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The Role of Academic Status Norms in Friendship Selection and Influence Processes Related to Academic Achievement

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Abstract

This study examined the role of academic status norms in friendship selection and influence processes related to academic achievement across the 2nd year of secondary school (SNARE project, $N = 1,549$ students from 70 classes, $M_{age} = 13.69$ years). Academic status norms were operationalized as the class-level correlation between academic achievement and 4 types of peer status: popularity, acceptance, unpopularity and rejection. Longitudinal social network analyses indicated that the unpopularity and popularity norm play a role in friendship selection processes (but not influence processes) related to academic achievement. In line with our hypotheses, the unpopularity norm in the classroom strengthened similarity-based friendship selection among low-achieving adolescents, and predicted greater avoidance of academically similar friends among high-achieving adolescents. Also, the popularity norm strengthened friendship selection among similar peers, both among low- and high-achievers. Acceptance and rejection norms did not play a role in friendship processes. In sum, the average achievement of popular and unpopular peers shapes friendship preferences in the classroom, which may have important implications for adolescent academic development.

Key words: peer norms; friendship selection; friendship influence; academic achievement; popularity; unpopularity

Adolescent academic achievement is a key predictor of future success in education and occupation (Crosnoe & Benner, 2015). Peers may provide a crucial developmental context for adolescents' academic achievement (Rodkin & Ryan, 2012) and peer relationships may shape students' academic achievement through friendship selection and influence processes. Friendship *selection* refers to adolescents' selecting similarly achieving peers as friends, because similarity enhances mutual understanding and facilitates communication, for instance when collaborating on academic tasks. This makes a relationship more rewarding and stable (similarity attraction hypothesis; Byrne, 1971). In turn, friendship *influence* can change individual academic achievement over time through, among others, information exchange modeling (Kindermann & Gest, 2009), supporting or distracting from learning (Rodkin & Ryan, 2012) and peer tutoring experiences (Gest, Rulison, Davidson, & Welsh, 2008). Both friendship selection and influence processes may result in similarity in achievement among friends, for better or worse: Hanging out with high-achieving friends may promote achievement, whereas hanging out with low-achieving friends may dampen achievement over time (Shin & Ryan, 2014).

Some studies examined friendship processes related to achievement, but findings vary considerably regarding the *strength* and *direction* of friendship processes. In regard to the *strength* (i.e., the extent to which processes take place), most studies have found that influence processes take place, whereas friendship selection was found in some (Gremmen, Dijkstra, Steglich, & Veenstra, 2017; Flashman, 2012; for girls; Kretschmer et al., 2018; Rambaran, Hopmeyer, Schwartz, Steglich, Badaly, & Veenstra, 2016) but not in other studies (Fortuin, Van Geel, & Vedder, 2016; for boys; Kretschmer et al., 2018; Shin & Ryan, 2014). Regarding the *direction* of friendship selection (i.e., whether friendship selection is based on high or low achievement), one study found that adolescents select each other based on

similarity in *low* achievement (Rambaran et al., 2016), whereas two studies found differences between settings in the direction of selection processes. Flashman (2012) found that in one school, high-achieving students mostly formed friendships with other high-achieving students, whereas in another school, similarity-based selection took place equally among low- and high-achieving students. Gremmen and colleagues (2017) indicated that in some classrooms, friendship selection mostly took place based on similarity in low achievement, whereas in other classrooms, similarity-based selection occurred both among low- and high-achieving peers. Only two studies examined the direction of friendship influence. One study indicated that friends influenced each other to increase rather than decrease in achievement over time (Rambaran et al., 2016). Another study showed that high-achievers were influenced to decrease in achievement, whereas low-achievers were influenced to increase in achievement over time (Gremmen et al., 2017). In order to promote adolescents' academic achievement, it is crucial to identify when adolescents' friendship processes are for better or for worse.

One reason why achievement-based friendship processes may vary across settings, is that different settings may present different peer contexts, which in turn has diverging implications for friendship processes (Kiuru et al., 2012). The peer context can be measured using the concept of peer norms, which represent how specific behaviors (here, academic achievement) are evaluated and appreciated within a specific context, which may determine the valence of certain behaviors for friendship processes (McCormick & Cappella, 2014). Therefore, the aim of our study was to examine whether peer norms play a role in the strength and direction of selection and influence processes regarding academic achievement.

The Role of Peer Norms in Friendship Processes Related to Academic Achievement

Similarity-based friendship selection and influence processes do not take place for just any characteristic or behavior; they may occur especially for characteristics or behaviors that

are important and salient to adolescents (Fortuin et al., 2016). According to the reputational

salience hypothesis (Hartup, 1996), similarity among friends occurs mainly for

"reputationally salient" behaviors: behaviors that are an important tool to improve one's

social reputation. This is in line with the idea that adolescents prioritize achieving status

(LaFontana & Cillessen, 2010) and that they actively avoid a low status among peers,

because this may put them at risk for peer victimization and exclusion (Hopmeyer Gorman,

Schwartz, Nakamoto, & Mayeux, 2011). According to goal-framing theory (Lindenberg,

2006), adolescents may particularly attend to behaviors that could serve their goal of

obtaining a higher peer status. Therefore, these behaviors may become valuable and

important for similarity-based friendship processes (Hartup, 1996; Haselager, Hartup, Van

Lieshout & Riksen-Walraven, 1998). Whereas the reputational salience hypothesis is mainly

about the *general* reputational salience of a certain attribute, we argue that previously found

inconsistencies in the importance of achievement for friendship processes may indicate that

the reputational salience of achievement varies across settings, such as the classroom

(Laninga-Wijnen, Ryan, Harakeh, Shin, & Vollebergh, 2018). One way of measuring the

"setting-level" reputational salience of behavior is by examining the concept of *status norms*,

also known as norm salience (Henry, Guerra, Huesmann, Tolan, VanAcker, & Eron, 2000).

Status norms for academic achievement refer to the extent to which academic

achievement is *positively* valued in classrooms because of its associations with high social

peer status or, instead, *negatively* valued because of its associations with low social peer

status. Although the original concept of status norms (norm salience) defined peer status by

peer rejection and peer acceptance (Henry et al., 2000), recent studies have emphasized the

need to examine four types of peer status: peer acceptance, popularity, rejection, and

unpopularity (Cillessen & Marks, 2011; Hopmeyer Gorman et al., 2011). These four

constructs are partly overlapping but also conceptually distinct because they are associated

with different behavioral, socioemotional and academic outcomes and therefore warrant being examined separately (Hopmeyer Gorman et al., 2011). Peer popularity (i.e., perceived as most popular) and unpopularity (i.e., perceived as least popular) are reputation-based constructs, representing high or low social power, visibility and prestige in the peer group (Adler, Kless, & Adler, 1992; Cillessen & Borch, 2006). Peer acceptance (i.e., sociometric popularity, being liked) and peer rejection (i.e., being disliked) are dyadic, preference-based constructs that refer to the extent to which someone is accepted or rejected (Cillessen & Marks, 2011; Hopmeyer Gorman et al., 2011). The class-level associations between achievement and these four status constructs represent four types of status norms: popularity norms, acceptance norms, unpopularity norms and rejection norms.

