

Reactive and Proactive Aggression: Evidence of a Two-Factor Model

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This article examines the construct validity of reactive and proactive aggression, as assessed by the teacher-rating scale developed by K. A. Dodge and J. D. Coie (1987). In Study 1 ($n = 149$ boys), confirmatory factor analyses revealed that a 2-factor model, in which a substantial correlation was observed between the 2 latent factors, presented a better fit than a single-factor model. Study 2 ($n = 193$ boys) examined the relations presented by the 2 forms of aggression with peer status, leadership, social withdrawal, and victimization by peer. Reactive and proactive aggressive behaviors presented distinct patterns of relations consistent with the theoretical definitions. The results of these studies suggest that the questionnaire measures 2 forms of aggressive behavior that, although being substantially related, have a unique discriminant dimension.

Aggressive behaviors in childhood are associated with several concomitant problems such as peer rejection and hyperactivity (Coie & Dodge, 1998; Parke & Slaby, 1983). They also predict later adjustment problems such as delinquency, substance use, and school dropout (Parker & Asher, 1987). However, aggressive behaviors are multifaceted, which may confuse our understanding of the processes involved in the emergence and the maintenance of these behaviors, as well as their specific impact on social relationships. Accordingly, researchers have pointed out important distinctions among specific forms of aggressive behaviors. For instance, Dodge and Coie (1987) have proposed a distinction between *reactive* aggressive behaviors and *proactive* aggressive behaviors. According to Dodge and Coie, a reactive aggressive behavior is a hostile act displayed in response to a perceived threat or provocation. This behavior is generally impulsive and typically occurs with hostile facial expressions and a strong negative affect. A proactive aggressive behavior is a nonprovoked aversive act aimed at influencing others. This behavior could attempt to gain a resource (i.e., an object, a privilege, or a territory) or could be directed toward a person with the purpose of intimidation or domination. This distinction echoes the opposing views observed in the literature regarding the origin and the function of aggressive behavior (Bandura, 1973, 1983; Berkowitz, 1983). Whereas reactive aggression is a hostile response, possibly in reaction to a frustration (Berkowitz, 1983), proactive aggression is instrumental and more likely to be acquired and reinforced (Bandura, 1973, 1983).

Dodge and colleagues (Boivin, Dodge, & Coie, 1995; Coie, Dodge, Terry, & Wright, 1991; Dodge & Coie, 1987; Dodge, Coie, Pettit, & Price, 1990; Dodge, Price, Coie, & Christopoulos, 1990; Price & Dodge, 1989) succeeded in reliably distinguishing these two types of aggressive behaviors on the basis of direct observations of school-age children's behavior both in laboratory and in natural settings. This distinction was observed among children as young as 3 to 6 years of age (Bowen, 1992).

Distinguishing reactive aggressive behaviors from proactive aggressive behaviors at the morphological level is an important first step in understanding the nature and functional value of both behaviors. However, an equally important issue is the capacity to reliably distinguish individuals along these two dimensions. Dodge and Coie (1987) developed a short teacher-rating scale, describing reactive aggressive behaviors (three items on a 5-point Likert scale) and proactive aggressive behaviors (three items). Their initial examination of this rating scale revealed that both subscales presented a high internal consistency. However, the results of an exploratory factor analysis were not convincing because the eigenvalue of the second factor was small (i.e., lower than 1). Moreover, the correlation between the two scales was substantial ($r = .76$), which suggests that a single-factor structure could adequately represent the general pattern of scores for the items. Price and Dodge (1989) also observed a high correlation between the two scales ($r = .83$), but they did not report any information regarding the factor structure of the instrument. Day, Bream, and Pal (1992) found a two-factor structure (i.e., two factors with eigenvalues higher than 1 as revealed by an exploratory factor analysis), as well as a moderate correlation between the two forms of aggression ($r = .41$).

The substantial correlations found between the two dimensions could be due to the fact that teachers cannot dissociate them, or it could simply reflect that some children are characterized by both reactive and proactive aggression. However, the moderate correlation reported by Day et al. (1992) suggests otherwise. Their study was conducted with aggressive boys only, which could have prompted the teachers to focus more on the nuances of the aggressive repertoire of each child. It could also reflect a restriction-in-range because of their focus on aggressive boys.

