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The Norms of Popular Peers Moderate Friendship Dynamics of Adolescent Aggression

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This study examined whether peer norms for aggression within the classroom impact friendship selection, maintenance, and socialization processes related to aggression across the 1st year of secondary school (N = 1,134 students from 51 classes, M_{age} = 12.66). As hypothesized, longitudinal social network analyses indicated that friendship selection and influence processes related to aggression depended on the popularity norm within the classroom (i.e., the class-level association between popularity and aggression) rather than the descriptive norm (aggregated average of aggressive behavior). Hence, *only* in classes where the valence of aggression is high (because it is positively associated with popularity), adolescents tend to select their friends based on similarity in aggression and adopt the aggressive behavior of their friends.

Peer relations provide an important developmental context for adolescent aggressive behavior (Dishion, Piehler, & Myers, 2008). Aggressive behavior may shape peer relationships through processes in which peers select and maintain similar others as friends; relationships, in turn, may shape individual aggressive behavior through peer socialization (i.e., influence) processes. Due to these processes, similarity in aggression occurs among friends. However, friendship selection, maintenance, and influence dynamics do not operate in isolation, but are encapsulated in broader social peer contexts, such as classes and schools (Veenstra & Dijkstra, 2011). One way of characterizing the broader social context in the classroom is by using the concept of peer norms (Dijkstra & Gest, 2015). As peer norms reflect the expected and accepted behavior of a social group (Shaw, 1981), they may be considered a basis for friendship selection, maintenance, and influence processes. Therefore, in the current study, we examined the moderating role of peer norms for aggression on friendship dynamics (i.e., selection, maintenance, and influence) related to adolescents' aggressive behavior.

Peer Selection, Maintenance, and Socialization Processes related to Aggression

According to the similarity attraction hypothesis (Byrne, 1971), adolescents tend to *select* and *maintain* similar peers as friends, for instance, peers who exhibit similar levels of aggression. Similarity enables individuals to communicate with less effort and with shared feelings of understanding and

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belongingness, making these relationships more rewarding and stable (Byrne, 1971; Veenstra & Dijkstra, 2011). Friends may be similar in aggression not only due to selection or maintenance processes but also because of a tendency to adopt their friends' behavior. These *influence* processes may be due to social pressures, such as reinforcement and persuasion (Dishion, Andrews, & Crosby, 1995), or to observational, social, and vicarious learning mechanisms (Bandura, 1977). Innovative methodological advances like social network analysis allow for the disentangling of peer selection, maintenance, and influence processes in a statistically sound way, yielding reliable indications of the strength and direction of these friendship dynamics (Steglich, Snijders, & Pearson, 2010). However, empirical studies that used these innovative social network analyses to examine friendship dynamics related to adolescent aggression did not examine maintenance processes and vary considerably in their findings on the presence of selection and influence processes. Significant selection effects were found in only one study (Rulison, Gest, & Loken, 2013), whereas these effects were marginal (Sijtsema Ojanen, Veenstra, Lindenberg, S., Hawley, & Little, 2010) or not present in other studies (Dijkstra, Berger, & Lindenberg, 2011; Logis, Rodkin, Gest, & Ahn, 2013; Molano, Jones, Brown, & Aber, 2013). Evidence was found for the presence of influence processes in some studies (Logis et al., 2013; Molano et al., 2013; Rulison et al., 2013; Sijtsema et al., 2010), but not in others (Dijkstra et al., 2011; Sijtsema et al., 2010).

Two major factors may explain why findings regarding friendship processes related to aggression were inconsistent in earlier studies. First, the nonsignificance of selection processes may result from the fact that, to our knowledge, all studies took place when the adolescents had known each other for several years. It is likely that friendship formation had already taken place and, therefore, the adolescents were less active in selecting new friends. In order to take friendship formation into account, it is worthwhile to follow students who are entering a new peer context: for instance, in the 1st year of secondary education. Second, and more important, the inconsistent findings of previous studies may be due to the fact that none of these studies took into account the social contexts in which friendship selection, maintenance, and influence processes take place. For instance, specific characteristics of the classroom, like peer norms, can be considered an important basis and a crucial standard for the magnitude and direction of friendship processes related to aggression. To our knowledge, in only one study so far has the role of classroom peer norms in friendship dynamics been examined, showing that these peer norms indeed moderated influence processes in the realm of risk attitudes (Rambaran, Dijkstra, & Stark, 2013). More specifically, risk attitudes proliferated more via friendship influence processes in classes with more positive correlations between popularity and risk attitudes (i.e., high popularity norms for risk attitudes) than in classes with negative correlations between popularity and risk attitudes (i.e., low popularity norms for risk attitudes). In this study, we extended upon the study of Rambaran et al. (2013) by examining the impact of peer norms for aggression on friendship dynamics related to aggressive *behavior* (i.e., not *attitudes*) and by additionally examining both selection and maintenance processes in a new peer context.

Peer Norms as a Moderator in Friendship Processes Related to Aggression

Two distinct types of peer norms can be distinguished: descriptive norms and popularity norms. Descriptive norms refer to the perceived average behavior of all peers in a given setting, for instance, a classroom (Wright, Giammarino, & Parad, 1986). Popularity norms indicate to what extent certain behavior in a classroom is associated with popularity. In the literature, "popularity" may refer to two different concepts: *sociometric popularity* (i.e., the extent to which someone is liked) and *perceived popularity* (i.e., the extent to which someone is seen as popular by his or her peers; LaFontana & Cillessen, 2002). Sociometric popularity and perceived popularity start to become different from one another by the middle of elementary school, but their distinction peaks in early adolescence (Cillessen & Rose, 2005). Moreover, during early adolescence, aggression is negatively associated with sociometric popularity, but it becomes increasingly associated with perceived popularity (Cillessen & Mayeux, 2004; Cillessen & Borch, 2006). In this study, consistent with previous studies on popularity norms (Dijkstra & Gest, 2015; Rambaran et al., 2013), we use the term popularity (norms) to refer to *perceived popularity.*

Both descriptive and popularity norms for aggression can be a way of defining the broader social context in which the coevolution of the friendship network and adolescents' aggressive behavior takes place (Chang, 2004; Rambaran et al., 2013). Regarding friendship *selection* and *maintenance* processes, the social misfit theory, which can

be applied to both popularity norms and descriptive norms (Wright et al., 1986), states that when adolescents conform to the norm, they have a greater chance of being accepted or liked and not rejected by their peers, because they fit in with the expectations of the peer group. Hence, although the findings of previous studies have indicated that aggression is related to lower levels of being liked (or sociometric popularity) by other peers (Cillessen & Mayeux, 2004), this appears to depend on the peer norm for aggression within the classroom (Chang, 2004; Dijkstra & Gest, 2015). Indeed, the findings of two studies indicated that in classrooms where antisocial behavior was the descriptive norm, antisocial adolescents were less likely to be rejected or were even liked by their peers (Dijkstra & Gest, 2015; Dijkstra, Lindenberg, & Veenstra, 2008). Similar (and even stronger) results were found in studies of the moderating impact of antisocial popularity norms (i.e., the class-level association between antisocial behavior and perceived popularity) on the association between individual antisocial behavior and being liked (Dijkstra & Gest, 2015; Dijkstra et al., 2008).

When adolescents are liked in a particular setting, they may be seen as attractive friendship partners and, hence, have a greater chance of being selected and maintained as a friend by their peers. Therefore, conforming to the peer norm for aggression in the classroom may foster friendship *selection* and *maintenance* processes related to aggression (Veenstra & Dijkstra, 2011, p. 137). In addition, the reputational salience hypothesis (Hartup, 1996) emphasizes in particular the role of popularity norms in selection and maintenance processes. When aggressive behavior is positively associated with perceived popularity in a given context, this aggressive behavior becomes reputationally salient. This implies that this aggressive behavior has high valence in such a context and that this behavior is an important tool for improving an adolescent's reputation (i.e., popularity in the current study). Aggression may then become an important characteristic based on which adolescents select and maintain each other as friends. Hence, in this study, we expected that the extent to which aggression is associated with popularity within a classroom (i.e., the popularity norm for aggression) would play a more pronounced role in friendship *selection* and *maintenance* processes than descriptive norms for aggression.

