

Reactively and proactively aggressive children: antecedent and subsequent characteristics

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Background: Reactive and proactive subtypes of aggressive 10–11–12-year-old children were compared with non-aggressive children to examine whether the two forms of aggression were differentially related to antecedent and subsequent measures. **Method:** A large community sample of boys and girls was used. Reactive and proactive aggression was measured through teacher ratings when the children were 10, 11 and 12 years old. Antecedent measures were age 6 temperament and behavioral dispositions; subsequent measures were age 13 delinquency and depressive symptoms. **Results:** Results indicated that reactive and proactive children had distinctive profiles on antecedent and subsequent measures. **Conclusions:** We conclude that children characterized by reactive or proactive aggression differ on several dimensions of personal functioning, and that reactive and proactive aggression are distinct forms of aggression, although both co-occur in a large proportion of aggressive children. **Keywords:** Adolescence, aggression, behavior problems, delinquency, depression, temperament.

Over the last decade, several authors have distinguished proactive from reactive aggression (Day, Bream, & Paul, 1992; Dodge, 1991; Dodge & Coie, 1987; Kolko & Brown, 1997; Price & Dodge, 1989; Pulkkinen, 1996; Vitaro, Gendreau, Tremblay, & Oigny, 1998). Earlier researchers had already stressed the distinction between different forms of aggression but used different labels to identify reactive (i.e., affective, defensive, 'hot tempered') and proactive (i.e., instrumental, offensive, predatory, 'cold tempered') aggression (see Dodge, 1991). Proactive aggression is goal-oriented. It requires neither provocation nor anger. Furthermore, proactive aggression can be oriented toward the possession of objects (i.e., instrumental) or toward dominating people (i.e., person oriented or bullying). Reactive aggression, on the other hand, results from provocation and involves angry outbursts. The two forms of aggression may co-occur in the same individuals, however, and informants may have difficulty distinguishing between them in the flow of interactions among children (Dodge, 1991). Despite the overlap, Poulin and Boivin (2000a) found that a two-factor model presented a better fit than a single-factor model for teacher-rated reactive and proactive aggression.

Important differences between reactively and proactively aggressive children have also been found in regard to concurrent social-cognitive measures, peer popularity, and behavioral dimensions. For example, reactive children interpret others' ambiguous provocations as hostility more readily than proactive-only or proactive-reactive children. They also manifest more problem-solving deficits in difficult social situations (Day et al., 1992; Dodge, 1991; Dodge & Coie, 1987; Kolko & Brown, 1997; Price & Dodge, 1989). On the other hand, proactive children tend to

value aggression as an effective means to achieve desired goals more than other children (Dodge, Lochman, Harnish, Bates, & Pettit, 1997). At the social level, reactive children are likely to be rejected, whereas proactive children are accepted by their peers (Dodge, Coie, Pettit, & Price, 1990; Dodge et al., 1997). Reactive children are also more victimized, especially girls, and they have fewer mutual friends than proactive children (Poulin & Boivin, 2000a). Finally, Day et al. (1992) reported teacher-rated behavioral differences between proactive and reactive school-aged boys. Reactive-only boys and proactive-reactive boys (but not proactive-only boys) are less skilled than non-aggressive children at responding to teasing, sharing, negotiating, handling failure, compromising, and displaying sportsmanship. Reactive boys also perform more poorly at school and manifest more internalized symptoms. Dodge et al. (1997) also found that reactive children score higher on attention problems and on impulsivity. Overall, research has shown concurrent discriminative validity of reactive and proactive aggression. A demonstration that reactive and proactive aggressiveness are also differently related to antecedent and subsequent measures, as they are to concurrent measures, would further strengthen the suggestion that there is a valid distinction between the two types of aggressiveness. It would also help document the specific antecedents and consequences of the two types of aggression.

Dodge (1991) hypothesized different etiologies for reactively and proactively aggressive children. Briefly, parents of reactive children try to control their children through aversive means, and they form relationships that lack intimacy. Hence, reactive children learn to fear and react negatively to harm and threat. On the other hand, proactive children learn

aggression by observing parental aggression and being positively reinforced for their own use of proactive aggression. Mixed proactive-reactive patterns result in families in which both processes operate. In support of this notion, Dodge et al. (1997) reported findings showing that reactive aggressive children experienced physical abuse in comparison to proactive, proactive-reactive or non-aggressive children. Dodge et al. (1997), however, did not examine whether the two types of aggression were differentially related to personal dispositions such as temperament. Although this aspect was not covered by Dodge's (1991) theoretical analysis of proactive and reactive aggressiveness, early theorists (Berkowitz, 1962; Dollard, Doob, Miller, Mowrer, & Sears, 1939) recognized the possibility that temperamental dispositions such as high reactivity to unconditioned and conditioned threatening or frustrating stimuli may characterize reactive individuals. Despite the theoretical significance (i.e., further distinction between the two types of aggression) and the practical implications (i.e., differential prevention of the two types of aggression), no study has yet examined whether reactively and proactively aggressive children differ on temperamental dimensions at an early age.

In current models of temperament, the ability to regulate the internal emotional arousal resulting from the processing of emotion-producing stimuli involves attentional processes such as attention shifting and attention focusing (Rothbart, 1989; Windle & Lerner, 1986). It is thus possible that reactive children who are deficient in regulating their emotional arousal might also manifest deficits in attentional processes. The links between general reactivity and later inhibition found by Kagan and collaborators suggest that reactive children might also be more inhibited and anxious than proactive aggressive or non-aggressive children (Kagan, Reznick, & Gibbons, 1989; Kagan, Snidman, & Arcus, 1998). Such differences between reactively and proactively aggressive children on early temperamental aspects, especially on reactivity, inattention, and anxiety, would further support the distinction between the two types of aggressive behaviors.

In addition to the dearth of studies regarding differential antecedent variables, authors have only recently begun to investigate whether proactive and reactive aggression predict different outcomes. Replicating Pulkkinen's (1996) findings with young male adults, Vitaro et al. (1998) showed that proactive aggressiveness during pre-adolescence predicts delinquency during mid-adolescence, whereas reactive aggressiveness does not. However, Vitaro et al. (1998) did not examine whether proactive aggressiveness better predicts physically violent delinquency than other forms of delinquent behaviors (which might be predicted by reactive aggression).