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The magnitude of the correlations may vary between studies, but it is clear that the two dimensions are substantially correlated. Although the results of the factor analyses previously reported suggest the presence of a two-factor structure, these analyses did not show that such a structure more adequately represented the data than a single-factor structure; these analyses were exploratory and did not systematically compare the fit of the two models. Only confirmatory factor analyses would allow an adequate comparison of the two models.¹ In other words, the fact that a substantial correlation was observed between these two dimensions does not necessarily imply that a single-factor model is more appropriate than a two-factor model. The two aggressive dimensions may be associated, but not to the extent that they constitute a general aggressive dimension. They could overlap while still bearing specific information that uniquely contributes to our understanding of social adjustment.

In sum, the usefulness of the two-factor model depends on two elements. On the one hand, the strength of the correlation between the dimensions limits the usefulness of the two-factor model to the extent that such a model generates an information that is basically redundant. As noted by Mulaik et al. (1989), the examination of the fit of a model should take into account its parsimony (i.e., its ability to explain the phenomenon with a limited number of parameters). However, the usefulness of the two-factor model also depends on the unique capacity of each dimension (i.e., the residual variance) to generate a distinct, and theoretically consistent, pattern of predictions.

The nomological networks of reactive aggression and proactive aggression have been documented in previous studies. For instance, Dodge and Coie (1987) found that reactive aggression (either observed or rated by the teacher) was associated with a hostile attributional bias when interpreting the intentions of a peer, whereas proactive aggression was not. A subsequent study revealed that proactive aggression was associated with a positive evaluation of aggression and its consequences, especially in the context of a conflict with a peer, which was not the case for reactive aggression (Crick & Dodge, 1996). Proactive aggression is associated with disruption in the classroom, but it is also positively correlated with leadership and having a sense of humor (Dodge & Coie, 1987), thus, indicating that it is not just linked to negative characteristics. In contrast, reactive aggression is associated with starting fights and getting angry, and with an absence of leadership, cooperation, and caring about peers (Price & Dodge, 1989).

Given the aversive character of reactive aggression, it is not surprising that this behavior has been systematically related to a negative peer status (Dodge & Coie, 1987; Dodge et al., 1990; Price & Dodge, 1989). Proactive aggression presents a more equivocal pattern of relations; some proactive aggressive behaviors (i.e., behaviors aiming at intimidating or dominating a peer) have even been positively associated with peer status in the first years of school (Dodge et al., 1990; Price & Dodge, 1989). These differences between reactive aggression and proactive aggression are also reflected in the behaviors and reactions of the peers. A positive relation has been observed between reactive aggressive behaviors and victimization by peers (e.g., the negative behaviors manifested by the peers toward the child; Schwartz et al., 1998), whereas proactive aggression was not related to peer victimization.

To summarize, the network of relations differs for these two forms of aggression and in ways that are theoretically consistent

with their definitions. Specifically, the sociocognitive deficits associated with reactive aggressive behaviors suggest that such behaviors may be instigated by the perception of provocation by a peer, whether justified or not. Once manifested, these behaviors are likely to lead to peer rejection. Because they are generally characterized by a strong negative affect, these behaviors are salient to the peer group, and the child may be perceived as the initiator of the aggressive exchange. Rejection by peers could also result from the lack of social skills (i.e., absence of leadership, cooperation, and caring toward peers) associated with reactive aggression.

The positive evaluation of the consequences of aggressive behavior associated with the proactive dimension is consistent with the idea that this form of aggression is planned and instrumental. Moreover, the purposefulness of proactive aggressive behaviors is illustrated by their association with leadership and humor. Finally, proactive aggressive behaviors may be tolerated and accepted by some members of the peer group, not only because these behaviors provide some forms of social regulation appreciated by the group, but also because they may grant the child the power, giving him access to desired resources (Boivin et al., 1995). In sum, even though reactive aggression and proactive aggression are substantially correlated, the distinction between these two behavioral tendencies appears useful for a qualified study of the processes underlying the display of aggressive conducts, as well as for the study of their differential impact on children's social adjustment.

The main purpose of this article was to examine the construct validity of reactive aggression and proactive aggression, as measured by Dodge and Coie's (1987) teacher-rating scale. Two studies were conducted to this end. In the first study, the factor structure of the rating scale was examined by comparing the fit of two models, using confirmatory factor analyses: (a) a single-factor model and (b) a two-factor model, allowing for a correlation between the two latent factors. On the basis of previous studies, it was expected that the two-factor model would provide a better fit to the data than the single-factor model. In that same study, we also examined the relations between the two aggressive dimensions with peer reports of children's involvement in aggression.