Regarding *influence processes*, according to the social impact theory (Latané, 1981), the extent to which adolescents tend to adopt behaviors from their peers depends on the extent to which they experience social forces or pressures in their environment. The strength of these social forces is determined by the power of the source (for instance, the "status of the source," that is, the popularity of peers in the current study), the immediacy of the source (the closeness of peers), and the number of sources present (the higher the number of peers, the greater the impact). Descriptive norms can be used to test this latter aspect of the social impact theory, because they represent the average behavior of *all* peers within a setting. Therefore, we expected that descriptive norms for aggression would play a moderating role in the extent to which adolescents tend to become similar in aggression to their friends.

The social impact theory (Latané, 1981) also suggests that the status of the source acting on the individual can be important. Popularity norms can be used to test this, as they represent the behaviors that are associated with the "status of the source," that is, in the current study, the popularity of aggressive peers in the classroom. Indeed, prior research has indicated that popular peers are powerful and influential and may have a disproportionate impact on what is considered attractive and valuable in a particular context (Cillessen & Rose, 2005). As becoming popular within the peer group is an increasingly important goal during early adolescence (Cillessen & Mayeux, 2004; LaFontana & Cillessen, 2010), behaviors that are associated with popularity have a highly positive valence within the classroom according to the reputational salience hypothesis (Hartup, 1996). Therefore, adolescents may tend to adopt from their friends particularly those behaviors that are associated with popularity (i.e., reputationally salient behaviors) in a particular context (Hartup, 1996). On the basis of this literature, we expected that friendship *influence* processes would depend on the popularity norm for aggression rather than on the descriptive norm for aggression within the classroom.

Present Study

The aim of the current study was to examine to what extent the peer norms (i.e., popularity norms and descriptive norms) for aggression play a role in friendship selection, maintenance, and socialization processes related to aggression among early adolescents within the classroom. On the basis of the social misfit theory and the similarity attraction hypothesis (Byrne, 1971; Dijkstra & Gest, 2015; Wright et al., 1986), we expected that adolescents would be more likely to select and maintain similar

others as friends when they exhibited behaviors that were in line with the peer norms for aggression in the classroom. Regarding influence, we expected that adolescents would have a higher tendency to conform to the aggressive behavior of their friends when this behavior was in line with the peer norms for aggression based on the social impact theory and the hypothesis of reputational salience (Hartup, 1996; Latané, 1981). During early adolescence, especially popularity norms for aggression (rather than descriptive norms) may define an important social context for friendship selection, maintenance, and influence processes. First, popularity is often more highly desired and more actively pursued by adolescents than by children (LaFontana & Cillessen, 2010). Second, during early adolescence, there is an increase in aggression (Moffitt, 1993), and aggression is increasingly linked with popularity (Cillessen & Mayeux, 2004; Cillessen & Borch, 2006). Hence, during early adolescence, behaving like or affiliating with aggressive peers may be an important tool to "bask in reflected glory" and to gain popularity within the peer group (Dijkstra, Cillessen, Lindenberg, & Veenstra, 2010). As friendship networks at school are known to be highly gender segregated (especially during early adolescence; Maccoby, 1998) and aggression is more common among men, we used gender as a predictor for friendship nominations and aggression.

Method

Procedure and Participants

The Social Network Analysis of Risk behavior in Early adolescence (SNARE) project is a longitudinal study of adolescent social and behavioral development (ethical review passed at one of the participating universities; see also Dijkstra et al., 2015; Franken et al., 2015). All 1st-year students in two secondary schools (one in the north and one in the middle of the Netherlands) were approached to take part in the SNARE project (Cohort 1) at the beginning of the academic year 2011–2012. A second cohort of students entering 1st year in these secondary schools was also approached the following academic year, 2012–2013 (Cohort 2).

In the Netherlands, when adolescents enter secondary education, they enter a new school and are organized in classrooms based on their academic capacities. This implies that most adolescents know hardly anybody in their new classroom at the start of the academic year (on average, it was estimated that fewer than two students per classroom came from the same primary school). Moreover, students were in the same class with the same students all day, every day (hence, they did not change between classes). Therefore, this sample of 1st-year students provides an excellent opportunity to examine friendship formation in a new peer context.

For all 1st-year students of Cohort 1 and Cohort 2, data were collected three times in one academic year, that is, 1 month after the students transferred to secondary education (Wave 1 [T1]; in October 2011 for Cohort 1 and October 2012 for Cohort 2), followed by a second wave in December 2011 and 2012 (T2), and a third wave in April 2012 and 2013 (T3). The students received an information letter for themselves and their parents. Parents who did not wish their children to participate in the study were asked to indicate this (passive consent), and students were made aware that they could opt out anytime. The survey was completed in the classroom by computer (under the supervision of a researcher).

Of the 1,144 first-year students that were approached, 0.9% declined to participate for various reasons (i.e., the adolescent was dyslectic or the research was perceived to be too time-consuming). This yielded a sample of 1,134 first-year students (99.1% of the full sample) from 51 classes, 568 (50.1%) boys and 566 (49.9%) girls, with a mean age of $M = 12.66$ ($SD = 0.48$). Each class had 12–30 students ($M = 22.24$ students per class). Of the participants, 46.5% were enrolled in lower level education (including preparatory secondary school for technical and vocational training), and 53.5% were attending higher level education (including preparatory secondary school for higher professional education and for university). The majority of the sample was native Dutch (83.4%).

Measures

All variables were based on peer nominations measured during each of the three waves (T1, T2, and T3). Peer-nominated variables were assessed by asking participants questions about their classmates. Participants could select an unlimited number of same-gender and opposite-gender classmates. There was also the option of selecting "nobody," which allowed us to differentiate between missing responses and valid empty responses in the name generators. Names were presented in random order to avoid answer tendencies. To take differences in the number of respondents per class into account, the number of times an individual was nominated by classmates was tallied and divided by the number of classmates who made nominations minus

one (as the respondent was not able to select him or herself). Moreover, in constructing the peer-nominated variables, students who were absent or refused to participate during a particular wave were subtracted from the total number of students in the class, as they did not nominate any classmates. This yielded scores ranging from 0 (*received no nominations*) to 1 (*received nominations from everyone in the classroom*).

Friendships

The participants received a list of all consenting students in their class. They were asked to indicate who their "best friends" within the class were. Based on these nominations, we constructed an adjacency matrix containing all friendship nominations of the whole class across the three waves.

Aggressive Behavior (Individual Level)

This refers to aggression in the school context, that is, aggression in different forms, visible to all students in the classroom (see also Hamre & Pianta, 2006; Logis et al., 2013; Molano et al., 2013). Individual-level aggressive behavior was assessed using peer nominations on five items relating to aggression: "Who bullies you?", "Who quarrels and/or initiates fights with you?", "Who is rude and defies teachers?", "Who sometimes spreads rumors or gossips about you?", and "Who makes fun of others?" (cf. Lease, Kennedy, & Axelrod, 2002). Exploratory factor analyses for the three waves showed that these five items represented one factor, explaining 59.7%–63.8% of the variance. These five items were averaged for each wave, to create a scale for aggressive behavior. This scale represented the average percentage of peers that nominated a particular adolescent as aggressive using the five items. Cronbach's alphas were $\alpha_{T1} = .76$, $\alpha_{T2} = .77$, and $\alpha_{T3} = .78$ respectively, indicating good internal consistency. Because RSIENA analyses (Simulation Investigation for Empirical Network Analyses) require ordinal categorical-dependent behavior variables, the peer-nominated aggressive behavior was recoded into five roughly equally populated categories, ranging from < 0.1% of peers nominating a student as aggressive to more than 8.0% of peers nominating a student as aggressive.

