



## Disentangling proactive and reactive aggression in children using self-report

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### ABSTRACT

The distinction between proactive and reactive functions of aggression is one of the most common divisions when investigating aggression among children and adolescents. To date, self-report is the least used measurement, despite existing literature supporting the view that the best informant regarding internal processes and motives are children themselves. The main aim of this study was to examine the construct and concurrent validity of a new self-report questionnaire, which aims to disentangle acts of reactive vs. proactive aggression that are most common within the daily lives of children. We examined the self-report measure among 578 children (313 girls, 265 boys, mean age 11 years, range 9–13 years). Most children (90% boys; 85% girls) reported at least one act of aggression over the last four weeks. Furthermore, the outcomes support the two-factor structure (reactive and proactive aggression) and the questionnaire showed good concurrent and discriminant validity with measures for emotional and social functioning. This study validates the use of the self-report instrument for reactive and proactive aggression and demonstrates that children can successfully distinguish between their own motives for reactive and proactive forms of aggressive behaviours.

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Aggressive behaviour during childhood can cause many problems, both for the aggressor and the victim. It can lead to the rejection and isolation of the aggressor and cause emotional and behavioural problems at school and at home for the victims (Brendgen, Vitaro, Tremblay, & Lavoie, 2001). Numerous authors have identified proactive and reactive aggression as two fundamental functions of aggression (Card & Little, 2006; Dodge & Coie, 1987; Hubbard, McAuliffe, Morrow, & Romano, 2010; Kempes, Matthys, de

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Vries, & van Engeland, 2005; Polman, Orobio de Castro, Koops, van Boxtel, & Merk, 2007). The present study aims to examine the validity of a newly adapted self-report questionnaire, which aims to distinguish between reactive and proactive aggression in children (range 9–13 years old), in terms of its psychometric properties and its relationship with other measurements of social–emotional functioning.

*Proactive aggression* is instrumental and characterized by an absence of provocation. Such behaviour seems to originate internally within a child, based upon a drive for personal gain, which is related to a desire to dominate social interactions (Dodge & Coie, 1987). It is viewed as intentional and ‘cold blooded’, without emotional charge, and is related to low affect (Hubbard et al., 2010). Children who show more proactive aggression expect positive outcomes from their aggressive behaviour (Bollmer, Harris, & Milich, 2006; Orobio de Castro, Merk, Koops, Veerman, & Bosch, 2005).

*Reactive aggression* is defined as a defence mechanism against frustration, or perceived provocation or threat. The function of reactive aggression is to avoid or terminate a perceived threat, rather than to achieve an intrinsically sought after goal (Dodge & Coie, 1987). Reactive aggression is considered impulsive, even explosive, and is characterized by high physiological arousal (Kempes et al., 2005).

Various empirical studies show that proactive and reactive aggressive actions have distinctive profiles on antecedent and subsequent behaviours. Proactively aggressive children bully other children more often and are bossier than reactive aggressive or non-aggressive children (Camodeca, Goossens, Terwogt, & Schuengel, 2002; Polman, Orobio de Castro, Thomaes, & van Aken, 2009; Raine et al., 2006). Not surprisingly, children who show more proactive aggression feel less guilt when potentially harming other children (Orobio de Castro et al., 2005), and this form of aggression is related to externalizing symptoms such as antisocial behaviour, psychopathology and delinquency (Brendgen et al., 2001; Seah & Ang, 2008).

Reactive aggression is related to problems with emotion regulation, for example, anxiety (Seah & Ang, 2008) and anger (Hubbard et al., 2010). Additionally, this type of aggression is associated with strained peer relationships, lower levels of popularity and increased social isolation, when compared to proactively aggressive or non-aggressive children (Camodeca et al., 2002; Card & Little, 2006; Dodge & Coie, 1987; Polman et al., 2009; Xu & Zhang, 2008).