The goal of the second study was to provide support for the construct validity of reactive aggression and proactive aggression by examining their networks of relations with dimensions of social adjustment (i.e., peer status and peer victimization), as well as with leadership and social withdrawal. We expected reactive aggression to be positively associated with social withdrawal and peer victimization, and to be negatively associated with peer status and leadership. Conversely, proactive aggression should be positively associated with leadership and peer status, and it should be negatively associated with peer victimization and social withdrawal. Finally, Dodge and Coie's (1987) rating scale was also completed by the parents in order to verify whether the two-factor model of aggression could be replicated with a different source of information.

¹ Dodge (1991) mentioned having conducted confirmatory factor analyses with a sample of kindergarten boys and girls. The results of this analysis revealed that the two-factor model presents a high degree of goodness of fit. However, this study was not published, which prevents a critical evaluation of it. Furthermore, even though the two-factor model presents a high degree of goodness of fit, Dodge (1991) did not verify whether this model was more appropriate than a single-factor model.

Study 1

Method

Participants. Participants were 149 Caucasian boys in fourth, fifth, and sixth grades (mean age = 127.77 months), attending 16 classrooms in four different French-speaking schools located in a middle-class socioeconomic neighborhood (Ministère de l'Éducation, 1992); 78% of the parents provided written permission for their children to participate. Even though the classrooms were coeducational, only boys were included in this study. As in Dodge and Coie's (1987) study, the age range of participants spanned a time when the nature and functions of aggressive behaviors were relatively organized and stable. Girls were not included in this study simply because they are very unlikely to use these forms of aggression, with samples of girls typically generating near zero occurrences of these types of aggressive behaviors. Rather, girls tend to express their aggression through means that are intended to manipulate the social structure or damage another's self-esteem (Crick & Grotpeter, 1995; Galen & Underwood, 1997; Lagerspetz, Björkqvist, & Peltonen, 1988).

Teacher rating of reactive and proactive aggressive behaviors. This questionnaire includes three items assessing reactive aggressive behavior ("overreact angrily to accidents," "when teased, strikes back," and "blames others in fights"; Dodge & Coie, 1987) and three items assessing proactive aggressive behavior ("gets others to gang up on a peer," "uses physical force to dominate," and "threatens and bullies others"). The teachers were asked to fill out the questionnaire for each boy in their classrooms who was involved in the project. They had to use a 5-point Likert scale (1 = *never*, 5 = *almost always*), indicating how frequently each statement applied to a particular child.

In contrast to Dodge and Coie's (1987) study, the teachers were informed of the distinction between reactive and proactive aggression. The rationale was that by making teachers more aware of this distinction, as is commonly done when coders or interviewers are trained, we could improve their ability to accurately rate the frequency of aggressive behaviors of their students. Teachers were provided with the following description:

You are invited to fill out these questionnaires without portraying the children either better or worse than they really are. It is important for us to get an evaluation as accurate as possible. The following questions are on behaviors that characterize most of the children at different levels. Two types of problem behaviors could be identified: Reactive behaviors and proactive behaviors. *Reactive* problem behaviors involve a reaction from the child facing an event that frustrates him/her or that he/she perceives as a threat. The child would then tend to overreact (ex: want to fight after being teased). This type of behavior is often accompanied by anger. *Proactive* problem behaviors are directed toward a goal. They can happen without a provocation from others. The child exhibits these behaviors either with the aim of taking over a resource (object, privilege, or territory), or with the intention of intimidating or dominating others. We are asking you to fill out these questionnaires with these definitions in mind.

Reactive and proactive aggressive behavior scores were eventually obtained by summing the three items on each of these scales. The internal consistency (Cronbach's alpha) of these scales was .91 for reactive aggression and .91 for proactive aggression.

Peer assessment of children's involvement in aggression. The peer evaluation of children's involvement in aggressive episodes was based on three items selected from the Revised Class Play (Masten, Morison, & Pellegrini, 1985) and from the Peer Nomination Inventory (Perry, Kusel, & Perry, 1988): "he tries to pick fights with people," "gets into a lot of fights," and "he hits and pushes others around." Boys and girls whose parents provided written permission to participate in the study as a respondent appeared on an alphabetical roster handed over to the children. With the help of this roster, children had to select two peers who best fit each behavioral descriptor. The boys' scores for each item were obtained by summing the nominations received from their classmates. These scores were then transformed into Z scores within each classroom, and a total score was obtained by computing the mean of the three items. Internal consistency was high (Cronbach's $\alpha = .97$).