Popularity Norms (Classroom Level)

Popularity norms (also referred to in the literature as "status norms" by Laninga-Wijnen, Harakeh, Dijkstra, Veenstra, & Vollebergh, 2016; or "norm salience" by Henry et al., 2000) for aggression at T1 were calculated for each class separately as the correlation between peer-nominated aggressive behavior and peer-nominated popularity (Dijkstra & Gest, 2015; Dijkstra et al., 2008). Peer-nominated popularity was assessed by asking participants, "Who is the most popular?" and "Who is least popular?". The score for least popular was subtracted from the score for most popular to obtain a single continuum of popularity (e.g., Cillessen & Rose, 2005; Lease et al., 2002). We distinguished between the three types of classes based on the average within-classroom correlation between peer-nominated popularity and peer-nominated aggression ($M = 0.31$) and standard deviations ($SD = 0.32$). The classes with *low* popularity norms for aggression were those which scored 1 *SD* lower than the average within-classroom correlation between popularity and aggressive behavior ($r < -.01$; type low; $n = 10$ classes). Classes with *average* popularity norms for aggression had average within-classroom correlations between popularity and aggressive behavior ($.00 \leq r \geq .62$, type average; $n = 33$ classes). Classes with *high* popularity norms for aggression scored 1 *SD* higher than the average within-classroom correlation between popularity and aggressive behavior ($r > .63$, type high; $n = 8$ classes).

Descriptive Norms (Classroom Level)

Descriptive norms for aggression were measured at T1 as the aggregated average proportion score for peer-nominated aggressive behavior across all students in the class (Dijkstra & Gest, 2015; Rambaran et al., 2013). Hence, the descriptive norms represent the average proportion of peer-nominated aggression within the classroom. We distinguished between three types of classes based on the aggregated average peer-nominated aggressive behavior ($M = 0.04$) and standard deviations ($SD = 0.02$). The classes with *low* descriptive norms were those which scored 1 *SD* lower than the average proportion of aggressive behavior (type low; $n = 9$ classes). Classes with *average* descriptive norms had average proportions of aggressive behavior (type moderate; $n = 31$ classes). Classes with *high* descriptive norms scored 1 *SD* higher than the average proportions of aggressive behavior (type high; $n = 11$ classes).

Popularity norms and descriptive norms were unrelated ($r_{Spearman} = .003$, $p = .981$). This indicates that those two class-level variables do not overlap. Popularity norms were moderately to highly

correlated across waves ($r_{T1–T2}$ = .73; $r_{T2–T3}$ = .42), as well as descriptive norms ($r_{T1–T2}$ = .49; $r_{T2–T3}$ = .75).

Analytic Strategy

Attrition Analyses

Of the 1,134 respondents, 2.9% showed missing values in T1 and 3.4% and 3.3% in T2 and T3, respectively. The average percentage of missing values per variable was 0.01%. Attrition analyses showed no significant differences in the research variables of interest between partially missing cases and complete cases. Missing data in the network were imputed with the "last observation carry forward" method (LOCF, cf. Ripley, Snijders, Boda, Vörös, & Preciado, 2014). This means that for each missing tie variable the last previous nonmissing value was imputed; if there was no previous nonmissing value, the value 0 (referring to no friendship tie) was imputed. Also for the missing data in the behavioral attribute (i.e., aggression), LOCF was applied, and the missing values were imputed by the mode per observation when no previous nonmissing value existed.

RSIENA Analyses

Analyses were conducted using longitudinal social network analysis (also called "stochastic actor-based models"; Snijders, 2005) implemented using the RSIENA software program (RSIENA version 1.1-289 in R 3.2.2). The RSIENA program estimates to what extent similarity among friends (for instance, in aggression) is due to friendship selection, maintenance, and influence processes (Snijders, Steglich, & Schweinberger, 2007), while controlling for structural network effects and the overall development of a certain behavior in the network (explained below). For a detailed, more technical explanation of longitudinal social network analyses, we refer to Snijders et al. (2007, 2010) and Veenstra, Dijkstra, Steglich, and Van Zalk (2013). See the Appendix for how the terminology used in this study corresponds to the terminology used in prior RSIENA studies.

Structural Network Effects

In this study, we examined four structural network effects as control variables that represent the general tendencies that are present in a friendship network. The "tendency to make friends" parameter functions as an intercept in the friendship model and captures the overall tendency to create friendship ties. In data sets like ours, which are not random samples of students but groups of students sharing a quite intensely experienced classroom context, it is important to take into account our knowledge about the interdependencies that characterize such data and that manifest themselves in the form of friendship networks. The strong point of the chosen analysis method is that it allows for exactly this. Friendships are characterized by a strong tendency to reciprocate relationships, establishing nonindependence among incoming and outgoing relations *within* a dyad. These are controlled for by including the "reciprocated friendships" effect. Friendships are also characterized by group formation tendencies ("friends of my friends are my friends"), establishing nonindependence *between* dyads. This departure from independence is controlled for in this network analysis method by including the "transitive group formation" and "cyclical group formation" effects. In transitive groups, there is a clear hierarchy that some peers receive more friendship nominations than others. Cyclical groups are egalitarian in nature; a positive three-cycles effect can be interpreted as a tendency to have no pronounced differences in the number of friendship nominations that members receive, whereas a negative estimate of the parameter can be interpreted as a tendency to have hierarchical ordering with relatively few three cycles. Examining these four structural network effects helps us to take into account the dependency in friendship networks, but also avoids overestimation of selection, maintenance, and influence effects (Ripley, Snijders, Boda, Vörös, & Preciado, 2014). For instance, two adolescents may become friends based on similarity in aggression, but they may also become friends because they share a common friend (i.e., "friends of my friends are my friends," represented in group formation tendencies).

Friendship Selection Based on Aggression

In addition to these structural network characteristics, selection effects based on aggression were estimated. The "effect of aggression on friendship nominations received" refers to the extent to which aggression affects being nominated as a best friend. Conversely, the "effect of aggression on friendship nominations given" indicates the extent to which aggression affects the number of best friend nominations *given* to peers. Hence, these effects control for the possibility that *everybody* (regardless of their own level of aggression) might have a tendency to select aggressive peers (for instance, because they

are seen as "cool"). Because these two effects were included as control variables, the parameter *similarity-based selection effect* (using creation effects) gave a reliable estimate for testing our hypothesis about the extent to which adolescents form new friendships with others based on similarity in aggression. We also examined similarity-based selection for gender, as same-gender friendships were common.

Friendship Maintenance Based on Aggression

We examined to what extent being similar in aggression predicted that a friendship present at one measurement would still be present at the next measurement (using endowment effects). A positive parameter for similarity-based maintenance of friends indicates that aggression similarity predicts friendship *maintenance*, whereas aggressive behavior dissimilarity predicts friendship *dissolution* (deselection). Friendship termination (deselection) is the reverse of friendship maintenance. Hence, the effect of peer norms on friendship termination can be retrieved by placing a "-" in front of the results for maintenance.

Friendship Influence on Aggression

Friendship influence processes refer to the tendency of adolescents to become similar to their friends in aggression. A positive influence effect represents the tendency of adolescents to adopt friends' aggressive behavior over time; this can work in an upward or in a downward direction (or remain similar), depending on how aggressive an adolescent's friends are. Friendship influence processes were estimated while controlling for the linear shape parameter, quadratic shape parameter, and the main effect of gender on aggressive behavior: It is important to control for the overall development of aggression within a particular context to provide more reliable estimates of the extent to which the adolescents' aggressive behavior is subject to peer influence processes. The *linear* and *quadratic shape* parameters model the rate of change, and whether behavior change conforms to linear or quadratic trends. A positive quadratic shape parameter means that the higher an adolescent scores on aggressive behavior, the stronger the adolescent's tendency become even more aggressive (escalation); a negative quadratic shape parameter means that the higher an adolescent scores on aggression, the lower the adolescent's tendency to become more aggressive (self-corrective). In statistical terms, a positive quadratic shape parameter stands for an overdispersed (skewed or U-shaped) distribution of the aggression variable, whereas a negative quadratic shape parameter stands for an underdispersed (unimodal, bell-shaped) distribution of the aggression variable: hence, the name "shape parameter."

