

New Directions in Measuring Reactive and Proactive Aggression: Validation of a Teacher Questionnaire

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Abstract The well-known distinction between reactive and proactive aggression is theoretically important but empirically controversial. Recently, aggression researchers have argued that we should separate the form and function of aggression to make a clearer distinction between reactive and proactive aggression. This article describes the validation of a new teacher-report Instrument for Reactive and Proactive Aggression (IRPA) that assesses the form separate from the function of aggression. We demonstrated good discriminant, convergent, and construct validity of the IRPA in a sample of 427 children aged 10 to 13. Reactive and proactive functions of aggression were independent constructs ($r=0.03$) which indicates excellent discriminant validity. Convergent validity was satisfactory; scores from the IRPA were moderately to highly related to scores from the widely used Teacher Rating Instrument, TRI (Dodge and Coie in *Journal of Personality and Social Psychology* 53:1146–1158, 1987). Additionally, reactive and proactive aggression showed unique correlations with most a priori hypothesized theoretically relevant variables, which indicates construct validity. (150 words)

Keywords Reactive aggression · Proactive aggression · Discriminant validity · Aggression · Form and function

Introduction

Aggressive behavior seems to be one of the most heterogeneous constructs in psychology. The one child may beat up

another child, a second may say something mean behind another child's back, and a third takes pleasure in throwing water on another child's painting. Although these behaviors can all be considered aggressive, they clearly have different manifestations (i.e., *forms*) and may each have different underlying motivations or reasons (i.e., *functions*). Research suggests that these different types of aggression have distinct causes, developmental processes, and prognoses (Vitaro et al. 2006). Therefore, it seems of much importance to both researchers and clinicians to conceive of aggression as a heterogeneous construct consisting of different forms and functions.

Several attempts have been made to distinguish between subtypes of aggression. Definitions and typologies have predominantly focused on forms of aggression, such as physical, verbal, and relational aggression (for extensive reviews see Parrott and Giancola 2007; Underwood et al. 2001). However, information about the form of aggression only tells us something about the behavioral manifestation of some underlying process. It does not shed light on the function of that behavioral manifestation.

Both in research and in practice, it seems of great importance to uncover the functions of children's aggressive behavior. Knowing why children engage in aggressive behavior is a prerequisite for the development of effective aggression interventions. For instance, if a child uses aggression in an instrumental manner, reinforcing other non-aggressive tactics may be beneficial. However, if a child gets easily frustrated and angry in the face of setbacks, it seems of more use to teach this child how to manage anger through self-control (McAdams 2002).

Importantly, these functions of children's aggressive behavior are intra-individually consistent across different forms of aggression (Polman et al. 2008, submitted for publication; Prinstein and Cillessen 2003). Such consistent individual differences in function suggest that subtyping of

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children for diagnostic purposes may be feasible, and more informative than less theoretically grounded typologies based on forms of aggression.

Reactive and Proactive Aggression

One of the most common distinctions based on differences in functions of aggressive behavior is the distinction between reactive and proactive aggression. Reactive aggression is a reaction to a presumed threat which is associated with anger and is instigated by provocation (Dodge 1991). The function of this kind of behavior is to defend oneself against or to undo an event believed to be threatening or unjust (Frijda 1993). Proactive aggression, on the other hand, is planned and unemotional behavior. The function of this type of aggressive behavior is to take possession of things or to dominate or intimidate (Dodge 1991).

The aim of the present study is to develop and validate a new teacher-report measure that adequately distinguishes between reactive and proactive functions of aggression. Recently, the validity and practical utility of the distinction between reactive and proactive aggression has been debated (Bushman and Anderson 2001; Parrott and Giancola 2007; Poulin and Boivin 2000; Waschbusch et al. 2002). The key concern seems to be the high correlation between reactive and proactive aggression. A recent meta-analysis found a mean correlation of 0.70 between these constructs (Polman et al. 2007). When two types of behaviors are related so strongly that the one type is always accompanied by the other and never present on its own, it can be doubted whether it is useful to distinguish between the two. Nevertheless, we believe that the distinction between reactive and proactive aggression is thwarted.

Methodological Problems

Researchers have suggested that the high correlation between reactive and proactive aggression is due to two methodological problems of the measures being used and is thus not necessarily indicative of a lack of discriminant validity (Card and Little 2006; Little et al. 2003a,b; Polman et al. 2007; Polman et al. 2008, submitted for publication).

The first methodological problem is that the items on most measures of reactive and proactive aggression are ambiguous mixtures of both form *and* function of aggression. This may well contribute to the inflated correlations between reactive and proactive aggression. Different functions may not be distinguished by respondents if they tend to focus on the forms (instead of the functions) of an aggressive act. Thus, respondents might rate a child high in both reactive and proactive aggression because he/she often hits others, not because he/she has both reactive and

proactive reasons for doing so. Therefore, this high correlation does not necessarily imply that the distinction between reactive and proactive aggression can not be made. It only implies that current questionnaires are not suited to differentiate between the two types.

