



The influence of friends on adolescents' behavior problems at school: The role of ego, alter and dyadic characteristics



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ABSTRACT

This paper deals with the influence of friends in class on adolescents' problematic school behavior (i.e. inattention in class and not doing homework). We examine whether this influence is moderated by ego (i.e. the adolescent's indegree), alter (i.e. friends' indegree) and dyadic characteristics (i.e. friendship reciprocity). Influence processes are analyzed with a stochastic actor-based model (SIENA), while controlling for friendship selection. Using a 4-wave panel dataset, we find that friends influence adolescents' problematic school behavior. Adolescents with a higher indegree are less likely to be influenced. The influence of friends is not significantly moderated by friends' indegree and friendship reciprocity.

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1. Introduction

For a long time scholars have investigated the determinants of adolescents' school outcomes, such as grades, attitudes toward school and (problematic) behavior at school (Dika and Singh, 2002; Jimerson et al., 2003). Research has shown that the educational outcomes of adolescents are affected by characteristics of their parents, such as parental socio-economic resources or parental involvement (Dika and Singh, 2002); by class and school characteristics, such as the size of the school and teacher support (Fredricks et al., 2004); and that there are racial and ethnic differences with respect to school outcomes (e.g. Steinberg et al., 1992).

The influence that peers exert on each other's school outcomes has, since Coleman's (1961) report "The Adolescent Society", increasingly gained interest among researchers. Past research on peer influence has studied achievement-related outcomes, such as grades and test scores (Lin, 2010), attitudes toward school (e.g. Knecht, 2008; Altermatt and Pomerantz, 2003), motivation (Ryan, 2001) and educational aspirations (e.g. Cohen, 1983; Hallinan and Williams, 1990; Kandel, 1978).

In this study we focus on the influence of *friends* on adolescents' *problematic school behavior*. In the literature, problematic school behavior is sometimes also referred to as school misconduct (Demant and van Houtte, 2012) or disengagement, whereas its counterpart is referred to as (behavioral) school engagement or school adjustment (Fredricks et al., 2004; Jimerson et al., 2003). Research on the influence of friends on problematic school behavior

is limited (Fredricks et al., 2004). Only a handful of studies have investigated the influence of friends or friendship groups on the engagement (i.e. Kindermann, 2007; Molloy et al., 2011), disruptive and problematic behavior of students at school (Berndt, 1999; Berndt and Keefe, 1995; Crosnoe et al., 2003). Nevertheless, it is important to study school behavior, since it is related to school success and drop-out (Fredricks et al., 2004). Hence, our first contribution to the literature on peer influence and school outcomes is that we study the specific dimension of problematic school behavior, which has hardly been done before.

Two important indicators of problematic school behavior will be examined: not doing homework and not paying attention in class. While both are indicators of problematic school behavior (Fredricks et al., 2004), their nature is distinct. Since homework is mostly done outside the class context, friends might be less aware of each other's homework inactivity than of each other's inattention in class; although the consequences of not doing homework might become evident in class or communicated among students. Hence, peer influence processes on homework inactivity might be less pronounced than peer influence processes on inattention in class.

In this paper we will rely upon insights from the broader literature on (peer) influence processes, such as studies on the influence of peers on risk behavior, for example smoking and drinking. Within this research area, several scholars have argued that some adolescents are more susceptible to influence than others and that some friends are more influential than others (Brechwald and Prinstein, 2011; Veenstra and Dijkstra, 2011). Aspects that might moderate the influence of friends can be classified into: (1) characteristics of ego (i.e. the focal person) that affect the susceptibility of ego to the influence of friends; (2) characteristics of alter (i.e. person that the focal person is directly connected to in the network) that affect

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the extent to which alter is influential, and (3) the combination of ego and alter characteristics, such as friendship characteristics (i.e. dyadic characteristics).

Empirical studies on these moderating effects are generally rare (Brechwald and Prinstein, 2011). However, a couple of studies that deal with the influence of friends on adolescents' (problematic) school behavior have investigated whether the influence of friends is moderated by friendship characteristics, namely, friendship quality (Berndt and Keefe, 1995; Berndt, 1999) and stability (Berndt, 1999). Less is known about the extent to which the influence of friends on adolescents' school behavior is moderated by ego and alter characteristics.