So far, studies have not examined whether status norms play a role in friendship processes related to achievement. Status norms regarding academic achievement may differ between classrooms. In some classrooms low academic achievement might be considered 'cool', for instance because students in these classrooms react against adult-approved behaviors to achieve well in school (Moffitt, 1993); whereas in other classrooms, high achievement may be related to high peer status, as students are more occupied with their future education and careers (Ryan & Rodkin, 2012). Also, in line with the original ideas about norm salience (Henry et al., 2000), our focus on *four* types of status norms enables us to (a) compare the power of social sanctions or social rewards of achievement (Brechwald & Prinstein, 2011), and (b) examine the relative impact of reputation-based norms (popularity, unpopularity) versus preference-based norms (acceptance, rejection).

Reputation-based constructs may generally be more relevant to adolescents than are preference-based constructs, because it is assumed that there is more consensus about someone's status for reputation-based constructs, so that people know whom they have to look to when they want to know what the norm is (Adler et al., 1992; Hopmeyer Gorman et

al., 2011). Also, reputation-based constructs are assumed to be a more important reward (popularity) or sanction (unpopularity) than are preference-based constructs during the developmental period of adolescence. That is, previous work indicated that popularity is prioritized over other social goals (LaFontana & Cillessen, 2010), such as being accepted by peers (Dijkstra, Cillessen, Lindenberg, & Veenstra, 2010). Moreover, unpopularity seems to be a more severe sanction compared to being disliked, because unpopular peers experience more internal distress and are more at risk for victimization compared to disliked peers; and being 'disliked' sometimes even seems to be a payoff of being popular (Hopmeyer Gorman et al., 2011). However, we do not formulate hypotheses on the relative impact of the four status norms, as we are the first to examine these four status norms types and we examined them in a relatively unexplored area (academic achievement). Nevertheless, we expected that status norms would play a role in both the strength and direction of friendship processes, which we will explain further in the next paragraph.

Strength of selection and influence processes. It can be argued that selection and influence take place especially based on reputationally salient attributes (Hartup, 1996). Hence, when achievement is positively *salient* (i.e., strongly associated with popularity or acceptance) or negatively *salient* (i.e., strongly associated with unpopularity or rejection) in a classroom, students may particularly select peers based on similarity in achievement, and may be more susceptible being influenced by their friends toward similarity in academic achievement. This is in line with two previous studies that examined the importance of popularity norms for the strength of similarity-based selection and influence processes related to two relatively deviant characteristics: aggressive behaviors (Laninga-Wijnen, Harakeh, Steglich, Dijkstra, Veenstra, & Vollebergh, 2017) and risk attitudes (Rambaran et al., 2013). These studies showed that, in line with the reputational salience hypothesis (Hartup, 1996), friendship selection and influence processes related to aggression (Laninga-Wijnen et al.,

2017) and influence processes regarding risk attitudes (Rambaran et al., 2013) were strongest in classrooms where these behaviors and attitudes were associated with popularity.

Direction of selection and influence processes. In classrooms where high academic achievement is *positively salient* (with high popularity or acceptance norms), there may be a stronger tendency for *high*-achieving students to select similarly high-achieving peers as friends compared to *low*-achieving students' selecting similarly low-achieving peers as friends (reputational salience hypothesis, Hartup, 1996). Similarity-based selection effects are expected to be weaker among low-achieving students, because for low achieving students another process may occur as well: They may also select attractive high-achieving peers to become higher in peer status (goal-framing theory, Lindenberg, 2001; 2006; basking in reflected glory hypothesis, Dijkstra et al., 2010). Hence, in these classrooms low-achieving students may have a higher tendency to select high-achieving peers as friends, than vice versa. Regarding influence, adolescents may become similar to their friends in *high* achievement, as this contributes to a higher peer status in these classrooms (Hartup, 1996).

By contrast, in classrooms where high achievement is *negatively salient* (high unpopularity or rejection norm), there may be a stronger tendency for *low*-achieving students to select similarly low-achieving peers as friends compared to *high*-achieving students selecting similarly high-achieving peers as friends (reputational salience hypothesis, Hartup, 1996; Haseleger et al., 1998). That is, for high-achieving students another process may occur as well: They may also select low-achieving peers as friends to avoid a low peer status in these classrooms (Brechwald & Prinstein, 2011). Hence, high-achieving students may have a higher tendency to select low-achieving students, than vice versa. With regard to influence, adolescents may become similar to their friends in *low* achievement, as this may help to avoid a low peer status in these classrooms (Hartup, 1996).

Present Study

We examined whether the extent to which achievement is positively or negatively *salient* in a classroom determines the strength and direction of friendship selection and influence processes related to achievement. Regarding *strength,* we hypothesized that there would be stronger similarity-based selection and influence effects in classrooms in which high academic achievement is related to a *positive* peer status (i.e., popularity norm and acceptance norm) or a *negative* peer status (i.e., unpopularity norm and rejection norm).

Regarding the *direction* of selection processes, we hypothesize that when high achievement is related to a positive social status (i.e., high popularity or acceptance norms), similarity-based selection processes would be stronger between high-achieving peers compared to low-achieving peers. For influence effects, we hypothesized that low-achieving students have a tendency to increase their academic achievement in the direction of high-achieving students. By contrast, we hypothesized that when high achievement is related to a *negative* social status (i.e., high rejection or unpopularity norms), similarity-based selection effects are stronger between low-achieving than high-achieving peers. For influence effects, we hypothesized that high-achieving students would have a tendency to decrease their academic achievement in the direction of low-achieving students.

We used 'perceived friendship' as an indicator of friendship. That is, we assessed friendships using unlimited peer nominations on the question "Who are your best friends in class" and we considered both asymmetrical and reciprocal friendships as 'friendships'. Therefore, strictly speaking, what we studied was an index of 'friendship choice' or 'friendship selection'. Even though this is regular practice in social network studies on peer relations (Veenstra & Dijkstra, 2011), friendship reciprocity is of central importance in defining a friendship (Bukowski & Hoza, 1989; Furman, 1996; Degirmencioglu, Urberg, Tolson, & Richard, 1998). However, from a social network perspective, both asymmetrical and reciprocal friendships are important social ties that may influence adolescents' behavior.

That is, even when friendship ties are nonreciprocal, adolescents may become similar to the peers that they perceive to be their best friends. For instance, adolescents may be particularly motivated to behave in the same way as does their perceived best friend, to receive a friendship nomination back (Bot, Engels, & Knibbe, 2005). Nevertheless, we consider it important to stress that our measure of friendship may rather be a construct of perceived friendship.