The Moderating Role of Peer Norms in Friendship Processes Related to Aggression

The aforementioned effects were first analyzed for each class separately in RSIENA, yielding 51 parameters for each effect. To examine the moderating role of peer norms, we conducted three steps of analyses. In a first step, we ran a meta-analysis using Viechtbauer's (2010) meta-analysis method implemented in the R-package "metafor" to aggregate these results for the total sample of 51 classes. Hence, the meta-analysis in this first step displays a statistical model (which we will refer to as Model 1) regarding the extent to which, in general, friendship processes related to aggression took place within *all* classes. In the second step, we analyzed the role of popularity norms and descriptive norms at T1 in friendship processes related to aggressive behavior. To this end, we conducted six separate meta-analyses for classes with high, moderate, and low descriptive norms and high, moderate, and low popularity norms, resulting in six different statistical models (Models 2–7). In the third step, to test the moderating effect of peer norms, we tested for differences between parameter estimates among classes with low, moderate, and high peer norms for aggression using the following formula: $\beta_a - \beta_b / \sqrt{(SE_a^2 + SE_b^2)}$,, with estimates β_a and β_b and standard errors SE_a and SE_b, respectively, resulting in a z score which under the null hypothesis of equal parameters had an approximately standard normal distribution (see Steglich, Sinclair, Holliday, & Moore, 2012, p. 367). We used the significance criterion of $p < .05$ ($z = 1.96$). In order to facilitate the interpretation of the findings, we calculated odds ratios by taking the exponential function of the parameter estimates (= exp.(βk); Ripley, Snijders, Boda, Vörös, & Preciado, 2014). For the friendship influence, we first divided the estimates by the number of answer categories minus one to reflect the effect of a one-unit increase or decrease on the scale. Odds ratios were not calculated for the quadratic shape terms because these were not linear.

Results

Descriptive Statistics

Tables 1 and 2 provide information on the sample, network characteristics, and measures for

Table 1

Description of the Sample, Network Characteristics, and Measures for All Classes, and for School Classes With a Low, Moderate, and High Correlation Between Perceived Popularity and Aggression (i.e., Popularity Norms)

	All classes			Low popularity norms for aggression			Moderate popularity norms for aggression			High popularity norms for aggression		
Sample	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
Friendship												
Average number of friends	5.05 (1.27)	5.50 (1.22)	5.40 (1.27)	4.68 (1.57)	5.20 (1.67)	5.20 (1.58)	5.18 (1.23)	5.74 (1.03)	5.50 (1.25)	4.95 (1.04)	4.93 (1.20)	5.27 (1.06)
Average number of friends, boys	5.10 (1.79)	5.63 (1.69)	5.71 (1.86)	4.07 (1.76)	4.84 (1.84)	5.45 (1.78)	5.50 (1.87)	6.07 (1.62)	5.96 (1.97)	4.77 (0.78)	4.81 (1.25)	5.04 (1.44)
Average number of friends, girls	4.93 (1.66)	5.23 (1.73)	4.93 (1.79)	5.08 (1.66)	5.55 (1.74)	5.02 (2.13)	4.87 (1.60)	5.25 (1.56)	4.93 (1.56)	4.96 (2.11)	4.74 (2.45)	4.83 (2.44)
Cohesion in friendship network	0.25 (0.08)	0.28 (0.07)	0.28 (0.08)	0.30 (0.12)	0.32 (0.08)	0.32 (0.09)	0.24 (0.06)	0.27 (0.07)	0.26 (0.07)	0.26 (0.06)	0.27 (0.04)	0.29 (0.10)
Proportion reciprocated friendships	0.62 (0.08)	0.63 (0.09)	0.64 (0.10)	0.58 (0.09)	0.61 (0.10)	0.64 (0.10)	0.63 (0.08)	0.67 (0.09)	0.63 (0.10)	0.63 (0.06)	0.63 (0.06)	0.66 (0.08)
Proportion triadic friendships	0.62 (0.09)	0.64 (0.08)	0.65 (0.07)	0.67 (0.08)	0.68 (0.07)	0.65 (0.07)	0.61 (0.08)	0.64 (0.07)	0.65 (0.08)	0.59 (0.10)	0.61 (0.10)	0.63 (0.06)
Same-gender friendships	0.85 (0.09)	0.85 (0.10)	0.85 (0.09)	0.80 (0.11)	0.79 (0.10)	0.82 (0.09)	0.86 (0.09)	0.86 (0.10)	0.86 (0.09)	0.85 (0.09)	0.89 (0.08)	0.88 (0.08)
Average aggressive behavior												
Boys	0.05 (0.07)[a]	0.07 (0.08)[a]	0.08 (0.09)[a]	0.04 (0.07)[a]	0.07 (0.08)[a]	0.07 (0.09)[a]	0.05 (0.07)[a]	0.07 (0.08)[a]	0.08 (0.09)[a]	0.05 (0.08)[a]	0.06 (0.08)[a]	0.07 (0.08)[a]
Girls	0.03 (0.05)[b]	0.04 (0.07)[b]	0.07 (0.08)[b]	0.04 (0.05)[a]	0.06 (0.08)[a]	0.06 (0.08)[a]	0.03 (0.04)[b]	0.03 (0.06)[b]	0.04 (0.07)[b]	0.04 (0.08)[a]	0.04 (0.09)[a]	0.05 (0.08)[a]
Highly popular students	0.09 (0.09)[a]	0.12 (0.11)[a]	0.13 (0.11)[a]	0.05 (0.04)[ab]	0.07 (0.07)[ab]	0.13 (0.10)[a]	0.09 (0.08)[a]	0.12 (0.12)[a]	0.13 (0.11)[a]	0.13 (0.11)[a]	0.17 (0.13)[a]	0.16 (0.10)[a]
Moderately popular students	0.03 (0.05)[b]	0.04 (0.06)[b]	0.05 (0.08)[b]	0.03 (0.06)[a]	0.05 (0.06)[a]	0.05 (0.06)[b]	0.04 (0.05)[b]	0.04 (0.06)[b]	0.06 (0.08)[b]	0.02 (0.04)[b]	0.03 (0.05)[b]	0.04 (0.06)[b]
Nonpopular students	0.03 (0.05)[b]	0.03 (0.07)[b]	0.03 (0.05)[c]	0.06 (0.07)[b]	0.09 (0.12)[b]	0.06 (0.08)[b]	0.03 (0.05)[b]	0.02 (0.03)[c]	0.03 (0.03)[c]	0.00 (0.04)[b]	0.01 (0.02)[b]	0.02 (0.03)[b]
Respondents												
% Boys	50.4	50.6	51.1	44.1	45.8	47.3	51.0	50.8	50.7	56.1	55.9	57.3

Table 1
Continued

	All classes			Low popularity norms for aggression			Moderate popularity norms for aggression			High popularity norms for aggression		
Sample	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
Probability similarity between friends in aggression	0.06 (0.13)	0.07 (0.16)	0.14 (0.16)	−0.01 (0.09)	0.00 (0.16)	0.07 (0.13)	0.06 (0.12)	0.07 (0.13)	0.16 (0.15)	0.17 (0.14)	0.17 (0.24)	0.17 (0.20)
Friendship change		T1 > T2	T2 > T3		T1 > T2	T2 > T3		T1 > T2	T2 > T3		T1 > T2	T2 > T3
Average number of friendship changes		78.1	73.8		65.8	51.5		83.6	81.6		71.1	70.3
Proportion of stable friendships		0.52 (0.08)	0.54 (0.08)		0.50 (0.08)	0.60 (0.84)		0.53 (0.08)	0.54 (0.08)		0.50 (0.07)	0.51 (0.07)

Note. T1–T3 = Waves 1–3. Standard deviations are given within parentheses. Density was calculated as number (N) of ties divided by the total number of potential ties, $N \times (N - 1)$. Reciprocity was calculated as $2M/(2M + A)$, where M = mutual ties and A = asymmetric ties. Transitivity was calculated as N of transitive triplets divided by N of two paths (potentially transitive triplets). For more information on the calculation of the different network indices, see Veenstra and Steglich (2012). Students scoring > 1 *SD* above the mean of perceived popularity were assigned as "highly popular students," whereas students scoring > 1 *SD* below the mean were defined as nonpopular students. Remaining students were defined as moderately popular students. Using one-way analysis of variance with the Bonferroni post hoc test, for every wave, average aggression of non, moderately, and highly popular youth were compared and indicated with different superscripts. Average aggression for boys and girls were compared and indicated with different superscripts as well.

