

unpopular and popular youth can be understood by examining the different functions of aggression (e.g., Rose et al., 2004). These functions can generally be classified as reactive and proactive (Card & Little, 2006; Dodge, 1991). From the perspective of the Frustration–Aggression model (Dollard, Doob, Miller, Mowrer, & Sears, 1939), reactive aggression can be seen as an impulsive aggressive response to other’s behavior that is perceived as threatening or intentional. Proactive aggression represents planned and goal-oriented aggression and is, based on social learning theory (Bandura, 1983), motivated by external rewards (Vitaro, Brendgen, & Barker, 2006).

Although differentiating these functions of aggression in association with peer status is logical, surprisingly, the unique associations of reactive and proactive aggression with adolescent popularity have not yet been examined in the literature. So far, researchers who have examined that the unique associations of popularity with forms of aggression have focused on the distinction between overt and relational aggression (with clear results), but the reactive–proactive distinction, while logical conceptually, has not yet been demonstrated empirically in association with popularity. Therefore, the goal of the current article was to examine the role of popularity in the development of reactive and proactive aggression in a sample of middle school adolescents (Grade 7 and 8) using peer measures for popularity and aggression.

POPULARITY AND PROACTIVE AGGRESSION

Based on previous research, we expected both unpopular and popular youth to show aggressive behavior, but with different underlying functions. For popular youth, recent research shows that they typically engage in relational aggression, such as spreading rumors or excluding others (Cillessen & Rose, 2005; Currie, Kelly, & Pomerantz, 2007; Puckett, Aikins, & Cillessen, 2008). This relational aggressive behavior is perceived to be socially competent (e.g., Rodkin & Roisman, 2010), as it helps popular adolescents to attain and maintain their popularity status (Rose et al., 2004) and allows them to achieve other important social goals (Cillessen & Mayeux, 2004; LaFontana & Cillessen, 2002; Mayeux et al., 2011). Based on these findings, it seems plausible to expect popular adolescents to engage in the specific function of proactive aggression, which is more strategic and more goal-oriented than reactive aggression.

As suggested before, a main theoretical perspective for understanding the etiology of proactive aggression is social learning theory, which states that aggression is a learned response reinforced by positive consequences (Bandura, 1983). Indeed, proactive aggression is defined

as instrumental and driven by perceived benefits, such as achieving and maintaining dominance among peers (Dodge & Coie, 1987; Volk, Dane, & Marini, 2004). Popular youth may be motivated to maintain their dominance and status, and may therefore use proactive aggression strategically to control peers and to gain or maintain power and influence in the peer group. Moreover, because proactive aggression is instrumental and strategic, it may be linked with a certain social skillfulness (i.e., sophisticated enough to limit the negative consequences of aggression), which is in line with the behavioral profile of popular adolescents.

POPULARITY AND REACTIVE AGGRESSION

In contrast, popular adolescents are less likely to show reactive aggression. Based on the Frustration–Aggression model (Dollard et al., 1939), reactive aggression is a result of an angry defensive response to frustration or provocation by others. Reactive aggression can be seen as a dysregulated and undercontrolled form of “communication” to express discontent. It is suggested that youth who are unattractive as friends and who experience difficulties in peer relations are more likely to attribute hostile intent to peers and to generate aggressive responses to peer dilemmas. As a result, they respond to these experiences of exclusion with (reactive) aggression (Poulin & Boivin, 1999; Price & Dodge, 1989; Sijtsema et al., 2009). Therefore, reactive aggression may be more likely in unpopular youth. Reactive aggression is also related to a lack of social skills and less socially competent behavior (Crick & Dodge, 1994), which is more associated with unpopular youth than popular youth.

Therefore, we predicted that aggressive behavior would be apparent in both popular and unpopular adolescents, with a positive association between popularity and proactive aggression, and a negative association between popularity and reactive aggression. In addition to these linear effects, it was predicted that a significant minority of both low and high popularity adolescents would show both types of aggression. This would result in a curvilinear trend in which reactive aggression is predominantly associated with low status, but also with high status, and proactive aggression predominantly with high status, but also with low status (Prinstein & Cillessen, 2003).

STABILITY OF POPULARITY AND AGGRESSION

Even though popularity is positively correlated across age, the correlation is not perfect, meaning that there are adolescents who gain or lose popularity over time. Especially in adolescence, and in the first grades of secondary school after school transition, new

opportunities for peer relationships and social positions are provided, which may lead to changes on an individual's popularity over time. From previous studies, we know that gains in popularity are associated with increases in overt and relational forms of aggression (Cillessen & Mayeux, 2004). Similarly, changes in popularity may be associated with different functions of aggression. Increases in popularity over time may be associated with higher levels of proactive aggression, as adolescents learned that this proactive aggression is a way to dominate over peers and to maintain or even enhance their status, which reflects the social learning process (Cillessen, 2011). On the other hand, losing popularity may be associated with increases in reactive aggression (i.e., using aggressive tendencies to cope with anger or frustration). To test these hypotheses, the second purpose of the present study was to investigate how changes in popularity are associated with changes in reactive and proactive aggression (from Grade 7 to Grade 8), and whether changes in popularity differentially predict reactive and proactive aggression over time.