Method

Participants

The Social Network Analysis of Risk behavior in Early adolescence (SNARE) project is a longitudinal study on adolescent social and behavioral development. All first- and second-year students in two secondary schools (one in the north and one in the middle of the Netherlands) were approached for enrollment in the SNARE project (Cohort 1) at the beginning of the academic year 2011-2012. A second cohort of students entering the first year in these secondary schools was also approached to take part in the project the following academic year 2012-2013 (Cohort 2). We examined friendship selection and influence in the second year of secondary education. This implies that we selected the students of the SNARE study who were in cohort 1 in the second year of secondary education in 2011-2012, students from cohort 1 who were in the second year of secondary education in 2012-2013, and students from cohort 2 who were in the second year in 2013-2014. This yielded a sample of 1,568 students from 70 classes. Of the 1,568 second-year students who were approached, 0.01% ($N = 19$) declined to participate for various reasons (e.g., the adolescent was dyslectic or the research was perceived to be too time-consuming). This yielded a sample of 1,549 second-year adolescents from 70 classes; 760 [49.1 %] girls, with a mean age of $M = 13.69$ ($SD = .49$). Each class had 12 to 31 students ($M = 22.13$ students per class). Of the participants, 54.3% were enrolled in lower-level education (including preparatory secondary

school for technical and vocational training), and 45.7% were attending higher-level

education (including preparatory secondary school for higher professional education and for

university). The majority of the sample was native Dutch (around 80.0%). The

socioeconomic status of participants was calculated based on the zip codes, using status

scores of the Social Cultural Planning Office, The Netherlands (e.g., Benson, Nierkens,

Willemsen, & Stronks, 2015). Status scores are calculated based on the average income of

inhabitants within an area, the percentage of habitants with lower incomes, the percentage of

lowly educated habitants, and the percentage of unemployed habitants. These scores

indicated that 55.0% of our participants came from areas with a lower socioeconomic status

compared to the average socioeconomic status in the rest of the Netherlands.

Procedure

Students received an information letter for themselves and their parents, in which they were

asked to participate. If students or their parents wished to refrain from participation, they

were asked to indicate this. During data collection, students were also made aware that they

could opt out anytime. For all students, data were collected three times in one academic year,

that is, in the fall, winter and spring. The survey was completed during regular lessons in the

classroom by computer (under the supervision of a researcher) using Bright Answer socio

software (SNARE software, 2011). Students who were absent that day were, if possible,

assessed within a month. The privacy and anonymity of the students were warranted and the

study was approved by the Internal Review Board of Utrecht University, see also Dijkstra et

al., 2015; the name of approved project is: "Social Network Processes and Social

Development of Children and Adolescents".

Measures

Friendship. Adolescents received a list of all consenting students in their class. They

were asked to indicate their 'best friends' within their classroom. Participants could select an

unlimited number of same-gender and opposite-gender classmates, and there was an option of

selecting *nobody*, which allowed us to differentiate between missing responses and valid

empty responses in the name generators. Based on these nominations, we constructed an

adjacency matrix for each classroom at all waves containing all nominations, with 0 and 1

representing absence and presence of a tie between actors *i* and *j*, respectively.

Academic achievement. Academic achievement was derived from three school report

cards with students' average grades (ranging between 1 and 10) per school subject (Grade

Point Average [GPA]). We calculated the average grades over at least four out of six school

subjects per student: Dutch, English, mathematics, biology, history, and geography.[1]

Students' average school grades were categorized into seven subcategories, because RSiena

is not able to handle continuous measures. The categorization was as follows: $1 = \text{GPA} \leq$

5.49; $2 = 5.50 \leq \text{GPA} \leq 5.99$; $3 = 6.00 \leq \text{GPA} \leq 6.49$; $4 = 6.50 \leq \text{GPA} \leq 6.99$; $5 = 7.00 \leq \text{GPA}$

≤ 7.49; $6 = 7.50 \leq \text{GPA} \leq 7.99$; $7 = \text{GPA} \geq 8.00$.

Status norms. Similar to the friendship measure, participants received a list of all

consenting students in their classroom in a random order. They were asked to indicate "Who

is most popular" (popularity), "Who is least popular" (unpopularity), "Who do you like?"

(acceptance), and "Who do you not like at all?" (rejection; see Appendix B). We calculated

per student the proportion of nominations. Subsequently, four types of status norms at T1

were calculated: (a) the within-classroom correlation between peer-nominated popularity and

achievement (popularity norm), (b) the within-classroom correlation between peer-nominated

unpopularity and achievement (unpopularity norm), (c) the within-classroom correlation

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[1] From one of the participating schools, we received the grades of students from September to October (representing the grades for T1), from October to December (representing the grades for T2) and from December to April (representing the grades for T3). From the other school, we also received three school report cards; however, the school report card grades on the second and third report card included all grades from previous periods in that specific school year. Hence, for this school, report cards displayed the average grade from September to October (T1), September to December (T2) and September to April (T3). To account for this, we calculated the average grade for T2 by multiplying the grade of T2 times two and subtracting it by the previous average grade of T1. For calculating the grade for the period from December to April (T3) we performed a similar procedure, controlling for the longer time period between assessments.

between peer acceptance and achievement (acceptance norm), and (d) the within-classroom correlation between peer-nominated rejection and achievement (rejection norm).

Gender. Gender was coded 0 for girls and 1 for boys. Therefore, girsl were indicated as reference category.

Analyses

Attrition analyses. Missing values on achievement and peer-nomination data across waves were 3.6%, 3.4% and 3.4% respectively, for instance due to illness and not being able to catch up on the questionnaire, or because adolescents were new at school and not yet in the nomination lists. Therefore, actual Ns across waves were $N_{w1} = 1494$, $N_{w2} = 1500$ and $N_{w3} = 1500$. Attrition analyses on partially missing cases and complete cases showed that students with missing data were on lower educational tracks ($\chi^2 = 693.32$; $p < .001$). There were no other significant or substantial differences in the research variables of interest between partially missing cases and complete cases. Missing friendship data due to nonresponse were handled using the RSiena missing data method (Huisman & Steglich, 2008) using the "last observation carry forward" (LOCF) method proposed by Huisman and Snijders (2003). The percentage of missing values on achievement was about 2.8% across waves, for instance because adolescents left the school or instead, joined the school year later. Missing data were handled using the expectation maximization method. Little's missing completely at random test produced a normed chi-square (χ^2/df) of 3.52, indicating that the data were likely missing at random and that it was safe to impute missing values (Bollen, 1989). Therefore, to gain statistical power, we estimated missing values for achievement data across waves using the Expectation Maximization procedure, with all study measures as predictors (achievement across waves, as well as the different types of status and gender; see also Gupta & Chen, 2010; Van Buuren & Groothuis-Oudshoorn, 2011, p. 22).

RSiena analyses. Analyses were conducted using longitudinal social network analysis (also called 'stochastic actor-based models'; Snijders, 2005) implemented using the RSiena software program (Version 1.1-289 in R 3.2.2). RSiena estimates to what extent similarity among friends is due to friendship selection and influence processes (Snijders, Steglich, & Schweinberger, 2007), while controlling for structural network effects and the general development of a certain behavior in the network. This modeling technique allowed for simultaneously testing effects from waves 1 to 2 and waves 2 to 3 (for a detailed, more technical explanation of longitudinal social network analyses, refer to Snijders et al., 2007, and Veenstra, Dijkstra, Steglich, & Van Zalk, 2013).

Friendship selection based on academic achievement. To examine the extent to which friendship selection related to academic achievement took place, we estimated several effects. We included structural network effects that capture natural tendencies that generally take place in a friendship network, such as the tendency to reciprocate friendships (reciprocity) and to become friends with friends of friends (group formation tendencies). Next, *"effect of achievement on friendship nominations received"* refers to which extent high achievement affects being nominated as a best friend (alter effect). Conversely, the *"effect of achievement on friendship nominations given"* indicates to what extent high achievement affects the number of best friend nominations *given* to peers (ego effect). The *similarity-based selection effect* (specifically, the SimX effect) provided an estimate for testing our hypothesis about the extent to which adolescents form new and maintain friendships with others based on similarity in achievement (the so-called evaluation effect).