A solution to this problem may lie in developing questionnaire items that separate the form and the function of aggression. Recently, Little et al. (2003b) developed a 36-item self-report questionnaire to be used in 11 to 16 year olds. The questionnaire measures pure overt (I'm the kind of person who often fights with others), reactive overt (When I'm hurt by someone, I often fight back), instrumental overt (I often start fights to get what I want), pure relational (I'm the kind of person who spreads rumors or gossips), reactive relational (When I am mad at others, I often gossip or spread rumors about them), and instrumental relational aggression (To get what I want, I often gossip or spread rumors about them). Structural equation analyses found higher-order (pure) reactive and (pure) proactive components that were not significantly related. A meta-analysis confirmed that much lower correlations between reactive and proactive aggression are found with measures that separate form and function such as the Little et al. (2003b) measure (Polman et al. 2007).

Although the procedure of separating form and function has many advantages over previous work, there are two issues we want to address in the current study that were not addressed in the Little et al. (2003b) study. First, we developed a questionnaire that could separate reactive and proactive aggression at the manifest level instead of the latent level. The Little et al. (2003b) study used a questionnaire in which form and function were included in each item and used structural equation modeling techniques to separate form and function as latent constructs. Thus, reactive and proactive aggression can be distinguished as two latent constructs. However, this questionnaire was not designed to distinguish between both types of aggression at the manifest level for each individual child. Therefore, the current questionnaire was designed to separate form and function by assessing them separately in a questionnaire. In this procedure, children receive an individual score on reactive and proactive aggression instead of complex individual scores that are derived from group modeling.

Second, instead of using self-reports, the current study asked *teachers* to evaluate the forms and functions of children's aggressive behavior. We consider teachers to be a reliable source for functions of aggressive behavior because they are trained professionals. Teachers can observe the children in their class in interaction with their peers and can therefore easily detect peer conflicts and aggressive behavior. By using teacher-report, we overcome problems of underperception of aggression associated with self-reports

(Lochman and Dodge 1998) and we build on former research on reactive and proactive aggression. We developed a questionnaire for late childhood and early adolescence, since studies on reactive and proactive aggression generally concern this group (Polman et al. 2007).

A second methodological shortcoming is that most research assigns null-scores to both reactive and proactive aggression for non-aggressive children. Null-scores may imply that a) the child is never aggressive, or b) the child is aggressive but not with this function. Because these studies confound forms and functions, null-scores on reactive and proactive aggression are ambiguous. This overrepresentation of null-scores is a likely cause of the inflated correlation between both types of aggression. In the current study, reactive and proactive aggression were conceptualized as distinctive *functions* of aggressive behavior. In this approach, functions of aggression can only be assigned to children who behave aggressively to begin with. Therefore, the current questionnaire only asks for functions of the behavior if the behavior is demonstrated. Hence, we first asked for the frequency of a certain form of aggression. If this behavior was present, we then asked for the function of this behavior.

Aim of the Study

To overcome the two methodological problems and to derive individual child information on reactive and proactive aggression, we constructed a teacher questionnaire called the Instrument for Reactive and Proactive Aggression (IRPA). The aim of the present study was to investigate the discriminant, convergent, and construct validity of this new teacher questionnaire that disentangles the forms and the functions of aggression. First, the discriminant validity of the IRPA was studied. Also, the discriminant validity of the IRPA was compared to the discriminant validity of the commonly used Teacher Rating Instrument (Dodge and Coie 1987) that confounds forms and functions. It was expected that the correlation between both types of aggression would be considerably lower in the IRPA than in the TRI. Second, convergent validity was assessed by correlating scores from this new teacher questionnaire with scores from the TRI. Third, construct validity was assessed by investigating the multiple distinct relations reactive and proactive aggression should have with other constructs. Theoretical insights (e.g. Dodge and Coie 1987; Dodge 1991; Vitaro et al. 2006) and empirical findings from numerous studies (see Card and Little 2006, for a meta-analytical review) indicate to which distinct constructs reactive and proactive aggression should be related. Reactive aggression is an impulsive, emotional (angry) reaction to perceived threat (Dodge 1991) related to internalizing problems, peer problems, and emotional and

attention problems (Card and Little 2006). Therefore, we predicted that reactive aggression (not proactive aggression) would be associated with higher levels of anxiety, attention problems, emotional problems, getting angry easily, peer problems, but to lower levels of social preference, social acceptance and perceived popularity. Proactive aggression, on the other hand, is an unemotional, instrumental type of aggression in order obtain something or dominate (Dodge 1991). Therefore, we predicted that proactive aggression (not reactive aggression) would be associated with higher levels of dominance, conduct problems, coercive strategies, leadership, humor, bullying, bossiness, but to lower levels of empathy and prosocial behavior. We investigated these constructs with multiple informants: teacher ratings, peer nominations, and self ratings. It was expected that, because of the presupposed discriminant validity of the new teacher questionnaire, unique relations with relevant variables would be found.

