



Overt and relational forms of reactive aggression in adolescents: Relations with temperamental reactivity and self-regulation [☆]



Andrew V. Dane ^{a,*}, Zopito A. Marini ^b

^a Department of Psychology, Brock University, Canada

^b Department of Child and Youth Studies, Brock University, Canada

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ABSTRACT

This study examined whether overt and relational forms of reactive aggression were differentially related to adolescents' temperament. Measures of adolescents' temperament and aggression were completed by 670 adolescents (369 females), ages 10–17, and their mothers. Effortful control and fearfulness were inversely associated only with reactive–overt aggression, whereas frustration proneness was more strongly linked with reactive–relational aggression. Furthermore, amongst younger adolescents, effortful control had a larger association with reactive–overt aggression when fearfulness was low, whereas frustration proneness had a stronger relation to reactive–relational aggression when effortful control was high. The differential relations between the two forms of reactive aggression (i.e., overt and relational) and effortful control or fearfulness are discussed with respect to variations in the riskiness and the social competence required to implement these aggressive actions.

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1. Introduction

Aggressive behavior in childhood predicts a host of negative developmental outcomes in adolescence and adulthood, including substance dependence, high school drop-out, mental health problems, financial problems, unemployment, interpartner violence, criminal offending, and imprisonment (Fergusson, Horwood, & Ridder, 2005; Moffitt, Caspi, Harrington, & Milne, 2002). In addition, conduct problems are the primary reason that children and adolescents are referred to mental health clinics (Kazdin, 1995). Consequently, it is crucial to study the development of aggressive behavior with a view to developing effective prevention and treatment programs.

Several models of aggressive behavior specify that temperament or personality-based predispositions affecting emotional reactivity and self-regulation abilities are important risk factors (e.g., Anderson & Bushman, 2002; Berkowitz, 2012; Dodge & Pettit, 2003). Temperament is defined as biologically-based individual differences in emotional, attentional and motor reactivity, and in

self-regulation processes, such as effortful control and reactive control (Rothbart, 2011; Rothbart & Bates, 2006). Proneness to frustration is a facet of emotional reactivity that has been shown to increase risk of aggression (Rothbart, 2011), though two aspects of self-regulation—effortful control or reactive control—may diminish this association. Effortful control involves conscious, voluntary, effortful, and cognitive strategies (e.g., stopping and thinking about consequences prior to acting) that facilitate the inhibition of a dominant impulse to permit the performance of a subdominant response, as well as planning and error detection (Eisenberg, Spinrad, & Eggum, 2010; Rothbart & Bates, 2006). Reactive control, on the other hand, entails automatic, unconscious, and emotion-related self-regulation processes that reflect the balance in the reactivity of approach and avoidance motivation systems (Eisenberg et al., 2010; Rothbart, 2011). For example, an easily frustrated adolescent who is relatively fearless may be predisposed to engage in an approach-related aggressive response to provocation rather than avoiding confrontation (Rothbart, Ellis, & Posner, 2011). Temperament contributes indirectly to the development of conduct problems by influencing the mental processes or internal states (e.g., cognitions, emotions, arousal levels, action tendencies) that arise in social situations, such as a perceived provocation by parents or peers (e.g., Anderson & Bushman, 2002; Berkowitz, 2012; Dodge & Pettit, 2003).

Temperament has been shown to differentiate reactive and proactive functions of aggression. In contrast to proactively aggressive

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* Corresponding author. Address: Department of Psychology, Brock University, St. Catharines, Ontario L2S 3A1, Canada. Tel.: +1 905 688 5550; fax: +1 905 688 6922.