Friendship influence on achievement. Friendship influence processes refers to the tendency of adolescents to become similar to their friends in achievement. A positive influence parameter (average similarity parameter) represents the tendency to adopt friends' achievement over time; this can work in an upward or in a downward direction (or remain

similar). Friendship influence processes were estimated while controlling for the linear shape parameter, quadratic shape parameter, and the main effect of gender on achievement. The *linear* and *quadratic shape* parameters model the rate of change, and whether change in achievement conforms to linear or quadratic trends.

The role of status norms in the coevolution of friendships and achievement. The aforementioned effects were first analyzed for each class separately in RSiena, yielding 70 parameters for each effect. To examine the moderating impact of the four types of status norms, we ran a meta-analysis, using Viechtbauer's (2010) meta-analysis method implemented in the R-package *metafor*. We aggregated these results for the total sample of 70 classes, while simultaneously including the four types of status norms as continuous class-level moderators. We adopted this approach to determine the unique contribution of all four types of status norms in predicting class-level variation in selection and influence processes on achievement, while controlling for each other. This is necessary because there might be some overlap between, for instance, low popularity and high unpopularity, even though these constructs are antagonistically distinct concepts, as indicated by previous work (see for instance Hopmeyer Gorman et al., 2011). 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, 2018). For 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.

Next, when friendship selection processes were significantly present, we calculated ego-alter selection tables (Ripley et al., 2018), to examine whether similarity-based selection takes place especially among high-achieving or low-achieving students, and to examine whether high-achieving students have a higher tendency to select low-achieving students or

vice versa. Also, when influence processes were significant, we calculated ego-alter influence tables to investigate whether friends influence each other in an upward or downward direction. For these ego-alter tables, we compared classrooms in the upper and lower 10% of status norms. We chose this criterion due to the skewed distribution of our popularity norm measure, because there were only a few classrooms with a positive association between popularity and achievement. If we had applied other criteria, classrooms with a neutral or even a negative association between popularity and achievement would have been included in our 'high popularity norm' classrooms. For consistency, we applied the 10% criterion to all types of status norms.

We also tested whether differences in the direction of effects were significant by giving weights to these differences and calculating a linear combination and standard deviation for each classroom with a certain status norm. We transformed this to a z score with the following formula: $(\sum(lc/se))/\text{sqrt}(N)$ where lc=linear combination in each classroom, se = standard error in each classroom and N = number of classrooms. We are the first social network study to apply this method because it was recently developed, so we refer to the newest RSiena manual (Ripley et al., 2018) and https://www.stats.ox.ac.uk/~snijders/siena/ for scripts and further explanation of this method.

Goodness of fit of models and sensitivity analysis. We assessed the goodness of fit with indegree distribution, outdegree distribution, triad census and geodesic distances, and the behavior distribution for GPA. For each goodness of fit statistic, we assessed the differences between the observed values in the network (summed across the three waves of data) and the simulated values in the model, using Mahalonobis distance for each classroom network (cf. Ripley et al., 2018). For all fit indices, less than 5% of the Mahalonobis distance values reached statistical significance, indicating an adequate goodness of fit (see also

Laninga-Wijnen et al., 2018). Violin plots indicated that in general, values were well represented in all classrooms. Model convergence was good.

We conducted three sensitivity analyses. First, we removed all adolescents who nominated all peers in the classroom as a best friend from the data set. This did not affect the interpretability of our results, so we decided to take the model *without* these adolescents who nominated everyone as a best friend as our final model. Second, we examined whether our pattern of results differed with and without imputed achievement values, which was not the case. Therefore, we chose the model with imputed data as our final model. Third, we included classroom means and variances in GPA as control variables in our analyses, yielding similar results. Results of all sensitivity analyses are available upon request.

Results

Descriptive Results

In Table 1, the averages and correlations of GPA and different types of status are displayed. In general, at the individual level, having a high GPA is significantly associated with lower levels of popularity, higher levels of unpopularity (except at T2), higher levels of acceptance (except atT2), and higher levels of rejection (except at T3). However, the strength of correlations between GPA and different types of status is quite weak. There is relative stability in the extent to which students are perceived as popular and unpopular, and are being accepted and rejected by their peers, as indicated with moderate to high correlations across waves.

Table 2 presents descriptive statistics and stability coefficients for the status norms. The popularity norm (i.e., the class-level association between being popular and GPA) was negative and the unpopularity norm (i.e., the class-level association between being unpopular and GPA) was positive at all time points. There were large between-classroom differences in

status norms, and status norms were relatively stable, as represented by significantly positive inter-correlations between time points.

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   Description of network characteristics and academic achievement. In Table 3, a description of the network is provided. On average, adolescents had more than four best friends. The density in the network (outdegree) represents the general tendency of students to have friendship ties. It was relatively low, with 22%‑ 24% of friendship ties being present in relation to the total amount of friendship ties possible. Also, most friendships were reciprocated and adolescents tended to form triadic relationships. Boys and girls differed significantly but not substantially on academic achievement (effect sizes $D_{t1} = 0.26$ and $D_{t2} = 0.16$ and $D_{t3} = 0.15$). Friendships were sufficiently stable to conduct social network analyses (Jaccard Index varying from .51 to .56). The Moran's I represents covariance of achievement in all friendship *dyads*, and this value was relatively low, in line with previous social network studies on achievement (Dieterich, 2015; Gremmen et al., 2017; Shin & Ryan, 2014). It was significant in 50 out of 70 classrooms across the three waves (as calculated with permutation tests; see also Kretschmer, Leszczensky, & Pink, 2018). It is important to note that the fact that Moran's I was not large or significant in all classrooms does fit in with what we expected to see in the data, because we mostly anticipated an autocorrelation in classrooms where achievement was reputationally salient, and not necessarily in classrooms where achievement was unrelated to status.

   Both friendship selection related to similarity in achievement and influence processes varied significantly across classrooms (selection: $p < .001$; influence: $p = .049$). We included the four types of status norms (popularity, unpopularity, acceptance, and rejection norms) as moderators to explain this between-classroom variance in friendship selection and influence processes related to achievement.

The role of status norms in the strength of friendship selection. The unpopularity and popularity norm played a significant role in the extent to which friendship selection based on similarity in GPA took place [i.e., the strength of selection; $b = 1.56$, $SE = .68$, $p = .021$ for unpopularity norm and $b = 1.30$, $SE = .66$, $p = .049$ for the popularity norm]; see Table 4. In contrast, the other two types of status norms (i.e., the acceptance norm and the rejection norm) did not play a role in the strength of friendship selection processes.

The role of status norms in the direction of friendship selection. To examine our hypotheses on the direction of friendship selection, we calculated ego-alter tables for those classrooms where achievement was negatively salient (high unpopularity norms) and for those classrooms where achievement was positively salient (high popularity norms). Values in ego-alter tables can be transformed to odds by taking the exponential function. In *high unpopularity* norm classrooms (i.e., classrooms with a high correlation between academic achievement and unpopularity; see Table 5, upper part), low-achieving students selected each other based on similarity, whereas high-achieving adolescents were likely to avoid each other as friends. This was indicated by the decrease in strength of effects across the diagonal, running from .36 to -.28. This difference in log odds was significant [$z = 1.97$, $p = .049$].