We advocate here the use of self-reports to accurately capture the difference in the functions of proactive and reactive aggression in children and early adolescents. First however, we will review the issues with existing, current tools of measurement.

### *Disentangling reactive and proactive aggression empirically*

Widely used parent and teacher reports assessing aggression in children, examined by factor analysis, have been found to support the two-factor structure of proactive and reactive aggression (Kempes et al., 2005). However, others have criticized such measurements as lacking discriminant validity (Hubbard et al., 2010). Questionnaires completed by parents or teachers could be biased due to the general impression that the informant has about the child (Polman et al., 2007). This factor may account for the higher correlations in teacher reports between these types of aggression, as Card and Little (2006) reported correlations between .41 and .89 in their meta-analysis.

Observational methods and other behavioural studies have demonstrated substantially lower correlations between proactive and reactive aggression in children than questionnaires (.04–.47, see Card & Little, 2006). Yet, observations may not capture what is happening within a child's mind, and coders may be unable to identify the reason for an aggressive act. A possible time lag between provocation and retaliation could suggest proactive aggression, whereas the function of the behaviour is actually reactive. Additionally, young children may mostly rely on overt aggression, but this may transcend in late childhood and adolescence into more covert aggression such as gossiping.

Since children possess the best insight into why it is that they engage in aggressive acts, it only seems reasonable to directly ask the child. To our knowledge, studies using children's self-reports to isolate and study proactive and reactive aggression are extremely limited, and not applicable to the general population of children because items also include extreme forms of aggression, such as gang fighting, and are used with older adolescents (Raine et al., 2006).

Little, Henrich, Jones, and Hawley (2003) developed a self-report questionnaire to assess proactive vs. reactive aggression in children, but the study showed an unexpected correlation of  $-.10$  between the two functions and the discriminant validity with other measures of social functioning did not show a clear pattern. Furthermore, the items designed to capture proactive aggression were all based on one single motive 'to get what I want', whereas proactive aggression could also include other motives, such as social dominance or pleasure (Orobio de Castro, Verhulp, & Runions, 2012). In two other self-report questionnaires, the two functions for aggression correlated fairly highly, .67 and .66, respectively, (Raine et al., 2006; Roland & Idsoe, 2001), suggesting conceptual overlap, and again the discriminant validity was not strong.

Therefore, we believe that a new self-report measuring the frequency of the most common, daily aggressive behaviours in childhood will contribute to understanding proactive and reactive functions of aggression.

## The present study

The aim of the current study is to examine the construct validity of a newly developed self-report for children (age ranged from nine to thirteen years old) designed to distinguish between the forms of reactive aggression and proactive aggression by examining its psychometric properties. This self-report is based on an existing questionnaire for reactive and proactive aggression (*Instrument for Reactive and Proactive Aggression* (IRPA); Polman et al., 2009), which assesses teacher reports of common aggressive acts and has been shown to have good reliability and validity. With permission from the authors, we adjusted the IRPA teacher report to a self-report. Common aggressive acts from the original IRPA were presented to children who were then given the opportunity to rate how often they engaged in these acts for both proactive and reactive reasons over the last four weeks.

First, we examined the two-factor structure of the IRPA self-report. Second, we examined incidence of the two identified functions of aggression, to secure that this IRPA self-report, indeed, measures common forms of daily reactive and proactive aggression. Third, we examined the concurrent validity of the IRPA self-report: several related aspects of emotional and social functioning were also measured and their links with reactive and proactive aggressive behaviour were tested. Regarding *emotional functioning*, we expected reactive aggression to be related to problems concerning emotion regulation, i.e., lower levels of emotion awareness, more symptoms of depression (Vitaro, Brendgen, & Tremblay, 2002) and lower self-esteem (Ostrowsky, 2010). We expected proactive aggression to be related to lower levels of guilt (Tangney, Wagner, Hill-Barlow, Marschall, & Gramzow, 1996).