E-mail address: adane@brocku.ca (A.V. Dane).

attacks, which are goal-directed, instrumental and deliberate, reactively aggressive acts are described as provoked, retaliatory, defensive, anger-driven, emotionally dysregulated, and impulsive (Card & Little, 2006; Hubbard, McAuliffe, Morrow, & Romano, 2010; Vitaro, Brendgen, & Barker, 2006). Consistent with the Frustration–Aggression and Cognitive Neoassociation model of aggressive behavior (Berkowitz, 1993; Berkowitz, 2012), reactive aggression has been associated with predispositions that contribute to difficulties with the regulation of negative affect (Hubbard et al., 2010), which include anxiety, angry reactivity, emotional dysregulation and inattention (see Vitaro et al., 2006). Furthermore, a recent meta-analysis indicates that reactive aggression, rather than proactive aggression, is independently associated with measures of emotional dysregulation and ADHD symptoms (Card & Little, 2006). However, much of the previous research that has examined distinctions between reactive and proactive aggression has employed measures that emphasize physical aggression (Vitaro et al., 2006). Therefore, the purpose of the present study is to investigate the link between temperament and both overt and relational forms of reactive aggression.

Currently, there is very little research differentiating reactive–overt from reactive–relational aggression. In contrast to the physical or verbal attacks that characterize overt aggression, relational aggression involves harming the victim by damaging relationships or social status, and by virtue of being more indirect and covert, it allows the aggressor to avoid detection as the perpetrator (Card, Stucky, Sawalani, & Little, 2008; Crick & Grotpeter, 1995). A reactive–relationally aggressive response involves retaliation through acts such as social exclusion or rumor spreading. Amongst adolescent participants, reactive–relational aggression is associated with perceived popularity and social preference, whereas reactive–overt aggression is negatively related to these same outcomes (Prinstein & Cillessen, 2003). Furthermore, reactive–overt aggression also has a stronger association than reactive–relational aggression with adolescents' violent delinquency and arrest history (Marsee et al., 2011). Finally, in a sample of adolescent girls in a detention centre, reactive–overt but not reactive–relational aggression was uniquely associated with emotional dysregulation (Marsee & Frick, 2007). Additional research is required to illuminate the temperament dimensions that distinguish the heterogeneous forms of reactive aggression.

We expected that two facets of self-regulation – effortful control and reactive control – would constitute protective factors for reactive–overt aggression as opposed to reactive–relational aggression. Although the ability to inhibit impulses and regulate emotions is negatively related to the frequency of overt and relational aggression (Card et al., 2008), the use of relational aggression also appears to be facilitated by social competence (Björkqvist, 1994). For example, it is done more often by youth with high levels of social intelligence or social status (Cillessen & Mayeux, 2004; Kaukiainen et al., 1999). Furthermore, a meta-analysis indicates that measures of poor self-regulation are more strongly associated with overt aggression (Card et al., 2008). Thus, there are empirical and theoretical reasons to suggest that complex relationally aggressive responses to provocation, such as social exclusion, may be facilitated by good effortful control. Therefore, because effortful control may both inhibit and facilitate reactive–relational aggression, we hypothesized that effortful control would be more strongly related to reactive–overt than to reactive–relational aggression, and that it would significantly moderate the association between frustration proneness and only the overt form of reactive aggression.

We further predicted that fearful youth would display lower frequencies of reactive–overt aggression. We reasoned that fear would affect participation in reactive–overt aggression rather than reactive–relational aggression because the former is more

dangerous and risky, given that the perpetrator is more likely to sustain a physical injury, to be identified as the aggressor and, consequently, to face retaliation (Björkqvist, 1994). Indeed, some writers taking an evolutionary perspective have stated that females prefer to use relational rather than overt aggression primarily because it is a safer option (Vaillancourt, 2005; Volk, Camilleri, Dane, & Marini, 2012). Consistent with this expectation, Terranova, Morris, and Boxer (2008) found that temperamental fearfulness was inversely associated with future overt but not relational bullying.

2. Method

2.1. Participants

Participants included 670 adolescents (369 females) and their mothers from southern Ontario, Canada. The adolescents ranged in age from 10 to 17 ($M = 13.92$; $SD = 2.10$), and the mean maternal age was 43.19 ($SD = 5.37$). Seventy-three percent of the mothers were married, whereas 14% were lone parents. Regarding ethnicity, 72% identified themselves as Canadian, 16% cited a European ethnicity, 4% comprised small groups of diverse ethnicities, and 8% did not specify an ethnicity. Median household income was \$70,000. The highest education level for 41% of the mothers was high-school, whereas 59% completed a post-secondary degree.

