing items across stories in order to form hostile attribution and anger to provocation subscales. Internal consistency for these scales in the current study was moderate ( $\alpha=0.77$  and  $0.68$  for hostile attribution and anger to provocation scales, respectively).

*Outcome Expectations Questionnaire (OEQ; Pardini et al. 2003)* This version of the Outcome Expectations Questionnaire (OEQ; Perry et al. 1986) consists of eight brief vignettes designed to measure adolescents’ expectations that aggressive behavior against a same-sex peer will result in various outcomes. In the vignettes, participants are asked to imagine using overtly or relationally aggressive behavior to either obtain a tangible reward from a peer (e.g., physically threatening a peer to get something from her) or retaliate against aversive treatment from a peer (e.g., writing a mean note about a peer because she has been gossiping about you). Four of the vignettes depict overtly aggressive situations and four vignettes depict relationally aggressive situations. The relational aggression vignettes were modeled after those used in Goldstein and Tisak (2004).

After reading each vignette, participants are asked to rate the likelihood that various outcomes will occur on a four-point scale, with 1 indicating that the participant is “very sure” that the outcome *will not* occur, 2 indicating that the participant is “pretty sure” that the outcome *will not* occur, 3 indicating that the participant is “pretty sure” that the outcome *will* occur, and 4 indicating that the participant is “very sure” that the outcome *will* occur. For each vignette, participants are asked to rate the likelihood that they will successfully obtain the desired object/reduce aversive treatment (depending on the goal depicted in the vignette), be punished for their actions, and gain a sense of dominance over their peer. Similar scales have been shown to successfully differentiate between aggressive/nonaggressive and antisocial/control boys and girls (Hall et al. 1998; Perry et al. 1986). Further, delinquent boys and girls with CU traits exhibited a tendency to overestimate the rewarding aspects and underestimate the punishing aspects of aggression using this measure (Pardini et al. 2003). For the purposes of the current study, only the positive outcome expectation and punishment expectation scales were used. Scores were calculated by summing the items for these two subscales. Internal consistency for these scales was adequate ( $\alpha=0.65$  and  $0.80$  for positive outcome expectation and punishment expectation, respectively).

## Procedure

Prior to the initiation of the study, all procedures were approved by the university Institutional Review Board (IRB), which included a prisoner representative from a statewide juvenile justice initiative. Prior to data collection, a telephone informed consent procedure was conducted with the parents of potential participants. Parents were contacted by telephone, provided a description of the study, and read an informed consent form. The consent form included information regarding the procedures of the study, the voluntary nature of participation, risks and benefits associated with study participation, and the terms of confidentiality. Parents were then asked whether they agreed to allow their child to participate in the study. Upon agreement, the researcher asked parents if they would allow their consent to be audiotaped. All parents agreed and a tape recording device was connected to the telephone to record verbal parental consent. Following verbal consent procedures, hard copies of all consent forms were mailed to parents.

Procedures for youth assent were implemented individually with each youth. The researcher read an assent form (written at a seventh grade reading level) to potential participants describing the basic procedures of the study, the voluntary nature of participation, risks and benefits associated with the study, and the terms of confidentiality. Youth were informed that refusal to participate would not result in any disciplinary action at the detention facility. They were also informed that the information they provided would be used for research purposes only and that no detention staff would have access to the information. Finally, potential participants were allowed to ask questions about the study before agreeing to participate. After obtaining parental consent and youth assent, the principal investigator administered the questionnaires to participants during small group sessions (three to eight participants per group). All questionnaires were read to all participants in order to control for potential reading level differences. Additionally, at least one trained undergraduate research assistant was present during data collection. Assistants were trained to answer any questions that the participants had, to ensure that participants understood the questionnaires and were not skipping ahead, and to ensure that participants did not look around at others’ papers during the session. Upon completion of data collection, participants were rewarded with a pizza party.

