

Callous-Unemotional Traits and Social Information Processing
as Predictors of Reactive and Proactive Aggression

by

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ABSTRACT

No research to date has examined the relative contribution of social information processing (SIP) and callous-unemotional (CU) traits to the prediction of reactive and proactive aggression, and that is the goal of the current study. Participants included 150 racially/ethnically diverse adolescents (mean age = 13.53 years) and their parents. Adolescents completed questionnaires reporting their reactive and proactive aggression as well as a task to assess social information processing (including hostile attributional bias, dominance, and positive expectations for aggression), while parents reported on their child's callous-unemotional traits (including three subscales assessing callous, uncaring, and unemotional). When the subscales of SIP and CU traits were entered as simultaneous predictors of reactive aggression, significant positive effects emerged for dominance and positive expectations for aggression and a marginal negative effect emerged for callous-unemotional. When the same analysis was conducted to predict proactive aggression, a marginal positive effect emerged for dominance, a marginal negative effect emerged for callous-callous, and a significant positive effect emerged for callous-uncaring. Implications, limitations, and future directions are discussed.

Chapter 1

INTRODUCTION

The Importance of Aggression in Childhood and Adolescence

Aggressive behavior causes serious problems across the lifespan. Aggression in children accounts for 25% of all special services in schools and half of all child referrals for psychological services (Nelson & Finch, 2000). In adolescence, aggressive youth are responsible for the bulk of criminal conduct (Snyder & Sickmund, 1999). Looking across developmental periods, aggression in childhood is one of the best predictors of adult criminality (Huesmann, Eron, & Dubow, 2002). Aggression is also linked to internalizing disorders such as anxiety and depression (Neumann, Veenema, & Beiderbeck, 2010). These negative outcomes make it important to investigate the predictors of youth aggression.

Reactive and Proactive Aggression

Aggressive behavior can come in many forms, including physical, verbal, and relational aggressive behaviors. Regardless of the form it takes, aggressive behavior is conceptualized as having two potential underlying functions. The first, reactive aggression, occurs in response to provocation or a perceived wrong (Kempes, Matthys, de Vries, & van Engeland, 2005). In contrast, proactive aggression describes behaviors that are used for instrumental gain (Kempes et al., 2005). An example of reactive aggression would be a child pushing back when a peer pushed him first, whereas an example of proactive aggression would be a child pushing a peer to be first

in line. Although reactive and proactive aggression are quite strongly related (Polman, Orobio de Castro, Koops, van Boxtel, & Merk, 2007), they differentially predict a variety of outcomes. For example, reactive aggression is uniquely correlated with impulsivity, inattention, peer rejection, social anxiety, hostility, depression and suicidal behavior (Barry et al., 2007; Evans, Fite, Hendrickson, Rubens, & Mages, 2015; Fite, Fite, Stoppelbein, & Greening, 2009; Polman et al., 2007). In contrast, proactive aggression specifically predicts disruptive behaviors, property crime, and substance use (Camodeca & Goossens, 2005; Fite, Fite, et al., 2009; Fite, Stoppelbein, & Greening, 2009; Miller & Lynam, 2006).

Social Information Processing

SIP is a construct focused on the cognitive steps that people use to think about social interactions. SIP includes five steps: encoding of situational cues, interpretation of those cues, mental search for possible responses to the situation, evaluation of those responses, and selection of a response (Crick & Dodge, 1994). Impairment at each of the five steps of SIP has been linked to childhood aggression (Orobio de Castro & Van Dijk, 2017). Aggressive children are more likely to interpret ambiguous social cues as hostile than their peers, they are more likely to believe that aggressive responses will result in positive outcomes, and they are more likely to choose aggressive responses to social situations (Orobio de Castro & Van Dijk, 2017).

SIP in Relation to Reactive and Proactive Aggression

As this work advanced, researchers discovered that some SIP steps were uniquely linked to reactive aggression, whereas others were more predictive of proactive aggression. Reactive aggression is especially linked to the earlier stages of

SIP, including encoding and interpretation of cues. In particular, hostile attributional biases predict reactively aggressive behavior (Arsenio, Adams, & Gold, 2009; Orobio De Castro, Merk, Koops, Veerman, & Bosch, 2005). In an interesting example of this work, Crick and Dodge (1996) measured SIP, as well as proactive and reactive aggression, in a sample of children ages 9-12; children with hostile attributional biases were more likely to display reactive aggression than their peers. A possible consequence of reactive aggressive behavior is that these children may become alienated from their peers, which may in turn lead to inadequate opportunities for social interaction.