Thus, the second contribution of this paper, is that we investigate new moderators of the influence of friends on adolescents' problematic school behavior by studying the moderating effect of the number of friendship nominations that ego and alter receive. Moreover we will test the extent to which friendship reciprocity affects the influence of friends (i.e. dyadic friendship characteristic). Thus, the research questions of this study are: (1) to what extent is problematic school behavior affected by adolescents' friends in class? and (2) to what extent is the influence of friends moderated by characteristics of ego, alter and the dyadic relationship?

To investigate the influence of friends on adolescents' problematic school behavior, we use panel data collected among over 3000 first-year secondary school pupils in 126 school classes in the Netherlands, who were interviewed at four different time points (Knecht, 2006).

We study the influence of friends in class by making use of stochastic-actor models, i.e. Simulation Investigation for Empirical Network Analysis (SIENA) (Snijders, 2011; Steglich et al., 2010). SIENA is specifically designed to disentangle friendship selection effects from influence effects in observational panel data. Most previous studies that tried to separate influence from friendship selection effects with respect to students' problematic school behavior have made use of discrete panel methods (e.g. Berndt, 1999; Berndt and Keefe, 1995; Crosnoe et al., 2003; Kindermann, 2007; Molloy et al., 2011). This implies that networks and behavior are studied at two or more time points and it is (implicitly) assumed that changes in the network and adolescents' behavior do not take place in between the different measurement points. SIENA explicitly models the latent changes that could occur in between measurement points. Moreover, in contrast to previous methods, SIENA enables the researcher to take into account the effect of the network structure on people's friendship evolution. Network formation effects, such as the tendency of people to reciprocate friendship ties (i.e. dyadic network formation effects) and the tendency to become friends with friends of friends (i.e. triadic network effects), can be incorporated in the statistical model. By studying the evolution of networks and behavior at the same time, selection processes and influence processes can be disentangled (Steglich et al., 2010).

2. Theory and hypotheses

The literature on peer influence has been rapidly growing in the past decades (Brechwald and Prinstein, 2011; Veenstra and Dijkstra, 2011). In particular, there is a large literature on risky behavior of adolescents, such as smoking, drinking and delinquency (e.g. Bot et al., 2005; Knecht, 2008; Snijders and Baerveldt, 2003). In this study, which is on problematic school behavior, we use some of the theoretical arguments that have been developed in the more general literature on peer influence. A key assumption made by most researchers is that adolescents are in need of the social approval from peers and try to avoid the social rejection by peers (Cialdini and Goldstein, 2004; Lindenberg, 2013). Attaining

approval and avoiding rejection is not only a goal in itself, but is also related to higher feelings of self-worth. Adolescents try to gain social approval from their peers by adjusting to the behavior that matches the social norms of their peers. In this paper we focus on the influence of friends. Adolescents are particularly likely to adjust their behavior to that of their (close) friends, since they mostly desire to be appreciated by peers they value and feel more positively about (Hallinan, 1982; Brechwald and Prinstein, 2011).

There is evidence showing that adolescents adjust their smoking and drinking behavior to that of the levels of their friends (e.g. Bot et al., 2005; Mercken et al., 2010), and we expect to see a similar tendency with respect to problematic school behavior. For example, when adolescents have a friendship group that is marked by studious behavior, adolescents are less likely to show problematic school behavior. Contrarily, when adolescents' friends are marked by problematic school behavior, adolescents will be more likely to show problematic school behavior. Hence, we hypothesize that:

H1. Adolescents will adjust their problematic school behavior to the problematic school behavior of their friends.

In this paper we want to investigate ego, alter and dyadic factors that we expect to moderate the influence of friends on adolescents' problematic school behavior. Ego is a focal actor in the network, in this case it refers to an adolescent who can alter his or her behavior and who can create and break friendship ties. Alters refer to the actors to whom ego is directly tied in the network, in this case they refer to ego's friends in class. A dyad refers to a pair of two actors in the network, in this case two classmates.

We assume that the influence of a friend on the problematic school behavior of ego is dependent on the extent to which ego finds the social approval of a certain friend important. We will use this line of reasoning to elaborate on *ego*, *alter* and *dyadic* characteristics that might alter the influence of friends in class on the problematic school behavior of adolescents.