## Results

Table 1 reports the means, standard deviations, and internal consistency for the main study variables. As found in past

research (e.g., Brown et al. 1996; Dodge and Coie 1987; Vitaro et al. 2002), levels of self-reported reactive aggression in this sample were much higher than levels of proactive aggression, although this was somewhat more evident for overt ( $t(57)=-15.20, p<0.001$ ) than relational aggression ( $t(57)=-6.83, p<0.001$ ). Neither age ( $r_s=-0.10$  to  $0.07$ ) nor ethnicity ( $r_s=-0.09$  to  $-0.06$ ) was significantly correlated with any of the aggression scales. Ethnicity (coded as 1=Caucasian and 2=African-American) was associated with the hostile attribution bias ( $r=-0.31, p<0.05$ ) and anger to provocation ( $r=-0.32, p<0.05$ ) scales from the Adolescent Stories measure, indicating that Caucasian participants attributed greater hostile intent ( $t(56)=2.41, p<0.05$ ) and endorsed stronger angry reactions ( $t(56)=2.52, p<0.05$ ) to the provocations described in this measure. Ethnicity was also associated with punishment expectation ( $r=0.30, p<0.05$ ), indicating that African-American participants endorsed a greater tendency to expect punishment for their aggressive actions ( $t(56)=-2.31, p<0.05$ ). Also, the aggression subscales from the PCS were significantly intercorrelated. The overt and relational subscales were correlated  $r=0.73, r=0.56$ , and  $r=0.76$  (all  $p<0.001$ ) for the total, reactive, and proactive scales, respectively. The reactive and proactive scales were correlated  $r=0.65$  ( $p<0.001$ ) for both overt and relational aggression.

Correlations between the subscales of the PCS and the cognitive and emotional variables are provided in Table 2. Consistent with past research, overt aggression was significantly associated with five of the six cognitive and affective variables. The only variable that was not signif-

icantly associated with self-report of overt aggression was the hostile attributional bias score from the Adolescent Stories measure ( $r=0.11, p=n.s.$ ). Also, consistent with predictions, only the reactive overt aggression scale was significantly associated with the emotional dysregulation subscale of the ADI ( $r=0.42, p<0.01$ ), and only the proactive overt aggression scale was associated with positive outcome expectation scale of the OEQ ( $r=0.31, p<0.05$ ). The results were similar but less strong for the relational aggression subscales. Relational aggression was significantly associated with three of the six emotional/cognitive variables. Further, for the three variables that did reach significance, there was no evidence for differential associations between reactive and proactive aggression on the relational aggression subscales (see Table 2).

Due to the significant correlation between the reactive and proactive subscales of the PCS, differential correlations with the cognitive and affective variables of interest may have been obscured. To examine the separate associations between the aggression and cognitive/emotional variables, hierarchical regression analyses were conducted. The regression models were set up to assess the unique variance in the cognitive and affective variables associated with each of the aggression subscales. In order to examine unique variance, the aggression variables were entered as separate predictor variables in the regression equations. Since the predictor variables were highly correlated, the degree of multicollinearity among the variables was examined for all regression analyses by calculating variance inflation factor (VIF) and tolerance values. Tolerance represents the proportion of variability in an independent variable not

**Table 1** Means, standard deviations, and internal consistency of main study variables

| Variable                   | Mean (SD)     |                           |                           | Min–max | Alpha |
|----------------------------|---------------|---------------------------|---------------------------|---------|-------|
|                            | Total         | CA                        | AA                        |         |       |
| <b>Aggression</b>          |               |                           |                           |         |       |
| OVT                        | 18.61 (10.38) | 19.92 (11.03)             | 18.23 (10.29)             | 1 – 44  | 0.90  |
| REA                        | 14.66 (7.05)  | 15.54 (7.91)              | 14.41 (6.86)              | 1 – 27  | 0.87  |
| PRO                        | 3.95 (4.31)   | 4.38 (3.84)               | 3.82 (4.47)               | 0 – 17  | 0.82  |
| REL                        | 11.97 (8.44)  | 13.23 (9.70)              | 11.60 (8.13)              | 0 – 32  | 0.87  |
| REA                        | 7.78 (5.14)   | 8.38 (6.10)               | 7.60 (4.89)               | 0 – 22  | 0.80  |
| PRO                        | 4.19 (4.15)   | 4.85 (4.24)               | 4.00 (4.16)               | 0 – 18  | 0.76  |
| <b>Emotional/cognitive</b> |               |                           |                           |         |       |
| ED                         | 18.62 (5.68)  | 19.54 (6.10)              | 18.36 (5.59)              | 7 – 30  | 0.75  |
| ANG                        | 27.60 (4.99)  | 30.54 (3.82) <sup>a</sup> | 26.76 (5.00) <sup>a</sup> | 16 – 38 | 0.68  |
| HAB                        | 26.09 (6.64)  | 29.85 (3.78) <sup>b</sup> | 25.00 (6.92) <sup>b</sup> | 8 – 36  | 0.77  |
| CU                         | 23.50 (9.17)  | 26.85 (7.81)              | 22.53 (9.38)              | 5 – 45  | 0.79  |
| PEX                        | 21.47 (4.92)  | 22.56 (4.05)              | 21.15 (5.14)              | 8 – 30  | 0.65  |
| PUN                        | 19.12 (5.03)  | 16.38 (4.07) <sup>c</sup> | 19.91 (5.04) <sup>c</sup> | 8 – 30  | 0.80  |