The current study also examined whether effects of popularity on reactive and proactive aggression differed between boys and girls. There is some evidence that the link between popularity and aggression is moderated by gender. For example, it has been found that popularity is more strongly related to relational aggression for girls than for boys during early to middle adolescence (Cillessen & Mayeux, 2004). However, other studies found similar effects of popularity on aggression in both sexes (e.g., LaFontana & Cillessen, 2002; Rose et al., 2004; Vaillancourt & Hymel, 2006). These mixed findings emphasize the need to have a closer look at gender as moderator of the link between popularity and the functions of reactive and proactive aggression. Based on previous studies, however, we predicted stronger associations between popularity and proactive aggression for boys, as boys might be more focused on dominating (Sijtsema et al., 2009). Although popularity seems to be less related to aggression in general for girls (Coie, Dodge, & Kupersmidt, 1990), based on previous empirical findings we expected similar associations between popularity and reactive aggression for boys and girls (Salmivalli, Kaukiainen, & Lagerspetz, 2000).

CURRENT STUDY

To summarize, the goals of this study were: (1) test the hypothesis that popularity is differently related to different functions of reactive and proactive aggressive behavior both cross-sectionally and longitudinally, (2) to test for curvilinear effects on reactive and proactive aggression, in addition to linear effects, (3) to test

whether *changes* in popularity predict reactive and proactive aggression over a 1-year period, and (4) to examine whether effects are similar for boys and girls. This study adds to the existing literature in several ways. First, hypotheses were tested in a longitudinal sample of young adolescents in their first 2 years of secondary school (Grade 7 and 8), which is an important period in which new peer relations will be formed (Brown, 2011). Peer groups, and therefore social status among peers, become increasingly important. Moreover, the transition to high school can be seen as a developmental risk point with significant increases in aggressive behavior (Walker, Colvin, & Ramsey, 1995). Knowledge about factors that cause or are associated with increases in aggression is useful for the development of preventive interventions that can alter developmental trajectories toward aggression in adolescence.

Second, very few studies tested these assumptions using peer nominations of reactive and proactive aggression and popularity. Although peer nominations are valid methods for understanding children's social relationships, studies on reactive and proactive aggression have typically relied on teacher-reports (e.g., Card & Little, 2006). Peer nominations of aggression assess youth's engagement in aggressive behavior in the absence of adult supervision. As adults are typically less aware of the prevalence of aggression in high status children (Mayeux et al., 2011), parent- or teacher-reports may be especially inaccurate in this case. Further, peer nominations are based on multiple informants and are therefore a reliable way to assess engagement in aggressive behavior (van Lier & Crijnen, 2005). Differentiating between proactive and reactive aggression should enable a more refined understanding of why both popular and unpopular adolescents engage in aggressive behavior.

METHOD

Participants and Procedure

Participants were part of the Kandinsky Research Project, a longitudinal study on detecting children at risk for social and emotional problems in secondary education. For the current study, we selected adolescents who were in seventh Grade (first year of Dutch secondary education) at Time 1 and in eight Grade at Time 2. A total of 266 adolescents from 10 classrooms of a secondary school in a city in the south-eastern Netherlands participated in both grades (56% boys; Time 1: $M_{age} = 12.80$, $SD = .40$; Time 2: $M_{age} = 13.71$, $SD = .40$). Most of the adolescents indicated that they were native Dutch (94%).

This study was conducted in agreement with the policies of the school where the data were collected and

approved by the Institutional Review Board of our institution. Parental consent was obtained through regular school policies: the school requested parental permission at the beginning of the school year for all examinations and studies that they considered necessary for the well-being of the students. The school signed a letter in which they formally requested us to conduct a study on the socio-emotional well-being of their students and in which they claimed the responsibility for the parental consent procedure. Parents were informed by a letter (distributed by the school) about the purpose and procedures of the study. The letter also requested them to respond if they wanted to exclude their child from participation. None of the parents objected to the participation of their son or daughter and none of the participants declined to fill out the questionnaire prior to or during the assessment. Of the 273 participants eligible for participation, seven participants were absent, either at Time 1 or Time 2, due to illness.

Prior to testing in the classroom, participants were verbally informed by one of the researchers about the goal of the study and the computerized questionnaire during a 10–15-min instruction period. They could also ask any questions they might have had. In the verbal instruction, the confidentiality and privacy of answers were emphasized. We also discuss the ethics of sociometric data collection more generally (e.g., clear instructions with explanations of confidentiality and anonymity), and specific ethical issues regarding the computerized versions (e.g., explanation of storage of code numbers instead of names, etc.). Students were asked to keep their answers to themselves and to be truthful in answering all questions.