Loeber and Hay (1994) identified different developmental pathways, which may involve proactive and reactive aggression, leading to different forms of

delinquency during adolescence. The overt pathway includes aggressive behaviors reminiscent of proactive aggression at the first stage (i.e., annoying others, bullying, initiating fights), physical fighting as the next stage, and violence as the third stage. The covert pathway includes behaviors such as lying, theft, vandalism and firesetting, which also resemble instrumental, proactive forms of aggression. The third pathway proposed by Loeber and Hay (1994), which they labelled the authority conflict pathway, is characterized by stubborn behavior and defiance/disobedience at the first stages, and truancy, running away and staying out late at the final stage. Given the nature of the specific behaviors involved, it is thus possible that proactive aggressiveness predicts overt and covert delinquency. However, reactive aggressiveness may predict the authority conflict pathway, because of the emotion-arousing encounters between reactively aggressive children and authority figures.

Finally, little is known about the differential predictiveness of proactive and reactive aggression with respect to internalizing problems such as depressive symptoms. It has been suggested that aggression predicts depression during childhood and early adolescence because aggressive children are or feel rejected by the members of their social network, especially their peers (Panak & Garber, 1992), but also their parents (Windle, 1992). Consequently, it should be reactively aggressive children who should be more prone to depressive feelings than proactively-only or proactively-reactively aggressive children (who should score in between) because they experience more negative parent-child interactions (i.e., victimization, harsh discipline) and more peer relationship problems (i.e., peer victimization and rejection; Dodge et al., 1997; Poulin & Boivin, 2000a). Reactively aggressive children also have fewer friends (Poulin & Boivin, 2000b), who have been found to protect victimized children from depressive feelings (Hodges, Boivin, Vitaro, & Bukowski, 1999). Reactively aggressive children may also be more prone to depressive feelings because they have more anxiety-related problems which, in turn, have been found to predict depression (Kovacs & Devlin, 1998; Maser & Cloninger, 1990).

In summary, there were two aims to the present study. The first aim was to examine the antecedent temperamental dispositions of reactively-only, proactively-only, mixed proactively-reactively aggressive, and non-aggressive children. We hypothesized that, already at 6 years of age, children classified as reactively aggressive at ages 10, 11 and 12 (on average) would be more temperamentally reactive and inattentive than proactively aggressive children. We also examined differences between the groups on age 6 externalizing (i.e., physical aggressiveness, inattention) and internalizing (i.e., anxiety) problems. It was hypothesized that early physical aggressiveness would characterize the proactively aggressive chil-

dren whereas inattentive and anxious behaviors would characterize their reactive counterparts. The second aim was to compare the reactively and the proactively aggressive children on outcomes such as delinquency and depression assessed during early adolescence (i.e., by age 13 years which corresponds to the age where these behaviors start increasing) (Elliott, 1994; Nolen-Hoeksema & Girgus, 1994; Warr, 1993). For the reasons stated earlier, proactively aggressive children should score higher on delinquency than the other groups of children, especially on overt but also on covert delinquency. However, reactively and proactively-reactively aggressive children may score as high as or even higher than proactively-only aggressive children on conflict with authority. In turn, reactively aggressive children should report more depressive symptoms than the other children. Given the differential rise in depressive feelings in boys and girls by early adolescence, however, this link might be visible more for girls than for boys.

Method

Participants

The children who participated in this study were aged 10, 11 and 12 years (and were typically in grades 4, 5 and 6) when proactive and reactive aggression ratings were collected from their teachers. These participants were part of an ongoing longitudinal study that had started in kindergarten when the children were turning 6 years old. The initial sample of children attending kindergarten in public schools in 1986–1987 ($N=6,337$) was selected at random from small, medium and large French school boards in all 11 administrative regions of Quebec. Questionnaires for the parents (described later) were sent in the spring for each selected student, when the students were on average 6 years old.

Of 6,397 selected students, 4,659 (2,408 boys) had completed parent questionnaires. Initial responders were not significantly different from non-responders in terms of geographical location or size of school board. The total number of subjects selected for follow-up until age 12 years was 3,017, of whom 1,594 were girls. This follow-up sample included 1,000 boys and 1,000 girls randomly selected and 1,017 additional children considered at risk because of behavioral problems at age 6. Data on reactive and proactive aggressiveness were available for 2,550 of these children at ages 10, 11 or 12 years (84.5% of the follow-up sample).

The sample was predominantly white and French-speaking. When first assessed in kindergarten, 17% and 22% had, respectively, mothers and fathers with less than 10 years of formal education. Eighty percent of the subjects were living with both biological parents and 91% of the fathers were employed. Socio-economic status was mainly middle-class according to the Blishen, Carroll, and Moore (1987) occupational prestige scale, which was applied to parental occupation (average mother occupational prestige = 40.09, $SD=12.01$; average father occupational prestige = 42.29, $SD=12.83$).

By age 13 years, 2,020 of the 3,017 children were requested to fill questionnaires administered to their schools by trained assistants. Those who attended schools with 7 or fewer participants were not included. Finally, 1,245 children participated in data collection by age 13 years (61.9% of the targeted sample for age 13 assessment). The age 13 participants did not score higher on parents' occupational prestige than the children who were lost through attrition and non-selection for age 13 assessment. They did not differ from the non-participants on any maternal measure collected at age 6 years (i.e., temperament and behavior characteristics). Finally, they were not rated by their teachers as less reactively and proactively aggressive at ages 10, 11 and 12 years old than the non-participants. Mean scores for participants and non-participants are presented in Table 1.

Ages 10, 11 and 12 instruments

Proactive and reactive aggressiveness. Teachers completed the three reactive and the three proactive aggressiveness items used by Dodge and Coie (1987). Because these items were embedded in the Social Behavior Questionnaire (SBQ; used annually with this sample), the three-unit response scale of the SBQ items was also used with the proactive and reactive items instead of the original five-unit scale. The three-unit anchors were: does not apply (0), applies sometimes (1), applies often (2). Internal consistency was high for the proactive aggression score (alphas from .81 to .83 for ages 10 through 12) and for the reactive aggression score (alphas = .85, .84 and .81, for ages 10, 11 and 12, respectively). Correlation coefficients between reactive and proactive aggression were high for boys ($r_s=.76, .75$ and $.72, p_s < .001$ at ages 10, 11 and 12, respectively), and for girls ($r_s=.70, .66$ and $.71, p < .001$, at ages 10, 11 12, respectively). Stability coefficients for each type of aggression were also moderately high as shown in Table 2.