$N = 58$ ; CA Caucasian ( $n = 13$ ); AA African-American ( $n = 45$ ); OVT overt; REL relational; REA reactive; PRO proactive; ED emotional dysregulation; ANG anger to provocation; HAB hostile attributional bias; CU callous–unemotional traits; PEX positive expectation for aggression; PUN punishment expectation for aggression. Means sharing like superscripts are significantly different at  $p < 0.05$  using a  $t$  test for independent samples ( $df = 56$ ).

**Table 2** Correlations between aggression and emotional/cognitive variables

| Variable                   | TR        | RR       | PR       | TO        | RO       | PO        |
|----------------------------|-----------|----------|----------|-----------|----------|-----------|
| Emotional dysregulation    | 0.20      | 0.24     | 0.12     | 0.32*     | 0.42**   | 0.09      |
| Anger to provocation       | 0.44**    | 0.42**   | 0.37**   | 0.47***   | 0.46***  | 0.37**    |
| Hostile attributional bias | 0.08      | 0.06     | 0.09     | 0.11      | 0.14     | 0.03      |
| CU traits                  | 0.47***   | 0.39**   | 0.48***  | 0.34*     | 0.26*    | 0.38**    |
| Positive expectation       | 0.20      | 0.15     | 0.23     | 0.26*     | 0.20     | 0.31*     |
| Punishment expectation     | − 0.48*** | − 0.44** | − 0.43** | − 0.47*** | − 0.41** | − 0.47*** |

TR Total relational, RR reactive relational, PR proactive relational, TO total overt, RO reactive overt, PO proactive overt, CU callous–unemotional  
 \* $p < 0.05$   
 \*\* $p < 0.01$   
 \*\*\* $p < 0.001$

**Table 3** Hierarchical regression analyses examining unique associations of reactive aggression with measures of emotional dysregulation, anger, and attributional bias