In classrooms with *high popularity* norms (Table 5, lower part), the ego-alter table indicates that high-achieving adolescents were somewhat more likely to select each other as friends based on similarity in achievement than low-achieving adolescents, evidenced by the slight increase of effects across the diagonal (.02 to .13). However, this increase was not significant ($z = .84$, $p = .40$).

Next, both in high popularity norm classrooms and in high unpopularity norm classrooms, off-diagonal numbers of ego-alter tables indicate that the tendency of low-achieving adolescents to avoid high-achieving peers as friends was not significantly stronger than vice versa (-.41 versus -.37; $z = .40$, $p = .69$ and -.35 versus -.07; $z = .80$, $p = .42$).

Although we did not formulate specific hypotheses about the direction of selection effects in low (un)popularity classrooms, we illustrate patterns of selection processes in these classrooms by means of ego-alter tables (see Appendix A). There were no significant differences in the direction of selection processes within these classrooms (z scores are available upon request).

The role of status norms in the strength and direction of friendship influence. In contrast to our hypotheses, status norms did *not* play a role in the extent to which friends became similar to each other in achievement over time (i.e., influence processes). Due to nonsignificant influence effects in high and low status norm classrooms, it was not useful to gain insights in the direction of influence processes (higher vs. lower achievement) by means of ego-alter influence tables.

Supplemental analyses. We performed supplemental analyses (available upon request) to investigate whether there were gender differences in (the role of status norms in) friendship processes, but this was not the case. Also, educational level was initially included as control variable, but it did not affect friendship processes. Therefore, we presented the most parsimonious model without educational level.

Discussion

We tested the reputational salience hypothesis (Hartup, 1996) in a context-specific way, by examining whether the class-level relationship between academic achievement and four types of peer status (i.e., popularity, unpopularity, acceptance, and rejection), so called status norms, could explain differences between classrooms in friendship selection and influence processes regarding academic achievement. In general, adolescents chose their friends based on similar levels of achievement and were influenced by their friends in academic achievement. Of importance, unpopularity and popularity norms within the classroom explained differences in strength and direction of friendship selection processes (but not of

influence processes) for academic achievement, whereas acceptance and rejection norms did not. More specifically, in classrooms where popular peers were high on academic achievement, both high- and low-achieving adolescents were most likely to select each other based on similarity in achievement. At the same time, in classrooms where unpopular peers were high on academic achievement, low-achieving adolescents selected friends based on similarity in achievement and high-achieving adolescents avoided similarly-achieving peers as friends. Hence, both popularity norms and unpopularity norms appear to strengthen a friendship selection bias within the classroom, in that similar (e.g., low-achieving) peers mainly affiliate with each other. This may have important consequences for adolescents' academic development. For instance, it may limit opportunities for low-achieving adolescents to learn from their higher achieving peers; or vice versa, because adolescents may also learn from peer tutoring experiences that are most likely to occur when high-achievers explaining academic topics to low-achievers (Gest et al., 2008). Because we found that friendship influence processes occur in every classroom, this friendship selection bias may result in a process where similarly low-achieving friends influence each other toward even lower levels of achievement, particularly in high unpopularity norm classrooms. This may negatively impact their academic development over time.

The Role of Academic Status Norms in Friendship Selection Processes

The finding that unpopularity and popularity norms strengthened friendship selection processes based on similarity in achievement was in line with our hypotheses. Hence, adolescents' preference for similarly achieving friends was strongest in classrooms where achievement was a salient and important characteristic due to its associations with popularity or unpopularity (reputational salience hypothesis; Hartup, 1996).

Remarkably, unpopularity norms played a role in the direction of friendship processes, whereas popularity norms did not. That is, in classrooms with *high unpopularity*

norms, low-achieving adolescents selected friends based on similarity, but high-achieving adolescents did not; whereas in classrooms with high popularity norms, similarity-based friendship selection processes were equally strong among low-achieving and high-achieving adolescents. This latter finding was somewhat in contrast to our hypothesis; we expected that similarity-based selection would mainly take place among high-achieving students. A potential explanation for this finding is that in high popularity norm classrooms, high-achieving students chose each other based on preferential attraction, whereas low-achieving students were 'stuck with what they could get' (i.e., default selection, as found in a study on aggression; Sijtsema, Lindenberg, & Veenstra, 2010). Importantly, this 'default selection' did not occur among high-achievers in classrooms with high unpopularity norms. Instead, high-achieving peers were avoided as potential friendship partners, even by other high-achieving peers. This may indicate that adolescents' tendency to avoid unpopularity is stronger than the desire to obtain popularity (Brechwald & Prinstein, 2011; Hopmeyer Gorman et al., 2011). Maybe the consequences to select each other based on similarity in low achievement are less severe in high popularity norm classrooms (missing an opportunity to become more popular), than are the consequences of selecting each other based on similarity in high achievement in high unpopularity norm classrooms (risking unpopularity; Hopmeyer Gorman et al., 2011).

Whereas popularity norms and unpopularity norms played a role in similarity-based friendship processes, both types of status norms seemed to be not powerful enough to encourage bonds among friends who are *dissimilar* in achievement. We found that, irrespective of the (un)popularity norm, high-achieving students avoided low-achieving peers as friends and low-achieving students avoided high-achieving peers as friends. This was in contrast to our hypothesis, because we expected that adolescents would have a preference for friends who show reputationally salient characteristics (Lindenberg, 2001), for instance to avoid low peer status (Brechwald & Prinstein, 2011) or to bask in reflected glory (Dijkstra et

al., 2010). One explanation for this finding is that it may be more important for adolescents to be to a certain extent similar to their friends than to achieve a higher peer status by selecting highly dissimilar peers as friends (i.e., to bask in reflected glory; Dijkstra et al., 2010). That is, high-achieving and low- achieving students often differ largely in the values, aspirations, academic behaviors, and principles that they endorse (Ryan, 2001). Therefore, they may be less attracted to each other as a friend (similarity attraction hypothesis; Byrne, 1971), irrespective of the status norm in the classroom.

Next, acceptance and rejection norms did not play a role in the strength and direction of friendship in selection processes in classrooms. This finding might be explained as follows: Even though the original concept of status norms focused on peer acceptance and rejection (Henry et al., 2000), reputation-based constructs such as popularity and unpopularity might be a stronger social reward or social sanction to adolescents. Previous studies have indicated that adolescents prioritize popularity over other social and relational domains (LaFontana & Cillessen, 2010), and that they might especially fear unpopularity as a social sanction because this increases their risk of social exclusion and victimization (Brechwald & Prinstein, 2011; Hopmeyer Gorman et al., 2011). Also, the norm of (un)popular peers might be more evident and clear within the classroom. That is, conceptually, popularity and unpopularity are reputation-based constructs, reflecting a certain consensus on which youth achieved power, visibility and prestige within the peer group. In contrast, acceptance and rejection are preference-based constructs reflecting students' personal appraisals of their interactions with individual peers (Adler et al., 1992; Cillessen & Marks, 2011). Therefore, these preference-based constructs may be more variable on the group level (Hopmeyer Gorman et al., 2011), and present a less clear norm within the classroom that may be less informative for friendship processes.