2.1. Characteristics of ego and alter

From the broader literature on peer influence processes, we can derive the assumption that the sanctions for non-conformity and the benefits for conformity to the school behavior of friends are higher when the number of people that consider ego to be a friend is smaller (i.e. indegree is lower). Research has shown that when more classmates nominate a child as a friend, that child feels less lonely and more satisfied about his/her social situation (Asher et al., 1984). Consequently, we assume that when fewer alters consider ego as a friend, ego usually feels less socially approved of, is more insecure and has a lower self-esteem (Friedkin, 1998; Lindenberg, 2013). This increases the need for and the importance of the social approval from others and the costs of rejection. For example, losing a friend when you have few friends is more costly than losing a friendship when you have many friends. We hypothesize:

H2. Ego will adjust his/her problematic school behavior more to the problematic school behavior of his/her friends, when fewer classmates consider ego as a friend.

It could be argued that not only the indegree of ego, but also the indegree of alter affects the influence process. When ego's friend is considered by more people as a friend, ego is assumed to find the social approval from this friend more important. According to Friedkin (1998), people who have a higher indegree are likely to have more resources or competence (such as skills, contacts or access to information) or are perceived to have more resources or competence. A person's resources and indegree are related to each other in a self-reinforcing way: people tend to connect to a person with more resources; the more connections a person has, the more people will perceive his or her resources as valuable (Friedkin,

1998). Based on this idea, we argue that people assume that the social approval from an alter with a higher indegree will improve the access to resources. Ellis and Zabatany (2007) apply a similar rationale to explain their expectations regarding peer group influence processes. They argue that adolescents find the social approval of peer groups with a higher status more important, because higher status peer groups might provide better access to resources such as attention from peers, contacts and social acknowledgment. Ellis and Zabatany (2007) define well-liked peer groups or highly central peer groups in the network as higher status peer groups. Based on this argumentation, we assume that adolescents more strongly desire to maintain their friendships with friends with a higher indegree and are therefore more affected by their behavior.

H3. Ego will adjust his/her problematic school behavior more to the problematic school behavior of his/her friends, when the average indegree of his/her friends is higher.

2.2. Dyadic characteristics

Influence processes might not only be affected by the characteristics of alter or the characteristics of ego, but also by the combination of the characteristics of ego and alter. We will investigate whether the influence process on problematic school behavior is affected by friendship reciprocity (Hallinan and Williams, 1990).

A reciprocal friendship implies that ego and alter consider each other as a friend, whereas an unreciprocated friendship means that ego considers alter as a friend, but alter does not consider ego to be a friend. On the one hand friendship reciprocity can be seen as a proxy for friendship quality and intimacy (Hallinan, 1982; Hallinan and Williams, 1990). Hence, it could be argued that ego finds the social approval from reciprocal friends more important than the social approval from unreciprocated friends, because reciprocal friends are better friends. On the other hand, a reciprocated friendship tie indicates that ego's friend already greatly approves of ego.

In contrast to reciprocal friends, ego still has to gain the social approval from an unreciprocated friend. Bot et al. (2005) stress that unreciprocated friendships are marked by inequality. An unreciprocated tie might indicate that a person *wants* to be friends with the other person. Consequently, adolescents find the social approval from unreciprocated friends more important than the social approval from reciprocal friends, because an unreciprocated friendship still has to be 'gained'. Therefore, we hypothesize:

H4. Ego will adjust his/her problematic school behavior more to the problematic school behavior of his/her unreciprocated friends than to the problematic school behavior of his/her reciprocated friends.

3. Data

To test our hypotheses we use data that contains information on the relationship between pupils in class and the behavior of these pupils in their first year of secondary school in the Netherlands (Knecht, 2006). The transition to secondary school implies for most children a complete change of the school and class environment. Consequently, we expect students to form many new friendships, which make this data highly appropriate for testing influence and selection processes (Altermatt and Pomerantz, 2003; Knecht, 2006). Influence processes between friends might be more likely to take place immediately after the friendship has been formed. The data were collected in the school year of 2003/2004 at four different time points with three months in between the waves. The pupils were on average 12 years old.