| Aggression variable | Emotional/cognitive variables |      |                      |      |      |                    |        |      |         |
|---------------------|-------------------------------|------|----------------------|------|------|--------------------|--------|------|---------|
|                     | ED                            |      |                      | ANG  |      |                    | HAB    |      |         |
|                     | B                             | SE B | $\beta$              | B    | SE B | $\beta$            | B      | SE B | $\beta$ |
| <i>Model 1</i>      |                               |      |                      |      |      |                    |        |      |         |
| Step 1: RR          | 0.27                          | 0.14 | 0.24                 | 0.41 | 0.12 | 0.42**             | 0.08   | 0.17 | 0.06    |
| $R^2$               |                               |      | 0.06                 |      |      | 0.18**             |        |      | 0.00    |
| <i>Model 2</i>      |                               |      |                      |      |      |                    |        |      |         |
| Step 1: RR          | 0.32                          | 0.19 | 0.29 <sup>a</sup>    | 0.31 | 0.15 | 0.32*              | − 0.00 | 0.23 | − 0.00  |
| Step 2: PR          | − 0.10                        | 0.23 | − 0.07 <sup>a</sup>  | 0.20 | 0.19 | 0.17               | 0.15   | 0.28 | 0.10    |
| $R^2$               |                               |      | 0.06                 |      |      | 0.19               |        |      | 0.01    |
| <i>Model 3</i>      |                               |      |                      |      |      |                    |        |      |         |
| Step 1: RR          | 0.01                          | 0.16 | 0.01 <sup>b</sup>    | 0.24 | 0.14 | 0.24               | − 0.03 | 0.21 | − 0.02  |
| Step 2: RO          | 0.34                          | 0.12 | 0.42** <sup>b</sup>  | 0.23 | 0.10 | 0.32*              | 0.14   | 0.15 | 0.15    |
| $R^2$               |                               |      | 0.18**               |      |      | 0.25*              |        |      | 0.02    |
| <i>Model 4</i>      |                               |      |                      |      |      |                    |        |      |         |
| Step 1: RO          | 0.34                          | 0.10 | 0.42**               | 0.32 | 0.08 | 0.46***            | 0.13   | 0.13 | 0.14    |
| $R^2$               |                               |      | 0.18**               |      |      | 0.21***            |        |      | 0.02    |
| <i>Model 5</i>      |                               |      |                      |      |      |                    |        |      |         |
| Step 1: RO          | 0.51                          | 0.12 | 0.64*** <sup>c</sup> | 0.26 | 0.11 | 0.37* <sup>d</sup> | 0.19   | 0.17 | 0.20    |
| Step 2: PO          | − 0.43                        | 0.20 | − 0.33* <sup>c</sup> | 0.15 | 0.18 | 0.13 <sup>d</sup>  | − 0.14 | 0.27 | − 0.09  |
| $R^2$               |                               |      | 0.24*                |      |      | 0.22               |        |      | 0.02    |

Betas sharing like superscripts are significantly different.  
 ED Emotional dysregulation, ANG anger to provocation, HAB hostile attributional bias, RR reactive relational, PR proactive relational, RO reactive overt, PO proactive overt  
<sup>a</sup> $t(55) = 2.68$  at  $p < 0.01$   
<sup>b</sup> $t(55) = 3.76$  at  $p < 0.001$   
<sup>c</sup> $t(55) = 3.62$  at  $p < 0.001$   
<sup>d</sup> $t(55) = 2.32$  at  $p < 0.05$   
 \* $p < 0.05$   
 \*\* $p < 0.01$   
 \*\*\* $p < 0.001$

explained by other independent variables, whereas VIF indicates whether the proportion of variability in an independent variable has been exaggerated due to multicollinearity (Allison 1999). In general, these values did not indicate problematic levels of multicollinearity, as all VIFs were less than 2.50 and all tolerance values were greater than 0.40, which are considered acceptable values (Allison 1999). A power analysis (calculated using GPOWER; Erdfelder et al. 1996) for a sample of 58 ( $\alpha=0.05$ ) indicated that the power to detect a medium effect for these analyses was over 0.70.

Table 3 reports results for five hierarchical regression models examining the unique variance associated with

reactive aggression. Each model represents a distinct analysis in which the aggression variables were entered at separate steps to test their unique associations with the cognitive/affective variables of interest. For example, in Model 1 reactive relational aggression was entered by itself, and in Model 2 proactive relational aggression was added to Model 1's equation at a separate step to examine its ability to account for variance in the cognitive/affective variables over and above that accounted for by reactive relational aggression. The results reported in Table 3 generally support the predicted divergent associations among the emotional/cognitive variables and reactive aggression. That is, reactive relational aggression but not

**Table 4** Hierarchical regression analyses examining unique associations of proactive aggression with callous–unemotional traits and outcome expectancies