Regarding children's *social functioning*, we focused on different aspects of social competence, such as prosocial and antisocial behaviour. We expected that proactive aggression would be related to higher levels of antisocial behaviours, and lower levels of prosocial behaviours (Card & Little, 2006; Marcus & Kramer, 2001). Specifically, we expected more conduct problems, delinquent and antisocial behaviours to correlate with proactive aggression (Pulkkinen, 1998; Vitaro et al., 2002).

Regarding gender differences, it has been noted that boys display more reactive and proactive aggression than girls (Mayberry & Espelage, 2007), which we expected to replicate in our study. We also expected to find stronger links of aggression with antisocial behaviour in boys (Barriga & Morrison, 2001).

## Method

### Participants and procedure

The sample consisted of 578 children (313 girls, 265 boys, grades 6–8) from primary schools around Utrecht, the Netherlands, aged 9–13 years ( $M = 11.75$  years,

SD = 1 month). Participants were asked to fill out questionnaires regarding their own emotions and behaviour, and the behaviour of their classmates. Parents and teachers were asked to fill out questionnaires regarding the participants' emotional and social functioning. Prior to the data collection, parental consent was obtained from all participants. In the analyses including data from parents and teachers, 222 cases were excluded due to missing values in the parents' questionnaires.

## Materials

Besides self- and teacher reports of aggressive behaviour, additional aspects of social and emotional functioning were assessed using self-, parent and peer reports (i.e., emotion awareness, symptoms of depression, self-esteem, delinquency, prosocial, antisocial behaviours and conduct problems). All measures had internal consistencies ranging from sufficient to high (Table 1).

### Self-report

The children rated their own aggressive behaviour on the adapted self-report version of the *Instrument for Reactive and Proactive Aggression* (Polman et al.,

**TABLE 1.** Psychometric properties of the self- and teacher reported aggression and self-, parent and peer reports of social and emotional functioning.

	No of items	Min–Max	Cronbach's $\alpha$	Mean inter-item corr.	Mean (SD)	
					Boys	Girls
<i>Self-report</i>						
Reactive aggression**	18	1–5	.95	.53	2.01 (.90)	1.69 (.75)
Proactive aggression**	18	1–5	.92	.41	1.20 (.39)	1.10 (.24)
Emotion awareness	30	1–3	.80	.12	2.19 (.25)	2.17 (.27)
Guilt**	6	1–3	.78	.38	2.30 (.49)	2.51 (.40)
Depression (CDI)	26	1–3	.86	.20	1.32 (.23)	1.35 (.26)
Self-esteem (SE)	25	1–3	.86	.20	2.40 (.24)	2.42 (.27)
Delinquency**	9	0–6 <sup>a</sup>	.74	.28	2.66 (6.23)	.90 (2.37)
<i>Teacher report</i>						
Reactive aggression**	21	0–4	.90	.30	.29 (.46)	.11 (.26)
Proactive aggression*	21	0–4	.85	.24	.16 (.30)	.09 (.21)
<i>Parent report</i>						
Conduct problems (CSI)	12	0–3	.77	.22	1.04 (.07)	1.02 (.07)
<i>Peer report</i>						
Prosocial behaviour**	3	0–1	.78	.54	.07 (.09)	.14 (.12)
Antisocial behaviour**	2	0–1	.92	.85	.10 (.16)	.03 (.07)

Note: Measures with significant gender differences are indicated by an asterisk. \* $p < .01$ \*\* $p < .001$ .<sup>a</sup>Delinquency had no preset range, but the highest score was 6.

2009), which consists of two scales; reactive and proactive aggression. Children were presented with six forms of aggression (3× physical aggression: kicking, hitting and pushing; 3× relational aggression: name calling, picking fights and gossiping). One form of relational aggression from the teacher report was not included in the self-report because (i) we preferred to balance the presence of the two forms of aggression; and (ii) because the seventh item ('doing sneaky things') might be more difficult for children experiencing language delays.