Procedures. The teacher reports and the peer nominations were collected in late November, 1993. Three months of daily interactions among the classmates were largely sufficient to ensure that the teachers and peers could base their evaluations on a sizable amount of social behaviors. Teachers were given 2 weeks to fill out the questionnaires. The peer nominations data were collected in the classroom during the same period in a 40-min session where participants were asked to complete the instrument individually. One investigator was present in the classroom to answer participants' questions and to ensure that the instructions were followed correctly.

Results

Confirmatory factor analyses. The six items on reactive aggressive and proactive aggressive behaviors were submitted to confirmatory factor analyses. These analyses were conducted with the EQS program (Bentler, 1989). The normality of distribution for each item was verified; univariate coefficients of kurtosis varied between -0.19 and 5.21, and Mardia's (1970) normalized multivariate coefficient of kurtosis was 27.32. As indicated by these high values, the data were not normally distributed, and consequently, the arbitrary distribution generalized least square method (AGLS) was utilized (Bentler, 1989). This method of parameter estimation does not require normal distribution. Correlations among the observed variables, as well as standard deviations, are presented in Table 1.

Two models were tested. The first one assumed a single-factor structure for which the factor loading matrix was set to reflect loadings on one factor only. The second model assumed a two-factor structure; loadings of each item were only estimated for

Table 1
Correlations Among the Items of the Questionnaire Assessing Reactive Aggression and Proactive Aggression

Items	1	2	3	4	5	6
1. Gets others to gang up on a peer (P)	(0.77)	.73	.74	.59	.51	.57
2. Threatens and bullies others (P)		(0.91)	.85	.74	.63	.65
3. Uses physical force to dominate (P)			(0.99)	.72	.64	.70
4. Overreacts angrily to accidents (R)				(1.11)	.80	.81
5. Blames others in fights (R)					(1.20)	.73
6. When teased, strikes back (R)						(1.18)

Note. P = Proactive; R = Reactive. Standard deviations are presented on the diagonal, in parentheses.

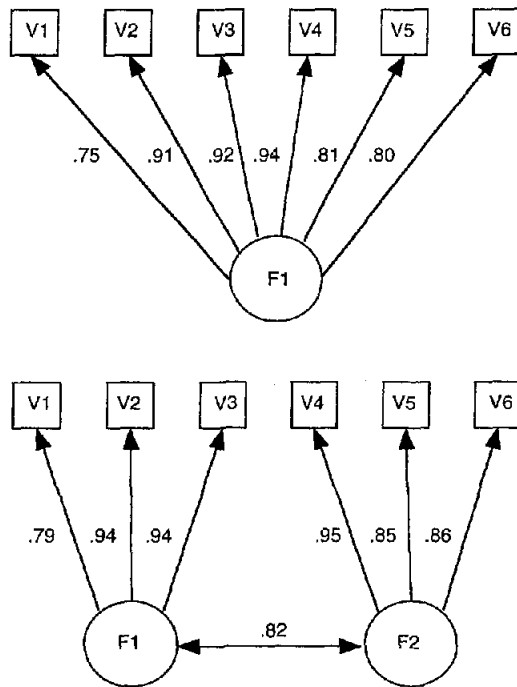


Figure 1. Estimated parameters for the single-factor model and the two-factor model. V = variable; F = factor.

their expected latent factor, the loading relative to the other factor being fixed at 0. Considering the high correlation found in previous studies between the two forms of aggression, the covariance between the two latent factors was also estimated (Dodge & Coie, 1987; Price & Dodge, 1989). The estimated parameters for each model are presented in Figure 1.

For the single-factor model, the standard errors of these parameters varied between .42 and .64, and their standardized values varied between .35 and .66. For the two-factor model, the standard errors were lower (between .08 and .11), and their standardized values varied between .30 and .61. The standard error of the covariance between the two latent factors was also very low (.04).

The fit indexes. Several fit indexes are available to determine the goodness of fit of the two models. The first index is the chi-square test. This test compares the covariance matrix of the model to the covariance matrix of the sample, a low chi-square reflecting a high convergence between the matrices. When two models are nested, one can directly evaluate the best fitting model using the chi-square difference test (Bentler & Bonnett, 1980). Models are nested when two models have exactly the same parameters, but one has more parameters to be estimated than the other. In the present case, the two models were nested because by fixing the covariance between the two latent factors at 1, the two-factor model became identical to the single-factor model (Bentler, 1989).

The chi-square test is sensitive to the number of variables in the model and to the sample size (Bentler & Bonnett, 1980). Several fit indexes were developed to avoid these problems. The comparative fit index (CFI; see Bentler, 1990) estimates the fit of a model with respect to a continuum that goes from the null model (no relationship is estimated among the variables) to the saturated model (all

the possible relationships among the variables are estimated). The CFI is bounded by zero and unity, and a model is considered acceptable when it shows a value higher than .90.