Method

Participants

Participants were recruited from 22 fifth and sixth grade classrooms in Dutch schools. Participants' schools were located in large cities (39%), medium-sized towns (31%) and villages (39%). The child population in the municipalities we studied, is mostly Caucasian (81%); 19% has other (e.g., Surinam, Turkish, Moroccan), or mixed ethnical/cultural origins.

Informed parental consent was obtained for 438 children (88% consent rate). As a small subset of children was absent at the time of the study, the final N was 427 (46% boys). Children ranged in age from 10 to 13 years ($M=11.73$; $SD=0.66$).

Children participated on two different days. On the first day of the study children filled out self-report questionnaires in the classroom with one of the research members present. On the second day of the study children were individually taken out of the classroom by one of the research members to complete peer nominations.

Measures

Teacher Measures

Instrument for Reactive and Proactive Aggression Teachers rated participants' aggressive behavior on the Instrument for Reactive and Proactive Aggression (IRPA). This measure differentiates between the form and frequency of aggressive behavior on one hand and the function of this behavior on the other hand. The form and function-items are presented in Table 1. The IRPA questionnaire is a modification of a

questionnaire for preschoolers developed by Kupersmidt et al. (1998), which is described in an unpublished conference paper. The Kupersmidt et al. questionnaire (1998) measures four forms (overt verbal, overt non-verbal, covert verbal, covert non-verbal) and four functions (proactive bully, proactive instrumental, reactive delayed, reactive immediate) of aggression. Because several of these items concerned double statements (for instance push, shove or grab other kids), we changed them to items with a unitary meaning (push other children) and only included a selection of form items. Also, we decided to drop the subdivision into immediate and delayed reactive aggression because a) we did not want to complicate the teacher report by adding a time dimension and b) we see no theoretical need to distinguish between the both. Instead, we defined the function items in general terms, without referring to time.

In the current study teachers rated the frequency of 3 form scales of aggression over the period of a month. The 3 form scales concerned (a) physical aggression (hitting, kicking, pushing), (b) verbal aggression (name calling, arguing), (c) covert aggression (doing sneaky things, gossiping). Teachers rated the frequency of the 7 form-items of aggression on a 5-point scale (0 = never, 1 = once or twice, 2 = weekly, 3 = several times a week, 4 = daily).

In case of a score on a form-item of 1 or higher, teachers also rated 7 aggression functions. Function-items consisted of 4 proactive items (to get something he/she wanted, to hurt someone or to be mean, to be the boss, because this child takes pleasure in it), and 3 reactive items (because someone teased or upset him/her, because this child felt threatened by someone, because this child was angry).

Table 1 IRPA Items for Forms and Functions of Aggression

Form	a) How often did ...
Physical	Kick other children
	Push other children
	Hit other children
Verbal	Call other children names
	Argue with other children
Covert	Gossip or tell lies about other children
	Do sneaky things
Function	b) If ... did [form], was it done
	To hurt or to be mean
	To be the boss
	Because this child takes pleasure in it
Reactive	Because someone teased or upset him/her
	Because this child felt threatened by someone
	Because this child was angry

The IRPA measure was administered in Dutch. The Dutch items were translated into English for presentation in this Table only

These items were rated on a 5-point scale (0 = never, 1 = rarely, 2 = sometimes, 3 = most of the time, 4 = always).

In case of a null-score on a form-item, function-items were coded as missing values. For instance, if a child never pushed another child, the function for pushing was scored as a missing value. However, when a child did show a certain type of aggression to any extent, functions of aggression were all included. This function score can be interpreted as the reason for aggressive behavior *if* this behavior is reported on to begin with. Then, a null-score on a proactive function item indicates this child demonstrated aggressive behavior but not for this specific proactive function. A high score on a proactive function does not mean this child engages in a lot of proactively aggressive acts. It means that if this child behaves aggressively, it is almost always with a proactive function.

Seven function-scores were computed by aggregating functions across forms. For instance, the reactive function-item “because this child was mad” was computed by averaging “hitting because this child was mad”, “kicking because this child was mad”, etc. Variables concerning functions of aggression were all continuous, and normally distributed. Only behaviors that were actually performed according to the teacher were included in these function variables, since functions were missing by design for non-existing forms of aggression.