| Aggression variable | Emotional/cognitive variables |             |                    |          |             |                     |          |             |                     |
|---------------------|-------------------------------|-------------|--------------------|----------|-------------|---------------------|----------|-------------|---------------------|
|                     | CU                            |             |                    | PEX      |             |                     | PUN      |             |                     |
|                     | <i>B</i>                      | SE <i>B</i> | $\beta$            | <i>B</i> | SE <i>B</i> | $\beta$             | <i>B</i> | SE <i>B</i> | $\beta$             |
| <i>Model 1</i>      |                               |             |                    |          |             |                     |          |             |                     |
| Step 1: PR          | 1.06                          | 0.26        | 0.48***            | 0.27     | 0.15        | 0.23                | – 0.52   | 0.15        | – 0.43**            |
| $R^2$               |                               |             | 0.23***            |          |             | 0.05                |          |             | 0.18**              |
| <i>Model 2</i>      |                               |             |                    |          |             |                     |          |             |                     |
| Step 1: PR          | 0.86                          | 0.34        | 0.39* <sup>a</sup> | 0.26     | 0.20        | 0.22 <sup>b</sup>   | – 0.31   | 0.19        | – 0.25              |
| Step 2: RR          | 0.25                          | 0.28        | 0.14 <sup>a</sup>  | 0.01     | 0.17        | 0.01 <sup>b</sup>   | – 0.27   | 0.15        | – 0.27              |
| $R^2$               |                               |             | 0.24               |          |             | 0.05                |          |             | 0.23                |
| <i>Model 3</i>      |                               |             |                    |          |             |                     |          |             |                     |
| Step 1: PR          | 0.98                          | 0.40        | 0.44* <sup>c</sup> | – 0.04   | 0.23        | – 0.03 <sup>d</sup> | – 0.19   | 0.22        | – 0.16 <sup>e</sup> |
| Step 2: PO          | 0.10                          | 0.39        | 0.05 <sup>c</sup>  | 0.39     | 0.23        | 0.34 <sup>d</sup>   | – 0.41   | 0.21        | – 0.35 <sup>e</sup> |
| $R^2$               |                               |             | 0.23               |          |             | 0.10                |          |             | 0.24                |
| <i>Model 4</i>      |                               |             |                    |          |             |                     |          |             |                     |
| Step 1: PO          | 0.82                          | 0.26        | 0.38**             | 0.36     | 0.15        | 0.31*               | – 0.55   | 0.14        | – 0.47***           |
| $R^2$               |                               |             | 0.15**             |          |             | 0.10*               |          |             | 0.22***             |
| <i>Model 5</i>      |                               |             |                    |          |             |                     |          |             |                     |
| Step 1: PO          | 0.79                          | 0.35        | 0.37* <sup>f</sup> | 0.37     | 0.19        | 0.32 <sup>g</sup>   | – 0.42   | 0.18        | – 0.36*             |
| Step 2: RO          | 0.03                          | 0.21        | 0.02 <sup>f</sup>  | – 0.01   | 0.12        | – 0.01 <sup>g</sup> | – 0.12   | 0.11        | – 0.17              |
| $R^2$               |                               |             | 0.15               |          |             | 0.10                |          |             | 0.24                |

Betas sharing like superscripts are significantly different.

CU Callous–unemotional traits, PEX positive expectation for aggression, PUN punishment expectation for aggression, RR reactive relational, PR proactive relational; RO reactive overt, PO proactive overt

<sup>a</sup>  $t(55) = 2.44$  at  $p < 0.05$

<sup>b</sup>  $t(55) = 1.94$  at  $p < 0.05$

<sup>c</sup>  $t(55) = 5.30$  at  $p < 0.001$

<sup>d</sup>  $t(55) = 4.78$  at  $p < 0.001$

<sup>e</sup>  $t(55) = 2.20$  at  $p < 0.05$

<sup>f</sup>  $t(55) = 3.52$  at  $p < 0.001$

<sup>g</sup>  $t(55) = 3.02$  at  $p < 0.01$

\* $p < 0.05$

\*\* $p < 0.01$

\*\*\* $p < 0.001$



proactive relational aggression accounted for unique variance in anger to provocation ( $\beta=0.32$ ,  $p<0.05$ ) and reactive but not proactive overt aggression accounted for unique variance in the emotional dysregulation ( $\beta=0.64$ ,  $p<0.001$ ) and anger to provocation ( $\beta = 0.37$ ,  $p<0.05$ ) variables.

To further examine the differences in the relative strength of the unique associations between reactive and proactive forms of aggression and the variables of interest, difference scores between the standardized regression coefficients were calculated using the test for differences in dependent correlations (Bruning and Kintz 1997). The standardized Betas for reactive relational aggression were significantly stronger in predicting emotional dysregulation ( $t(55)=2.68$ ,  $p<.01$ ) than the standardized coefficients for proactive aggression. Further, the standardized coefficients for reactive overt aggression were significantly stronger for predicting emotional dysregulation ( $t(55)=3.62$ ,  $p<.001$ ) and anger to provocation ( $t(55)=2.32$ ,  $p<.05$ ) than the standardized coefficients for proactive aggression. These differences were all in the predicted directions.