The parsimony of the models is also an important aspect to consider (Bentler & Mooijart, 1989; Mulaik et al., 1989), because some models may well fit the data simply because a larger number of parameters are estimated. An index of parsimony on the basis of the normed-fit index (NFI) was developed by Mulaik et al. The parsimonious normed-fit index (PNFI) is obtained by multiplying the NFI by the ratio of the degrees of freedom of the hypothesized model to the degrees of freedom of the null model. This index varies between 0 and 1 and is smaller than the NFI. The PNFI takes into account the model's goodness of fit and its parsimony. The chi-square, CFI, and PNFI values for the two models are presented in Table 2.

The confirmatory factor analyses revealed that the chi-square test did not reach the level of significance for the two-factor model, which suggested that only this model was satisfactory. The chi-square of this model was significantly lower than the one of the single-factor model ($\chi^2 = 19.68 - 5.57 = 14.11$, $df = 9 - 8 = 1$, $p < .001$). The CFI and the parsimony index of the two-factor model were higher than those of the single-factor model, which also confirmed that the two-factor model more adequately represented the data.

Relations with peer assessment of children's involvement in aggression. The next question was to evaluate whether the two forms of aggressive behaviors were equally associated with peer reports of children's involvement in aggression. Correlations were computed between the scores, reflecting the child's involvement in aggression on the one hand and reactive aggressive scores and proactive aggressive scores on the other hand. The correlations were .47 ($p < .01$) and .46 ($p < .01$), respectively. Given that these two forms of aggressive behavior are substantially related, partial correlations were also computed, taking into account the variance shared with the other aggressive dimension. The partial correlations for reactive aggression and proactive aggression were .20 ($p < .05$) and .19 ($p < .05$), respectively.

Discussion

The main goal of Study 1 was to examine the factor structure of Dodge and Coie's (1987) questionnaire, using confirmatory factor analyses. These analyses revealed that the two-factor model better represented the factor structure of the scale than a single-factor model, as indicated by the chi-square significant difference between the two models, the goodness-of-fit index, and the parsimony index. Thus, there is empirical ground to distinguish between these two aggressive dimensions.

However, a substantial correlation was found between the two latent factors. Such a correlation was foreseeable, considering the

Table 2
Confirmatory Factor Analyses for Teacher Ratings

Model	χ^2	df	p	CFI	PNFI
Single factor	19.68	9	.02	.77	.41
Two factor	5.57	8	.70	.99	.49

Note. CFI = confirmatory factor index; PNFI = parsimonious normed-fit index.

results of previous studies (Dodge & Coie, 1987; Price & Dodge, 1989). The magnitude of this correlation could bring into question the usefulness of the distinction between the two forms of aggressive behavior, as it could mean that the information about the two aggressive tendencies is basically redundant. However, despite this high correlation, both aggressive dimensions contributed uniquely to a child's involvement in aggressive exchanges with peers, which suggests that both should be taken into account to understand boys' involvement in aggressive episodes.

The next stage was to examine the degree to which each of the two forms of aggressive behaviors presented a distinct network of relations with specific dimensions of social adjustment and social behavior. The goal of the second study was to address this issue.

Study 2

Method

Participants. Participants were 193 Caucasian boys who attended third, fourth, fifth, and sixth grades (mean age = 11 years), in five different French-speaking schools located in a middle-class socioeconomic neighborhood (Ministère de l'Éducation, 1992); 84% of the parents provided written permission for their children to participate. Even though the classrooms were mixed, only boys participated in this study. None of these boys participated in Study 1.

Teacher and parent ratings of reactive and proactive aggressive behaviors. As in Study 1, Dodge and Coie's (1987) questionnaire was used. The instructions presented to the teachers in Study 1 were again communicated to the teachers of this sample. The reactive aggression and proactive aggression scores were obtained by summing the items of the teacher evaluation. Both scores were highly reliable (Cronbach's $\alpha = .90$ and $.92$). The Dodge and Coie's rating scale was also completed by one of the two parents, generally the mother (95%), who received the same instructions as the teacher. Parent reports were available for 94% of the participants.