For the sociometric questions, a procedure was built in to prevent students from going through the questionnaire without at least reading or considering any question by just clicking through the screens. This procedure required participants to provide at least one nomination for each sociometric question. However, participants were never forced to answer questions. They were explicitly told that they could stop at any given moment. This meets the ethical guidelines for sociometric research (Guideline 2, Bell-Dolan & Wessler, 1994). If students said they did not know whom to nominate, we gave an extra verbal explanation of the purpose of the question and procedure to keep the answers anonymous. In all cases, students were confident to nominate one or more of their peers for the specific sociometric question and proceeded without hesitation. None of them indicated that they felt coerced. The computerized questionnaire started with an introduction in which the most important information from the verbal instruction that had just been given in the classroom was mentioned again. The confidentiality and anonymity of the data was

again emphasized. Students had to read this instruction and assent by clicking “start” before they could proceed. Students had the option to withdraw at any time during the assessment and completely stop if they wanted to do so with no adverse consequences. None of the participants declined to fill out the questionnaire prior to or during the assessment.

During the assessment (45–60-min classroom session), talking was prohibited to guarantee participants’ privacy and the reliability of the assessment. All participants sat in a test arrangement (i.e., a private desk), with adequate space between desks. Dividers were placed around the computer screens. In this way, it was impossible for students to see others’ computer screens. There were always at least two researchers present during data collection to make sure instructions were followed and to answer any questions students had while completing the computerized questionnaire.

Measures

Sociometric and peer assessment. The participants completed a computerized sociometric and peer assessment questionnaire that included measures of popularity, reactive aggression, and proactive aggression. Each question was presented on a separate screen at the top of the page, followed by a list of the names of all students in the classroom. The order of names was randomized for each participant but remained the same across the questions for that participant. Participants named classmates for each question by clicking on the names. If a participant clicked on a name, the color of the name changed from black to gray. In this way, participants could see whom they had nominated, while others could not easily detect their choices if they happened to see the screen. Participants had to nominate at least one classmate for each question before they could go to the next question. They could not name themselves, because their names were not presented on the screens. Computerized sociometric and peer assessment has shown to be a reliable and valid method (van den Berg & Cillessen, 2013). The nomination procedure was within classrooms and not within grades as the Dutch school system has a strong classroom structure. Students are in a classroom with the same peers throughout the entire day and throughout the majority of the school week.

Popularity. Adolescents were asked to nominate classmates who were “most popular” and who were “least popular.” They could nominate an unlimited number of same-sex and other-sex peers, with a minimum of one nomination. They were not allowed to name themselves. Nominations *received* were counted for each item and standardized within classrooms. In each wave (Grade 7 and Grade 8), a score for

popularity was computed as the difference between the standardized most popular and least popular scores, and again standardizing the resulting scores within classrooms (Parkhurst & Hopmeyer, 1998). This continuous score for popularity was used to answer the first research question.

For the second research question, the standard scores for popularity were recoded into three categories at each wave; popular ($z \geq 1$), average popular ($-1 \leq z \leq 1$), and unpopular ($z \leq -1$). Next, five groups were created that indicated the stability of the popularity categories: (1) stable unpopular (unpopular in Grade 7 and Grade 8, $n = 22$ children), (2) stable popular (popular in grades 7 and 8, $n = 24$ children), (3) stable average popular (average popular in both grades, $n = 171$ children), (4) increasing popular (unpopular or average in Grade 7, average or popular in Grade 8, $n = 25$ children), and (5) decreasing popular (popular or average in Grade 7, average or unpopular in Grade 8, $n = 24$ children).

Reactive and proactive aggression. The questions for reactive and proactive aggression were based on the questionnaire developed by Dodge and Coie (1987). For reactive aggression, adolescents were asked to nominate classmates “who feel threatened or attacked easily (even though this might not have been intended). These classmates are not able to control their behavior and feelings and react with aggressive behavior, like yelling or hitting.” For proactive aggression, adolescents were asked to nominate classmates “who try to reach their goals by using aggressive behavior. These classmates intimidate, manipulate or bully others to get admiration, respect or objects.” If students did not know what the questions meant, they could ask one of the researchers or research assistants for extra information or explanations. Students did not ask more questions about these variables than they did about the other sociometric variables. As for popularity, participants could not name themselves, but could nominate an unlimited number of same-sex and other-

sex peers, with at least one nomination for each question. At each wave, nominations received were counted for each question and standardized within classrooms.’

RESULTS

Descriptive Statistics

Intercorrelations between all variables were calculated for boys and girls separately at Time 1 (Grade 7) and Time 2 (Grade 8; see Table I). For both boys and girls, popularity was associated with less reactive, but more proactive aggression at Time 1. This same pattern of correlations was found at Time 2. Moreover, for both boys and girls, popularity at Time 1 was associated with less reactive aggression and more proactive aggression at Time 2. Popularity and aggression in Grade 7 and popularity and aggression in Grade 8 were highly correlated for both boys and girls, indicating stability of popularity and aggression across waves.