Teacher Rating Instrument The six-item Teacher Rating Instrument (Hendrickx et al. 2003) is a Dutch translation of the reactive and proactive aggression instrument developed by Dodge and Coie (1987). Three items describe reactive aggression; for example, “When this child has been teased or threatened, he or she gets angry easily and strikes back.” The other three items describe proactive aggression; for example, “This child uses physical force in order to dominate other kids.” The answer format is a 5-point Likert scale ranging from 1 (never) to 5 (almost always). Reliability, factor structure, and validity are adequate (e.g. Hendrickx et al. 2003; Hubbard et al. 2002). Reliabilities in the current study were excellent for both reactive and proactive aggression ($\alpha_{\text{reactive}}=0.91$, $\alpha_{\text{proactive}}=0.86$).

Strengths and Difficulties Questionnaire The Strengths and Difficulties Questionnaire (SDQ) is a short 25-item questionnaire assessing emotional symptoms, conduct problems, hyperactivity-inattention, peer problems, and prosocial behavior (Goodman 2001) on a 3-point scale (1 = not true, 2 = somewhat true, 3 = certainly true). The Dutch version of the SDQ has proven acceptable to good psychometric properties (van Widenfelt et al. 2003). Alpha's in the current sample were all acceptable to good ($\alpha_{\text{emotional symptoms}}=0.80$, $\alpha_{\text{conduct problems}}=0.70$, $\alpha_{\text{hyperactivity-inattention}}=0.86$, $\alpha_{\text{peer problems}}=0.78$, and $\alpha_{\text{prosocial behavior}}=0.80$).

Peer Nomination Measures

For all peer nominations a class roster was handed out to participants. Children were asked to nominate an unlimited number of classmates that fit the description. Scores on all variables were z-standardized within each classroom.

Social Preference Children named classmates that they liked most (positive nominations) and liked least (negative nominations). From these nominations, social preference was calculated for each participant following standard procedures outlined by Coie et al. (1982).

Behavioral Reputation Children were asked to nominate classmates who fit each of the following behavioral descriptions: (a) popular (children liked by many classmates), (b) has a good sense of humor and makes the class laugh, (c) gets angry easily, (d) bossy, (e) leader, (f) gets bullied (g) bullies others. Several of these behavioral descriptions were taken from earlier research (Coie et al. 1982; Dodge and Coie 1987; Price and Dodge 1989). Descriptions a, d, and g were added for the sake of this study.

Coercive Strategy Use To measure coercive strategy use, Hawley's (2003) 6-item questionnaire was used. Participants were asked to nominate peers they thought employed coercive strategies (e.g. "which children force others to get what they want", $\alpha=0.90$).

Child Measures

Anxiety The 20-item trait anxiety subscale from the State-Trait Anxiety Inventory for Children was administered (Spielberger et al. 1970) on a 3-point Likert scale. The STAIC has been translated and validated for use in a Dutch population (Bakker et al. 1989). Reliability in the current sample was good ($\alpha=0.84$).

Social Acceptance Self-perceived social acceptance was measured with the 6-item Social Acceptance subscale of Harter's Perceived Competence Scale (Harter 1982; for the Dutch version see Veerman et al. 1997) with answering categories ranging from 0 (not at all true) to 3 (absolutely true). An average total Social Acceptance scale was computed such that a higher total score reflected a more positive self-image. Reliability for the Dutch version of this subscale is acceptable (internal consistency >0.70 ; test retest reliability is 0.68; Veerman et al. 1997), and was also acceptable in this sample ($\alpha=0.79$).

Empathy Empathy was measured with the 7-item subscale empathic sadness from the Empathy Index for Children

and Adolescents (IECA) developed by Bryant (1982). This questionnaire measures dispositional affective empathy on a two-point (yes/no) response format with items such as: "Seeing a boy who is crying, makes me feel like crying." Good reliability for the factor empathic sadness was found in a Dutch sample of 8–14 year old children (De Wied et al. 2007). Reliability in this sample was also acceptable ($\alpha=0.79$).

Dominance The 15-item dominance scale from the Dutch Personality Questionnaire-Junior (NPV-J) was used (Luteijn et al. 1989) with a 3-point response format (yes/?/no). This questionnaire measures the need to dominate and confidence in own capabilities with items such as: "I like to tell others what to do". Yes-answers were assigned a 2, ?-answers a 1, and no-answers a 0. Reliability in this sample was acceptable ($\alpha=0.68$).

Results

First, it was assessed through confirmatory factor analyses whether physical, verbal, and covert forms of aggression could be identified as separate factors. Second, it was examined whether distinct factors could be detected for reactive and proactive functions of aggression through confirmatory factor analyses. These analyses were conducted using the software program Mplus (Muthén and Muthén 1998). Third, discriminant validity was examined by comparing results from the IRPA with results from the TRI. Fourth, convergent validity was investigated by correlating scores from the IRPA with scores on the TRI. Fifth, relations with theoretically relevant variables were examined to assess construct validity.