In contrast, proactive aggression is more strongly linked to the evaluation of possible responses, with proactively aggressive children evaluating the consequences of aggressive solutions as more positive and less negative (Hubbard, McAuliffe, Morrow, & Romano, 2010) and prioritizing instrumental goals over social goals in peer interaction (Crick & Dodge, 1996). For example, in a study by Arsenio and colleagues in which they studied SIP and its relation to reactive and proactive aggression in a sample of 13- to 18-year-old adolescents, adolescents with higher proactive aggression expected more happiness and fewer moral concerns following aggression (Arsenio et al., 2009).

Callous-Unemotional Traits

Callous-unemotional (CU) traits are a set of often co-occurring characteristics including lack of empathy, disregard for others, and lack of guilt. CU traits are most often assessed using the Inventory of Callous Unemotional Traits (ICU), a 24-item questionnaire with three subscales (Callousness, Uncaring, and Unemotional). Importantly, a large body of research links CU traits in childhood to concurrent and

later delinquency, violent behaviors, aggression, and anti-social behavior (Lynam & Gudonis, 2005; McMahon, Witkiewitz, Kotler, & Conduct Problems Prevention Research Group, 2010). Frick and colleagues examined CU traits in a community sample of children in the 3rd through 7th grades using an emotional lexical decision task followed by self-report scales of personality; CU traits designated subgroups of children with conduct problems (Frick, Cornell, Barry, Bodin, & Dane, 2003). Another study focused on CU traits as a defining pathway for the development of conduct problems in a similar sample of children. In this study, children with CU traits and conduct problems showed evidence of a lack of behavioral inhibition and a decreased sensitivity to cues to punishment (Frick, Cornell, Barry, et al., 2003). In a study by Jones and colleagues, researchers found reduced amygdala activity in response to fearful faces mediated the relation between CU traits and proactive aggression but not reactive aggression (Jones, Laurens, Herba, Barker, & Viding, 2009). This finding further highlights the relation between CU traits and proactive aggression.

Current Study

As reviewed above, previous investigations have linked both SIP and CU traits differentially to reactive versus proactive aggression. However, no research to date has examined the relative contributions of SIP and CU traits to reactive versus proactive aggression, and the goal of the current study was to assess these relations in a community sample of adolescents. We hypothesized that both SIP and CU traits would make independent contributions to the prediction of adolescents' aggression. More specifically, we expected that the SIP construct of hostile attributional biases would positively predict reactive aggression, whereas the SIP constructs of dominance goals

and positive evaluations of aggressive responses would positively predict proactive aggression, over and above the contribution of the other subtype of aggression, the other SIP constructs, and CU traits. In addition, we predicted that each of the three subscales of CU traits would positively predict proactive aggression, over and above the contribution of reactive aggression, the SIP constructs, and the other CU trait subscales.

Chapter 2

METHOD

Participants

Participants included 150 adolescents (84 girls, 66 boys; *M* age = 13.53 years; *SD* = 1.32). Parents reported participants' race or ethnicity as 60.7% European American, 12.0% African American, 10.7% Latino American, 8.7% Asian American, and 8.0% of mixed race or ethnicity. Parents reported annual household income as less than \$20,000 (2.7%), \$20,000-\$50,000 (14.9%), \$50,000-100,000 (26.4%) and greater than \$100,000 (56.1%). All participants had taken part in previous research in our laboratory and agreed to be contacted about future studies. A total of 662 adolescents met this criterion. All families were contacted in a random order, and the first 150 families to complete data collection were enrolled.

Procedure

Families were initially recruited by telephone. Families who agreed to participate during this conversation were scheduled for a home visit, and participating parents and youth provided consent and assent respectively at the beginning of the home visit. After providing consent and assent, parents and youth completed questionnaires. Adolescents reported on their reactive and proactive aggression and completed a social information processing task. Parents reported on family demographic information, as well as on their child's callous-unemotional traits.

Parents and adolescents were each compensated \$20 at the end of the visit.