The written questionnaires took approximately 40 min and were administered in 126 classes in 14 schools by trained assistants (Knecht, 2006). Schools were asked to join the study after they

were randomly selected from a dataset that contained all, except for the ten percent largest and the ten percent smallest secondary schools in the Netherlands. From the schools that were willing to participate, a selection was made of schools with different denominations that were located in different areas in the Netherlands. The selection of classes was mainly based on the educational tracks, so that each educational track would be represented in the data. The final sample of 126 classes comprises classes from public and private schools; schools in rural and in urban areas and classes of every educational track (Knecht, 2008). The participation rate at the level of the students was 93%. Four classes were excluded from the datasets either because too many students were absent during one wave or because they did not participate in all waves.

The information we use in this study contains pupils' self-reports about their relationships, behavior, and background. This means that the attributes of ego's friends are reported by friends themselves, and do not reflect ego's perception of his/her friends. Using self-reports avoids overestimation of influence and selection effects, since people's perception of the similarity between them and their friends is often higher than the actual similarity (Brechtwald and Prinsein, 2011).

4. Methods

In order to test our hypotheses we will make use of Simulation Investigation for Empirical Network Analysis (SIENA) (Snijders, 2011; Snijders et al., 2010). SIENA is a stochastic actor-based model that is specifically designed to analyze the co-evolution of networks and behavior. Because network evolution and behavioral evolution are analyzed jointly, social influence effects can be disentangled from friendship selection effects.

SIENA assumes that actors make (small) changes (i.e. micro-steps) in their network and behavior in between measurement points, which are modeled by means of simulations. An actor is randomly chosen from the network to take a micro-step (Steglich et al., 2010). A micro-step in the actor's *network* implies that the actor forms a new tie or dissolves one of his/her ties. A micro-step in an actor's *behavior* implies that the actor can change the value of his/her behavior one level up or down on the ordinal scale of the behavior variable.

Whether an actor makes a micro-step and which micro-step an actor will make, is estimated by means of the 'objective function', that actors are assumed to optimize. Hence, based on the 'objective function' all possible micro-steps (including the possibility to not take a micro-step) are evaluated, and the acts of the actor are determined. Behavioral micro-steps and network micro-steps are each evaluated by their own objective function. Nevertheless, the two are interdependent.

We run SIENA analyses on 110 of the 122 classes. 12 classes are excluded because for these classes there was not enough tie stability in between two subsequent waves (i.e. a Jaccard index of below 0.3 for at least one of the four waves), which violates data requirements (Snijders et al., 2010). Table 1 shows the extent to which the dependent behavioral variables change across waves for these 12 excluded classes and the 110 included classes. The class size of the 110 classes ranges from 13 to 33 pupils, with a mean of 25.15.

We use the unconditional Method of Moments estimation (MoM) in RSiena version 4 (Ripley et al., 2011). For classes for which the convergence statistics is unsatisfactory (i.e. the absolute value of the *t*-statistic is above 0.1 for non-fixed effects), we rerun the analysis by using the obtained results as a starting value (Ripley et al., 2011). We repeat this procedure several times. However, for some models, some classes are unable to reach convergence. We drop these classes from the meta-analysis.

Table 1
Variation across waves of the dependent variables.

	Wave I → II			Wave II → III			Wave III → IV		
	% Pupils participate the same	% Pupils participate less	% Pupils participate more	% Pupils participate the same	% Pupils participate less	% Pupils participate more	% Pupils participate the same	% Pupils participate less	% Pupils participate more
All classes (N classes = 122, N pupils = 3068)	Homework inactivity	43	12	55	25	20	55	28	17
	Inattentive in class	21	18	63	18	19	63	18	19
Excluded classes (Jaccard < 0.3, N classes = 12, N pupils = 302)	Homework inactivity	43	10	58	20	22	54	28	18
	Inattentive in class	22	16	62	17	21	66	17	17
Included classes (Jaccard > 0.3, N classes = 110, N pupils = 2766)	Homework inactivity	43	12	54	26	20	55	28	17
	Inattentive in class	21	18	64	18	18	63	18	19