Factor Analysis Form

In order to detect whether physical, verbal, and covert aggression could be identified as separate factors, confirmatory factor analysis was performed on these form scales. Descriptives for the physical, verbal, and covert form scales are presented in Table 2.

The scale of the form-items was set up to be of interval level. However, because respondents rarely rated children as demonstrating behavior on the highest levels (3 several times a week, 4 daily) the form-items were considered ordinal scales and a robust weighted least square analysis (WLSMV) for categorical indicators was implemented. This approach is also robust to moderate violations of nonnormality (Flora and Curran 2004).

The model presented in Fig. 1 with three latent form factors (physical, verbal, covert) and a total of seven

Table 2 Descriptives for Form and Function Scales

	Form			Function	
	Physical	Verbal	Covert	Reactive	Proactive
α	0.77	0.81	0.60	0.72	0.72
Minimum	0.00	0.00	0.00	0.00	0.00
Maximum	3.33	4.00	2.50	3.33	2.71
M	0.16	0.39	0.20	1.08	0.60
SD	0.36	0.57	0.38	0.83	0.67

indicators showed an appropriate fit to the data, χ^2_{wlsmv} (9, $N=418$)=12.18, $p=0.20$, RMSEA=0.03, CFI=1.00. All factor loadings of this model were significant ($p<0.001$). This model was a better fit than a more parsimonious model with only one general aggression factor, χ^2_{wlsmv} (11, $N=418$)=68.55, $p<0.001$, RMSEA=0.11, CFI=0.96, $\Delta\chi^2(3, n=418)=47.65$, $p<0.001$. Chi-square difference testing was performed according to the procedure for WLSMV estimators outlined in the Mplus manual (Muthén and Muthén 1998).

Factor Analysis Reactive and Proactive Functions

In order to detect whether reactive and proactive functions of aggression could be identified as separate factors, confirmatory factor analysis was performed on these function scales. These variables concerned only children that demonstrated a certain form of aggression ($n=236$). Non-aggressive children were excluded from these analyses ($n=191$).

A model with the two latent factors reactive and proactive functions of aggression measured by seven indicators (three reactive functions and four proactive functions) did not show an adequate fit to the data, χ^2_{ml} (13, $n=234$)=57.87, $p<0.001$, RMSEA=0.12, CFI=0.89. However, deletion of the item “to get something he/she wanted” led to a much better fit of the model, χ^2_{ml} (8, $n=235$)=21.96, $p=0.01$, RMSEA=0.09, CFI=0.96. Compar-

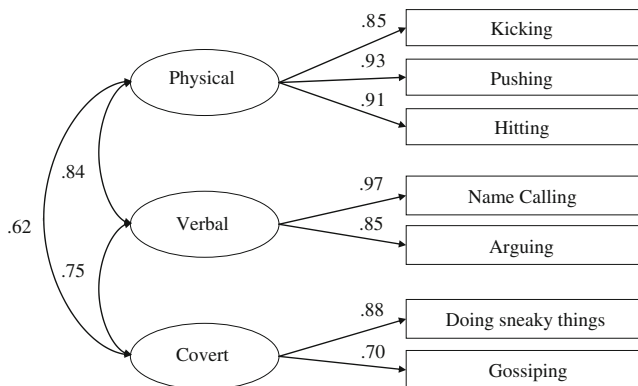


Fig. 1 Confirmatory factor analysis form scales *note*. Estimates are standardized

ing the AIC from the model with seven items (4020) to the model with six items (3498) led us to conclude that the model with six items was superior. This model is presented in Fig. 2. All factor loadings of this model were significant ($p<0.001$). Descriptives for the reactive and proactive function scales are presented in Table 2. As can be seen, reactive functions of aggression occurred more often than proactive functions of aggression, $F(1, 235)=49.13$, $p<0.001$

The model with two factors showed a much better fit to the data than a model with one latent factor measured through six functions, χ^2_{ml} (9, $n=235$)=171.13, $p<0.001$, RMSEA=0.28, CFI=0.49, $\Delta\chi^2(1, n=235)=149.17$, $p<0.001$.

Discriminant Validity

Discriminant validity was investigated by comparing reactive and proactive functions of aggression as measured by the IRPA with reactive and proactive aggression as measured by the TRI. Table 3 shows that the reactive and proactive function scales measured by the IRPA were not correlated at all ($r=0.03$), whereas the reactive and proactive aggression scales measured by the TRI showed a high correlation ($r=0.73$). Consequently, discriminant validity of the IRPA was very high, whereas discriminant validity of the TRI was questionable. These results remained virtually the same when listwise deletion was used and only the 236 aggressive children were studied.