Table 2
Description of the Sample, Network Characteristics, and Measures for School Classes With Low, Moderate, and High Average Levels of Aggressive Behavior (i.e., Descriptive Norms)

	Low descriptive norms for aggression			Moderate descriptive norms for aggression			High descriptive norms for aggression		
Sample	T1	T2	T3	T1	T2	T3	T1	T2	T3
Friendship									
Average number of friends	4.10 (0.74)	5.35 (1.14)	4.69 (1.11)	5.42 (1.30)	5.54 (1.21)	5.76 (1.26)	4.77 (1.08)	5.53 (1.40)	4.98 (1.13)
Average number of friends, boys	4.31 (1.04)	5.42 (1.47)	4.89 (1.24)	5.44 (1.96)	5.64 (1.68)	6.22 (1.98)	4.78 (1.61)	5.78 (2.02)	4.96 (1.51)
Average number of friends, girls	3.79 (1.10)	5.02 (1.65)	4.43 (1.61)	5.46 (1.61)	5.54 (1.56)	5.36 (1.61)	4.34 (1.63)	4.52 (2.15)	4.13 (2.16)
Cohesion in friendship network	0.20 (0.04)	0.26 (0.05)	0.24 (0.05)	0.26 (0.07)	0.27 (0.06)	0.28 (0.08)	0.27 (0.09)	0.32 (0.09)	0.30 (0.10)
Proportion reciprocated friendships	0.62 (0.11)	0.65 (0.08)	0.65 (0.09)	0.62 (0.07)	0.61 (0.09)	0.64 (0.10)	0.63 (0.07)	0.63 (0.09)	0.63 (0.09)
Proportion triadic friendships	0.59 (0.07)	0.64 (0.07)	0.58 (0.06)	0.62 (0.08)	0.64 (0.08)	0.66 (0.07)	0.62 (0.11)	0.66 (0.08)	0.65 (0.07)
Same-gender friendships	0.89 (0.09)	0.87 (0.10)	0.87 (0.10)	0.84 (0.08)	0.85 (0.09)	0.84 (0.00)	0.83 (0.13)	0.82 (0.13)	0.88 (0.09)
Aggressive behavior									
Average boys	0.02 (0.04)[a]	0.03 (0.05)[a]	0.05 (0.05)[a]	0.05 (0.07)[a]	0.07 (0.08)[a]	0.08 (0.09)[a]	0.08 (0.09)[a]	0.08 (0.10)[a]	0.10 (0.10)[a]
Average girls	0.01 (0.03)[a]	0.02 (0.05)[a]	0.04 (0.07)[a]	0.03 (0.05)[b]	0.04 (0.06)[b]	0.05 (0.07)[b]	0.05 (0.06)[b]	0.04 (0.08)[b]	0.05 (0.08)[b]
Average highly popular students	0.04 (0.05)[a]	0.06 (0.07)[a]	0.11 (0.10)[a]	0.11 (0.08)[a]	0.12 (0.11)[a]	0.14 (0.11)[a]	0.14 (0.12)[a]	0.16 (0.14)[a]	0.12 (0.12)[a]
Average moderately popular students	0.01 (0.03)[b]	0.02 (0.04)[b]	0.04 (0.05)[b]	0.03 (0.05)[b]	0.05 (0.06)[b]	0.05 (0.07)[b]	0.06 (0.07)[b]	0.05 (0.07)[b]	0.08 (0.09)[ab]
Average nonpopular students	0.02 (0.07)[ab]	0.03 (0.08)[ab]	0.02 (0.05)[b]	0.02 (0.04)[b]	0.03 (0.05)[b]	0.03 (0.09)[b]	0.05 (0.07)[b]	0.03 (0.09)[b]	0.04 (0.06)[b]
Respondents									
Probability similarity between friends in aggression	0.04 (0.07)	0.04 (0.12)	0.08 (0.13)	0.06 (0.15)	0.08 (0.18)	0.15 (0.18)	0.09 (0.12)	0.08 (0.14)	0.15 (0.12)
Friendship change		T1 > T2	T2 > T3		T1 > T2	T2 > T3		T1 > T2	T2 > T3
Average number of friendship changes		74.8	54.8		81.9	83.1		70.2	63.7
Proportion of stable friendships		0.51 (0.11)	0.59 (0.07)		0.52 (0.09)	0.53 (0.08)		0.51 (0.06)	0.56 (0.09)

Note. T1–T3 = Waves 1–3. Standard deviations are given within parentheses. Density was calculated as number (N) of ties divided by the total number of potential ties, $N \times (N - 1)$. Reciprocity was calculated as $2M/(2M + A)$, where M = mutual ties and A = asymmetric ties. Transitivity was calculated as N of transitive triplets divided by N of two paths (potentially transitive triplets). For more information on the calculation of the different network indices, see Veenstra and Steglich (2012). Students scoring > 1 *SD* above the mean of perceived popularity were assigned as "highly popular students," whereas students scoring > 1 *SD* below the mean were defined as nonpopular students. Remaining students were defined as moderately popular students. Using one-way analysis of variance with the Bonferroni post hoc test, for every wave, average aggression of non, moderately, and highly popular youth were compared and indicated with different superscripts. Average aggression for boys and girls were compared and indicated with different superscripts as well.

school classes with different popularity norms (Table 1) and descriptive norms (Table 2) for aggression. The proportion of stable friendship nominations relative to all new, lost, and stable friendships was around 50% across the whole academic year, which made our data sufficiently stable for social network analysis (Veenstra & Steglich, 2012). Using one-way analysis of variance with the Bonferroni post hoc test, for every wave, the average levels of aggression of non, moderately, and highly popular adolescents were compared and indicated with different superscripts. Average levels of aggression for boys and girls were also compared and indicated with different superscripts. The results of the SIENA meta-analyses on the total model (with all 51 classes; Model 1) and separate analyses for classes with different types of norms (Models 2–7) are presented in Tables 3 and 4. The goodness of fit of our models were adequate and good.