We analyze the remaining school classes by means of a meta-analysis. We rely upon two types of meta-analysis: we obtain results according to the Iterated Weighted Least Square (IWLS) method of [Snijders and Baerveldt \(2003\)](#) and according to the Fisher combination procedure of one-sided tests ([Ripley et al., 2011](#)). The method of [Snijders and Baerveldt \(2003\)](#) provides for each parameter a mean estimate across classes and a standard error on the basis of all networks that have a standard error lower than 5 for this effect. The method of [Snijders and Baerveldt \(2003\)](#) assumes that the estimated standard errors and effects are not correlated ([Ripley et al., 2011](#)). For effects for which this is not the case, we rely upon the Fisher type tests. Fisher's procedure conducts a right-sided test – to investigate whether there are any networks with an effect that is significantly greater than zero (i.e. positive) – and a left-sided test – to examine whether in any of the networks the effect is smaller than zero (i.e. negative). Because the effect is tested twice, we take an alpha level for significance of 0.025

For each dependent variable we estimate four models. The first model estimates the effect of the average behavior of ego's friends on ego. This model does not contain moderators. Each of the subsequent models contains a different moderator: in the second model we examine ego indegree as a moderator for peer influence; in the third model we investigate whether friends with a higher indegree influence ego more; and in the last model we study whether reciprocal friends influence ego more than unreciprocated friends. Because of multicollinearity issues, we cannot test all moderators simultaneously and we have to fix the main influence effect. We fix it to the value obtained in the first model.

5. Measurements

SIENA estimates a model that comprises a behavioral evolution part and a network evolution part. In this section we describe the measurement of our dependent variables (students' problematic school behavior and students' friendship network), our moderators, our independent variables, behavioral evolution control variables and friendship formation effects.

5.1. Dependent variables

5.1.1. Problematic school behavior

The data contain four problematic school behavior variables that measure the extent to which the respondent: skips class, comes late to school, does not pay attention in class and does not do his/her homework. Since there was little variation, either within or across waves, on two of these variables, we will only analyze the variables: "I always do my homework" and "I pay attention during class". The answers for these variables are on a 5-point scale ranging from very true to not true at all. We will refer to them as *homework inactivity* and *inattentive in class*. Past research has used similar variables to measure the (problematic) school behavior of pupils ([Fredricks et al., 2004](#); [Jimerson et al., 2003](#)), however we are aware that there are also other aspects and measures of problematic school behavior which are not covered in this study.

We use two dependent variables that measure problematic school behavior to examine whether our results are robust.¹ We do not make a scale out of these two variables, since they refer to slightly different aspects of school behavior and, consequently,

¹ Ideally, we would want to model influence and selection effects of homework inactivity and attention problems in one model, since they might affect each other. However, it is impossible to disentangle these two dimensions of problematic school behavior from each other due to multicollinearity issues. Depending on the wave the correlation between homework inactivity and attention problems ranges between 0.39 and 0.57.

influence processes for these two variables might differ (Fredricks et al., 2004).

5.1.2. Friendship networks

In our analyses we also model friendship formation. Students were asked to indicate their best friends in class. Students were provided with a list that contained the names of all classmates and were able to nominate up to 12 classmates as their friend. In this way a complete directed friendship network of the class could be obtained for each wave.

5.2. Independent variables

The influence of friends is measured by investigating the effect of the average behavior of ego's friends in class on ego's behavior. Respondents could nominate up to 12 classmates as their friend. Friendships do not need to be reciprocal, so classmates are considered to be ego's friend, when ego nominates them as friends. We measure the effect of the average homework behavior of ego's friends on the homework behavior of ego; and the average attention behavior of ego's friends on the attention behavior of ego. We refer to this effect as the *average similarity* effect. The precise definition of the average similarity effect is depicted in Table 2.

5.3. Moderators

We investigate interactions between the similarity between ego and his/her friends and: the indegree of ego, the indegree of ego's friends and reciprocity. These are standard interaction effects in SIENA. Their precise definition is depicted in Table 2.