Measures

Reactive and proactive aggression. Participants reported on their tendency to engage in reactive and proactive aggression using the Reactive and Proactive Aggression subscales of the Forms and Functions of Aggression Questionnaire (Little, Jones, Henrich, & Hawley, 2003). This questionnaire asked them to rate the extent to which they engaged in aggressive behavior for reactive or proactive reasons on a five point scale (1 = *not at all true* and 5 = *completely true*). Reactive aggression was assessed by six items (e.g., “When others make me mad or upset me, I often hurt them”; $\alpha = .83$), and proactive aggression was assessed by six items (e.g., “I often start fights to get what I want”; $\alpha = .70$). This self-report measure is a well-validated and reliable scale for use among adolescent samples (Hubbard et al., 2010; Little, Jones, et al., 2003; Little, Brauner, Jones, Nock, & Hawley, 2003). Factor analysis findings confirm a two-factor structure (i.e., reactive and proactive aggression) for the motivations of aggressive behavior with strong internal consistencies (Little, Jones, et al., 2003; Little, Brauner, et al., 2003). Additionally, this measure reliably distinguishes reactive from proactive aggression on emotional constructs, with reactive aggression positively related to frustration and proactive aggression negatively related to frustration when controlling for the other subtype of aggression (Little, Jones, et al., 2003). Items were averaged to create a reactive aggression composite and a proactive aggression composite.

Callous-unemotional traits. Parents completed a parent adaptation of the 24-item Inventory of Callous-Unemotional Traits (Frick, 2004). This questionnaire asked

parents to rate the extent to which their child displayed callous, uncaring and unemotional behaviors on a five-point scale (1= *not at all* and 5= *a whole lot*). Callous behaviors were assessed using eleven items (e.g. “What my child marks thinks is ‘right’ or ‘wrong’ is different than what other people think.”; $\alpha = .64$), uncaring behaviors were assessed using eight items (e.g. “My child cares about how well he/she does at school/work.”; $\alpha = .73$), and unemotional behaviors were assessed using five items (e.g. “My child does not show his/her emotions to others.”; $\alpha = .74$). This measure is well-validated and reliable for use in adolescent samples (e.g. Hawes et al., 2013; Waller, Wright, Shaw, Gardner, Dishion, Wilson & Hyde, 2015; Willoughby, Mills-Koonce, Waschbusch, Gottfredson & Family Life Project Investigators, 2015). Items were averaged to create a callousness composite, an uncaring composite and an unemotional composite.

Social information processing. Adolescents completed an adapted version of the Social Information Processing Application (Kupersmidt, Stelter, & Dodge, 2011). This measure includes descriptions of 8 scenarios in which one adolescent causes harm to another, but the intention of the provocateur is ambiguous. Examples include an adolescent tripping over a peer’s foot in the classroom and an adolescent throwing a ball that hits a peer’s science project. After reading each scenario, adolescents answered nine questions. Four items assessed hostile attribution bias (e.g. “Do you think the boy/girl intended to be mean?”; $\alpha = .89$), two items assessed dominance goals (e.g. “Would you want to make sure that the boy/girl knows you are the boss and he/she can’t push you around?”; $\alpha = .81$), and three items assessed positive

expectations for aggression (e.g. “If you got back at the boy/girl, would things turn out to be good or bad for you?”; $\alpha = .78$). The original Social Information Processing Application is well-validated and reliable for use in child samples (e.g. Kupersmidt, et al., Zajac, Bookhout, Hubbard, Carlson, & Dozier, 2018) and the adaptation of the format from videos to written vignettes is consistent with other studies examining SIP (Crick & Dodge, 1996; Dodge & Coie, 1987). Items were averaged to create composite scores for hostile attributional biases, dominance, and positive outcome expectations for aggression.

Chapter 3

RESULTS

Descriptive Statistics, Correlations, and Covariates

Means, standard deviations, ranges, and skewness for all variables are provided in Table 1. Bivariate correlations among study variables are provided in Table 2. Notably, subscales from the same measures covaried significantly (the three SIP subscales; the three CU trait subscales). For this reason, all SIP subscales and CU subscales were entered in the regressions described below as simultaneous predictors. In addition, proactive and reactive aggression were significantly related, and thus, the other subtype of aggression was entered as a covariate in regressions predicting each subtype of aggression.