Similar analyses are reported in Table 4 for the variables predicted to be more strongly associated with proactive aggression. As predicted, proactive relational aggression accounted for unique variance in CU traits after controlling for reactive relational aggression ( $\beta=0.39$ ,  $p<0.05$ ). Further, proactive overt aggression accounted for unique variance in CU traits ( $\beta = 0.37$ ,  $p<0.05$ ) and punishment expectation ( $\beta=-0.36$ ,  $p<0.05$ ) when controlling for reactive overt aggression. Also, the standardized Beta for proactive overt aggression in the prediction of positive outcome expectancies for aggression ( $\beta=0.32$ ,  $p=0.06$ ) approached significance. In comparing the regression coefficients for proactive and reactive relational aggression in the prediction of CU traits ( $t(55)=2.44$ ,  $p<0.05$ ) and positive outcome expectancies for aggression ( $t(55)=1.94$ ,  $p<0.05$ ), the coefficients differed significantly and were in the predicted direction, with proactive relational aggression showing stronger associations than reactive relational aggression with these variables. Similarly, the coefficients for proactive overt aggression and reactive overt aggression in the prediction of CU traits ( $t(55)=3.52$ ,  $p<0.001$ ) and positive outcome expectation for aggression ( $t(55)=3.02$ ,  $p<0.01$ ) were significantly different from each other and in the expected direction.

Also reported in Tables 3 and 4 (Model 3) are results from hierarchical regression equations testing the unique variance accounted for in the cognitive/affective variables by relational and overt forms of aggression. These analyses generally indicated that overt aggression accounted for a greater degree of the unique variance in the measures than relational aggression, although in many cases there was evidence for substantial shared variance. The one exception

to this finding was evident in the analysis using proactive aggression as a predictor of the measure of CU traits (see Table 4, Model 3). In this analysis, proactive relational aggression accounted for a significant amount of unique variance in CU traits after controlling for proactive overt aggression ( $\beta=0.44$ ,  $p<0.05$ ), whereas proactive overt aggression only accounted for a minimal amount of unique variance after controlling for proactive relational aggression ( $\beta=0.05$ ,  $p=n.s.$ ). In further support of this finding, the regression coefficients for proactive relational and proactive overt aggression in the prediction of CU traits were significantly different ( $t(55)=5.30$ ,  $p<0.001$ ), with proactive relational aggression showing a stronger association than proactive overt aggression with the measure of CU traits<sup>2</sup>.

## Discussion

The results of the current study support past research suggesting that reactive and proactive aggression are associated with distinct cognitive and emotional characteristics (Day et al. 1992; Little et al. 2003; Vitaro et al. 2002). The current findings expand on this research by examining these differential correlates in a sample of detained girls. Similar to past research with boys and community samples of girls, reactive overt aggression was uniquely associated with measures of poorly regulated emotion (emotional dysregulation) and anger to perceived provocation when controlling for proactive overt aggression. Further, proactive overt aggression was more strongly associated with positive outcome expectations than reactive overt aggression, and was uniquely associated with CU traits and lower expectations for punishment when controlling for reactive overt aggression. These results suggest that distinguishing between reactive and proactive aggression may be as

<sup>2</sup>In addition to the analyses conducted using reactive and proactive aggression as continuous variables, we also conducted analyses using these variables categorically in order to group participants based on their aggression scores (median split). ANOVAs were used to determine whether group differences existed and Tukey HSD tests were conducted to compare pairs of group means. Although small  $n$ 's in the high reactive/low proactive groups ( $n=8$  for both overt and relational scales) and the high proactive/low reactive groups ( $n=5$  for both overt and relational scales) may have prevented the finding of differences for these groups, the overall pattern of results was consistent with the continuous analyses. Specifically, participants in the high reactive/high proactive groups ( $n=20$  for overt scales;  $n=21$  for relational scales) scored significantly higher on both anger to provocation and CU traits than those in the low reactive/low proactive groups ( $n=25$  for overt scales;  $n=24$  for relational scales). Further, participants in the low reactive/low proactive groups scored significantly higher on the punishment expectation scale than those in the high reactive/high proactive groups, suggesting that those with lower levels of aggression expected more punishment for their actions.

important for understanding aggression in girls as it is for boys (see Frick and Marsee 2006, for a review).