2.2. Instruments

2.2.1. Temperament

Temperament was measured using three subscales of the Early Adolescent Temperament Questionnaire-Revised (Capaldi & Rothbart, 1992). For each temperament dimension, we calculated a composite mean of adolescent-report and mother-report means, the correlations between which ranged from .24 to .56. All items involved a five-point scale ranging from Almost Always Untrue to Almost Always True. The Effortful Control scale consisted of 14 adolescent-report and 18 mother-report items that tapped Inhibitory Control (e.g., It is easy for me to keep a secret), Activation Control (e.g., If I have a hard assignment to do, I get started right away), and Attention (e.g., I pay close attention when someone tells me how to do something), which had a high level of internal consistency ($\alpha = .90$). Seven adolescent-report and six mother-report items indexed the Frustration Proneness scale (e.g., It really annoys me to wait in long lines), which had a coefficient alpha of .75. Fearfulness (e.g., I worry about getting into trouble) was assessed with six self-report and six mother-report items; internal consistency was adequate ($\alpha = .73$).

2.2.2. Aggression measure

Aggression was measured using 25 items with a four-point scale ranging from Not at all True to Completely True (Little, Jones, Henrich, & Hawley, 2003). For each subtype of aggression, we calculated a composite mean of youth-report and mother-report means, the correlations between which ranged from .21 to .39. There were four adolescent-report and four mother-report items ($\alpha = .81$) indexing reactive–overt aggression (e.g., If others have angered me, I often hit, kick or punch them), and four adolescent-report and four mother-report items ($\alpha = .64$) tapping reactive–relational aggression (e.g., If others upset or hurt me, I often tell my friends to stop liking them). In addition, proactive–overt aggression was tapped by four self-report and four mother-report items ($\alpha = .76$; e.g., I often threaten others to get what I want) whereas proactive–relational aggression was measured with four self-report and four mother-report items ($\alpha = .76$; e.g., I often tell my friends to stop liking someone to get what I want). Finally,

Table 1
Descriptive statistics and correlations among aggression subtypes and study variables.

Study Variables	1	2	3	4	5	6	7
1. Reactive overt aggression							
2. Reactive relational aggression	.51***						
3. Effortful control	-.39***	-.31***					
4. Frustration proneness	.26***	.40***	-.40***				
5. Fearfulness	-.23***	.01	-.03*	.31***			
6. Age	.15*	.04	-.07	-.02	-.31***		
7. Gender	-.21***	.06	.22***	.02	.19***	-.02	
<i>M</i>	1.59	1.70	3.49	3.23	2.81	13.92	
<i>SD</i>	.51	.40	.55	.53	.62	2.10	

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

Table 2
Effortful control of temperamental reactivity in relation to reactive–overt and reactive–relational aggression.

Predictors	Reactive–overt				Reactive–relational			
	β	sr^2	R^2	ΔR^2	β	sr^2	R^2	ΔR^2
1			.35	.35***			.32	.32***
Age	.09**	.01			-.03	.00		
Gender	-.23***	.05			.11***	.01		
Pure Proactive	.05	.00			.08*	.01		
Pure Relational or overt	.53***	.28			.56***	.30		
2			.42	.06***			.38	.06***
EC	-.15***	.02			-.04	.00		
FRUS	.14***	.01			.25***	.04		
FEAR	-.21***	.03			-.03	.00		
3			.42	.01			.39	.01
FRUS x EC	-.05	.00			.05	.00		
FEAR x EC	.04	.00			-.05	.00		
FRUS x FEAR	-.05	.00			-.04	.00		
4a			.42	.00			.39	.01
EC x GEN	.06	.00			-.07	.00		
FRUS x GEN	.07	.00			-.01	.00		
FEAR x GEN	.02	.00			.01	.00		
4b			.42	.00			.39	.00
EC x AGE	.04	.00			-.02	.00		
FRUS x AGE	.04	.00			.00	.00		
FEAR x AGE	.02	.00			.04	.00		
5a			.43	.00			.39	.01
FRUS x EC x GEN	-.10	.00			-.02	.00		
FEAR x EC x GEN	.00	.00			.04	.00		
FRUS x FEAR x GEN	-.01	.00			.12*	.00		
5b			.43	.01*			.40	.01*
FRUS x EC x AGE	.01	.00			-.10*	.01		
FEAR x EC x AGE	-.11***	.01			-.01	.00		
FRUS x FEAR x AGE	.00	-.03			.02	.00		

Note. EC = effortful control. FRUS = frustration proneness.