Next, we examined whether age, gender, and race/ethnicity significantly covaried with reactive or proactive aggression. No significant association was emerged for age or race/ethnicity. However, gender (dummy coded 0=girls, 1 = boys) marginally predicted reactive aggression, with girls reporting lower levels of reactive aggression than boys, $F(1, 149) = 3.461, p = .065$. As such, gender was included as a between-person covariate in all primary analyses.

Callous-Unemotional Traits and Social-Information Processing as Predictors of Reactive Aggression

In our first regression, we predicted reactive aggression from the three SIP

subscales and the three CU trait subscales, with gender and proactive aggression entered as covariates. We hypothesized that the SIP construct of hostile attributional biases would positively predict reactive aggression over and above the contribution of proactive aggression, the other SIP constructs, and the CU traits subscales.

Results are presented in Table 3. The expected positive relation between hostile attributional bias and reactive aggression did not emerge. However, several unexpected findings were revealed. First, dominance goals emerged as a significant positive predictor of reactive aggression. The effect indicates that, for the average adolescent, a one unit increase in dominance goals is associated with a 0.17 increase in reactive aggression. Second, positive expectations for aggression emerged as a significant positive predictor of reactive aggression, with a one unit increase in positive expectations for aggression associated with a 0.18 increase in reactive aggression. Finally, a marginal negative effect emerged for the Unemotional subscale of CU traits; this effect suggests that a one unit increase in unemotional behaviors is associated with a 0.07 decrease in reactive aggression.

Callous-Unemotional Traits and Social-Information Processing as Predictors of Proactive Aggression

In our second regression, we predicted proactive aggression from the three SIP subscales and the three CU trait subscales, with gender and reactive aggression entered as covariates. We hypothesized that the SIP constructs of dominance goals and positive evaluations of aggressive responses would positively predict proactive aggression, over and above the contribution of the reactive aggression, the other SIP constructs, and CU traits subscales. In addition, we predicted that each of the 3 subscales of CU traits would positively predict proactive aggression over and above

reactive aggression, the SIP constructs, and the other CU traits subscales.

Results are presented in Table 4. As hypothesized, a positive marginal effect emerged for dominance goals, such that a one-unit increase in dominance goals is associated with a .03 increase in proactive aggression. Also as expected, a significant positive effect emerged for the Uncaring subscale of the CU traits measure (such that a one-unit increase in uncaring behavior is associated with a .04 increase in proactive aggression). Contrary to hypotheses, a marginal negative effect emerged for the Callous subscale of the CU traits measure, such that a one-unit increase in callous behavior is associated with a .26 decrease in proactive aggression. Surprisingly, no effects emerged for the SIP construct of positive expectations for aggression or the Unemotional subscale of the CU traits measure.

Chapter 4

DISCUSSION

The goal of this study was to examine the relative contributions of SIP and CU traits to reactive versus proactive aggression. In a community sample of 150 adolescents, we assessed reactive aggression, proactive aggression, and SIP via adolescent report, and we measured CU traits via parent report. We hypothesized that the SIP construct of hostile attributional biases would be a positive predictor of reactive aggression, and that the positive predictors of proactive aggression would include the SIP constructs of dominance goals and positive outcome expectations for aggression, as well as the three subscales of CU traits. A strength of the study was the use of different informants for SIP versus CU traits.

Reactive Aggression

In contrast to hypotheses, hostile attributional biases did not predict reactive aggression. There are several possible explanations for this null result. First, the hypothetical nature of the SIP assessment may have lacked ecological validity, meaning that participants' cognitions during the task may have differed from their thoughts in similar real-life situations. Second, the low rates of aggression reported by our normative sample may have limited the ability to detect relations to hostile attributional bias.

Unexpectedly, a marginal negative relation emerged between the unemotional subscale of the CU traits measure and reactive aggression. Although we did not hypothesize this effect, it is consistent with literature suggesting that reactive aggression is positively related to emotionality or emotional expressiveness, with respect to a range of emotions including anger, anxiety, and depression (Evans et al., 2015; Fite, Fite, et al., 2009).

Also contrary to hypotheses, significant positive relations emerged between reactive aggression and both dominance and positive expectations for aggression, when we predicted that both of these SIP constructs would be positively related to proactive aggression. It is important to note that these findings emerged in the context of an analysis which controlled for proactive aggression, hostile attributional bias, and the CU subscales using a normative sample. For this reason, we hesitate to interpret these effects and instead suggest that replication is needed before interpretation is appropriate.