Friendship Selection Based on Aggression

The similarity-based selection effect for peer-nominated aggression was nonsignificant in the meta-analyses performed on all classes (Model 1). However, when the analyses were separated across classrooms with different peer norms (Models 2–7), this selection effect *was* significant in classes with *high* popularity norms for aggression. The

Table 3
RSIENA Meta-Analyses of Network and Influence Dynamics for Aggressive Behavior in All Classes and Classes With Low, Moderate, and High Associations Between Perceived Popularity and Aggressive Behaviors (i.e., Popularity Norms)

	All classes			Low popularity norms for aggression			Moderate popularity norms for aggression			High popularity norms for aggression		
	Model 1			Model 2			Model 3			Model 4		
	B	*SE*	OR	*B*	*SE*	OR	*B*	*SE*	OR	*B*	*SE*	OR
Structural network effects												
Tendency to make friends	−2.23***	0.05	0.11	−2.09***	0.13	0.12	−2.25***	0.06	0.11	−2.30***	0.12	0.10
Reciprocated friendships	1.34***	0.06	3.82	1.04***	0.19	2.83	1.39***	0.07	4.01	1.29***	0.12	3.63
Transitive group formation	0.32***	0.01	1.38	0.34***	0.04	1.40	0.32***	0.01	1.38	0.29***	0.03	1.35
Cyclical group formation	−0.36***	0.02	0.70	−0.32***	0.06	0.73	−0.36***	0.02	0.70	−0.39***	0.08	0.68
Selection processes												
Same-gender (selection; 1 = boy)	0.85***	0.06	2.34	0.95***	0.12	2.59	0.81***	0.07	2.25	1.01***	0.20	2.75
Effect of aggression on friendship nominations received	−0.03	0.02	0.97	−0.06	0.07	0.94	−0.06**	0.02	0.94	0.05	0.05	1.05
Effect of aggression of friendship nominations given	−0.01	0.02	0.99	0.01	0.08	1.01	−0.02	0.02	0.97	−0.03	0.06	0.97
Similarity-based selection of friends	0.05	0.25	1.05	−0.92	0.90	0.38	−0.21	0.29	0.81	1.49*	0.59	4.44
Maintenance processes												
Similarity-based maintenance of friends	1.10***	0.26	3.00	1.54	1.05	4.66	1.10***	0.36	3.02	0.43	0.52	1.54
Influence processes												
Aggression linear shape	0.09	0.04	1.09	0.24	0.11*	1.27	0.09	0.05	1.09	0.02	0.10	1.02
Aggression quadratic shape	0.19***	0.02		0.18***	0.07		0.16***	0.03		0.26***	0.05	
Aggression: Gender (1 = boy)	0.10	0.05	1.11	0.21	0.14	1.23	0.11	0.07	1.12	−0.08	0.16	0.92
Friendship influence on aggression	2.83***	0.40	2.03	1.09	1.11	1.31	2.84***	0.47	2.04	4.27***	1.10	2.91
n of classes	51			10			33			8		
n of students	1134			186			780			168		

Note. All models represent separate meta-analyses. Two-tailed significance tests were performed by dividing the estimates by their standard error resulting in *t* values that under the null hypothesis are approximately normally distributed (Ripley, Snijders, & Preciado, 2012). Due to some convergence issues, we had to fix the rate effect for numerical stability at 4.0 in all analyses. For almost all parameters, all classes converged. In some cases, it was not possible to identify the selection, maintenance, or influence parameter for one class due to too high standard errors; this class was therefore excluded from the calculation of this parameter. This did not affect the interpretability of the results. *B* = the unstandardized multinominal logit coefficient; OR = odds ratio; RSIENA = Simulation Investigation for Empirical Network Analyses.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 4
RSIENA Meta-Analysis of Network and Influence Dynamics for Aggressive Behavior in All Classes and Classes With Low, Moderate, and High Average Levels of Aggressive Behaviors

	Low descriptive norms for aggression			Moderate descriptive norms for aggression			High descriptive norms for aggression		
	Model 5			Model 6			Model 7		
	B	*SE*	OR	*B*	*SE*	OR	*B*	*SE*	OR
Structural network effects									
Tendency to make friends	−2.23***	0.09	0.11	−2.26***	0.07	0.10	−2.20***	0.24	0.11
Reciprocated friendship	1.58***	0.11	4.85	1.28***	0.07	3.60	1.24***	0.20	3.46
Transitive group formation	0.37***	0.02	1.45	0.31***	0.02	1.36	0.31***	0.03	1.36
Cyclical group formation	−0.41***	0.04	0.66	−0.35***	0.02	0.70	−0.36***	0.04	0.70
Selection processes									
Same-gender (selection; 1 = boy)	0.84***	0.13	2.31	0.86***	0.06	2.36	0.91***	0.24	2.48
Effect of aggression on friendship nominations received	−0.05	0.06	0.95	−0.01	0.03	0.99	−0.10*	0.05	0.91
Effect of aggression on friendship nominations given	0.04	0.05	1.04	−0.01	0.03	0.99	−0.09	0.09	0.93
Similarity-based selection of friends	0.21	0.64	1.23	0.03	0.32	1.03	0.10	0.61	1.11
Maintenance processes									
Similarity-based maintenance of friends	1.15	0.80	3.16	1.10**	0.34	3.00	1.04	0.60	2.83
Influence processes									
Aggression linear shape	0.02	0.07	1.02	0.12*	0.06	1.13	0.06	0.13	1.06
Aggression quadratic shape	0.28***	0.05		0.16***	0.03		0.20***	0.06	
Aggression: Gender (1 = boy)	0.06	0.14	1.06	0.09	0.07	1.09	0.18	0.14	1.19
Friendship influence on aggression	4.01***	0.84	2.73	2.50***	0.49	1.87	2.47*	1.06	1.85
n of classes		9			31			11	
n of students		206			706			222	

Note. All models represent separate meta-analyses. Two-tailed significance tests performed by dividing the estimates by their standard error resulting in *t* values that under the null hypothesis are approximately normally distributed (Ripley et al., 2012). Due to some convergence issues, we had to fix the rate effect for numerical stability at 4.0 in all analyses. For almost all parameters, all classes converged. In some cases, it was not possible to identify the selection, maintenance, or influence parameter for one class due to too high standard errors; this class was therefore excluded from the calculation of this parameter. This did not affect the interpretability of the results. *B* = the unstandardized multinominal logit coefficient; OR = odds ratio; RSIENA = Simulation Investigation for Empirical Network Analyses.
*$p < .05$. **$p < .01$. ***$p < .001$.

difference in selection processes between classes with low and moderate popularity norms for aggression was not significant ($z = 0.75$, $p = .454$), whereas it was significant between classes with moderate and high popularity norms for aggression ($z = 2.57$, $p = .011$) and classes with low and high popularity norms for aggression ($z = 2.24$, $p = .025$). These results show that adolescents in classes with strong associations between popularity and aggression tend to select peers as friends based on similar levels of aggressive behavior, whereas adolescents in classes with weak or moderate associations between popularity and aggression tend *not* to select peers as friends based on similar levels of aggressive behavior.

For descriptive norms, the similarity-based selection effects for aggression were nonsignificant (Table 4) and did not differ significantly across classes with different descriptive norms (i.e., low vs. moderate descriptive norms [$z = 0.25$, $p = .803$], moderate vs. high descriptive norms [$z = 0.10$, $p = .920$], and low vs. high descriptive norms [$z = 0.51$, $p = .608$]). This indicates that, contrary to our hypothesis, descriptive norms for aggression did not play a moderating role in the extent to which adolescents tend to select similarly aggressive friends within classes.

Friendship Maintenance Based on Aggression

The analyses showed that the similarity-based maintenance effect was positive and significant in the model with all 51 classes (Model 1). When the analyses were separated across classrooms with different popularity norms (Models 2–4), maintenance effects were positive in all types of classes and significant in classes with moderate aggressive popularity norms. Estimates did not differ significantly

from each other across classes with different popularity norms (i.e., low vs. moderate popularity norms [$z = 1.21$, $p = .226$], moderate vs. high popularity norms [$z = 0.39$, $p = .697$], and low vs. high popularity norms [$z = 0.95$, $p = .342$]), indicating that, contrary to our hypothesis, popularity norms for aggression did not play a moderating role in the extent to which friendships between adolescents similar in aggressive behavior were maintained.

For descriptive norms for aggression (Models 5–7), maintenance effects were positive in all types of classes, and significant in classes with moderate descriptive norms. Estimates did not differ significantly from each other across classes (i.e., for low vs. moderate descriptive norms [$z = 0.06$, $p = .952$], moderate vs. high descriptive norms [$z = 0.02$, $p = .984$], and low vs. high descriptive norms [$z = 0.11$, $p = .912$]), indicating that, contrary to our hypothesis, the maintenance of friendships between adolescents similar in aggression did not differ across classes with different descriptive norms.