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

the scales for Pure Relational ($\alpha = .74$; e.g., I am the kind of person who fights with others) and Pure Overt aggression ($\alpha = .79$; e.g., I am the kind of person who gossips or spreads rumors) included items that contained no reference to function.

2.2.3. Demographic measures

The mothers completed a number of demographic questions. These pertained to the age and gender of the adolescent, maternal age, marital status, ethnicity, family income and the highest level of maternal education.

2.3. Procedure

The participants were recruited from the community using a random-digit-dialing procedure. Families with at least one child between the ages of 10 and 17 were eligible. The percentage of families recruited from each municipality corresponded with census data regarding the percentage of households in each

municipality known to have children within the 10–17 age range, to ensure representation from rural and urban regions and from areas differing in socioeconomic status. Eligible families interested in the study were mailed a package containing a questionnaire for the adolescent child and the mother, consent forms, and instructions on how to complete and return the questionnaires (including an indication that they could withdraw from participation at any time and assurances of confidentiality). In all, 828 of the 1663 families who received this package returned completed questionnaires (50%), 670 of whom met criteria for inclusion in this study, having one adolescent child between the ages of 10 and 17 and a questionnaire completed by an adolescent and a mother or female guardian. If there was more than one child within the designated age range, parents were instructed to give the questionnaire to the child whose birthday was closest to the date the surveys were received. All participants were asked to complete the questionnaires independently and privately, and to ensure confidentiality, we provided envelopes into which each questionnaire could be sealed

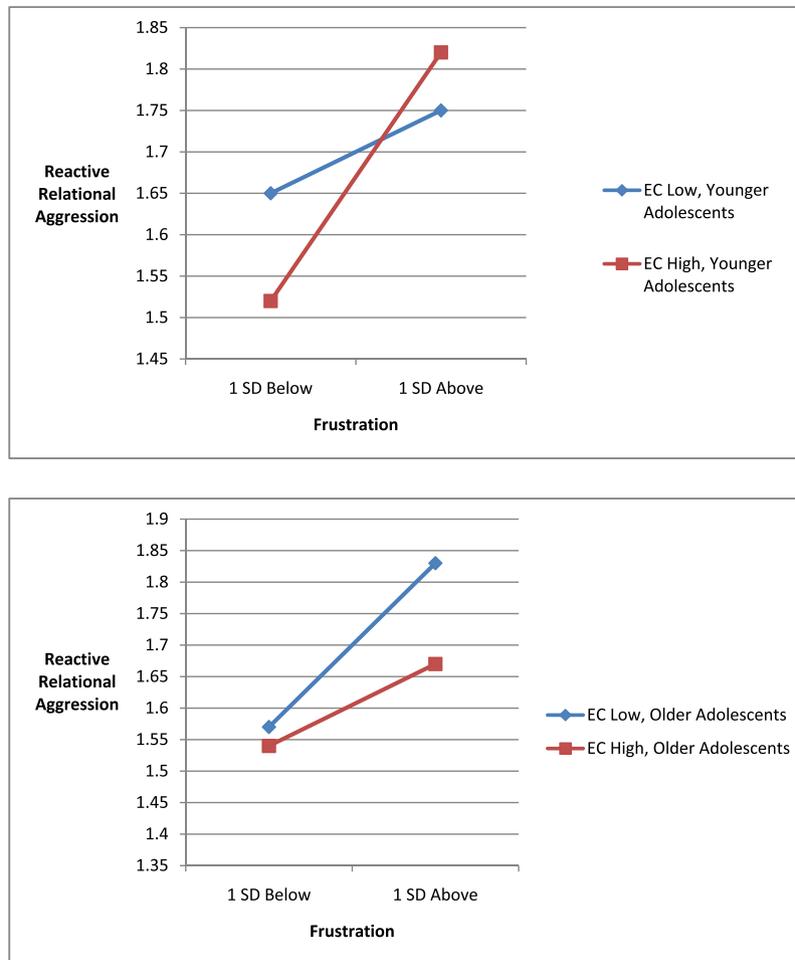


Fig. 1. Effortful control and age as moderators of the relation between frustration proneness and reactive–relational aggression.