Peer assessment of social behavior. Several items of the peer assessment of social behavior came from the Revised Class Play instrument (Masten et al., 1985) and aimed at assessing the extent to which a child was perceived as *socially withdrawn*: "very shy" and "rather play alone than with others"; and as *leader*: "good leader," "good ideas for things to do," and "can get things going." The original subscales of the Revised Class Play were not used because they are equivocal and do not reflect specific aspects of social behavior, especially for the Sensitive-Isolated subscale (Coie, Dodge, & Kupersmidt, 1990; Rubin, Hymel, LeMare & Rowden, 1989; Rubin & Mills, 1988). Four other items were taken from the Victimization subscale of the modified Peer Nomination Inventory (Perry et al., 1988), with the purpose of assessing the extent to which the child was perceived by his classmates as being a *victim* of peer aggression: "kids make fun of him," "he gets called names by other kids," "he gets hit and pushed by other kids," and "kids try to hurt his feelings." These three scales have been used previously, and they were found to be uniquely informative in the context of a differentiated examination of children's social adjustment (Boivin & Hymel, 1997).

The procedure used to compute the peer nomination scores was the same as in Study 1. The scores for each item were transformed into standardized scores within each classroom, and the boys' scores for each scale were obtained by computing the mean of the standardized scores of the items comprising these scales. In this study, the Leadership scale and the Victimization scale showed high internal consistency (Cronbach's $\alpha = .83$ and $.90$, respectively). The two items of the Withdrawal scale were moderately correlated ($r = .51, p < .001$). The correlations between the three scales varied between $-.33$ and $.53$, suggesting that they assess distinct aspects of social behavior and adjustment.

Peer status evaluation. The peer status assessment was based on the work of Vitaro, Tremblay, Gagnon, Piché, and Royer (1988). Each child

received a two-page form. On each page was a specific request followed by a roster of the names of the boys and girls participating in the study sorted alphabetically. The requests were as follows: (a) "I would like you to circle the name of the three children that you *like the most* to play with" (LM), and (b) "I would like you to circle the name of the three children that you *like the least* to play with" (LL). The LM and the LL scores were obtained by summing the choices each child received from all classmates. These scores were standardized within each classroom. Social preference (SP) was obtained by the subtraction of the LL score from the LM score.

Procedures. All the data were collected at the end of March. The teachers had 2 weeks to fill out the questionnaires. The parent questionnaire was sent home through the child who had to bring it back to school in a sealed envelope the following week. The children were interviewed in the classroom. During the classroom meetings of approximately 40 min, participants were asked to fill out questionnaires individually. In third- and fourth-grade classrooms, each question was read aloud by the project investigator. The project investigator was helped by a research assistant who made sure the instructions were followed correctly, while being available to answer participants' questions. In fifth and sixth grades, only one adult was present, and the participants had to read the questions.

Results

Confirmatory factor analyses. The confirmatory factor analyses described in Study 1 were again conducted on teacher and parent assessments of reactive aggressive and proactive aggressive behaviors. The results of these analyses are presented in Table 3.

The item loadings for the teacher evaluation varied from $.82$ to $.90$ for the single-factor model, and from $.85$ to $.93$ for the two-factor model. The correlation between the two latent factors of the two-factor model was $.90$. Both the single-factor and the two-factor models had significant chi-squares. However, the chi-square of the two-factor model was significantly lower than the chi-square of the single-factor model ($\Delta\chi^2 = 11.71, df = 1, p < .01$). Moreover, the CFI and the PNFI were higher for the two-factor model than for the single-factor model, although they were lower and less impressive than in the first study.

The item loadings for the parent evaluation varied from $.42$ to $.66$ for the single-factor model, and from $.50$ to $.76$ for the two-factor model. The correlation between the two latent factors of the two-factor model was $.82$. Again, a significant chi-square was found for the two models, but the chi-square of the two-factor model was significantly lower than the chi-square of the single-factor model ($\Delta\chi^2 = 14.67, df = 1, p < .01$). Finally, both the goodness-of-fit index and the parsimony index were higher for the two-factor model than for the single-factor model.

Relations with the social and behavioral dimensions. Correlations were computed between teacher-rated reactive aggression

Table 3
Confirmatory Factor Analyses for Teacher Ratings and Parent Ratings

Model	χ^2	df	p	CFI	PNFI
Teachers					
Single factor	32.09	9	.001	.74	.41
Two factor	20.38	8	.01	.86	.43
Parents					
Single factor	31.49	9	.001	.71	.40
Two factor	16.82	8	.03	.89	.44

Note. CFI = confirmatory factor index; PNFI = parsimonious normed-fit index.

and proactive aggression on the one hand, and the social and behavioral dimensions on the other hand. To detect statistically significant differences among these pairs of correlations, we used the procedure recommended by Cohen and Cohen (1983) for dependent correlations. Given the substantial correlation between the two forms of aggressive behavior, partial correlations were also computed between each aggressive behavior dimension and the other dimensions, taking into account the other aggressive behavior dimension. Thus, partial correlations were computed between reactive aggression and the social and behavioral dimensions controlling for proactive aggression, and between proactive aggression and these same variables controlling for reactive aggression. Partial correlation allowed us to evaluate the extent to which the unique variance (i.e., the residual variance) of each form of aggressive behavior showed distinct networks of relations with the social and behavioral dimensions. These correlations are presented in Table 4.