Convergent Validity

To investigate convergent validity, the correlations between the reactive scales from the IRPA and the TRI and the proactive scales from the IRPA and TRI were examined according to conventional procedures by Campbell and Fiske (1959). These results are presented in Table 3. The convergent coefficients between the reactive scales were moderate ($r=0.44$). This was somewhat higher for the proactive scales ($r=0.62$). These correlations between the

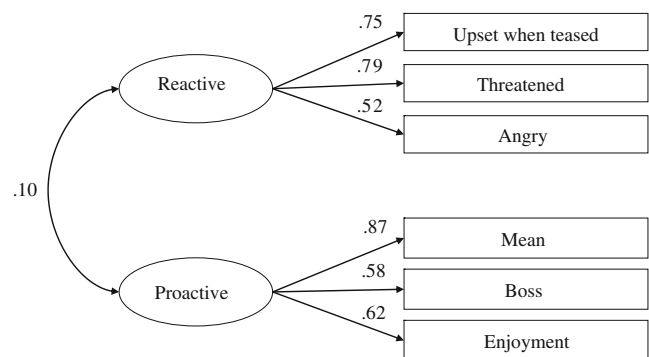


Fig. 2 Confirmatory factor analysis reactive and proactive function scales *note*. Estimates are standardized

Table 3 Correlations between Scores from the IRPA and the TRI

	IRPA		TRI	
	Reactive	Proactive	Reactive	Proactive
IRPA				
Reactive	(0.72)			
Proactive	0.03	(0.72)		
TRI				
Reactive	0.44***	0.41***	(0.91)	
Proactive	0.13	0.62***	0.73***	(0.86)

Reliabilities are presented in parentheses. Cases are deleted pairwise * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$, two-tailed testing

same traits from the IRPA and TRI were higher than correlations between different traits from the IRPA and the TRI ($r = 0.13$ and $r = 0.41$), indicating satisfactory convergent validity (Campbell and Fiske 1959).

Construct Validity: Relations with Theoretically Relevant Variables

To test whether reactive and proactive functions of aggression are distinctly related to theoretically relevant variables—and thus show construct validity—correlations with these variables were examined. These correlations are presented in Table 4. For reactive aggression, most hypothesized unique relations were found. As predicted, reactive (not proactive) aggression was related to higher levels of anxiety, emotional problems, peer problems, but to lower levels of social acceptance and perceived popularity. However, relations with attention problems, getting angry easily, and social preference were not found to be unique for reactive aggression as these variables were also related to proactive aggression. To assess whether reactive and proactive aggression correlated differently with the hypothesized theoretically relevant variables, we computed *t*-tests for the difference between two dependent correlations from the same sample (Steiger 1980). Relations with attention problems, $t(233) = 1.40$, $p = 0.16$, getting angry easily, $t(233) = 0.71$, $p = 0.48$, and social preference, $t(233) = 1.29$, $p = 0.20$, were the same for reactive aggression as for proactive aggression.

Also, for proactive aggression several of the hypothesized unique relations were confirmed. As predicted, proactive (not reactive) aggression was related to higher levels of coercive strategies, humor, bullying, bossiness, but to lower levels of prosocial behavior. However, unique relations were not found for empathy, dominance, conduct problems, and leadership. Dominance and leadership were unrelated to both reactive and proactive functions of aggression. Empathy was negatively related to reactive aggression, but this correlation was not different from the

relation with empathy and proactive aggression, $t(233) = 1.44$, $p = 0.14$. Even though the relation with conduct problems and proactive aggression was not unique, this relation was significantly stronger than with reactive aggression, $t(233) = 3.29$, $p = 0.001$.

Discussion

The distinction between reactive and proactive aggression is theoretically important but empirically controversial (Bushman and Anderson 2001; Poulin and Boivin 2000; Waschbusch et al. 1998). Most studies find that reactive and proactive aggression are highly correlated (Card and Little 2006; Polman et al. 2007), suggesting that the usefulness of the distinction is possibly at stake. We aimed to overcome methodological problems in prevailing questionnaires by conceptualizing reactive and proactive aggression as functions of aggression only applicable to children that show aggressive behavior. With such an approach we found that reactive and proactive aggression are two independent constructs with clear discriminant and convergent validity. Also, most relations with theoretically relevant variables were confirmed, which indicates construct validity.