upon completion. Each family member was given a \$20.00 incentive upon returning a completed questionnaire. This research was conducted in accordance with the Code of Ethics of the World Medical Association.

2.4. Data analysis

Multiple linear regression analyses were conducted to examine the relation of the temperament variables to reactive–overt and reactive–relational aggression, controlling for residualized proactive aggression, and a “pure” measure of the opposite form of aggression (e.g., relational aggression for reactive–overt aggression, and vice versa). An index of residualized proactive aggression was calculated following the procedures specified by Little and colleagues (2003), whereby we calculated a mean of the standardized residuals that resulted when we partialled out pure overt aggression from proactive–overt aggression, and pure relational aggression from proactive–relational aggression.

We followed procedures outlined by Aiken and West (1991) to examine interactions among temperament variables and either gender or age. After entering age, gender and the aggression covariates in the first step, we placed the three temperament variables in the second step, followed in the third step by two-way interactions between temperament variables. At the fourth step, two-way interactions between temperament and age or gender were studied, whereas the fifth step included three-way interactions in which we examined whether the two-way temperament by temperament interactions were moderated by age or gender. To

ensure adequate parsimony and power, we conducted one set of analyses in which we considered two and three-way interactions involving the temperament variables and age, and another set in which we investigated two and three-way interactions pertaining to gender. Significant interactions with an sr^2 value exceeding .01 were interpreted following the procedures of Aiken and West (1991), examining the relation of the predictor to the aggression measure at values of the moderator(s) that fell 1 SD below and 1 SD above its mean (or for males and females in the case of gender).

3. Results

3.1. Preliminary analyses

Analyses indicated that missing data were well under the recommended cutoff point of 3%, both at the item and variable level (Tabachnick & Fidell, 2001). As shown in Table 1, reactive–overt aggression and reactive–relational aggression were strongly associated, though the correlation was somewhat lower than the average for pure overt and relational aggression (Card et al., 2008). As predicted, there were moderate, inverse links between effortful control and both forms of reactive aggression, whereas fearfulness was negatively associated only with reactive–overt aggression. Frustration proneness was positively associated with both forms of reactive aggression. Demographic variables such as ethnicity, family income, maternal education, marital status and maternal age were not associated with temperament or aggression measures, and thus were excluded from analyses.