Table 1 Mean scores on age 6 variables and ages 10, 11, and 12 reactive and proactive aggressiveness for participants and non-participants at age 13 years (across genders)

Measure	Participation status	
	Participants	Non-participants
Parental occupational prestige	45.44 (.33)	46.17 (.35)
Age 6 mother-rated		
– Anxiety	3.51 (.06)	3.45 (.06)
– Physical aggression	1.08 (.03)	1.05 (.03)
– Inattention	2.67 (.05)	2.56 (.06)
Age 6 mother-rated		
– Activity	0.92 (0.4)	0.95 (.04)
– Adaptation	4.15 (.04)	4.11 (.04)
– Attention	6.49 (.08)	6.65 (.09)
– Reactivity	2.95 (.05)	2.95 (.05)
– Rythmicity	6.32 (.05)	6.44 (.05)
Across ages 10–11–12 teacher-rated		
– Reactive aggressiveness	0.96 (.03)	0.89 (.04)
– Proactive aggressiveness	0.54 (.03)	0.52 (.03)

Socioeconomic information. Parents (principally mothers) provided information about the occupation(s) of parent(s) with whom the child was living. The Blisshen et al. (1987) scale for occupational prestige in Canada was used to score each parent's occupation on a continuous scale. This score is based on the average income and average education level associated with occupations in Canada. For children living with two working parents the higher score amongst the two parents was used. The lowest parental occupation score was attributed to children living in families on social welfare or on unemployment insurance. Thirteen per cent of the boys lived in such families. The average occupational prestige score for the whole sample was 42.08 ($SD = 12.09$) over the three-year period these data were collected.

Age 6 instruments

Social Behavior Questionnaire. Mothers completed the Social Behavior Questionnaire (SBQ; Tremblay et al., 1991) when their child was 6 years old. The SBQ is a behavior rating questionnaire used to assess physical aggressiveness (4 items: bullies; fights; hits, kicks, bites; inconsiderate), inattention (4 items: poor concentration; easily distracted; gives up easily; stares into space), and anxiety (5 items: worried; solitary; distressed; fearful about novelty; cries easily). It also includes prosociality, hyperactivity and opposition items but they were not considered in the present study. Respondents indicated on a three-point scale whether items did not apply (0), applied sometimes (1), or applied often (2). Internal consistency was high for the physical aggression and inattention scales (alphas > .80) and moderate for the anxiety scale (alphas = .74).

Temperament. Mothers also completed the Dimensions of Temperament Survey (Lerner, Palermo, Spiro, & Nesselroade, 1982) when the children were 6 years old (in kindergarten). This 34-item questionnaire measures five temperamental dimensions: activity level (3 items), attentional span/distractibility (11 items), adaptability/withdrawal (6 items), rhythmicity (8 items) and reactivity (6 items). Response alternatives to each item were dichotomous ('more true than false', and 'more false than true'). Satisfactory construct validity has been obtained for the five scales (Lerner et al.,

1982). In the present study, internal consistency (Cronbach's alpha) varied from .64 to .94 depending on the scales. We adjusted the coding system so that high scores indicate high levels on all dimensions.

Age 13 instruments

Self-Reported Delinquency Questionnaire. The Self-Reported Delinquency Questionnaire (SRDQ; LeBlanc & Tremblay, 1988) assesses delinquent acts committed over the past 12 months (i.e., since last teacher ratings at age 12 years). The seven items of the physical violence scale were: forced someone to do something, engaged in a gang fight, used a weapon, been in a fist fight, beat someone for no reason, threw rocks, carried a weapon. Ten items that assess theft and six items that assess vandalism were combined to produce the covert delinquency scale. These items were: kept objects worth \$10 or more, stole something from a store, stole \$100 or more, stole money from home, stole something worth between \$10 and \$100, stole a bicycle, bought a stolen article, broke down a door to take something, been in an unauthorized place; destroyed instruments, intentionally destroyed another's property, intentionally broke parts of school property, purposely broke something belonging to a family member, intentionally destroyed part of an automobile, set fire. Finally, five items were used to assess the authority conflict scale. These items referred to truancy (2 items), running away from home, hanging out late at night, and disobeying parents to keep deviant friends. The children reported whether they had never (1), rarely (2), sometimes (3) or often (4) engaged in each act. LeBlanc and McDuff (1991) have reported good temporal stability and concurrent validity of the SRDQ with early adolescent boys. Other investigators have also documented the validity of self-reported delinquency (Hindelang, Hirschi, & Weiss, 1981; Klein, 1989). In the present study internal consistency was .72, .67, and .63 for the overt, covert, and conflict with authority scales, respectively.

Children's Depression Inventory (CDI). The CDI (Kovacs, 1983) is a self-rated 27-item scale that assesses affective, cognitive, motivational and somatic symptoms of depression. In the present study, the suicidal ideation item was eliminated for ethical reasons. Subjects rated each item on a three-point scale, with higher ratings indicating more severe symptoms. Total scores range from 0 to 52. The psychometric properties of the CDI are well documented (Carey, Gresham, Ruggiero, Faulstich, & Enyart, 1987; Saylor, Finch, Spirito, & Bennett, 1984). In this sample, internal consistency was high (alpha = .75 at age 13).

Table 2 Correlation coefficients between ages 10, 11, and 12 teacher-rated reactive and proactive aggressiveness (i.e., stability coefficients)

	Age 11	Age 12
<i>Reactive aggressiveness</i>		
Age 10	.51, .40	.49, .36
Age 11		.49, .40
Age 12		
<i>Proactive aggressiveness</i>		
Age 10	.45, .39	.41, .32
Age 11		.42, .37
Age 12		

Note. First coefficient for boys and second for girls. All coefficients are significant at $p < .001$.

Procedure

All instruments were administered in French. The teacher questionnaire (SBQ) that included the reactive and proactive items was mailed in April or May when children were aged 10, 11 and 12 years (i.e., the last three years of primary school). Parents provided socio-demographic information at the same period of time. The DOTS and the SBQ were administered to mothers by mail when subjects were 6 years old. The

delinquency (SRDQ) and depressive symptoms (CDI) questionnaires were administered in May when participants were 13 years old. They were administered at the school of the participants. By that time, most of the participants were at the end of their first year of high school.