Some significant differences in correlations between boys and girls were found, using Fisher’s *r*-to-*z* tests. Correlations indicated more stability over time among boys in reactive aggression ($r_{boys} = .54, r_{girls} = .25, z = -2.79, P < .01$) and proactive aggression ($r_{boys} = .48, r_{girls} = .21, z = -2.48, P < .05$) than among girls. Furthermore, correlations indicated that reactive and proactive aggression were more strongly correlated in boys than in girls: reactive and proactive aggression Time 1: $r_{boys} = .64, r_{girls} = .27, z = -3.85, P < .01$; reactive aggression Time 1 and proactive aggression Time 2: $r_{boys} = .50, r_{girls} = .14, z = -3.27, P < .01$.

Independent samples t-test revealed no differences between boys and girls in mean levels of popularity at Time 1 and Time 2 (see Table I). However, boys had higher mean levels of reactive (Time 1: $t = 3.87, p < .01$; Time 2: $t = 4.11, p < .01$) and proactive aggression than girls (Time 1: $t = 4.78, p < .01$; Time 2: $t = 4.75, p < .01$).

TABLE I. Intercorrelations, Means and Independent Sample T-Tests

	1	2	3	4	5	6	M ^a _{boys} (N = 148)	SD _{boys}	M ^a _{girls} (N = 118)	SD _{girls}	t
Reactive aggression T1	–	.27**	–.26**	.25**	.14	–.16	.17	1.12	–.27	.62	3.87**
Proactive aggression T1	.64**	–	.32**	.11	.21*	.22*	.23	1.18	–.32	.48	4.78**
Popularity T1	–.20**	.27**	–	–.25*	.15	.80**	.08	1.76	–.08	1.37	.829
Reactive aggression T2	.54**	.24**	–.10	–	.47**	–.26**	.21	1.15	–.27	.66	4.12**
Proactive aggression T2	.50**	.48**	.21*	.54**	–	.19*	.23	1.16	–.31	.49	4.75**
Popularity T2	–.16**	.31**	.88**	–.04	.30**	–	.17	1.77	–.19	1.39	1.79

Note. Values above the diagonal are for girls, below diagonal are for boys.

* $P < .05$.

** $P < .01$.

^aStandardized scores.

TABLE II. Associations Between Popularity and Reactive and Proactive Aggression: Cross-sectional Analyses

	Grade 7				Grade 8			
	Reactive Aggression		Proactive Aggression		Reactive Aggression		Proactive Aggression	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.05**		.08**		.06**		.08**	
Gender		-.23**		-.28**		-.25**		-.28**
Step 2	.04**		.07**		.02*		.15**	
Popularity		-.21**		.26**		-.14*		.39**
Step 3	.15**		.09**		.25**		.17**	
Popularity \times Popularity		.40**		.31**		.50**		.41**
Step 4	.01		.00		.00		.04**	
Gender \times Popularity		.04		-.04		.04		-.25**
Step 5	.00		.00		.01		.00	
Popularity \times Popularity \times Gender		-.01		.01		-.11		-.12
Total R^2	.25**		.24**		.34**		.44**	

* $P < .05$.** $P < .01$.

Cross-Sectional Associations Between Popularity and Reactive and Proactive Aggression

To examine associations between popularity and the two functions of aggression at each time point, hierarchical regression analyses were conducted for each grade, separately for reactive and proactive aggression. In Step 1, we entered gender to control for gender effects on the outcome variable. In Step 2, popularity in the same year was entered (in Grade 7 or Grade 8). In addition to the linear associations between popularity and aggression, curvilinear trends were expected that would indicate that adolescent aggression would be associated with high status but also with low status. Therefore, we entered a quadratic term of popularity in Step 3. The next two steps included interactions to test whether gender moderated the linear effect of popularity (Step 4) or the quadratic effect of popularity (Step 5). The results are presented in Table II.

The proportion of variance significantly explained by all predictors was .25 for reactive aggression and .24 for proactive aggression in Grade 7. In Grade 8, the proportion of variance explained was .34 for reactive aggression and .44 for proactive aggression. Gender predicted both reactive and proactive aggression in Grade 7 and 8, with girls displaying lower levels of both than boys. In each model, significant linear effects emerged with popularity negatively predicting reactive and positively predicting proactive aggression in each grade. In addition, a significant curvilinear trend emerged for popularity in all models. The combined presence of significant linear and curvilinear trends indicates that the data are best fit by a J-shaped curve (Prinstein & Cillessen, 2003). The interaction between

popularity and gender was significant and reliably explained additional variance in proactive aggression in Grade 8. Post-hoc probing of this interaction indicated that popularity was a significant positive predictor of proactive aggression for both boys and girls, with stronger effects for boys. Finally, the interactions of the quadratic term of popularity with gender were not significant, indicating similar curvilinear effects of popularity on both forms of aggression for boys and girls. Figures 1–4 illustrate the curvilinear effects, plotted separately for boys and girls. From the figures, it can be concluded that low popular youth show the highest level of reactive aggression, but that a substantial group of high popular youth display reactive aggression as well. Boys in general display higher levels of reactive aggression than girls. For proactive aggression, we found that mainly popular youth display high levels of proactive aggression, with higher mean levels for boys.