Social preference was negatively associated with reactive aggression, but it was not associated with proactive aggression. The difference between the two correlations was significant ($t = 3.83$; $p < .001$). Once the common variance was partialled out, the relation stayed the same for reactive aggression, but it became positive for proactive aggression. Therefore, the use of reactive aggressive behavior is associated with a negative peer status, whereas the use of proactive aggressive behavior is associated with a positive peer status.

Peer victimization was positively associated with reactive aggression, but it was not associated with proactive aggression. These two correlations were significantly different from one another ($t = 5.27$; $p < .001$). The partial correlations revealed that once the variance shared by the two forms of aggression were taken out, the relationship remained the same for reactive aggression, but became negative for proactive aggression. The use of reactive aggressive behaviors is, thus, associated with peer victimization; on the other hand, the use of proactive aggressive behaviors is associated with an absence of peer victimization.

At the behavioral level, leadership was found to be negatively associated with reactive aggression, but it was not associated with proactive aggression. These two correlations were significantly different from one another ($t = 2.77$; $p < .05$). Following the computation of partial correlations, leadership remained negatively associated with reactive aggression, but became positively associated with proactive aggression. In other words, the more a boy

exhibits reactive aggressive behavior, the less he is perceived by his peers as being a leader. Conversely, the more a boy exhibits proactive aggressive behavior, the more he is perceived by his peers as being a leader.

Finally, social withdrawal was positively associated with the two forms of aggressive behaviors, but this relationship was significantly higher for reactive aggression ($t = 2.95$; $p < .01$). Once the variance shared by the two forms of aggression was taken out, social withdrawal remained positively associated with reactive aggression, but became negatively associated with proactive aggression. The display of reactive aggressive behavior, then, is associated with social withdrawal, which is not the case for proactive aggressive behavior.

General Discussion

The construct validity of reactive aggression and proactive aggression, as measured by Dodge and Coie's (1987) questionnaire, was considered by examining: (a) the factor structure of the questionnaire, using confirmatory factor analyses; and (b) the networks of relations with social and behavioral dimensions, characterizing the two forms of aggressive behavior. To this day, the examination of the factor structure of this instrument has been limited to exploratory factor analyses. Here, the confirmatory factor analyses conducted on two different samples of boys revealed that a two-factor model presented a reasonable fit to the data and was more appropriate than a single-factor model, even though the two latent factors were substantially correlated. Study 2 also confirmed the two-factor model as the best model, for both teacher ratings and parent ratings, although the fit indexes were less convincing than in the first study.

These findings, based on two independent samples and on the perceptions of two different sources, support the view that reactive aggressive behaviors and proactive aggressive behaviors, as measured by Dodge and Coie's (1987) rating scale, can be reliably distinguished. However, in both studies, the two forms of aggression were substantially correlated, a level of overlap that could limit the usefulness of a two-factor solution. Yet, despite this correlation, the pattern of social-adjustment correlates of reactive aggression differed somewhat from that of proactive aggression. Although these differences were of moderate magnitude, they were theoretically meaningful and involved outcomes that are based on validated assessment strategies (Dygdon, 1988; Foster, Inderbitzen, & Nangle, 1993; Masten et al., 1985; Perry et al., 1988). For instance, the zero-order correlations in Study 2 revealed that the display of reactive aggressive behaviors was associated with a variety of social and behavioral difficulties. The magnitude of these correlations was comparable to other studies of the kind (Coie & Dodge, 1988), and the strength of the associations remained the same (or increased) when proactive aggression was taken into account. In contrast, proactive aggressive behaviors did not seem to be as negatively perceived by peers, as these behaviors were only slightly related to social withdrawal, and they were not associated with peer victimization or negative peer status. Interestingly, proactive aggression became positively, although modestly, associated with adjustment when reactive aggression was taken into account.