Group formation

Group formation was based on teacher ratings of proactive and reactive aggression collected at ages 10, 11 and 12. Teacher ratings were selected (a) to be concordant with most other research, which also used teacher ratings (Dodge et al., 1997; Vitaro et al., 1998); (b) to avoid shared method variance between assessment of reactive and proactive aggressiveness (i.e., teachers' reports), assessment of antecedent characteristics (i.e., mothers' reports), and assessment of subsequent delinquency and depressive feelings (i.e., participants' self-reports). A majority (>75%) of children had reactive and proactive aggression scores for two or three years. An average score was computed for these children. To avoid reducing the sample size and because aggressiveness scores were moderately stable over time as shown in Table 1, we also included children for whom data were available for one year only. A cut-off relative to each gender separately was used. Children who received reactive scores at 1 SD above the mean or higher within their gender-specific distribution (i.e., ≥ 3 for boys and ≥ 1.33 for girls) were labelled reactive. Children who received proactive scores at 1 SD above the mean or higher (≥ 2 for boys and ≥ 1 for girls) were labelled proactive. This categorization resulted in four groups: reactively aggressive, proactively aggressive, proactively-reactively aggressive, and non-aggressive groups. The number of participants in each group, presented in Table 3, varied depending on whether age 6 or age 13 years measures were considered for analysis. The proportions of participants in the four groups were very similar to the proportions obtained by Dodge et al. (1997) who used similar cut-off scores: 3.5% proactively aggressive only (P group), 5.9% reactively aggressive only (R group), 10.3% proactively and reactively aggressive (PR group) and 80.3% non-aggressive (non-PR group).

Table 3 Numbers of subjects in proactively-reactively, proactively-only, reactively-only, and non-proactively-reactively aggressive groups by measures considered and by age at assessment

Measures	Group			
	Pr ¹	P	R	Non-PR
Age 6 measures (N=2,550)	154-110 ²	34-54	81-70	1,057-990
Age 13 measures (N=1,245)	67-53	16-19	33-36	479-500

¹PR: Proactively-reactively aggressive group.

P: Proactively-only group.

R: Reactively-only group.

Non-PR: Non-aggressive group.

²First digit for boys and second digit for girls.

Results

Differences on parents' occupational prestige

A significant difference between the four groups was found on occupational prestige, $F(12, 5076) = 6.74$, with the non-aggressive group having a higher score than the three aggressive groups (who did not differ from each other). No interaction with children's sex was found. Consequently, occupational prestige was used as a covariate in subsequent analyses.

Differences at 6 years of age

Did reactive and proactive children differ in their behavioral profiles and temperamental dispositions when they were 6 years old? They did differ on some critical dimensions, even after controlling for parents' occupational prestige. Means and standard deviations for the Age-6 comparisons are presented in Table 4.

Temperament. A 4 (Group) × 2 (Sex) MANCOVA was applied to the five scales of the DOTS. Results showed a significant overall difference between the groups, Hotellings' $F(15, 7607) = 9.51, p < .001$, but no main effect of sex and no significant sex × group interaction emerged. At the univariate level, groups differed on attention, $F(3, 2549) = 21.62, p < .001$, reactivity, $F(3, 2549) = 22.48, p < .001$, withdrawal $F(3, 2549) = 8.95, p < .001$, and activity, $F(3, 2549) = 4.35, p < .01$. Post hoc contrasts¹ including the covariate showed that reactively-only and proactively-reactively children were rated as less attentive, more active, more withdrawn and more reactive than the non-aggressive children. The corresponding effect sizes for these differences were moderate for the attention and reactivity scales (*ds* varied from .30 to .53), but small for the withdrawal and the activity scales (*ds* varied from .20 to .27) (Cohen, 1988). The proactively-only children differed from their non-aggressive counterparts only insofar as the former were more withdrawn than the latter (*d* = .37). A second set of post hoc contrasts using the proactively-reactively aggressive group as the reference group revealed that the reactively-only group was more reactive and less attentive than the proactively-reactively group (*ds* = .19 and .22, respectively). Conversely, the proactively-only group was less reactive and more attentive than the proactively-reactively aggressive group (*ds* = .22 and .33, respectively).

Early behavioral dispositions. A similar 4 (Group) × 2 (Sex) analysis of covariance using the occupational prestige score as a covariate indicated that groups

¹For all the post hoc contrasts the alpha level was set at .02 to avoid capitalizing on chance findings.

Table 4 Means (adjusted for occupational prestige as a covariate) and standard errors for age 6 mother-rated measures according to group and gender

Measure-Scale	Gender	Group			
		Non-PR	R	P	PR
<i>DOTS (Mother-rated)</i>					
Attention	M	6.45 ^a (.09) ^b	5.19 (.33)	6.58 (.51)	5.77 (.24)
	F	7.09 (.09)	5.15 (.35)	7.06 (.40)	5.94 (.28)
Withdrawal	M	4.06 (.05)	4.41 (.16)	4.76 (.25)	4.38 (.12)
	F	4.06 (.05)	4.34 (.18)	4.35 (.20)	4.61 (.14)
Rhythmicity	M	6.42 (.05)	6.05 (.20)	6.31 (.30)	6.26 (.14)
	F	6.46 (.06)	6.41 (.21)	6.28 (.24)	5.76 (.17)
Reactivity	M	2.88 (.05)	3.75 (.18)	3.17 (.28)	3.40 (.13)
	F	2.77 (.05)	3.54 (.19)	2.85 (.22)	3.33 (.15)
Activity	M	0.87 (.04)	1.28 (.15)	1.09 (.23)	1.17 (.10)
	F	0.93 (.04)	1.16 (.16)	0.75 (.18)	1.15 (.13)
<i>SBQ (Mother-rated)</i>					
Physical aggressiveness	M	1.19 (.04)	1.48 (.13)	2.10 (.20)	1.94 (.09)
	F	0.75 (.04)	0.96 (.16)	1.17 (.14)	1.19 (.11)
Anxiety	M	3.45 (.06)	3.97 (.22)	3.73 (.34)	3.48 (.16)
	F	3.42 (.06)	4.04 (.24)	3.28 (.27)	3.55 (.19)
Inattention	M	2.80 (.06)	3.75 (.21)	2.59 (.32)	3.26 (.15)
	F	2.19 (.06)	3.49 (.22)	2.20 (.25)	2.99 (.18)

^a: Mean, ^b: Standard error.