Prediction of Reactive and Proactive Aggression From Popularity: Longitudinal Analyses¹

A similar set of analyses was conducted to predict aggression from popularity over time. The dependent variables in these analyses were reactive and proactive aggression in Grade 8. In Step 1, we again entered gender, to control for gender effects. In Step 2, reactive or proactive aggression in Grade 7 were entered, to examine the effect of popularity (in Step 3) on aggression in Grade 8 when controlling for aggression in Grade 7 (i.e., examining popularity as predictor of

¹ Models with popularity in Grade 8 as dependent variable and reactive and proactive aggression (Grade 7) as predictors were non-significant.

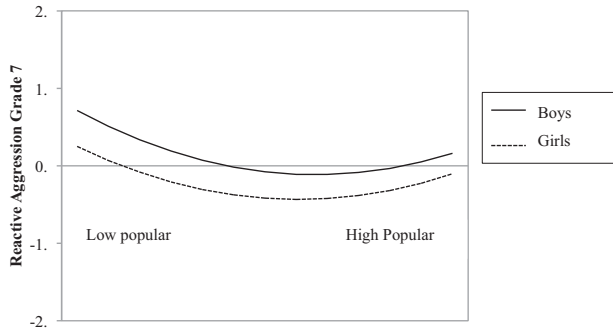


Fig. 1. Cross-sectional associations between popularity and reactive aggression (Grade 7).

change in aggression). In Step 3, we entered popularity in Grade 7. In Step 4, we again entered the quadratic term of popularity. In Step 5, we entered the interaction between gender and popularity, and finally in Step 6, we entered the interaction between gender and popularity squared.

The proportion of variance explained by all predictors together was .47 and .48, for reactive and proactive aggression, respectively (see Table III). Aggression in Grade 7 positively predicted aggression 1 year later, indicating stability of aggression. Popularity in Grade 7 did not significantly predict reactive aggression in Grade 8, but positively predicted proactive aggression in Grade 8. However, the significant quadratic terms indicated curvilinear effects for popularity on reactive and proactive aggression. For reactive aggression, it indicates that it was predominantly associated with low popular status, but also with high popular status. For proactive aggression, we found an inverse J-shaped curve, indicating that proactive aggression not only was predominantly associated with high popular status, but also with lower popular status (see Figs. 5 and 6). The interaction between gender and popularity was significant

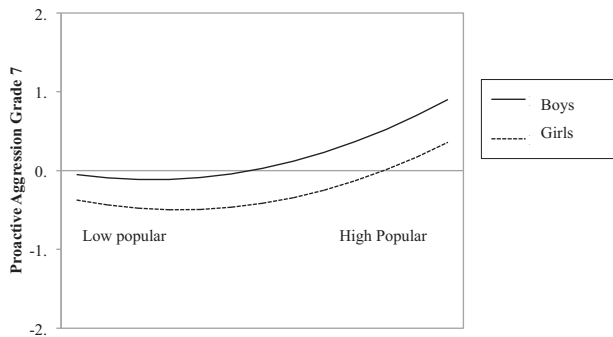


Fig. 2. Cross-sectional associations between popularity and proactive aggression (Grade 7).

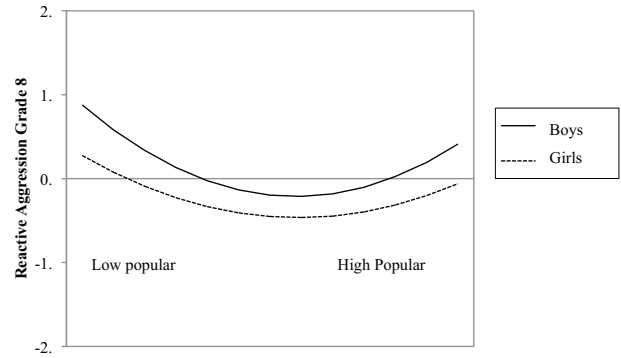


Fig. 3. Cross-sectional associations between popularity and reactive aggression (Grade 8).

for proactive aggression in Grade 8, with a stronger effect for boys. The interaction between popularity squared and gender was significant for both reactive and proactive aggression, indicating different curvilinear effects for boys and girls (see Fig. 6). Especially for boys, popularity predicted proactive aggression over time.

Stability in Popularity as Predictor of Reactive and Proactive Aggression

The means and standard deviations of reactive and proactive aggression for the five popularity groups are shown in Table IV. To predict reactive and proactive aggression over time (Grade 7 and Grade 8) from stability in popularity, we ran a 5 (Popularity Group) × 2 (Time: Grade 7 vs. Grade 8) ANCOVA on reactive aggression and on proactive aggression, with time as a repeated measures factor and gender as a covariate.