The Role of Academic Status Norms in Friendship Influence Processes

In contrast to our expectations, none of the status norms played a role in the strength and direction of friendship *influence* processes regarding academic achievement. In other words, we found that friends influenced each other over time in academic achievement, irrespective of the extent to which achievement was related to social sanctions or social rewards. Whereas previous studies have found that popularity norms strengthened friendship processes around aggression (Laninga-Wijnen et al., 2017) and risk attitudes (Rambaran et al., 2013), we found that this role of popularity norms (or any other type of status norms) could not be generalized to academic achievement. This may indicate that there is a potential limit to the power of high-status peers: their norms may affect friendship influence related to deviant social behaviors or attitudes, but not friendship influence related to academic achievement. There are several possible explanations for this finding.

First, academic achievement is not a social behavior that is directed to others, but rather an individual behavior that serves individual goals and aspirations (Ryan & Deci, 2000). Therefore, academic achievement may be a less visible characteristic, and a less strong strategy to gain a higher status in the peer group. Moreover, *parents* may exert more influence on their child's academic achievement than on their child's social behaviors in the classroom, which may be at the cost of the role of (high-status or low-status) peers in achievement (Im, Hughes, & West, 2016). For instance, parents can be highly involved with their children's academic development by monitoring school activities, helping them with their homework or by encouraging them to take extra classes. This may affect adolescents' achievement over time, irrespective of what kind of classroom these children are in (Marion, Laursen, Kiuru, Nurmi, & Salmela-Aro, 2014). Future studies are encouraged to further examine potential buffering effects of parents on the role of peers in academic achievement.

Second, because adolescents *did* become similar to their friends over time, friends can also be seen as important socializers of adolescents' academic achievement, irrespective of

the status norm in the classroom. Previous studies indicated that adolescents often fulfill their academic tasks in the presence of their friends (Rizzuto, LeDoux, & Hatala, 2009). For instance, adolescents may be especially inclined to make homework, exchange information, and collaborate on assignments with their friends. Also, friendship influence on achievement might (partly) occur outside the classroom context, for instance at home (Geven, Weesie, & Van Tubergen, 2013). These quite intensively shared experiences among friends, partly outside the classroom context, may result in more similarity between friends in achievement over time, irrespective of status norms within the classroom.

Third, status norms related to objective achievement may not be the strongest indicator of the importance of achievement in the broader peer context, because it may go together with diverging motivational processes or academic endeavors that may have distinct implications for friendship processes. For instance, adolescents may strive for high achievement to develop competence (i.e., mastery goal) or to outperform others (i.e., performance goal; Poortvliet & Darnon, 2010). A previous study indicated that when mastery goals were associated with popularity, there were strong friendship influence processes related to peer-perceived achievement, whereas this was not the case when performance goals were associated with popularity (Laninga-Wijnen et al., 2018). Hence, it might be that the underlying motive for *why* high-status students obtain high grades is more important for friendship processes than is the obtained grade itself.

Strengths, Limitations and Future Directions

Our study has several strengths. First, our study is strongly theoretically driven by the reputational salience hypothesis (Hartup, 1996) and we are the first to test the importance of status norms regarding friendship processes in academic achievement. Our study indicates that academic achievement is made salient within the classroom by virtue of its associations with social status, but only regarding selection processes and not influence processes. Besides

the fact that our findings on selection processes are generally in line with the reputational salience hypothesis, these might also add new information. The original reputational salience hypothesis (Hartup, 1996) is mainly about the *general* reputational salience of a certain attribute and does not go into potential contextual variations in this reputational salience. However, our study indicates that the salience of an attribute might vary across different settings (e.g., classrooms) and, in turn, can explain differences in friendship processes between these classrooms. Hence, these found variations in attributes' reputational salience across different peer contexts (such as the classroom) may present an important addition to the reputational salience hypothesis as formulated by Hartup (1996).

Second, we used a broader concept of status norms compared to that in previous studies by examining not only the association between achievement and social rewards, that is, popularity and peer acceptance, but also its relation with social sanctions, that is, unpopularity and peer rejection. Because we found an effect for both the popularity and the unpopularity norm on friendship selection processes, this seems a fruitful way for future studies to examine status norms. Apparently, approaching status norms by examining only the social rewards may result in overlooking another potentially more important process that might occur as well: avoiding social sanctions (Brechwald & Prinstein, 2011).

Third, we used actual grades of students (instead of, for instance, academic reputation among peers; Gest et al., 2008), which can be seen as a strong point for several reasons. Most previous social network studies used objective achievement as an attribute, and our aim was to extend upon those studies by examining whether status norms may explain why these previous studies found some inconsistencies. Moreover, particularly for friendship influence processes it is important to examine whether friends may influence each other's actual grade and not the perception of someone's academic functioning. That is, when adolescents hang out with high-achieving peers, it might be that other peers perceive those adolescents as also

academically competent, even when this is not the case. Instead, actual academic achievement is a relatively objective measure of students' academic functioning because grades are provided by different teachers, on different courses (multiple informants). Moreover, actual grades determine whether a student passes a class, and they influence further educational and occupational opportunities (Crosnoe & Benner, 2015).

However, our study should also be viewed in light of its limitations. First, we included evaluation effects for selection processes, which encompass both the selection (creation) and maintenance (endowment) of friendships based on similarity (or dissolution based on dissimilarity; Ripley et al., 2018), due to convergence issues. Because previous studies have indicated that maintenance related to achievement occurs as well (Rambaran et al., 2016; Laninga-Wijnen et al., 2018), and that norms may play a distinct role in friendship selection and friendship maintenance (Laninga-Wijnen et al., 2017), we encourage future studies to try to disentangle these two processes.

Second, we only examined friendship selection and influence processes related to a general average grade on six *academic* subjects. It might also be interesting to examine subject-specific status norms and friendship processes related to a particular subject. However, all six subjects were negatively linked with popularity and rejection, and positively or neutrally linked with peer acceptance and unpopularity. Therefore, all school subjects contributed equally to our construct of academic status norms and therefore may play a similar role in friendship selection and influence processes.

Third, as explained in the introduction, we assessed 'perceived friendship' rather than friendship in the current study. However, we did control for reciprocity, and by asking adolescents about their 'best friends' we hoped to capture a certain quality of a friendship. Moreover, a previous study indicated that reciprocal best friendships and asymmetric best friendships did not differ regarding perceived friendship quality (Bowker, 2004).

STATUS NORMS IN FRIENDSHIP PROCESSES RELATED TO ACADEMIC ACHIEVEMENT

Nevertheless, future studies may profit from taking into account the quality of friendships in explaining the mechanisms by which adolescents become similar to their friends in achievement, for instance by examining ordered networks (Elmer, Boda, & Stadtveld, 2017).

Implications

Our study provides insight on the importance of (un)popularity norms for the strength and direction of friendship selection processes. Future studies are encouraged to pay attention to potential implications of these findings. For instance, future studies may examine how the friendship selection bias that is triggered by high popularity and unpopularity norms may influence the (academic) development of both low- and high-achieving students. For instance, when low-achieving adolescents mainly select similarly low-achieving students as friends, this may dampen their academic development over time. Future studies are encouraged to examine not only whether this is the case, but also whether such a situation can be prevented by investigating which factors may contribute to the emergence and development of academic (un)popularity norms. This would help in understanding why in certain classrooms academic achievement is a valuable characteristic (due to its associations with high status), whereas in other classrooms it is not. Also, it may be an exciting avenue for future studies to investigate which factors (e.g., parents, teachers) may buffer the role of high unpopularity norms. These promising avenues for future studies may provide insights on which factors may predict the value that adolescents attach to their achievement, which may promote their educational and work-related success in later life.