Children were asked to report how often they performed this behaviour in the last four weeks on a five-point scale from 1 (never) to 5 (very often) for three proactive motives (e.g., 'Over the last four weeks, I kicked someone because: I wanted to be mean; I took pleasure in it; I wanted to be the boss') and for three reactive motives (e.g., 'Over the last four weeks, I kicked someone because: I was mad; I was bullied; I struck back'). Consequently, each of the reactive and proactive aggression scales consists of three subscales, each containing six acts of aggression, yielding 36 items in total.

The *Emotion Awareness Questionnaire* (Rieffe & De Rooij, 2012) identifies children's ability to reflect upon their own emotions, in terms of being able to differentiate between discrete emotions, to understand their causes as related to objects or events, as well as their tendency to value emotions as an important source of information. Twenty items are conversely formulated with respect to the trait. Respondents were asked to state to which degree the item is true for them on a three-point scale (1 = not true, 2 = sometimes true, 3 = often true). For this study, the total mean score was used. A higher score indicates better emotion awareness.

Guilt was measured using the *Brief Shame and Guilt Questionnaire for Children* (Novin & Rieffe, 2015). The guilt scale consists of six short descriptions of situations aiming to elicit guilt. Children were asked to state how guilty they would feel in each situation on a three-point scale (1 = not, 2 = a little, 3 = a lot). The total mean score was used.

The *Children's Depression Inventory* (Kovacs, 1992; Timbremont & Breat, 2002) consists of 26 items, each containing three statements. The children were asked to select the statement which best describes how they felt the past two weeks (e.g., 'Nobody really loves me'; 'I am not sure if anybody loves me'; 'I am sure that somebody loves me'). A higher score indicates more symptoms of depression.

The *Self-Esteem Questionnaire* (Theunissen et al., 2014) consists of 25 items, which could be scored on a three-point scale (not true (1) to often true (3)). The total mean score was used, and a higher score indicates more self-esteem.

Delinquency was measured with a *Short Delinquency questionnaire* (Kouwenberg, Rieffe, & Theunissen, 2011) which concerns nine minor delinquent offences, which can appear in childhood (e.g., shoplifting and stealing from parents). Participants were asked to write down how often they had committed that particular offence in the last four weeks. They were told that they would not be punished for these offences.

### Teacher reports

Participants' teachers rated aggressive behaviour using the *Instrument for Reactive and Proactive Aggression* (Polman et al., 2009), which contains seven aggressive behaviours, each including three proactive and three reactive motives ( $7 \times 6 = 42$  items). Teachers were first asked to state the number of times the child showed a specific aggressive behaviour (kicking, pushing, hitting, calling names, picking fights, lying or gossiping, or doing sneaky things) in the last month. Next, teachers were asked to rate six possible functions on a five-point scale: 0 (never) to 4 (always). Past research indicates the IRPA to show good reliability (Cronbach's  $\alpha$  .72 for both proactive and reactive aggression) (Polman et al., 2009).

### Parent report

The scale *Conduct Disorder* (12 items) was taken from the *Child Symptom Inventory: Parent checklist* (CSI-4; Gadow & Sprafkin, 1994). The CSI-4 is a parent report screening for several childhood disorders, as described by the American Psychiatric Association (1994). The CSI-4 was translated into Dutch and back-translated into English. The back-translation was compared with the original English questionnaire and the few inconsistencies were resolved by discussion. Items were scored on a four-point scale (0 = never, 1 = sometimes, 2 = often, 3 = very often).

### Peer reports

The *Peer Assessment* was adapted from a method by Dodge and Coie (1987). Children were asked to nominate all classmates who fit the behavioural descriptions presented. This included three prosocial descriptions (helping, sharing and consoling) and two antisocial descriptions (bullying and picking fights). Mean scores for *Prosocial Behaviour* and *Antisocial Behaviour* were calculated per child by computing the average of the proportion of nominations which a child had received from his/her classmates. Proportions were corrected for class size and the number of absent classmates on the day of data collection.