Note. An italic value indicates that the group differs significantly from the non-PR group.

differed on the three SBQ scales, multivariate Hotelling's $F(9, 7613) = 16.21, p < .001$. Boys also differed from girls, $F(3, 2539) = 19.78, p < .001$, but no significant interaction was found. Post hoc contrasts revealed that all three aggressive groups (i.e., reactively-only, proactively-only, and reactively-proactively) scored higher on the physical aggressiveness scale than the non-aggressive group. However, the reactively-only group scored lower on the physical aggressiveness scale than proactively-reactively and the proactively-only groups, who did not differ from each other. At the univariate level, the groups also differed on inattention, $F(3, 2541) = 24.47, p < .001$, and anxiety, $F(3, 2541) = 3.92, p < .001$. Post hoc contrasts including the covariate revealed that reactively-only and proactively-reactively aggressive children were less attentive than non-aggressive children ($d_s = .59$ and $.33$, respectively), whereas the proactively-only children did not differ from non-aggressive children in this respect. In line with previous findings on mother-rated temperamental inattention, reactively-only children were also rated by mothers as more inattentive than the proactively-reactively children ($d = .26$), whereas the proactively-only children were rated as less inattentive than the proactively-reactively aggressive children ($d = .37$). Finally, reactively-only children were rated more anxious than the non-aggressive group ($d = .29$) whereas the proactively-only and the proactively-reactively children were not. In addition, the reactively-only children were rated higher than the proactively-reactively children on the mother-rated anxiety scale ($d = .25$), whereas the proactively-only children were not.

Prediction of aggressive group membership. In order to confirm the previous analysis, a polychotomous logistic regression (i.e., SAS catmod procedure) was performed to examine which dimensions of temperament uniquely predicted group membership. All the variables were previously centred to reduce multicollinearity. Occupational prestige and sex were also entered first for control purposes. The overall model was significant at $\chi^2(21) = 165.14, p < .001$, indicating that the predictors together contributed significantly to the likelihood of belonging to one of the aggressive groups relative to the non-aggressive group. Further likelihood ratio tests showed that three scales made unique significant contributions to the regression equation: attention, reactivity and withdrawal, $\chi^2(3) = 30.59, 27.79$ and 22.19 , respectively, $p < .001$. Interactions with sex were included for each temperament scale but none was significant. Additional contrasts using the non-aggressive children as the reference group were also performed to see which aggressive groups specifically differed from the non-aggressive group. Odds ratios were included for this analysis to indicate how much the risk of belonging to one specific aggressive group relative to the non-aggressive group varied for each unit of the predictor variable. The analysis showed that withdrawal increased the probability of belonging to the proactively-reactively, reactively-only and proactively-only groups in comparison to the non-aggressive group, $B_s = .17, .14$ and $.23$, respectively; odds ratios = 1.19, 1.15 and 1.26, respectively, $p < .05$. Similarly, low attention and high reactivity both uniquely increased the probability of belonging to the proactively-reactively ($B = -.08$,

odds ratio = 1.08, $p < .05$, for low attention; $B = .17$, odds ratio = 1.19, $p < .05$, for reactivity) and the reactively-only group ($B = -.13$, odds ratio = 1.11, $p < .05$, for low attention; $B = .23$, odds ratio = 1.25, $p < .05$, for reactivity) in comparison to the non-aggressive group.

A similar polychotomous logistic regression was performed using mother-rated early behavioral dispositions to predict group membership. Once again, occupational prestige and sex served as control variables and as potential moderators. The overall model was significant at $\chi^2(15) = 166.85$, $p < .001$. Physical aggressiveness and inattention made unique contributions to the regression analysis, $\chi^2(3) = 63.32$ and 47.93 , respectively, $p < .001$. No interactions, however, were significant. Additional contrasts revealed that physical aggressiveness increased the probability of belonging to the proactively-reactively, the reactively and the proactively aggressive groups in comparison to the non-aggressive group: $B_s = .37$, $.17$ and $.35$ and odds ratios = 1.45, 1.18 and 1.42, respectively, $p < .05$. Inattention also contributed in predicting group membership in the proactively-reactively and the reactively aggressive groups, but not membership in the proactively aggressive group, relative to the non-aggressive group: $B_s = .15$ and $.27$ and odds ratios = 1.17 and 1.31 for the proactively-reactively and reactively aggressive groups respectively, $p < .05$.

Differences at 13 years of age

Do the consequences of aggressive behavior depend upon the type of aggressiveness displayed? For the most part the answer is yes, but it depends upon the type of consequence considered. Means and standard deviations for 13-year comparisons are presented in Table 5.

Delinquency. A 4 (Group) \times 2 (Sex) MANCOVA of SRDQ scores revealed a multivariate significant

difference between the groups, Hotellings' $F(12, 3569) = 2.56$, $p < .01$. No interaction with sex was found, but boys reported more delinquency than girls, $F(4, 1191) = 16.94$, $p < .01$. Subsequent ANCOVAs showed that groups differed on overt delinquency, $F(3, 1202) = 6.92$, $p < .01$, and on covert delinquency, $F(3, 1202) = 4.49$, $p < .01$, but not on conflict with authority. According to post hoc contrasts (including the covariate), the proactively-only and the proactively-reactively aggressive children reported more overt and covert delinquency than children in the non-aggressive group (d_s varied from $.27$ to $.43$), whereas the reactively-only group did not. Notably, the proactively-only aggressive children reported even higher levels of overt delinquency than the proactively-reactively aggressive counterparts ($d = .24$).

Depressive feelings. A 4 (Group) \times 2 (Sex) MANCOVA on CDI scores revealed, as expected, that girls were more depressed than boys, $F(1, 1202) = 3.93$, $p < .05$. The groups also tended to differ from each other, in this respect, $F(3, 1202) = 2.50$, $p = .058$, but no interaction with sex was found. Post hoc contrasts revealed that only the reactively-only group reported more depressive feelings than the non-aggressive group (see Table 5).