One finding in the current study that was notably inconsistent with past research was the lack of association between a hostile attributional bias and aggression. This finding may be due to our small sample size which may have limited our ability to detect significant associations. Still, this finding is somewhat surprising given the abundance of research suggesting that aggression in general, and reactive aggression specifically, is often associated with the tendency to interpret ambiguous provocations as intentionally hostile (Day et al. 1992; Dodge and Coie 1987; Hubbard et al. 2001). However, with some exceptions (e.g., MacBrayer et al. 2003), these findings have largely been found in samples of boys, with results for girls being much less consistent (Frick et al. 2003). One possible reason for this inconsistency may be that the hostile attributional bias in girls is dependent on the type of provocation situation they experience. That is, aggressive girls may only exhibit a hostile attributional bias for situations depicting relational provocation as girls find these situations more distressing than boys (Crick et al. 2002). However, in post-hoc analyses dividing the provocation scenarios used in our analyses into those with either relational or overt provocations, hostile attributions were still not significantly associated with any of the measures of reactive aggression ( $r_s = 0.05 - 0.17$ ). Thus, more research is needed to better understand potential gender differences in the association between hostile attributional biases and aggression.

Our results suggest that reactive and proactive relational aggression may show some of the same divergent correlates as reactive and proactive overt aggression. Specifically, reactive relational aggression was more strongly associated with poorly regulated emotion and anger to perceived provocation, whereas proactive relational aggression was more strongly associated with CU traits and positive outcome expectations for aggression. These results support the contention that relational aggression, despite not involving physical harm to a victim, captures a similar construct as overt aggression- potentially in a way that is more applicable to how girls harm others (Crick and Grotpeter 1995). However, it is important to note that in our detained sample, relational aggression did not consistently account for unique variance in the cognitive and emotional variables when controlling for overt aggression, as it has in many past studies of non-detained girls (e.g., Crick 1996; Crick and Grotpeter 1995; Prinstein et al. 2001). These discrepant findings may be due to our small sample size, or may be a result of the use of a sample with much higher rates of overt aggression than would typically be found in non-detained samples of girls. Thus, the current sample may have consisted of fewer girls who exhibit relational aggression without overt aggression.

Interestingly, the one variable with which relational aggression showed a stronger unique association than overt aggression was CU traits, and this was the case for proactive relational aggression only. This finding is consistent with past research suggesting that CU traits seem to be uniquely associated with a severe pattern of aggression involving proactively aggressive behaviors (Frick et al. 2003; Kruh et al. 2005). This finding is also consistent with past research documenting the importance of CU traits for understanding serious delinquent and/or aggressive behavior in girls (Chamberlain and Moore 2002; Frick et al. 2003; Marsee et al. 2005; Moretti et al. 2001; Silverthorn and Frick 1999). The link between relational aggression and CU traits is especially important due to the finding that the presence of CU traits seems to designate a distinct developmental pathway to serious conduct problems that is associated with a temperamental style characterized by reduced emotional reactivity to the distress of others (Frick 2006; Frick and Morris 2004). The fact that proactive relational aggression, as opposed to proactive overt aggression, accounted for the most unique variance in this theoretically important personality dimension further supports the importance of relational aggression in studying the development of aggressive tendencies in girls.

It is important to note that the divergent correlations found in the current study between reactive and proactive aggression and emotional/cognitive variables were largely found when controlling for the overlap between the two types of aggression. This finding is consistent with a number of past studies (Day et al. 1992; Dodge and Coie 1987; Dodge et al. 1997; Little et al. 2003; Vitaro et al. 2002), and provides support for the idea that these differential correlates need to be interpreted in light of the high degree of association between proactive and reactive aggression (Bushman and Anderson 2001; Walters 2005). A related issue to consider when interpreting the divergent emotional/cognitive correlates found in this study is the finding that there may be some asymmetry in the high degree of association between the two types of aggression. Specifically, past research suggests that a significant number of children exhibit only reactive forms of aggression, whereas most children who exhibit high levels of proactive aggression also show high rates of reactive aggression (Brown et al. 1996; Dodge and Coie 1987; Frick et al. 2003; Pitts 1997). Further, research suggests that children who use both reactive and proactive of aggression, rather than showing characteristics associated with both, seem to show cognitive and emotional characteristics associated with proactive aggression (Hubbard et al. 2002; Pardini et al. 2003; Pitts 1997). Thus, due to the different pattern of correlates found in youth who use both types, the unique emotional and cognitive correlates to reactive aggression may only become apparent when controlling for proactive aggression.