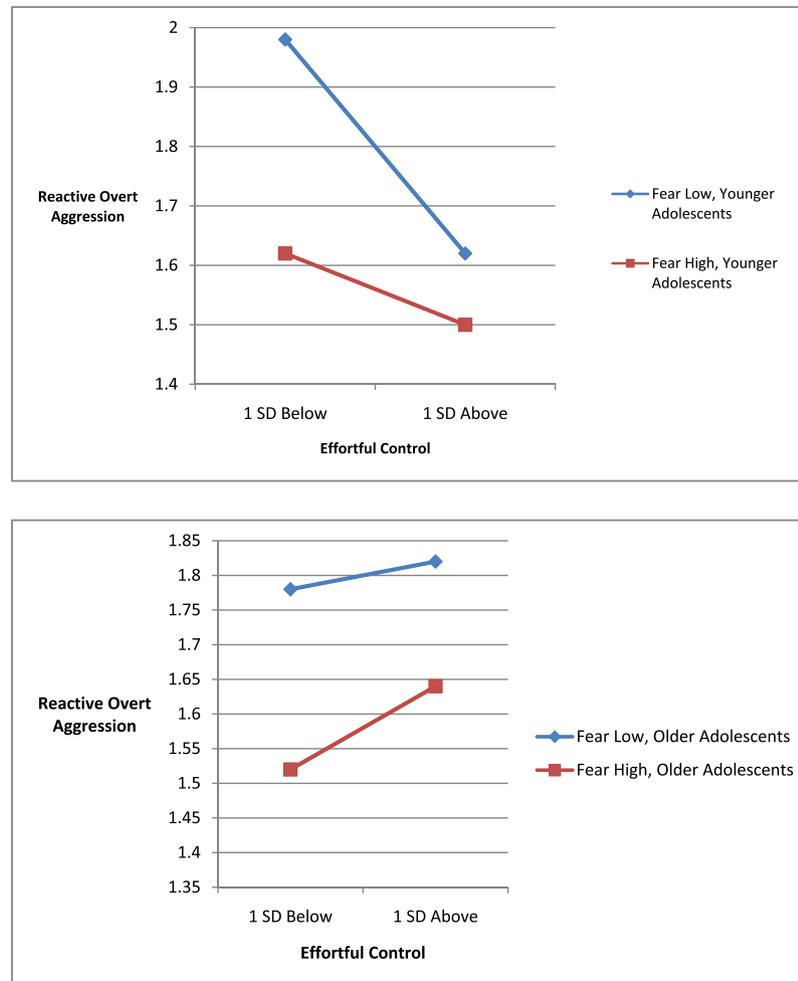


Fig. 2. Fear and age as moderators of the relation between effortful control and reactive–overt aggression.

3.2. Regression analyses

As shown in Table 2, effortful control and fearfulness were uniquely associated only with reactive–overt aggression, whereas frustration proneness was independently related to both forms of reactive aggression, though it uniquely accounted for more of the variance in the relational form (4% vs. 1%). Also illustrated in Table 2, we found significant interactions for effortful control by fear by age, $t(653) = -2.62$, $p = .009$, in relation to reactive–overt aggression, whereas for reactive–relational aggression, a significant interaction with an sr^2 value of $>.01$ was found for frustration by effortful control by age, $t(653) = -2.43$, $p = .015$. Fig. 1 shows the frustration by effortful control by age interaction for reactive–relational aggression. Amongst younger adolescents, frustration proneness was more strongly associated with reactive–relational aggression when effortful control was high ($\beta = .36$; $sr^2 = .03$; $p < .001$) than when it was low ($\beta = .13$; $sr^2 = .00$; $p = .03$). However, amongst older adolescents, frustration proneness was significantly associated with reactive–relational aggression at both high ($\beta = .16$; $sr^2 = .00$; $p = .046$) and low levels ($\beta = .31$; $sr^2 = .01$; $p < .001$) of effortful control, though in contrast to relations pertaining to younger adolescents, the association was stronger when effortful control was relatively weak.

As shown in Figure 2, effortful control had a stronger inverse relation with reactive–overt aggression for younger adolescents with a low ($\beta = -.36$; $sr^2 = .02$; $p < .001$) rather than high ($\beta = -.11$; $sr^2 = .00$; $p = .04$) level of fearfulness. For older

adolescents, the relation was non-significant at both low ($\beta = -.04$; $sr^2 = .00$; $p = .65$) and high ($\beta = -.13$; $sr^2 = .00$; $p = .14$) levels of fear.

4. Discussion

The overall pattern of findings was largely consistent with our prediction that relative weaknesses in self-regulation, due to low levels of effortful control and relative fearlessness (i.e., weak reactive control), would predispose adolescents more strongly to reactive–overt aggression. Although not expected, the results also indicated that reactive–relational aggression was more strongly associated with proneness to frustration, particularly in younger adolescents with a high level of effortful control, suggesting that emotional reactivity may play a key part in relational forms of retaliation, and that behavioral inhibition and planning abilities may in some cases facilitate such behavior. As discussed more fully below, there were important age-related variations in the relations between temperament and the subtypes of aggression.