Friendship Influence on Aggression

Friendship influence on peer-nominated aggression was highly significant in the model with all classes ($p < .001$). However, when the analyses were separated across classrooms with low, moderate, and high popularity norms for aggression, the influence of friends on aggression was found to be nonsignificant in classes with low popularity norms for aggression (Model 2), indicating that friendship influence processes on aggressive behavior did not take place in classes with a weak association between popularity and aggressive behavior. Friendship influence processes occurred in classes with moderate popularity norms for aggression (Model 3), and particularly in classes with high popularity norms for aggression (Model 4), indicating an increase in strength of friendship influence processes as the association of popularity with aggressive behavior increased. Influence processes did not differ significantly between classes with low and moderate popularity norms ($z = 1.46$, $p = .144$) and moderate and high popularity norms ($z = 1.20$, $p = .230$), but differences were significant between classes with low and high popularity norms ($z = 2.04$, $p = .041$). These results were consistent with our hypothesis that adolescents' aggressive behavior would proliferate more via peer influence processes in classes where there was a strong association between popularity and aggressive behavior than in classes with weak associations between popularity and aggressive behavior at T1.

All influence effects were significant in classes with low, moderate, and high descriptive norms for aggression, and the friendship influence effects on aggression did not differ significantly from each other between classes with low, moderate, and high descriptive norms for aggression (i.e., for low vs. moderate descriptive norms [$z = 1.55$, $p = .121$], moderate vs. high descriptive norms [$z = 0.03$, $p = .976$], and low vs. high descriptive norms [$z = 1.14$, $p = .254$]), implying that, in contrast to our hypothesis, descriptive norms for aggression did not play a moderating role in friendship influence processes related to aggression.

Discussion

In this study, we examined to what extent peer norms within the classroom play a role in friendship selection, maintenance, and socialization processes related to aggressive behavior. Our results show that the magnitude and direction of peer selection and influence processes differed across classes with different popularity norms for aggression but not across classes with different descriptive norms for aggression. Similarity-based selection and socialization processes related to aggression mainly took place in classes with highly popular aggressive adolescents (i.e., classes with high popularity norms for aggression) and not in classes in with nonpopular aggressive adolescents (i.e., classes with low popularity norms for aggression). Thus, aggression is not a valued characteristic for peer processes *as such* among early adolescents but only has valence for peer processes in a context in which it is related to popularity.

Peer Norms as a Regulator of Friendship Selection Based on Aggression

Consistent with our expectations, we found that popularity norms rather than descriptive norms for aggression played a crucial moderating role in regulating friendship selection processes related to aggression. Adolescents with similar levels of aggressive behavior tended to select each other as friends but only in classes in which aggressive behavior was strongly associated with popularity (i.e., high popularity norm for aggression) and not in classes with low or moderate popularity norms for aggression. Apparently, aggressive behavior is

used as a selection criterion for adolescent friendships only in a context in which the salience and valence of aggressive behavior is high (because it is related to popularity; Hartup, 1993, 1996). Hence, in classes with a high popularity norm for aggression, aggressive adolescents are more popular (Hartup, 1993) and may be more accepted by other peers (Dijkstra & Gest, 2015). Therefore, they may be perceived as attractive friendship partners to increase and maintain one's own popularity (Dijkstra et al., 2010), resulting in similarity-based selection processes based on preferential attraction (McPherson, Smith-Lovin, & Cook, 2001).

For descriptive norms, selection effects did not reach conventional levels of significance and did not differ significantly across classes. Apparently, average class-level aggression does not play a role in who is perceived as an attractive friendship partner (Dijkstra & Gest, 2015; Dijkstra et al., 2008) and, hence, selected as a friend. Thus, the formation of friendships can be seen as an active and strategic process, with adolescents as active agents (Latané, 1981) pursuing their goals of achieving popularity by selecting friends who exhibit behaviors that are related to popularity within a certain context (Logis et al., 2013).

Peer Norms and Friendship Maintenance Based on Aggression

Contrary to our hypotheses, the tendency of adolescents to maintain similarly aggressive friends did not differ across classes; peer norms did not play a moderating role in these effects. Hence, friendship maintenance appears to constitute an important additional process that may result in similarity in aggression among friends, *regardless of* the peer norms in the class (Veenstra et al., 2013). Hence, being similar in aggression may give adolescents a feeling of understanding each other, which makes mutual communication easier, resulting in more rewarding and stable friendships (Byrne, 1971). The finding that peer norms did not significantly affect maintenance processes across classes can be explained in several ways. First, we investigated best friend relationships. Best friendships can be perceived as high-quality friendships that include high levels of intimacy, self-disclosure, and support (Berndt, 2002). Due to these positive features, adolescents may have a higher tendency to be loyal to their best friends and to maintain the friendship, regardless of whether the behavior that they both exhibit conforms to the norm or not. Second, it might be the case that the norm *does* play a role in the maintenance of friendships for certain groups of adolescents within the classroom, but *why* it does may diverge across classes with different norm types. For instance, in classes with high popularity norms for aggression, highly popular adolescents may remain friends with similarly aggressive peers in order to maintain their high popularity (i.e., preferential attraction; Byrne, 1971), whereas in classes with low popularity norms for aggression, highly aggressive friends may be at the periphery of the peer group, and they may choose to stay with their similarly aggressive friends in order to have some affection and support (i.e., default selection; Dishion et al., 1995; Sijtsema, Lindenberg, & Veenstra, 2010). Future researchers might examine whether the maintenance processes are due to preferential attraction or default selection processes, for instance, by investigating bilateral versus unilateral friendships (Sijtsema, Lindenberg, et al., 2010).

Peer Norms as a Regulator of Friendship Influence Based on Aggression

Consistent with our expectations, peer influence processes related to aggression only took place in classes with moderate and high popularity norms for aggression. In these classes, adolescents seemed to be more susceptible to friendship influence related to aggressive behavior, resulting in a proliferation of aggressive behavior through popularity-based influence processes. More specifically, adolescents whose friends are perceived to be more aggressive on average are highly likely to become more aggressive themselves in classes with high popularity norms for aggression compared to in classes with lower popularity norms for aggression. These findings may be explained by a norm salience effect (Henry et al., 2000), which implies that popular students who exhibit aggressive behavior set the norm in the class and function as role models (Bandura, 1977). The valence of aggressive behavior is high in these classes, as this behavior is a means of becoming more popular (i.e., they are reputationally salient; Hartup, 1996). Therefore, less popular students might conform to the aggressive behavior of their highly popular peers in order to become more popular themselves.

Descriptive norms did not moderate the friendship influence processes related to aggression. This finding can be explained as follows: The social impact theory suggests that the strength of social forces is a function of the popularity of peers, closeness of peers, and number of peers present (Latané, 1981). Descriptive norms only represent the last,

quite subtle aspect of this function and hence may not be strong enough to determine social impact.

Strengths, Limitations, and Future Research

Some limitations of the present study need to be acknowledged. First, the data used in this study stem from peer nominations only, which might lead to problems with shared method variance (Vaillancourt & Hymel, 2006). However, measures stemming from peer nominations were aggregated across multiple nominators, enhancing the validity and reliability of our data (Bukowski, Gauze, Hoza, & Newcomb, 1993; Bukowski & Hoza, 1989). Moreover, the respondents were allowed to nominate an unlimited number of peers, by which means we avoided a ceiling effect in which respondents tend to nominate a certain maximum number of peers. Second, in this study, we focused on peer processes within classrooms, as students in the Netherlands spend most of their time in the same class and, therefore, may be expected to have most interactions with peers in this class. However, peer processes may also occur at the grade level or at the school level, and even among out-of-school friends (e.g., Kerr, Stattin, & Kiesner, 2007). Analyses at the class level may, therefore, provide a somewhat incomplete picture of the friendship networks of students, as they also have friends outside their own classroom (Veenstra & Dijkstra, 2011). We encourage future researchers to take into account friends from various contexts (class, grade, school, out of school) and compare the relative impacts of norms at several levels of friendship processes.