Proactive Aggression

As predicted, significant positive relations emerged between proactive aggression and both dominance and the uncaring subscale of the CU traits measure. These findings converge to suggest that adolescents are most likely to proactively aggress when they value domination over their peers and when they lack concern about the well-being of others. Both results suggest that interventions designed to reduce proactive aggression must focus on increasing adolescents' prosocial goals and empathy for peers.

In contrast to what we predicted, a marginal negative effect emerged for the callous subscale of the CU traits measure. This is extremely surprising given previous

research linking callousness and proactive aggression. It is possible that the use of parent report data for this construct influenced results, if parents were reluctant to endorse callous items as describing their child.

Of note, expected relations between proactive aggression and both positive expectations for aggression and the unemotional subscale of the CU traits measure failed to emerge. These null findings may be the result of the normative sample studied, the use of verbal as opposed to video stimuli for the SIP measure, or the use of a parent-report version of the CU traits measure. It may also be the case that the number of covariates included in analyses made it difficult to detect true effects.

Limitations and Future Directions

This study had two significant limitations each of which suggest directions for future research. First, we used a normative sample, and our participants reported fairly low levels of aggressive behavior. Future investigators should address our research questions using samples of adolescents who display higher rates of externalizing behaviors. Second, data collection was limited to self and parent report. The inclusion of peer and teacher report data, along with observational methods, would have enhanced the validity of our measurement. We suggest that future researchers strive to address our research questions using this multi-pronged assessment approach. Despite these limitations, the current study provides preliminary information on the relative contributions of SIP and CU traits to adolescents' display of proactive and reactive aggression.

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Table 1 Descriptive Statistics

	Min	Max	Mean	SD	Skew
Hostile Attributional Bias	1.31	4.09	2.45	0.56	0.42
Dominance	1.00	4.50	1.93	0.65	0.82
Positive Expectations for Aggression	1.00	4.08	2.02	0.68	0.24
CU Traits-Callous	1.00	3.18	1.75	0.49	0.89
CU Traits-Uncaring	1.00	4.13	2.26	0.67	.54
CU Traits-Unemotional	1.00	4.80	2.74	0.76	0.16
Reactive Aggression	1.00	3.08	1.47	0.40	1.11
Proactive Aggression	1.00	1.50	1.03	0.08	4.04

Table 2 Correlations

	1	2	3	4	5	6	7
1. Hostile Attributional Bias							
2. Dominance	.62*						
3. Postive Expectations for Aggression	.35*	.69*					
4. CU Traits- Callous	.09	.08	.13				
5. CU Traits- Uncaring	-.11	.08	.04	.62*			
6. CU Traits- Unemotional	-.12	-.12	.003	.23*	.43*		
7. Reactive Aggression	.30*	.52*	.51*	.11	.11	-.10	
8. Proactive Aggression	.24*	.34*	.24*	.05	.16	-.03	.33*

* $p < .05$.

Table 3 Regression Predicting Reactive Aggression

Predictor	SE B	SE	t
Gender	-0.01	0.06	-0.21
Proactive Aggression	0.74	0.38	1.94
Hostile Attributional Bias	-0.005	0.07	-0.08
Dominance	0.17	0.07	2.30*
Positive Expectations for Aggression	0.18	0.04	3.14*
Callous - Callousness	-0.17	0.07	-0.23
Callous - Uncaring	0.09	.06	1.57
Callous - Unemotional	-0.07	0.04	-1.79+

+ $p < .10$; * $p < .05$

Table 4 Regression Predicting Proactive Aggression

Predictor	SE B	SE	t
Gender	-0.01	0.06	-0.21
Reactive Aggression	0.04	0.19	1.94
Hostile Attributional Bias	0.14	0.01	1.01
Dominance	0.03	0.02	1.89+
Positive Expectations for Aggression	-0.01	0.01	-0.42
CU Traits - Callous	-0.26	0.02	-1.67+
CU Traits - Uncaring	0.04	0.01	2.86*
CU Traits - Unemotional	-0.01	0.01	-0.68

+ $p < .10$; * $p < .05$