Results from the current study need to be interpreted in light of several limitations. First, the cross-sectional nature of the data makes it impossible to make any type of causal interpretations regarding the associations between the cognitive and emotional variables and aggression. For example, while it is certainly possible that expectations of positive outcomes for aggressive behavior may increase the likelihood that a child will act aggressively, it is also possible that a child who is aggressive and receives positive gains from this behavior could develop such positive expectancies over time. Second, all of the variables measured in this study were assessed through self-report. Thus, all measures solely assess participants' self-perceptions, which could be susceptible to reporter biases. For example, the vignette procedure used to assess positive outcome expectancies only measures participants' perceptions of how aggression works in social situations but does not assess whether these perceptions are accurate. In addition to increased susceptibility to reporter biases, the reliance on self-report measures may have artificially inflated associations among variables due to shared method variance. However, the effects of shared method variance could not explain the differences in correlations across the two types of aggression, both of which were measured by self-report.

A third limitation to the current study was our small sample size, which may have affected the power to detect significant associations among variables. Although a-priori considerations of sample size as well as post-hoc power analyses indicated that our sample size was adequate to detect medium effects (Cohen 1988), the small size of the sample may have prevented us from detecting certain expected associations, such as that between reactive aggression and hostile attributional bias. Also, the small sample size prevented us from testing potentially important interactions, such as interactions between reactive and proactive aggression or the possible moderating role of ethnicity. Fourth, our focus solely on detained adolescent girls, while justified by the paucity of research on separate dimensions of aggression in this population, limits the generalizability of our results to boys, community youth, and/or youth in different age groups. Further, although the ethnic breakdown of our sample was representative of detained girls in the region of the participating detention centers, it was primarily composed of African-American youth, which may further influence the generalizability of the results.

Within the context of these limitations, the current results support the need to consider relational aggression in understanding serious delinquent and aggressive behavior in girls and, as with overt aggression, to consider reactive and proactive dimensions when studying cognitive and emotional correlates to aggression. While we have focused primarily on the theoretical implications of these

findings, they could also have important clinical implications as well. It is possible that reactive and proactive relational aggression represent distinct pathways to problem behavior, pathways which may require drastically different treatment approaches (Frick and Morris 2004). For example, interventions for youth who use reactive aggression often focus on developing better emotion regulation skills, and may consist of strategies such as helping youth control aggressive responses when angry (Larson and Lochman 2003). In contrast, youth who use proactive aggression may require a different treatment focus that addresses either their perceptions of the usefulness of aggression for obtaining social goals and/or their deficits in empathic concern towards others (Frick 2001, 2006). Children who use both types of aggression typically show cognitive and emotional correlates consistent with children who only use proactive aggression (Hubbard et al. 2002; Pardini et al. 2003; Pitts 1997), and therefore might benefit most from the latter type of intervention. However, given that the current study did not focus on distinct groups of aggressive youth, this assumption was not tested.

For both reactive and proactive treatment approaches, however, most past interventions have focused largely on reducing overt aggression. The results of the current study support past research in suggesting that these programs need to be broadened to target relational forms of aggression, especially when intervening with detained or incarcerated girls (Chamberlain and Moore 2002; Moretti et al. 2001; Van Schoiack-Edstrom et al. 2002). A focus on relational aggression may allow for more prevention-centered efforts, given findings that relational aggression may precede more serious delinquent and aggressive behavior in girls (Moretti and Odgers 2002). Thus, attention to relational aggression as well as reactive, proactive, and overt forms of aggression may be important in the design and implementation of individualized approaches to treatment that consider both emotional and cognitive differences, as well as gender differences, in the manifestation of aggressive behavior.

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