Consistent with our predictions, effortful control was independently and inversely associated with only reactive–overt aggression. This relation was larger for relatively fearless, younger adolescents, who have been found to be at greater risk for aggression (e.g., Rothbart, 2011), such that the highest levels of aggression were observed in youth who had low levels of both effortful control and fear. Thus, it appears that temperamental fearfulness

– which contributes to reactive control – helps to offset the risk of aggression posed by a relative lack of effortful control. This finding is similar to previous research showing that effortful control had a stronger, inverse relation to conduct problems in children who were less guilt prone, which like relative fearlessness would diminish reactive control (Kochanska, Barry, Jimenez, Hollatz, & Woodard, 2009).

In addition, there was some support for our expectation that good self-regulation abilities could facilitate or inhibit reactive–relational aggression. In this regard, we found that effortful control was independently and negatively related only to reactive–overt aggression, but also that the relation between frustration and reactive–relational aggression was magnified amongst younger adolescents when effortful control was high.

The results of the present study were also partially consistent with our hypotheses regarding reactive control. As expected, fearfulness reduced the likelihood of reactive–overt rather than reactive–relational aggression. Furthermore, it moderated the relation of effortful control to reactive–overt aggression, offsetting vulnerability due to weak cognitive self-regulation abilities. These findings are consistent with our prediction that fear would motivate the avoidance of overt forms of aggression more strongly than relational varieties because it is more risky and dangerous, and it makes the perpetrator vulnerable to retaliation and physical injury.

Although unexpected, the association between frustration proneness and reactive–relational aggression is consistent with previous research linking reactive–relational aggression with anger and hostility (Murray-Close, Ostrov, Nelson, Crick, & Coccaro, 2010). Together with non-significant independent relations with effortful control and fear, this unanticipated result suggests that a temperamental predisposition to emotional reactivity may be a more important risk factor for reactive–relational aggression than are problems with self-regulation.

Notably, the association between effortful control and aggression varied as a function of age group and aggression subtype. Whereas a high amount of effortful control was related to less reactive–overt aggression amongst fearless, younger adolescents, frustration-prone, older adolescents were likely to have a greater frequency of reactive–relational aggression when they were high in effortful control. These divergent findings may reflect developmental differences in the costs and benefits of aggressive behavior. For example, in late adolescence, overtly aggressive adolescents benefit from increased perceived popularity and face minimal costs in terms of reduced sociometric popularity (i.e., being liked), whereas relationally aggressive youth experience lower perceived and sociometric popularity relative to non-aggressive peers (Cillessen & Borch, 2006). Consequently, older adolescents with strong effortful control may not inhibit an overtly aggressive response to provocation because it may be perceived as a means to attain popularity, whereas they may be more inclined to inhibit relational aggression given its higher costs.

Findings from the present study have key theoretical and clinical implications. Consistent with the view of reactive–overt aggression as being more impulsive, immediate, risky and dangerous than reactive–relational aggression, we found that it was more strongly related to relative weaknesses in self-regulation, such that adolescents with low levels of effortful control and fearfulness were at greater risk. In contrast, adolescents appeared most vulnerable to reactive–relational aggression when they were prone to frustration, and thus the increased risk seemed to be a function of heightened emotional reactivity as opposed to weak self-regulation.

These findings suggest intervention strategies or clinical approaches that may be particularly useful in the prevention or reduction of overt and relational forms of reactive aggression. For example, cognitive-behavioral procedures for minimizing

emotional reactivity involving frustration and anger, such as targeting hostile attribution biases, may be especially important in dealing with reactive–relational aggression (e.g., Lochman, Boxmeyer, Powell, Barry, & Pardini, 2010), whereas strategies that enhance self-regulation abilities, including classroom-based social skills programs (Riggs, Greenberg, Kusché, & Pentz, 2006), may help to prevent the emergence of frequent reactive–overt aggression.

A limitation of this study is that the cross-sectional research design precludes inferences about causation and causal direction. Furthermore, the sample had a relative lack of diversity as the vast majority of participants identified themselves as Canadian or of a European ethnicity, consistent with the ethnic make-up of the community involved in the study. However, a notable strength of this research is the use of multiple informants, as both mother and adolescent perspectives were aggregated to reduce bias in the measures of temperament and aggression. To extend the present findings, future research could examine differential relations between temperament and overt or relational aggression with a proactive function, and could make use of a longitudinal design.

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