Despite the above limitations, the present study has several strengths. First, our sample consisted of 1st-year secondary school students, the majority of whom did not know each other initially. This provided us with an excellent opportunity to examine selection effects in a situation in which friendships were not already formed. Second, and more important, our research significantly adds to the current literature by addressing the "context gap": We have demonstrated that the broader social context matters regarding the direction and magnitude of friendship dynamics. The broader social context in terms of popularity norms may be decisive in determining whether peer effects are for the better (i.e., suppressing aggressive behavior) or the worse (i.e., enhancing aggressive behavior). Future researchers are encouraged to consider the broader social context when examining the coevolution of networks and behavior, and to investigate the role of peer norms in other behaviors (for instance, prosocial and academic behaviors; Dijkstra & Gest, 2015). Third, in the current study, we considered maintenance effects in addition to selection and influence effects, hereby capturing a friendship dynamic that appears to be equally important in all types of classes, regardless of the peer norm within these classes. Hence, even though it has been largely disregarded in previous studies, the maintenance of friendship is an important characteristic that, in general, may enhance similarity in aggressive behavior. Fourth, the measurement waves were grouped fairly closely together in the current study (i.e., three times in one academic school year). This allowed close monitoring of changes in the peer network over fairly short periods. At the same time, it is possible that the reason network stability was quite high over these short time intervals for some classes was because breaking ties can take longer than 3 months (indeed, the stability of the network in the current study was quite high compared with that in other studies, in which intervals of [half] a year were used; see, for instance, Molano et al., 2013; Rulison et al., 2013). We encourage future researchers to examine whether the timing of the measurement waves could impact on friendship processes and peer norms. Fifth, the finding that aggression is more strongly associated with popularity in some classes than in others is interesting in and of itself. Future researchers are encouraged to learn more about predictors of the extent to which popularity is associated with aggression within the classroom. Predictors could be at the individual level (socioeconomic background of students, gender, personality, maturity, or attractive features; see, for instance, Lindenberg, 2001, 2006), at the teacher level (teacher support, structure, monitoring), or at the structural group level (extent of cohesion, hierarchy, gender ratio, and educational level; see for instance Ahn, Garandeau & Rodkin, 2010). Sixth, we not only included gender as a control variable in the analyses for the current study, but we also performed additional analyses where we specifically addressed gender differences in selection, maintenance, and influence processes. Results of these analyses were nonsignificant and are available upon request. Two reasons may explain the nonsignificance of results. First, it may be the case that our unique measure of "aggression in the school context" taps a type of aggression that does not typically differ for boys and girls. Second, the nonsignificant findings could be due to power limitations, as our models were already quite complex and the number of classes with high and low peer norms for aggression was

small. Therefore, future researchers may profit from testing gender differences in friendship dynamics of adolescent aggression.

Implications

The implications of our findings are twofold. First, our findings lend important nuance to former findings on peer influence and selection effects, by demonstrating how the broader social context of popularity norms plays a role in the magnitude and direction of these effects. Future researchers might make use of this knowledge by examining the role of popularity norms in the coevolution of friendship networks and behavior during adolescence. It might also be useful to examine the impact of other components in the broader social context (i.e., the norms of socially accepted adolescents, teacher attitudes or behaviors, the atmosphere in the classroom or school, the goals of classmates; Gest & Rodkin, 2011) on the network–behavior dynamics.

Second, our study reveals the important role of popularity norms in the proliferation of aggressive behavior through friends. This knowledge is a crucial prerequisite to proposing solid research-based intervention strategies designed to change classrooms and create environments that appropriately foster adolescents' adjustment. As most adolescents tend to adopt aggressive behavior from their friends (Hartup, 1996), based on the results of our study, it could be reasoned that changing the popularity peer norm in the classroom may have important consequences for reducing aggressive behavior within the classroom. Up until now, to our knowledge, there have not been many studies on whether and how popularity norms for aggression can be changed and whether this affects aggressive behavior within the classroom. One recent intervention study (The Roots Intervention; Paluck, Shepherd, & Aronow, 2016) indicated that peer norms for aggression *can* be changed into more favorable norms, resulting in a decline of aggressive behavior within the school (for more information, see Paluck et al., 2016). In this intervention, a certain kind of students (called "social referents") are encouraged to take a public stance against conflict (such as verbal and physical aggression) at school. These "social referents" have many connections within the peer network: for instance (but not necessarily), due to their high popularity. Our study provides theoretical and empirical support for the (potential) effectiveness of such an intervention. At the same time, our findings also provide suggestions for extending on The Roots Intervention or developing new interventions. First, selecting particularly *popular* peers to take a public stance against aggression may be very fruitful. Second, the aggressive behavior of these popular peers themselves should be taken into account. In some classes, popular peers are very aggressive; in others, they are nonaggressive. It should be monitored whether the behavior of the popular peers themselves hinder them in taking a public stance against aggression. It is possible that when highly aggressive popular adolescents are encouraged to take a public stance against aggression, they change their own aggressive behavior as well. However, this could also work counterproductively. Therefore, learning more about the classes in which aggression is negatively associated with popularity could provide important information about how to intervene in peer groups in which aggression is positively linked with high popularity.

The current findings have important implications for both theory and practice. We found that popularity is a powerful construct during adolescence: Popular students set the norm for friendship processes related to aggressive behavior and their norms are an excellent and crucial target to change undesirable environments into more desirable ones, for the good of all peers.

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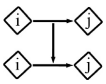
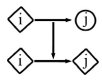
Appendix

Term for effect in current study	SIENA term	Conceptual meaning	Graphical representation
Descriptives			
Average number of friends	Average out-degree	Average number of friends	
Cohesion in friendship network	Density	Total number of ties divided by the total number of possible ties	
Proportion reciprocated friendships	Reciprocity	Proportion of reciprocated relationships within the network	
Proportion triadic friendships	Transitivity	Proportion of transitive relationships within the network	
Probability similarity between friends in aggression	Moran's I	Network autocorrelation: Extent to which relational partners are (not) more similar than one would expect under random pairing	
Average number of friendship changes	Hamming distance	Average number of tie changes from one time point to the next	
Proportion of stable friendships	Jaccard index	The proportion of stable relations out of the total number of created, resolved, and stable relations	
Structural network effects			
Tendency to make friends	Out-degree	Tendency to have ties at all	
Reciprocated friendships	Reciprocity	Tendency to form/maintain reciprocated relationships	
Transitive group formation	Transitive triplets effect	Tendency toward network closure (friends of my friends are my friends). Transitive triplets are hierarchical in nature	
Cyclical group formation	Three-cycles effect	This effect models the tendency toward forming three cycles, which is the simplest form of generalized exchange and is opposed to hierarchy	
Selection effects			
Effect of aggression on friendship nominations received	Alter effect	Tendency of peers to select adolescents as friends based on the adolescents' mean level of aggression	
Effect of aggression on friendship nominations given	Ego effect	Tendency for adolescents to select peers as friends based on the adolescents' mean level of aggression	
Similarity-based selection of friends	Creation effect	Tendency for adolescents and friends to select each other based on similarity between the adolescents and friends in the independent variable	
Maintenance effects			
Similarity-based maintenance of friends	Endowment effect	Tendency for adolescents and friends to maintain each other's friendship based on similarity between the adolescents and friends in the independent variable	
Influence effects			
Friendship influence on aggression	Average similarity effect	Tendency of friends to become more similar in behavior over time: The friends' aggressive behavior predicts changes in the adolescents' aggressive behavior	

SIENA = Simulation Investigation for Empirical Network Analyses.