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Tables.

Table 1
Correlations between Different Types of Status and Grade Point Average (GPA) Across the School Year

	M(SD)	Range	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. GPA T1	6.57(0.74)	[4.27 – 9.15]														
2. GPA T2	6.65(0.83)	[3.27 – 9.45]	.60**													
3. GPA T3	6.58(0.88)	[1.68 – 9.32]	.64**	.52*												
4. Popularity T1	0.14(0.16)	[0.00 - 0.82]	-.17**	-.17**	-.17**											
5. Popularity T2	0.14(0.16)	[0.00 – 0.90]	-.13**	-.13**	-.13**	.81**										
6. Popularity T3	0.13(0.16)	[0.00 – 0.88]	-.10**	-.10**	-.10**	.77**	.79**									
7. Unpopularity T1	0.12(0.18)	[0.00 – 0.94]	.10**	.00	.10**	-.41**	-.38**	-.36**								
8. Unpopularity T2	0.11(0.17)	[0.00 – 1.00]	.11**	.03	.11**	-.37**	-.36**	-.35**	.88**							
9. Unpopularity T3	0.11(0.17)	[0.00 – 0.95]	.12**	.04	.12**	-.38**	-.38**	-.38**	.81**	.86**						
10. Acceptance T1	0.39(0.16)	[0.00 – 0.86]	.10*	.01	.10**	.31**	.29**	.29**	-.43**	-.38**	-.36**					
11. Acceptance T2	0.38(0.18)	[0.00 – 0.83]	.06*	-.03	.06*	.25**	.29**	.26*	-.36**	-.36**	-.34**	.71**				
12. Acceptance T3	0.36(0.17)	[0.00 – 0.83]	.09*	-.01	.09**	.21**	.26**	.32**	-.33**	-.32**	-.32**	.55**	.63**			
13. Rejection T1	0.10(0.12)	[0.00 – 0.90]	-.06*	-.06*	-.06**	-.13**	-.14**	-.10**	.60**	.56**	.50**	-.53**	-.46**	-.39**		
14. Rejection T2	0.09(0.12)	[0.00 – 0.80]	-.07*	-.09**	-.07**	-.12**	-.13**	-.12**	.54**	.61**	.55**	-.47**	-.48**	-.41**	.74**	
15. Rejection T3	0.10(0.18)	[0.00 – 0.87]	-.05	-.11**	-.05	-.10**	-.12**	-.12**	.38**	.52**	.54**	-.40**	-.42**	-.45**	.66**	.72**

Note. $N = 1,549$. T1, T2 and T3 represent the measurement waves in October, December and April. GPA scores reflect report card scores, and all status scores refer to the average proportion of students within the classroom that nominated a particular individual for this characteristic. * $p < .05$. ** $p < .01$.

Table 2

Descriptives of Popularity Norms, Unpopularity Norms, Acceptance Norms and Rejection Norms across the School Year

	T1		T2		T3		Inter-correlations over time		Correlations at T1		
	M(SD)	Range	M(SD)	Range	M(SD)	Range	T1 – T2	T2 – T3	1.	2.	3.
1. Popularity norm	-.21(.24)	[-.85 to .29]	-.15(.22)	[-.66 to .34]	-.14(.26)	[-.71 to .51]	.55**	.54**	-		
2. Unpopularity norm	.14(.26)	[-.58 - .62]	.06(.26)	[-.54 to .69]	.11(.28)	[-.55 to .65]	.59**	.58**	-.56**	-	
3. Acceptance norm	.01(.27)	[-.66 to .86]	.04(.24)	[-.73 to .51]	.05(.26)	[-.64 to .61]	.38**	.41**	.31	-.47**	-
4. Rejection norm	-.06(.25)	[-.58 to .71]	-.08(.23)	[-.60 to .52]	-.05(.27)	[-.68 to .61]	.35**	.43**	-.10	.48**	-.43**

Note. N = 70 classes. T1, T2, and T3 represent the measurement waves in October, December, and April, respectively (Times 1,2,3). * *p* < .05. ** *p* < .01.

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Table 3

Description of the Sample, Network Characteristics, and Measures in all Classes

	T1		T2		T3	
Sample	*M(SD)*		*M(SD)*		*M(SD)*	
Average number of friends	4.66(1.21)		4.60(1.14)		4.20(1.10)	
Cohesion in the friendship network	0.24(0.07)		0.24(0.07)		0.22(0.06)	
Proportion reciprocated friendships	0.64(0.11)		0.62(0.11)		0.61(0.13)	
Proportion triadic relationships	0.65(0.10)		0.63(0.11)		0.63(0.14)	
Academic Achievement	*M(SD)*	*N*	*M(SD)*	*N*	*M(SD)*	*N*
Average boys	6.47(0.72)[a]	789	6.59 (0.82)[a]	789	6.50(0.86)[a]	789
Average girls	6.67(0.73)[b]	760	6.72 (0.84)[b]	760	6.65(0.90)[b]	760
Respondents						
Degree similarity in friendship dyads	0.03(0.12)		0.03(0.16)		0.03(0.14)	
Friendship and Achievement Change		T1-T2		T2-T3		
Average number of friendship changes per classroom		59		63		
Proportion stable friendships		0.56		0.51		
Fraction increasing actors in achievement		31.2%		38.3%		
Fraction decreasing actors in achievement		38.4%		30.3%		

Note. N = 70 classes; 1,549 participants. T1-T3 = Time 1 – Time 3 (Waves 1 – 3). For information on the calculation of the different network indices, see Veenstra & Steglich, 2012. Average achievement for boys and girls were compared and indicated with different subscripts.

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Table 4

RSiena Meta-analyses of Network and Behavior Dynamics for Academic Achievement with Four Types of Status Norms as Moderators