Discussion

The first purpose of the present study was to examine whether and how reactively-only, proactively-only and proactively-reactively aggressive children differed from non-aggressive children on temperamental dimensions and behavioral dimensions measured during early childhood (i.e., several years before group classification on aggressiveness scores). This is the first study (to our knowledge) to examine early differences between different subtypes of aggressive children. The second purpose was to examine whether reactively-only, proactively-only

Table 5 Means (adjusted for occupational prestige as covariate) and standard errors by group and by gender for age-13 measures

Measure – Scale	Gender	Group			
		Non-PR	R	P	PR
<i>SRDQ (Delinquency)</i>					
– Covert	M	19.18 ^a (.14) ^b	19.73 (.51)	20.70 (.74)	20.58 (.36)
	F	18.51 (.13)	18.78 (.49)	18.95 (.68)	18.98 (.41)
– Overt	M	8.41 (.08)	8.76 (.09)	9.55 (.42)	9.20 (.20)
	F	7.56 (.07)	7.73 (.28)	8.41 (.38)	7.75 (.23)
– Conflict with authority	M	7.06 (.09)	6.76 (.33)	7.50 (.48)	7.50 (.24)
	F	7.08 (.09)	7.38 (.32)	7.42 (.44)	7.24 (.26)
<i>CDI (Depressive feelings)</i>					
	M	8.18 (.29)	9.51 (1.11)	9.09 (1.59)	8.89 (.78)
	F	9.68 (.28)	12.17 (1.06)	9.95 (1.46)	10.57 (.87)

^a: Adjusted mean, ^b: Standard error.

Note. An italic value indicates that the group differs significantly from the non-PR group.

and proactively-reactively aggressive children differed from non-aggressive children on delinquency and depression measures collected during early adolescence. This second objective extended previous work by assessing different subtypes of delinquency and, in addition, internalizing problems as outcomes. Aggression scores were collected during middle and late childhood over a three-year period to increase reliability. Teachers served as informants for aggression measures whereas mothers rated temperamental dimensions and early behavioral dispositions for their children. Finally, children themselves reported on their delinquent acts and depressive feelings during early adolescence, thus minimizing the risk of shared method variance.

Overall, the results support the predictions and further contribute to the distinction between proactive and reactive aggression. First, the three categories of aggressive children differed on several temperamental dimensions. Specifically, reactively aggressive children (whether also proactively aggressive or not) were rated by their mothers as more reactive than the proactively-only or the non-aggressive children. This was even more true for those who were only reactively aggressive compared to those who were reactively and proactively aggressive. Effect sizes showed that these differences were moderately high and did not only result from the use of a large sample size. It is worth mentioning that some items on the DOTS reactivity scale refer to reactivity to unconditioned stimuli such as light or pain, suggesting that reactive children might be prone to react to any disturbance from a social or a non-social source already by age 6 years. If exposed to a harsh environment, these highly reactive children, who are assumed to possess a low threshold for frustration, punishment or threat, might develop defensive aggressiveness patterns. Indeed, Dodge et al. (1997) found that reactively aggressive children demonstrated histories of physical abuse whereas the other groups of aggressive children did not.

Reactively aggressive children (whether also proactively aggressive or not) were also rated by mothers as more inattentive than children in the proactively-only and the non-aggressive groups. This was even more so for those who were only reactively aggressive than for those who were reactively and proactively aggressive. Again, the effect sizes were moderately large. This result supports and extends previous reports by Dodge et al. (1997) that reactive children were concurrently more inattentive and impulsive than proactive or non-aggressive children. It is also in line with current models of temperament that suggest that emotion regulation (which is presumably deficient in reactively aggressive children) involves attentional processes such as attention shifting and focusing (Rothbart, 1989; Windle & Lerner, 1986). Finally, the present finding contributes to the image of reactively aggressive children as more 'excitable' than other groups of children

because of their low threshold to react to disturbing, and also, distracting stimuli.

Reactively aggressive children (whether also proactively aggressive or not) also scored higher on the activity dimension than the non-aggressive children. This result, however, may be attributable to the link between activity level and other temperamental dispositions (especially attention) since activity level did not predict group membership in the logistic regression once the effect of the other temperamental dispositions was controlled for.

All aggressive groups were also rated higher on withdrawal than the non-aggressive group. It is noteworthy that withdrawal had a unique contribution in the prediction of group membership, above and beyond the other temperamental dispositions and control variables. Notably, withdrawal does not seem to differentiate reactively- from proactively aggressive children but rather aggressive from non-aggressive children. This conclusion, however, may be premature and dependent on the specific items used in the temperament withdrawal scale.

All three aggressive groups were rated by mothers as more physically aggressive than the non-aggressive group. However, the proactively aggressive children (whether also reactively aggressive or not) were rated as more physically aggressive than their reactively-only agemates. This result may help explain why the proactively aggressive children (whether also reactively aggressive or not) scored higher on physical violence (i.e., overt delinquency) at age 13 than non-aggressive youth whereas the reactively-only children did not, a finding that is concordant with data reported by Pulkkinen (1996) with young adults and by Vitaro et al. (1998) with another sample of adolescent males at 16 years of age. Notably, in the present study, the proactively-reactively aggressive children reported less overt delinquency than the proactively-only aggressive children, although they did not differ on covert delinquency, suggesting that the proactively aggressive children are most at risk for total delinquency.

One part of the explanation why proactively aggressive children are more prone to become delinquent than reactively aggressive children might reside in social processes with peers. As shown by Poulin and Boivin (2000b), proactively aggressive children have more friends than reactively aggressive children. Moreover, their friends are more proactively aggressive than reactively aggressive children's friends. Finally, these authors found that friends' proactive aggressiveness increased children's own proactive aggressiveness whereas friends' reactive aggressiveness had no influence on children's own aggressiveness profile. Given the importance of the association with deviant friends in explaining delinquent behaviors (Elliott, Huizinga, & Ageton, 1985; Patterson & Dishion, 1985), the 'ganging up' of proactively aggressive children may be partly responsible for present and past results relative to delinquency.

Another part of the explanation may be found in some personal characteristics of reactively aggressive children that might protect them from delinquency despite their disruptive-inattentive-impulsive profile. For example, the high levels of anxiety found in reactively aggressive children suggest that they have strong inhibition systems. This may, in turn, explain why reactively aggressive children were not more involved in overt and covert delinquency by age 13 than non-aggressive children, despite their high activity and inattention and their high physical aggressiveness at age 6 years. In line with this notion, Kerr, Tremblay, Pagani, and Vitaro (1997) showed that behavioral inhibition protected disruptive-hyperactive boys from becoming delinquent adolescents. However, this explanation must be tempered by the finding that mother-rated anxiety did not uniquely predict reactively aggressive group membership once control variables and other behavioral dispositions such as physical aggressiveness and inattention were taken into account.