## Results

### Factor structure of the IRPA

To examine the two-factor structure of the IRPA self-report, a confirmatory factor analysis (CFA) was conducted using *R* version 3.2.1 on six aggression functions (see Table 2) as suggested by Hau and Marsh (2004). These parcels are based on the mean scores per function. This approach has clear advantages over analyses on item level (e.g., parcels have greater reliability and higher communality,

**TABLE 2.** Functions of aggression and CFA factor loadings for the self- and teacher report.

Function*	Self-report		Teacher report	
	Reactive	Proactive	Reactive	Proactive
I was mad	.80		.86	
I was bullied	.85		.89	
I struck back	.85		.88	
I wanted to be mean		.99		.76
I took pleasure out of it		.71		.68
I wanted to be the boss		.68		.85

\*For the teacher report, 'I' was replaced by '(s)he'.

optimize indicator-sample size ratio, and better approximate normality) (Little, Cunningham, Shahar, & Widaman, 2002).

Data inspection revealed substantial multivariate kurtosis, evidenced by Mardia's normalized estimate of 131.27. Therefore, Robust Maximum Likelihood Estimation was applied and all analyses were based on the Satorra–Bentler  $\chi^2$  statistic (S–B $\chi^2$ ; Satorra & Bentler, 1988). The two-factor model showed a good fit, with all functions loading on the intended factor (S–B $\chi^2$  (8) = 34.06, SRMR = .04, CFI = .96, RMSEA = .08). Standardized factor loadings ranged from .68 to .99 (see Table 2). The correlation between the two scales for reactive and proactive aggression was .49.

The same two-factor structure was tested for the IRPA teacher report, and resulted in reasonable model fit (S–B $\chi^2$  (8) = 27.98, SRMR = .04, CFI = .94, RMSEA = .07). Standardized factor loadings ranged from .68 to .89 (see Table 2). The correlation between the two scales for reactive and proactive aggression was .79. Correlations between the IRPA self-report and teacher report were moderately low for reactive aggression and proactive aggression ( $r = .24$ ;  $p < .001$  and  $r = .18$ ;  $p < .001$ , respectively).

For both the IRPA self-report and IRPA teacher report, multigroup CFA analyses were performed to test for measurement invariance across gender. These analyses confirmed the two-factor structure in boys and girls. In addition, we established configural, metric and scalar invariance for both the self-report and teacher report IRPA. Therefore, comparisons between boys and girls on reactive and proactive aggression are meaningful. Results are available upon request from the first author.

### **Incidence of self-reported aggression**

As expected, the mean scores of reactive and proactive aggression were higher for boys than girls, regarding both self- and teacher reports (Table 1). Table 3 shows how many boys and girls performed at least one act of aggression over the last four weeks. It can be seen that only 10% of the boys and 15% of the girls did not report any aggression at all. Furthermore, children rarely displayed proactive aggression without reactive aggression (1%), but approximately half



of the sample exhibited reactive, but not proactive, aggression over the last four weeks.

### **Relations of self-reported aggression with emotional and social functioning**

To examine the unique relationships between self-reported reactive and proactive aggression and the different aspects of emotional and social functioning, we conducted Pearson's correlations, partial correlations (controlling for the covariance between reactive and proactive aggression), and examined if the strength of these relationships differed between boys and girls, using Fisher  $R$  to  $z$  transformations (Table 4). Because parent reports were included in these analyses, whereby 222 parents reports' were missing, the sample for these correlations included data from 356 participants.

The outcomes in Table 4 show that reactive aggression was related to lower levels of emotion awareness and self-esteem, and higher levels of depression and delinquency, also when controlling for proactive aggression. The results show that proactive aggression was related to higher levels of conduct disorder, antisocial behaviours, delinquency and depression, also when the level of reactive aggression was controlled for. Proactive aggression was related to less guilt, but only in boys.