	Estimates			Effect of four types of status norms on variations between classrooms in estimates			
				Popularity norm	Unpopularity norm	Acceptance norm	Rejection norm
	b(SE)	OR	CI	b(SE)	b(SE)	b(SE)	b(SE)
Structural Network Effects							
Tendency to make friends (outdegree)	-2.67(0.12)***	0.07	[-2.90, -2.45]	-0.19(0.70)	-0.40(0.71)	-0.51(0.53)	0.05(0.72)
Reciprocated friendships (reciprocity)	1.91(0.08)***	6.75	[1.76, 2.07]	-0.51(0.42)	0.04(0.44)	0.01 (0.35)	-0.72(0.43) [†]
Transitive group formation (triplets)	0.48(0.02)***	1.62	[0.43, 0.53]	-0.07(0.13)	-0.06(0.14)	0.00(0.11)	0.00(0.13)
Transitive reciprocated group formation	-0.18(0.03)***	0.84	[-0.23, 0.13]	-0.04(0.16)	-0.09(0.16)	-0.10(0.13)	0.10(0.15)
Cyclical group formation (3-cycles)	-0.07(0.02)**	0.93	[-0.12, -0.02]	-0.04(0.15)	0.08(0.15)	-0.04(0.12)	-0.14(0.15)
Outdegree friendship	-0.17(0.01)***	0.84	[-0.20, -0.15]	0.06(0.06)	0.01(0.06)	0.05(0.05)	0.09(0.07)
Outdegree activity	0.03(0.00)***	1.03	[0.02, 0.04]	-0.01(0.03)	0.02(0.03)	0.02(0.02)	0.00(0.03)
Isolates	0.69(0.07)***	1.99	[0.54, 0.83]	-0.37(0.44)	-0.23(0.45)	0.27 (0.34)	0.25(0.45)
Selection Processes							
Same gender selection	0.55(0.05)***	1.72	[0.44, 0.65]	0.65(0.28)*	0.38(0.29)	0.12(0.22)	0.25(0.27)
Effect of achievement on friendship nominations received (alter)	-0.01(0.01)	0.99	[-0.04, 0.02]	-0.06(0.09)	-0.03(0.09)	0.08(0.06)	0.02(0.08)
Effect of achievement on friendship nominations given (ego)	-0.04(0.02)	0.96	[-0.06, 0.00]	-0.05(0.11)	-0.04(0.12)	-0.01 (0.08)	0.04(0.10)
Similarity-based selection of friends in achievement	0.37(0.12)**	1.45	[0.15, 0.60]	1.30(0.66)*	1.56(0.68)*	0.71(0.48)	-0.79(0.56)
Influence Processes							
Achievement linear shape	0.01(0.02)	1.02	[-0.03, 0.06]	0.15(0.14)	0.14(0.13)	-0.06(0.11)	0.01(0.12)
Achievement quadratic shape	-0.02(0.02)		[-0.05, 0.02]	0.06(0.10)	0.07(0.09)	0.00 (0.07)	-0.02(0.08)
Effect of gender (1=boy) on achievement	0.00 (0.04)	1.00	[-0.08, 0.08]	0.15(0.26)	0.02(0.24)	-0.27(0.21)	0.04 (0.22)
Friendship influence on achievement	1.09(0.44)*	1.20	[0.23, 1.95]	1.88(2.51)	1.05(2.36)	-1.47(2.17)	-2.10(2.31)

Note. Nclasses = 70; Nstudents = 1549. Due to convergence issues we had to fix the rate effect for numerical stability at 2.5 in all analyses, as well as the gender ego and gender alter effect. In about five classrooms, it was not possible to identify some parameters due to too-high standard errors; these classes were therefore excluded from the meta-analysis. This did not affect the interpretability of the results. *b*= the unstandardized multi-nominal logit coefficient. *OR* = Odds Ratio. † *p* < .10; * *p* < .05; ** *p* < .01; *** *p* < .001.

Table 5

Ego-alter Selection Table for Academic Achievement in Classrooms with High Unpopularity Norms (N = 7) and High Popularity Norms (N = 6)

Students' achievement	Peers' achievement						
High unpopularity norm classrooms	1	2	3	4	5	6	7
1	0.36	0.24	0.12	0.00	-0.13	-0.25	-0.37
2	0.24	0.26	0.13	0.01	-0.11	-0.23	-0.36
3	0.11	0.13	0.15	0.03	-0.10	-0.22	-0.34
4	-0.02	0.00	0.02	0.04	-0.08	-0.20	-0.33
5	-0.15	-0.13	-0.11	-0.09	-0.06	-0.19	-0.31
6	-0.28	-0.26	-0.24	-0.21	-0.20	-0.17	-0.30
7	-0.41	-0.39	-0.37	-0.37	-0.32	-0.30	-0.28
High popularity norm classrooms	1	2	3	4	5	6	7
1	0.02	0.00	-0.01	-0.03	-0.04	-0.05	-0.07
2	-0.04	0.04	0.02	0.01	-0.01	-0.02	-0.04
3	-0.10	-0.02	0.06	0.04	0.03	-0.01	0.00
4	-0.17	-0.08	0.00	0.08	0.06	0.05	0.03
5	-0.23	-0.15	-0.07	0.01	0.10	0.08	0.06
6	-0.29	-0.21	-0.13	-0.05	0.03	0.11	0.10
7	-0.35	-0.27	-0.19	-0.11	-0.03	0.05	0.13

Note. Numbers in the table reflect the strength of attraction for students to become friends with certain peers based on their levels of academic achievement (columns dependent on rows). The values in the cells in these tables can be transformed to odds by taking the exponential function (exp.(β)). Numbers 1 - 7 reflect to different GPA categories: 1 = GPA $\leq$ 5.49; 2 = 5.50 $\leq$ GPA $\leq$ 5.99; 3 = 6.00 $\leq$ GPA $\leq$ 6.49; 4 = 6.50 $\leq$ GPA $\leq$ 6.99; 5 = 7.00 $\leq$ GPA $\leq$ 7.49; 6 = 7.50 $\leq$ GPA $\leq$ 7.99; 7 = GPA $\geq$ 8.00. N= 6 for high popularity norm classrooms as one classroom did not converge properly.

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Appendix A.

Ego-alter Selection Table for Academic Achievement in Classes with Low Popularity and Unpopularity Norms

Students' achievement	Peers' achievement						
Low unpopularity norm classrooms	1	2	3	4	5	6	7
1	0.08	0.05	0.01	-0.03	-0.06	-0.10	-0.13
2	0.03	0.07	0.04	0.00	-0.03	-0.07	-0.11
3	-0.02	0.02	0.07	0.03	-0.01	-0.04	-0.08
4	-0.08	-0.03	0.01	0.06	0.02	0.01	-0.05
5	-0.13	-0.09	-0.04	0.01	0.05	0.02	-0.02
6	-0.18	-0.14	-0.09	-0.05	0.00	0.04	0.01
7	-0.24	-0.19	-0.15	-0.11	-0.05	-0.01	0.04
Low popularity norm classrooms	1	2	3	4	5	6	7
1	0.11	0.05	-0.01	-0.01	-0.12	-0.18	-0.24
2	0.08	0.09	0.03	-0.03	-0.09	-0.14	-0.20
3	0.04	0.06	0.07	0.01	-0.05	-0.10	-0.16
4	0.01	0.02	0.04	0.05	-0.01	-0.07	-0.12
5	-0.02	-0.01	0.00	0.02	0.03	-0.03	-0.09
6	-0.05	-0.04	-0.03	-0.02	0.00	0.01	-0.05
7	-0.08	-0.07	-0.07	-0.05	-0.03	-0.02	-0.01

Note. Numbers in the table reflect the strength of attraction for students to become friends with certain peers based on their levels of academic achievement (columns dependent on rows). The values in the cells in these tables can be transformed to odds by taking the exponential function (exp.(βk)). Numbers 1 - 7 reflect to different GPA categories: 1 = GPA $\leq$ 5.49; 2 = 5.50 $\leq$ GPA $\leq$ 5.99; 3 = 6.00 $\leq$ GPA $\leq$ 6.49; 4 = 6.50 $\leq$ GPA $\leq$ 6.99; 5 = 7.00 $\leq$ GPA $\leq$ 7.49; 6 = 7.50 $\leq$ GPA $\leq$ 7.99; 7 = GPA $\geq$ 8.00.

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Appendix B

Full set of items included:

GPA (Grade point average on three report cards)

Friendship ("Who are your best friends in class")

Popularity ("Who is popular")

Unpopularity ("Who is least popular")

Rejection ("Who do you not like at all")

Acceptance ("Who do you like")

Gender