The analysis for reactive aggression yielded a main effect of popularity group, $F(4, 260) = 19.97, P < .001$. The popularity groups differed in reactive aggression in Grade 7, $F(4, 261) = 15.05, P < .001$, and Grade 8, $F(4, 261) = 19.09, P < .001$. Post-hoc comparisons of all

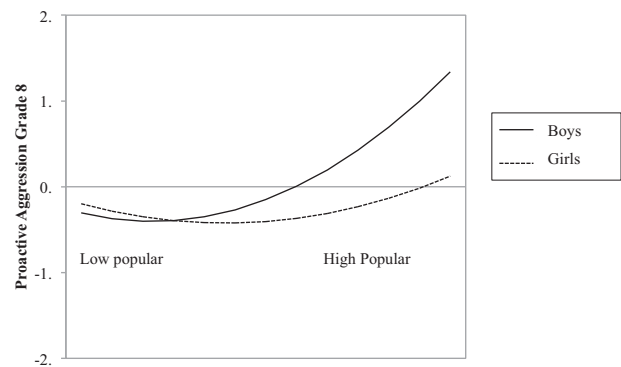


Fig. 4. Cross-sectional associations between popularity and proactive aggression (Grade 8).

TABLE III. Prediction of Reactive and Proactive Aggression From Popularity: Longitudinal Analyses

	Grade 8			
	Reactive Aggression		Proactive Aggression	
	ΔR^2	β	ΔR^2	β
Step 1	.06*		.08**	
Gender		-.25**		-.28**
Step 2	.37**		.26**	
Aggression Grade 7		.63**		.53**
Step 3	.00		.04	
Popularity Grade 7		-.02		.21**
Step 4	.04**		.05	
Popularity \times Popularity		.21**		.25**
Step 5	.00		.04	
Gender \times Popularity		-.05		-.23**
Step 6	.00		.01	
Popularity \times Popularity \times Gender		-.04		-.12*
Total R^2	.47**		.48**	

* $P < .05$.

** $P < .01$.

five groups at each time point were conducted using Tukey’s tests. The results of these comparisons are indicated in Table IV. The highest levels of reactive aggression were in unpopular youth in Grade 7 and for both unpopular and popular youth in Grade 8. There was also a significant main effect for gender, $F(1, 260) = 16.02, P < .001$. Boys were more reactively aggressive than girls in Grade 7, $t = 3.87, P < .001$, and Grade 8, $t = 4.12, P < .001$. There were no other significant effects.

For proactive aggression, a main effect of popularity group was found, $F(4, 260) = 16.79, P < .001$. The popularity groups differed in proactive aggression in Grade 7, $F(4, 261) = 7.44, P < .001$, and Grade 8, $F(4, 261) = 25.60, P < .001$. Again, post-hoc comparisons were performed using Tukey’s tests (see Table IV). The highest levels of proactive aggression were found for stable popular children. The analysis also yielded a main

effect of gender, $F(1, 260) = 23.02, P < .001$. Boys were more proactively aggressive than girls in Grade 7, $t = 4.78, P < .001$, and Grade 8, $t = 4.75, P < .001$. Moreover, there was a significant time by popularity group interaction, $F(4, 260) = 5.57, P < .001$. Post-hoc testing indicated that the change in proactive aggression from Grade 7 to Grade 8 varied between groups. There were significant increases in proactive aggression for stable popular youth ($t = 2.00, P = .050$) and significant decreases in proactive aggression for decreasing popular youth ($t = -2.45, P = .020$). There were no other significant effects.

DISCUSSION

Recently, studies using sociometric assessment for measuring youth social relationships found evidence for the associations between both high and low peer status

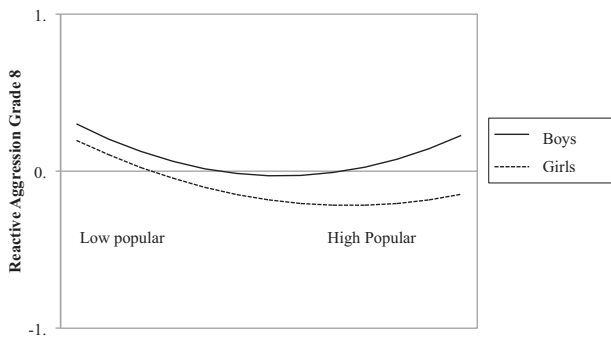


Fig. 5. Longitudinal associations between popularity and reactive aggression.

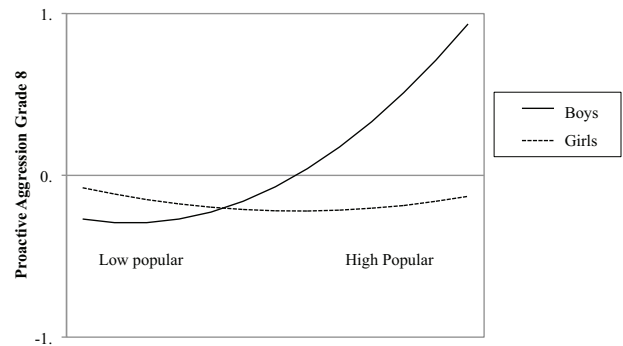


Fig. 6. Longitudinal associations between popularity and proactive aggression.