Table 4 Correlations between Reactive and Proactive Functions and Theoretically Relevant Variables

	Function ($n = 236$)	
	Reactive	Proactive
Self		
Anxiety	0.16*	-0.08
Social Acceptance	-0.21**	-0.03
Dominance	0.01	0.09
Empathy	-0.14*	-0.01
Teacher		
SDQ Attention	0.21**	0.33***
SDQ Emotional Problems	0.31***	-0.07
SDQ Peer Problems	0.29***	0.09
SDQ Conduct Problems	0.25***	0.51***
SDQ Prosocial	-0.13	-0.43***
Peer		
Angry easily	0.33***	0.27***
Victimization	0.33***	-0.03
Social Preference	-0.23***	-0.34***
Perceived Popularity	-0.14*	0.05
Coercive Strategies	0.11	0.37***
Leadership	-0.12	0.07
Humor	-0.04	0.16*
Bullying	0.02	0.40***
Boss	0.05	0.32***

Hypothesized correlations are presented in bold * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$, two-tailed testing

The current study found that reactive and proactive aggression as measured by the IRPA were virtually independent, whereas reactive and proactive aggression as measured by the widely used TRI (Dodge and Coie 1987) were highly correlated. This shows that discriminant validity of reactive and proactive aggression measured with the IRPA is good, whereas discriminant validity of the TRI is questionable. Also, the correlation between reactive and proactive aggression as measured by the IRPA is much lower than the typical correlation between both constructs found in a recent meta-analysis (Polman et al. 2007). Additionally, a two-factor model with reactive and proactive functions fit the data better than a one-factor model. This provides further evidence for the distinction between reactive and proactive aggression.

The clear discriminant validity between reactive and proactive aggression provides empirical support for recent theoretical insights suggesting that reactive and proactive aggression are best distinguished according their function (Card and Little 2006; Little et al. 2003a; Polman et al. 2007; Polman et al. 2008, submitted for publication) and should be unraveled from the form of aggression. By separating form and function at the item-level, detailed information on aggressive behavior in children can be obtained. It not only tells how often a child demonstrated aggressive behavior and what form of aggression was displayed. It also sheds light on the function that underlies aggressive behavior.

Besides the excellent discriminant validity of the IRPA, we also found satisfactory convergent validity. According to Cohen's (1992) conventional values for the strength of correlations, the traits measured by the IRPA were moderately correlated to the same traits measured by the TRI. In addition, correlations between the same traits were higher than those between different traits.

The construct validity of the IRPA was tested by examining the relations with a priori hypothesized theoretically relevant variables assessed with validated measures rated by multiple informants. As expected, it was shown that reactive aggression from the IRPA was uniquely related to higher levels of anxiety, emotional problems, peer problems, and victimization and lower levels of social acceptance. Non-unique relations (i.e., these relations were also found for proactive aggression) were found with attention problems, getting angry easily, and social preference. It was particularly surprising that getting angry easily was related to both reactive and proactive functions of aggression. Theoretically, angry feelings should be exclusively related to reactive aggression. One explanation for this finding may be that children who use aggression with a proactive function use anger in an instrumental manner. They may demonstrate premeditated levels of anger in order to justify their aggressive actions. Of course this line

of reasoning is speculative and should be tested empirically before any conclusions can be drawn. Importantly, inconsistent links between distinct aggression types and anger are not rare. Dodge and Coie (1987) used a similar peer nomination technique to measure getting angry easily and also failed to find a unique relation. Also, Hubbard et al. (2002) found self-reported anger to be correlated with proactive aggression but not reactive aggression. These authors, however, did find a relation between angry nonverbal behaviors and reactive aggression. Thus, theoretically the relation between anger and reactive aggression is evident, nevertheless, in practice this relation seems difficult to detect and highly dependent on the way anger was measured.

The fact that social preference was also negatively related to proactive aggression, may suggest that proactive aggression is a type of behavior that children in this sample do not approve of. Also, in spite of the unique negative relation between social preference and reactive aggression found in a meta-analysis, five out of seven individual studies relating social preference to reactive and proactive aggression, failed to find this unique effect for reactive aggression (Card and Little 2006). It may be that these small differences are hard to detect in a single study, even with a highly discriminative measure such as the IRPA.

Proactive aggression was uniquely related to higher levels of coercive strategies, humor, bullying, and bossiness, but to lower levels of prosocial behavior. However, the hypothesized unique relations with dominance, empathy, conduct problems, and leadership, were not confirmed. One post-hoc explanation for not finding some of the hypothesized relations may lie in the answering format. The dominance and empathy scales both used a yes–no answering format. Perhaps, these answering scales were too broad to detect subtle differences between reactive and proactive aggression. Also, in the current study only empathic sadness was measured as one of the key elements of affective empathy. Empathic sadness is a measure of responsiveness to another person's sadness and may be different from cognitive empathy which refers to the ability to accurately read another person's thought or feelings (Lovett and Sheffield 2007). It may be that proactive aggression is more strongly related to deficiencies in cognitive empathy instead of affective empathy. Perhaps, proactive aggression is related more strongly to low levels of perspective taking and a less developed theory of mind that does not necessarily translate into decreased affective empathy.