Reactively aggressive children reported more depressive feelings than other children (including the proactive-only and the proactively-reactively aggressive children). This result is in line with other studies reporting more unhappiness and fewer friends for reactively aggressive children compared to their proactively aggressive counterparts (Boivin, Vitaro, Hodges, & Poulin, 1998; Day et al., 1992). Reactively aggressive children may be more prone to depressive feelings because they are rejected, socially isolated and victimized by both parents and peers whereas proactive children are not (Boivin et al., 1998). Moreover, those reactively aggressive children who have a friend experience lower friendship quality than their non-aggressive counterparts, whereas this is not the case for proactively aggressive children (Poulin & Boivin, 1999). Higher levels of anxiety for reactive children may also play a role with respect to depressive feelings. In this case, anxiety may play more a precipitating than a protective role, as anxiety has been shown to predict later depression (Kovacs & Devlin, 1998).

Overall, the present results converge with previous findings in support of two distinct subtypes of aggressive children (i.e., reactively aggressive and proactively aggressive), and one mixed subtype (i.e., proactively-reactively aggressive). These subtypes seem to apply equally to females and to males. Our findings also support the notion of different etiologies and different developmental courses of the two types of aggressive behavior. Reactive aggression may be temperamentally based in terms of a low threshold to aversive stimuli and propensity to react emotionally. Per se, it does not seem to lead to delinquency, possibly because of a strong inhibition system or lack of social (peer) support for delinquency. However, reactive aggression seems to foster internalizing problems such as depression, possibly because of poor parent-child relationships, peer

rejection, or high sensitivity to stressors. In contrast, proactive aggression is linked to an early pattern of physical aggressiveness, lack of anxiety, and attentional resources that might be indicative of an antisocial/psychopathic personality profile. Not surprisingly, this type of aggression leads to delinquency, possibly because of a weak inhibition system or the association with deviant peers.

The present study has several assets: a large sample, different informants, a longitudinal perspective, and the inclusion of both sexes. It also has clear limitations: reliance on a single source of assessment at each point of data collection and a strong attrition by age 13. The attrition problem was, however, partly 'voluntary' because about half of the children who were not assessed were left behind because of financial and logistic reasons. The loss of cases resulted in loss of statistical power but did not bias the findings since the lost cases did not differ from the participants on any of the available measures. One additional comment is in order with respect to the modest portion of explained variance for the age 13 outcome measures. Obviously, other variables (school-, family-, peer-, or personality-related) play a role in predicting different forms of delinquency and depressive feelings, besides reactive and proactive aggression. It was not the objective of the present study, however, to examine their additional contribution. Future research should try to overcome the limitations mentioned previously and address the process mechanisms through which reactive aggression leads to internalized problems and through which proactive aggression leads to externalized problems.

Despite these limitations, the present findings have important theoretical and practical implications. First, we need to distinguish between reactive and proactive aggression to improve the prediction of later adjustment problems. As suggested by Cronbach (1951), in order to conclude that two measures represent the same underlying latent construct certain conditions need to be met. First, one needs to demonstrate strong intercorrelations between the measures, and second, one must show that these measures relate to other measures in the same way. Based on this set of criteria, two measures are distinct if they are differentially predictive of other measures even when the intercorrelation between them is high, as is the case for proactive and reactive aggression. The distinction between reactive and proactive aggression would also improve the understanding of differences in aggressive children's psycho-social functioning and their respective antecedents and developmental pathways. Relatedly, in light of the present results, it would seem useful to acknowledge that DSM-IV criteria (American Psychiatric Association, 1994) for conduct disorder include many proactive elements in the 'Aggression to people and animals' subscale whereas they almost

exclusively include reactive items for oppositional-defiant disorder. This might explain why the longitudinal links between ODD and CD are unclear (Lahey & Loeber, 1994): Oppositional-defiant children who are also proactively aggressive might become conduct-disordered whereas those who are only reactively aggressive might not. It would also be useful to examine the neuro-physiological correlates of reactive and proactive aggression which may help refine the distinction between the two types of aggression (Scarpa & Raine, 1997). Finally, in line with suggestions by Larson (1994) and by Dodge (1991), we need to adjust components of prevention/intervention programmes to the specific needs and difficulties of proactively and reactively aggressive children.

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References

- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th edn). Washington, DC: American Psychiatric Association.
- Berkowitz, L. (1962). *Aggression: A social psychological analysis*. New York: McGraw-Hill.
- Blishen, B.R., Carroll, W.K., & Moore, C. (1987). The 1981 socioeconomic index for occupations in Canada. *Canadian Review of Sociology and Anthropology*, 24, 465-488.
- Boivin, M., Vitaro, F., Hodges, E., & Poulin, F. (1998, July). *The quality of peer relationships and homophily in proactive and reactive aggression among preadolescent boys and girls*. Paper presented at the Biennial Meetings of the International Society for the Study of Behavioral Development, Berne.
- Carey, M.P., Gresham, F.M., Ruggiero, L., Faulstich, M.E., & Enyart, P. (1987). Children's Depression Inventory: Construct and discriminant validity across clinical and nonreferred (control) populations. *Journal of Consulting and Clinical Psychology*, 55, 755-761.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum.
- Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297-334.
- Day, D.M., Bream, L.A., & Paul, A. (1992). Proactive and reactive aggression: An analysis of subtypes based on teacher perceptions. *Journal of Clinical Child Psychology*, 21, 210-217.
- Dodge, K.A. (1991). The structure and function of reactive and proactive aggression. In D.J. Pepler & K.H. Rubin (Eds.), *The development and treatment of childhood aggression* (pp. 201-218). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Dodge, K.A., & Coie, J.D. (1987). Social information processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology*, 53, 1146-1158.
- Dodge, K.A., Coie, J.D., Pettit, G.S., & Price, J.M. (1990). Peer status and aggression in boys' groups: Developmental and contextual analyses. *Child Development*, 61, 1289-1309.
- Dodge, K.A., Lochman, J.E., Harnish, J.D., Bates, J.E., & Pettit, G.S. (1997). Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. *Journal of Abnormal Psychology*, 106, 37-51.
- Dollard, D.J., Doob, L.W., Miller, N.E., Mowrer, O.H., & Sears, R.R. (1939). *Frustration and aggression*. New Haven, CT: Yale University Press.
- Elliott, D.S. (1994). Longitudinal research in criminology: Promise and practice. In E.G.M. Weitekamp & H.-J. Kerner (Eds.), *Cross-national longitudinal research on human development and criminal behavior* (pp. 189-201). Dordrecht, The Netherlands: Kluwer Academic.
- Elliott, D.S., Huizinga, D., & Ageton, S.S. (1985). *Explaining delinquency and drug use*. Beverly Hills, CA: Sage.
- Hindelang, M.J., Hirschi, T., & Weiss, J. (1981). *Measuring delinquency*. Beverly Hills, CA: Sage.
- Hodges, E., Boivin, M., Vitaro, F., & Bukowski, W.M. (1999). The power of friendship: Moderation of risk and effects of peer victimization. *Developmental Psychology*, 35, 94-101.
- Kagan, J., Reznick, J.S., & Gibbons, J. (1989). Inhibited and uninhibited types of children. *Child Development*, 60, 838-845.
- Kagan, J., Snidman, N., & Arcus, D. (1998). Childhood derivatives of high and low reactivity in infancy. *Child Development*, 69, 1483-1493.
- Kerr, M., Tremblay, R.E., Pagani, L., & Vitaro, F. (1997). Boys' behavioral inhibition and the risk of later delinquency. *Archives of General Psychiatry*, 54, 809-816.
- Klein, M.W. (1989). *Cross-national research in self-reported crime and delinquency*. Dordrecht, Germany: Kluwer Academic.
- Kolko, D.J., & Brown, E.J. (1997, June). *Reactive and proactive aggression in clinically referred disruptive children: Social and cognitive characteristics*. Paper presented at the International Society for Research in Child and Adolescent Psychopathology. Paris.