Could these more negative patterns of results for reactive aggression be explained by the fact that reactive aggression was more associated with conflict, and therefore it was more salient to peers,

Table 4
Zero-Order and Partial Correlations Between Reactive Aggression and Proactive Aggression and Social and Behavioral Variables

Aggressive behavior	PRE	VIC	LEA	WIT
Reactive aggression				
Zero order	-.30**	.33**	-.20**	.28**
Partial	-.34**	.42**	-.24**	.27**
Proactive aggression				
Zero order	-.15	.12	-.09	.15*
Partial	.21**	-.30**	.15*	-.15*

Note. PRE = social preference; VIC = victimization; LEA = leadership; WIT = social withdrawal.

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

than proactive aggression? The fact that the two dimensions contributed equally to the peer's perception of the child's involvement in aggressive exchanges (see Study 1) suggests otherwise, as it indicates that both should be taken into account to understand boys' involvement in aggressive episodes. Rather, the findings of this article combined with the articles of previous investigators (Crick & Dodge, 1996; Day et al., 1992; Dodge & Coie, 1987; Price & Dodge, 1989) suggest that the distinction between the two forms of aggression is useful and informative for the study of children's social relationships.

Could the absence of association between proactive aggression and adjustment difficulties be interpreted as a lack of predictive value of the proactive subscale? It should be pointed out that proactive aggression has been associated with a positive evaluation of aggression and its consequences (Dodge, Lochman, Harnish, Bates, & Pettit, 1997; Crick & Dodge, 1996) and disruption in the classroom (Dodge & Coie, 1987), dimensions that were not considered in the present study. Although proactive aggressive behaviors could be more tolerated by peers than reactive aggressive behaviors during late childhood, perhaps because proactive aggression is associated with more socially acceptable demeanors, recent longitudinal studies that examined the developmental trajectories of aggressive youths indicate that reactive aggression and proactive aggression could reflect distinct pathways, which lead to maladjustment. Specifically, these studies suggest that proactive aggression in early adolescence was associated with delinquency in adolescence (Vitaro, Gendreau, Tremblay, & Oligny, 1998) and antisocial behaviors and alcohol use problems in early adulthood (Pulkkinen, 1996), whereas reactive aggression was not. We believe that one mechanism that would explain these predictive relationships is the tendency observed in proactively aggressive children to affiliate with similar peers and form friendship networks (Poulin & Boivin, 2000; Poulin et al., 1997).

The validation of Dodge and Coie's (1987) rating scale also has clinical implications. Dodge et al. (1997) recently suggested that two subclasses of conduct disorder could be identified based on the type of aggressive behavior displayed by the child; among conduct disorder children, those with attention deficit hyperactivity disorder (ADHD) might in fact be the reactively aggressive ones and those without ADHD might be the proactively aggressive ones. Determining whether a reactive or proactive aggressive tendency is more predominant in a child referred for conduct disorder problems could be central in choosing the most appropriate intervention strategy (Coie, Underwood, & Lochman, 1991).

The findings of our study are limited, and some caveats should be underscored. First, the two samples come from a normal population and are not made up of boys displaying serious behavior problems. It will be necessary in future studies to examine whether the two-factor model could be replicated with a higher risk sample (Day et al., 1992). Second, the findings reported here are limited to boys. Examinations of the distinction between proactive aggression and reactive aggression should also be conducted with a girl sample even though the relevance of this distinction with that population is questionable. As mentioned earlier, girls generally express their aggression through indirect means that are intended to manipulate the social structure or damage another's self-esteem (Crick & Grotpeter, 1995; Galen & Underwood, 1997; Lagerspetz et al., 1988). Third, the criterion validity measures used in this study were single, short measures exclusively based on peer nominations. Future examination of the validity of Dodge and Coie's

(1987) questionnaire should consider a multiagent, multimethod assessment approach for validity criteria that would combine teacher, parent, self, and peer reports as well as direct observation in the classroom, playground, or experimental contexts. Moreover, other criterion dimensions should be considered, such as the child's sociocognitive and physiological characteristics, family characteristics, and other behavioral dimensions.

In conclusion, this study provided empirical support for the construct validity of the distinction between reactive aggression and proactive aggression, as operationalized by Dodge and Coie's (1987) questionnaire. Confirmatory factor analyses revealed that a two-factor model represented the factor structure of the items better than a single-factor model. Moreover, the distinct relations presented by the two forms of aggression with social behavioral dimensions illustrated their unique capacity to generate a network of predictions distinct and theoretically consistent. These findings suggest that the distinction between reactive aggression and proactive aggression should be applied to the study of social relationships among children.

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