TABLE IV. Means and Standard Deviations for Subgroups Resembling Stability of Popularity

	Unpopular (<i>n</i> = 22)	Decreasing Popular (<i>n</i> = 24)	Average Popular (<i>n</i> = 171)	Increasing Popular (<i>n</i> = 25)	Popular (<i>n</i> = 24)
Reactive aggression Grade 7	1.19 (1.40) _a	-.22 (.57) _{bd}	-.24 (.81) _b	.21 (.82) _{bd}	-.03 (.96) _{cd}
Proactive aggression Grade 7	.01 (.98) _a	.16 (.95) _{ab}	-.21 (.78) _a	.33 (1.26) _{ab}	.80 (1.39) _b
Reactive aggression Grade 8	1.28 (1.76) _a	.04 (.94) _{bc}	-.26 (.64) _b	-.02 (.83) _b	.66 (1.14) _{ac}
Proactive aggression Grade 8	.09 (1.16) _{ab}	-.30 (.30) _a	-.25 (.53) _a	.41 (1.24) _b	1.58 (1.65) _c

Note. Means within rows with different subscripts were significantly different ($P < .05$).

and aggressive behavior. Thus, high levels of aggression occur at both low and high levels of social status. However, differences may occur between youth with high and low social status in the function of aggression. The goal of the current study was to disentangle the association between peer popularity and aggression, by distinguishing two functions of aggression as indicators of the underlying motives of aggression. To do so, we examined whether peer popularity was uniquely related to reactive and proactive functions of aggression in a sample of middle school adolescents (Grade 7–8) using peers' perspectives on both popularity and proactive and reactive aggression. Following previous research, we examined linear and nonlinear models to further clarify the complex associations between status and aggression (Prinstein & Cillessen, 2003). First, we tested whether popularity was differentially related to the two functions of aggressive behavior using both cross-sectional and longitudinal designs. The general pattern of findings was that, both concurrently and over time, high popular adolescents predominantly display high levels of proactive aggression, but low levels of reactive aggression. Curvilinear trends indicated minor associations of low popularity with proactive aggression and high popularity with reactive aggression. The association between popularity and proactive aggression tended to be stronger for boys. We also examined the stability of popularity in association with reactive and proactive aggression. Here too, as expected, stably popular adolescents engaged in the highest levels of proactive aggression, whereas stable unpopular adolescents engaged in the highest levels of reactive aggression.

Differential Associations of Popularity With Reactive and Proactive Aggression

As indicated earlier, growing evidence indicates that peer popularity is mainly associated with specific forms of aggression (i.e., relational aggression). Findings of the current study build on previous studies by examining the association between popularity and functions of aggression. Our results support the hypothesis that adolescents scoring high on popularity show higher levels of proactive aggression, whereas unpopular adolescents display more reactive aggression. Moreover, findings of

stability analyses show that youths who are perceived as popular over time (Grade 7 and Grade 8) display the highest levels of proactive aggression, whereas stable unpopular youths show the highest levels of reactive aggression. These results add to previous findings that popular adolescents have a significant aggressive component to their behavior by providing evidence on the motives of popular youth for engaging in aggressive behavior. Proactive aggression is thought to be driven by the anticipated rewards that follow the perpetration of aggressive acts: it is used to possess objects or to dominate peers (Bandura, 1973; Dodge, 1991). Using proactive aggression as a means of achieving dominance may contribute to the popular status of the adolescent (Vitaro et al., 2006). An alternative explanation for the prediction of proactive aggression over time from popularity, which is also in line with social learning theory, is that adolescents who are popular and proactively aggressive may be increasingly likely to affiliate with other popular and aggressive peers from whom they receive reinforcement for their (proactively) aggressive behavior.

While proactive aggression can have an instrumental value in the peer group, reactive aggression is not functional socially. Our findings indicate that unpopular adolescents are likely to show reactive aggression. This is consistent with other studies showing that children with more severe deficits in peer relations show higher levels of reactive aggression (e.g., Dodge & Coie, 1987; Price & Dodge, 1989). These children may expect rejection and are, as a result, hyper vigilant to small signs of disapproval from peers. This, in turn, may cause them to respond more aggressively toward peers in social situations.

After accounting for linear effects, significant curvilinear trends indicated that reactive, impulsive aggression, albeit to a lesser degree, was not only exhibited by unpopular adolescents but also by popular adolescents. Similarly, proactive, instrumental aggression was not only exhibited by popular adolescents but also by unpopular adolescents. Although the general pattern of findings remained unchanged, the nonlinear effects suggested that a significant minority of adolescents display both functions of aggression. These findings may indicate that a subgroup of popular adolescents has problems in controlling their behavior in peer conflict

situations, but apparently without negatively influencing their popularity status. Similarly, these findings may indicate that a subgroup of unpopular adolescents use planned and goal-oriented aggression to achieve a certain (social) goal, despite frequent issues in controlling their aggressive behavior and without positively influencing their popularity status. These results, in addition to findings from linear models in previous studies on status and aggression, offer new evidence concerning the complex association between status and aggression: adolescents who show aggressive behavior are a heterogeneous subgroup with different motives for their behavior. As Prinstein and Cillessen (2003, pp. 336) state: "Whereas linear models are limited by describing only a single predicted association, the examination of curvilinear trends allows for a systematic study of the heterogeneity of adolescents who may behave aggressively, suggesting that this behavior may be associated with various points along the status continuum." The findings of the current study contribute to the ongoing debate on the validity of the distinction between reactive and proactive aggression (Miller & Lynam, 2006; Raine et al., 2006). Although reactive and proactive aggression co-occur, results of this study provide evidence for different status antecedents of both constructs.