- Kovacs, M. (1983). *The Children's Depression Inventory: A self-rated depressive scale for school-aged youngsters*. Unpublished manuscript, University of Pittsburgh.
- Kovacs, M., & Devlin, B. (1998). Internalizing disorders in childhood. *Journal of Child Psychology and Psychiatry*, 39, 47–63.
- Lahey, B.B., & Loeber, R. (1994). Framework for a developmental model of oppositional defiant disorder and conduct disorder. In D.K. Routh (Ed.), *Disruptive behavior disorders in childhood* (pp. 139–180). New York, NY: Plenum.
- Larson, J. (1994). Violence prevention in the schools: A review of selected programs and procedures. *School Psychology Review*, 23, 151–164.
- LeBlanc, M., & McDuff, P. (1991). *Activités délictueuses, troubles de comportement et expérience familiale au cours de la latence [Delinquency, behavior problems and family dynamics during the latency period]*. Unpublished research report, School of Psycho-Education, University of Montreal.
- LeBlanc, M., & Tremblay, R.E. (1988). A study of factors associated with the stability of hidden delinquency. *International Journal of Adolescence and Youth*, 1, 269–292.
- Lerner, R.L., Palermo, M., Spiro, A., & Nesselroade, J.R. (1982). Assessing the dimensions of temperament individually across the life-span: The Dimensions of Temperament Survey (DOTS). *Child Development*, 53, 149–159.
- Loeber, R., & Hay, D.F. (1994). Developmental approaches to aggression and conduct problems. In M. Rutter & D.F. Hay (Eds.), *Development through life: A handbook for clinicians* (pp. 488–516). Oxford: Blackwell.
- Maser, J., & Cloninger, R. (1990). *Comorbidity in anxiety and mood disorders*. Washington, DC: American Psychiatry Press.
- Nolen-Hoeksema, S., & Girgus, J.S. (1994). The emergence of gender differences in depression during adolescence. *Psychological Bulletin*, 115, 424–443.
- Panak, W.F., & Garber, J. (1992). Role of aggression, rejection, and attributions in the prediction of depression in children. *Development and Psychopathology*, 4, 145–165.
- Patterson, G.R., & Dishion, T.J. (1985). Contribution of families and peers to delinquency. *Criminology*, 23, 63–77.
- Poulin, F., & Boivin, M. (1999). Proactive and reactive aggression and boys' friendship quality in mainstream classrooms. *Journal of Emotional and Behavioral Disorders*, 7, 168–177.
- Poulin, F., & Boivin, M. (2000a). Reactive and proactive aggression: Evidence of a two-factor model. *Psychological Assessment*, 12, 115–122.
- Poulin, F., & Boivin, M. (2000b). The role of proactive and reactive aggression in the formation and development of friendships in boys. *Developmental Psychology*, 36, 1–8.
- Price, J.M., & Dodge, K.A. (1989). Reactive and proactive aggression in childhood: Relations to peer status and social context dimensions. *Journal of Abnormal Child Psychology*, 17, 455–471.
- Pulkkinen, L. (1996). Proactive and reactive aggression in early adolescence as precursors to anti- and prosocial behaviors in young adults. *Aggressive Behavior*, 22, 241–257.
- Rothbart, M.K. (1989). Behavioral approach and inhibition. In J.S. Reznick (Ed.), *Perspectives on behavioral inhibition* (pp. 139–157). Chicago: University of Chicago Press.
- Saylor, C.F., Finch, A.J., Spirito, A., & Bennett, B. (1984). The Children's Depression Inventory: A systematic evaluation of psychometric properties. *Journal of Consulting and Clinical Psychology*, 52, 955–967.
- Scarpa, A., & Raine, A. (1997). Psychophysiology of anger and violent behavior. *Psychiatric Clinics of North America*, 20, 375–394.
- Tremblay, R.E., Loeber, R., Gagnon, C., Charlebois, P., Larivée, S., & LeBlanc, M. (1991). Disruptive boys with stable and unstable high fighting behavior patterns during junior elementary school. *Journal of Abnormal Child Psychology*, 19, 285–300.
- Vitaro, F., Gendreau, P.L., Tremblay, R.E., & Oligny, P. (1998). Reactive and proactive aggression differentially predict later conduct problems. *Journal of Child Psychology and Psychiatry*, 39, 377–385.
- Warr, M. (1993). Age, peers, and delinquency. *Criminology*, 31, 17–40.
- Windle, M. (1992). Temperament and social support in adolescence: Interrelations with depressive symptoms and delinquent behaviors. *Journal of Youth and Adolescence*, 21, 1–21.
- Windle, M., & Lerner, R.M. (1986). Reassessing the dimensions of temperamental individuality across the life span: The revised dimensions of temperament survey (DOTS-R). *Journal of Adolescent Research*, 1, 213–230.