The fact that conduct problems were not uniquely related to proactive aggression can perhaps be explained by the heterogeneity of the conduct problems scale. Closer examination of this scale reveals that one item (often loses temper) is theoretically more likely to be related to reactive

aggression, whereas the other items should be related to proactive aggression. When we removed this item from the scale, the relation between conduct problems and proactive aggression was unique.

Limitations and Future Studies

As outlined before, we had several reasons to choose teachers as the single informant of the functions of aggressive behavior. Still, it is not yet clear how teacher ratings of these functions are related to self, peer, and parent ratings of these functions, or even the actual functions of this aggressive behavior. A child may be rated differently at school by the teacher than at home by the parent. Children may demonstrate different levels of either or both forms of aggression in a home setting in comparison with a school setting because reinforcement contingencies and opportunities may differ across these settings. Future research with multiple methods and multiple informants is needed to establish informant agreement on functions of aggression and convergence with actual functions of aggression.

A child with high scores on both reactive and proactive aggression may (a) show aggressive acts in which both reactive and proactive elements are present or, (b) act in a purely reactive manner the one time and in a purely proactive manner the other time. A problem that was not resolved with the current approach is the incapability to tease apart at which of these levels reactive and proactive aggression are related. It seems highly relevant to know whether aggressive acts can reliably be categorized as either being done with a reactive or proactive function. These issues may be resolved with observational studies, in which both levels can be studied. Also, questionnaires asking for specific incidents within a limited time-frame may be instructive.

If it is possible to reliably categorize aggressive act as either reactive or proactive in function, it seems useful to provide teachers with information on how to deal with these aggressive acts. Then, a teacher may respond to Brian's angry outbursts the one day differently than to his instrumental aggression the other day. Being able to distinguish between reactively and proactively aggressive acts can provide teachers with detailed information regarding how to deal with different types of aggressive behavior.

The confirmatory factor analysis for the reactive and proactive function scales only showed model fit if the proactive item “to get something he/she wanted” was removed from the proactive function scale. Consequently, the current proactive function scale only regards proactive aggression related to dominance and intimidation and not related to object acquisition which is also thought to be part of proactive aggression (Brown et al. 1996). Future research may explore whether the same results are found

when proactive functions also regard instrumental acts such as object acquisition.

Diagnostic Usefulness

We consider it of great value to be able to distinguish between the form and frequency of aggressive behavior on the one hand and the function of this behavior on the other hand for each individual child. Clinical workers and teachers need to know whether a child scores below or above average on the *form and frequency* of aggressive behavior. Knowing that a child shows higher levels of aggressive behavior than his or her age mates is informative in so far as it tells us whether a child demonstrates non-normative problematic behavior. However, it does not tell us how to deal with this problematic behavior. Next, knowing that a child is not only highly aggressive (in form) but always gets aggressive because of anger and perceived threat is crucial additional information. This information about the *function* of aggressive behavior sheds light on the adequate strategies for treatment. Learning how to cope with anger and teaching children not to see others' intentions as hostile and threatening (Dodge 1991; Hubbard et al. 2002; Kempes et al. 2005; McAdams 2002) hopefully deals with the mechanisms underlying the reactive aggressive behavior. On the other hand, proactive aggression is learned behavior that can be changed through the use of operant techniques (Vitiello and Stoff 1997). Thus, from a diagnostic point of view, the combination of both elements (form and function) is essential in understanding behavioral problems.

One could even say it seems useless to interpret the function of aggressive behavior without knowing how often aggressive behavior is demonstrated to begin with. A high score on proactive function of aggression can not automatically be translated to a lot of problem behavior. It only means that *if* a child gets aggressive, it is always done with a proactive function. Only when a child is highly aggressive *and* is highly proactive one could speak of a highly proactive aggressive child. When form and function are not kept apart a high score on proactive aggression could be indicative of either a highly aggressive child who does not demonstrate this behavior with a proactive function or a mildly aggressive child who always gets aggressive with a proactive function. Thus, it seems crucial for clinical workers and teachers to obtain separate information on the form, frequency and function of aggressive behavior.

Conclusion

In conclusion, the IRPA teacher questionnaire for reactive and proactive aggression is a valid new measure. We showed that it is possible to discriminate between reactive

and proactive aggression by (a) separating forms and functions of aggression and (b) assigning scores on reactive and proactive functions of aggression exclusively to children that demonstrated aggressive behavior to begin with. In this approach, individual child-level information for both the forms and functions of aggression is available. The IRPA demonstrated good discriminant and satisfactory convergent validity. Also, most relations with a priori hypothesized relevant variables were confirmed, indicative of construct validity. On a theoretical note, the importance of this study is that it shows that reactive and proactive aggression are independent constructs *if* they are conceptualized in terms of functions of aggressive behavior. The findings of this validation study also have practical implications as it provides professional caregivers with complete information needed to intervene with the specific proximal causes of children's aggressive behavior.

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