Few gender differences were found in this study of associations between popularity and reactive and proactive aggression. Consistent with other studies, there were differences in mean levels of aggression (Bongers, Koot, van der Ende, & Verhulst, 2003), with boys displaying higher levels of reactive and proactive aggression in both grades. This confirms the view that gender may be a predisposing factor for the development of aggressive behavior (Card, Stucky, Sawalani, & Little, 2008). There were no differences in mean levels of popularity between boys and girls. Most associations between popularity and aggression were not moderated by gender, however, with only a few exceptions: interaction effects between gender and popularity indicated somewhat stronger effects on proactive aggression for boys. This is in line with the findings of Sijtsema et al. (2009) and might be explained by the included measures: the proactive measure might be more applicable to boys because of the more physical component in it. Moreover, as suggested by Sijtsema et al. (2009, pp. 64): "boys are more focused on dominating (Pellegrini & Long, 2002) and thus use more proactive aggression as a means to achieve this." Despite this interaction effect between gender and popularity, overall, results of this study suggest that the pattern of correlates of popularity and aggression may be relatively similar for both boys and girls (Hawley, 1999).

Limitations and Directions for Further Research

This study builds on previous research by examining not only a general hypothesis about the association between popularity and aggression, but also by specifically testing the functions of aggression that are linked with popularity, as predicted by theory. To our knowledge, this study is one of the first to examine popularity and aggressive functions as perceived by peers, using sociometric measures. Nevertheless, there are also some limitations.

First, our nomination procedure was within classrooms and not within grades. The reason for using classroom nominations is because the Dutch school system has a strong classroom structure. Students are in the classroom with the same peers the entire day throughout the school week. As a result, they come to know each other very well and friendships are mostly within the same class. However, it is possible that in some classes there were none of the popular students or students with aggressive behavior. Especially in smaller groups, with fewer peers, some sociometric roles or behavior reputations may not occur. Because the procedure requires students to name at least one student, it is particularly important to remember that sociometric assessment scores derived from peer nominations are relative to the group within which they were collected.

Second, although peer reports are considered the most valid and generalizable method for assessing peer relations and aggression (because scores derived from peer nomination are based on the opinions of multiple informants and, therefore, are less vulnerable to self-reporting biases), using peer reports to assess both social status and may have inflated statistical findings due to shared method variance. Therefore, current findings should be replicated in studies that include both peer- and self- or teacher reports.

A final limitation to the current study was the use of single-item measures to assess popularity, reactive and proactive aggression. Although use of peer nomination procedures means that the final scores are based on responses from multiple informants, future research could implement a scale to further examine the validity of the measures and to make sure that the adolescents' definitions of the construct are assessed.

To provide a more comprehensive view, future research on popularity and aggression should examine a model in which forms (i.e., relational and physical) and functions (i.e., reactive and proactive) of aggression are integrated. Reactive and proactive aggression may be underlying different observed overt or social relational forms of aggression, and although forms and functions may co-occur and may be exhibited by the same

individuals, they might have unique associations with (the development of) peer social status (e.g., Prinstein & Cillessen, 2003; Sijtsema et al., 2009). Moreover, longitudinal studies during early and middle adolescence are necessary to examine developmental trajectories of popularity and forms and functions of aggression. Especially, during the transition years to adulthood, social norms and rules change. Although specific forms and functions of aggression are socially acceptable at certain age (e.g., overt forms of aggression are more accepted in younger childhood), while growing older, this behavior might become less accepted.

Although we found evidence for popularity as a predictor of reactive and proactive aggression, we did not test exactly why youth with different social status show different functions of aggression. To achieve a better understanding of underlying processes that link peer status to the different functions of aggression, future studies should include, for example, social cognitive measures (i.e., hostile attribution biases, social dominance).

CONCLUSION

Overall, this study further clarifies the association between popularity and aggression by distinguishing proactive and reactive functions of aggression and by examining nonlinear effects. Popular youth mainly demonstrated proactive aggression, which is instrumental aggression. Unpopular adolescents mainly demonstrated reactive aggression, which is characterized by angry or defensive reactions to perceived provocation. Although findings should be considered tentative, until replicated with other study samples, these different motives for aggression also may have practical implications. Intervention programs targeting aggressive behavior may find it useful to distinguish the two subgroups of aggressive youth—popular and socially competent adolescents and unpopular adolescents—as both groups may require different kinds of interventions. Especially for popular youth, who show proactive aggressive behavior, interventions should be adapted to reduce the benefits and increase the costs of their aggressive behavior (Reijntjes et al., 2013).

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