**TABLE 3.** Frequencies of participants reporting reactive and proactive aggression as a function of gender.

	No aggression	Reactive only	Proactive only	Both	Total
Boys	26 (10%)	125 (47%)	2 (.8%)	112 (42%)	265 (100%)
Girls	46 (15%)	164 (52%)	2 (.6%)	101 (32%)	313 (100%)

**TABLE 4.** Correlations and partial correlations for aspects of emotional and social functioning on self-reported reactive and proactive aggression ( $N = 578$ ).

	Reactive aggression		Proactive aggression	
	Correlation	Partial correlation <sup>a</sup>	Correlation	Partial correlation
Emotion awareness	-.34**	-.35**	-.20**	-.09
Depression	.42**	.31**	.30**	.17**
Guilt	-.11	-.08	-.25**/.00	-.23**/.00
Self-esteem	-.38**	-.36**	-.21**	-.07
Delinquency	.31**	.27**	.33**	.18**
Conduct problems (parents)	.19**	.12	.21**	.15*
Prosocial behaviour (peers)	-.19**	-.13	-.17**	-.11
Antisocial behaviour (peers)	.23**	.12	.25**	.20**

\* $p < .01$ \*\* $p < .001$ .<sup>a</sup>Partial correlation implies correction for the other function of aggression.<sup>b</sup>Differences in strength of correlations for boys and girls only presented when significant; boys/girls.

## Discussion

The main findings of the current study confirmed good psychometric properties for the IRPA self-report, which was adapted from the IRPA teacher report by Polman et al. (2009), and the two-factor structure (reactive vs. proactive aggression) was supported. Additionally, the two scales for reactive and proactive aggression showed high internal consistencies and were moderately correlated, as should be expected for two related constructs (Polman et al., 2009).

The convergent validity of the IRPA self-report was also positive. Although depression contributed to the prediction of both constructs, other aspects of emotional functioning were clearly related to either proactive or reactive aggression. Emotion awareness and self-esteem contributed negatively to the prediction of reactive aggression in both boys and girls. Lower levels of guilt contributed to higher rates of proactive aggression, albeit in boys only. These outcomes conform to earlier findings which suggest that reactive aggression stems more from problems with emotion regulation, whereas proactive aggression is more often considered when wanting to obtain a goal, regardless of the harm caused to others (Dodge & Coie, 1987).

Regarding children's social functioning, all indices for antisocial behaviours were associated with proactive aggression. For reactive aggression, higher levels of delinquency were still associated after controlling for proactive aggression. The positive link between delinquency and reactive aggression and between depression and proactive aggression were not in line with our expectations. Although studies mostly suggest that depression is more strongly related to reactive aggression and delinquency to proactive aggression, there are studies reporting strong cross-sectional links between both types of aggression and both delinquency and depression (Raine et al., 2006).

Furthermore, our results suggest three types of children: those who aggress reactively only, those who act both proactively and reactively, and a small population who only display proactive aggression. It is plausible to posit that those children who use instrumental aggression for personal gain will also retaliate when they feel someone is threatening them or their possessions. In turn, children who react aggressively in order to defend themselves do not necessarily also use aggressive means to obtain their goals (Mayberry & Espelage, 2007).

In sum, this study validates the use of the self-report IRPA and demonstrates that children can successfully distinguish between their own motives for reactive and proactive forms of aggressive behaviours. The questionnaire is the first to present a reliable and efficient way for assessing common acts of proactive and reactive aggression in children. The relatively low correlations between the self- and teacher reports emphasize that motives for behaviours are indeed difficult to observe in others, but future studies could more thoroughly examine this issue.

We think that it might bear important clinical relevance to disentangle these different functions for aggression through self-report at the youngest possible age because early intervention is important and most beneficial in case of atypical development. Whereas early detection of higher levels of reactive aggression might help to prevent the development of mental health problems, the early detection of higher levels of proactive aggression might contribute to prevent further development into delinquency or other externalizing problems.

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