5.4. Behavioral evolution controls

For the behavior part of the model we control for two shape effects (Snijders et al., 2010). The *linear shape* effect expresses the tendency to score high on the dependent variable. We also incorporate the *quadratic shape* effect which is a feedback effect of the respondent's behavior at a previous time point on the current time point. A negative quadratic shape effects implies that adolescents' problematic school behavior is self-correcting: the higher adolescents' problematic school behavior score, the less likely they are to increase even more. When the quadratic shape effect is positive, people reinforce their behavior over time: the higher their score on the behavioral variable, the more likely they are to increase their behavior.

Besides these two shape effects, we control for the effect of two actor attributes. First, we include the effect of being a *male* on the respondent's school behavior. Second, we take into account the effect of ego's parents by controlling for ego's perception of *parental opinions* regarding ego's problematic school behavior. Parental opinions are measured by three questions asked in the second wave that indicate the extent to which the respondent thinks that his or her parents find it important that ego: pays attention in class, does his/her best at school and does his/her homework. The answers are on a 5-point-scale ranging from very important to unimportant. We create a scale out of these three items (Cronbach's alpha: 0.79).

Finally, we control for our moderators by including the effect of *ego's indegree*, the average indegree of ego's friends (*alter indegree*) and *reciprocated degree* on ego's school behavior. Reciprocated degree is the number of reciprocated relations that ego receives. The precise definition of these effects is depicted in Table 2.

5.5. Friendship formation effects

In order to correctly test for the influence of friends, we test for multiple aspects that affect friendship formation processes.

Firstly, we take into account the extent to which adolescents' homework inactivity and inattention behavior affect friendship formation processes. Depending on the problematic school behavior under scrutiny, we incorporate the effect of ego's problematic school behavior in class on the number of friendship ties ego creates (i.e. *homework inactivity ego* and *inattentive ego*); the effect of alter's problematic school behavior on the number of friendship ties that alter receives (*homework inactivity alter*, *inattentive alter*), and the effect of the similarity between ego and alter with respect to their problematic school behavior on the formation of a friendship tie between ego and alter (i.e. *homophily homework*; *homophily inattention*). This homophily effect is expected to be positive, since people tend to become friends with people who are similar to them.

Besides estimating whether our behavioral variables of interest affect friendship formation processes, we include the effect of several other characteristics of adolescents and their classmates on friendship formation processes. We include the effect of ego being a male (i.e. *male ego*), the effect of alter being a male (i.e. *male alter*) and *gender similarity* on friendship formation. Moreover, we include the effect of ego being Dutch (i.e. *Dutch ego*), the effect of alter being Dutch (i.e. *Dutch alter*) and the effect of alter and ego both being Dutch or not (we call this *ethnic similarity*). Adolescents are considered Dutch when both parents are born in the Netherlands. Because there are few ethnic minorities in the dataset, we cannot construct a more precise measure than this. Again, the similarity effects are expected to be positive, since people tend to become friends with people who are similar to them. We also take into account whether ego has been friends with alter in primary school (i.e. *friends primary*). We expect that ego's primary school friends are more likely to be ego's friends in the first year of secondary school.

Finally, we incorporate several structural network effects in our model. We include *outdegree*, which expresses the propensity of people to create a friendship tie (Steglich et al., 2010). The outdegree effect is expected to be negative for friendship ties, since friendships are usually costly. Thirdly, we incorporate the *reciprocity* effect in our model, since people are likely to reciprocate friendships (Steglich et al., 2010). Hence, we expect this effect to be positive. Fourthly, we take into account network closure. There are many different ways to estimate this in SIENA and we choose to represent it by the classical *transitive triplets* effect. A positive transitive triplets effect implies that people are likely to befriend friends of friends. Descriptives of network and individual characteristics can be found in Table 3.

6. Results

Table 4 shows the results for the SIENA meta-analysis on homework inactivity and Table 5 shows the results for being inattentive in class. The tables show the mean estimate, which can be interpreted as log odds (Ripley et al., 2011), and standard error for each effect, which are derived according to the Snijders and Baerveldt (2003) method. The mean estimates of our hypothesized effects are tested one-sided; the mean estimates of all other effects are tested two-sided. Our tables indicate how many networks are used for the estimation of the mean estimate (N). For each effect it is visible whether the right-sided (FR) and/or the left-sided Fisher (FL) type test is significant. The results of an effect are printed in bold in case there is a significant correlation ($p < 0.05$) between the parameter estimate and the standard error. In this case, an assumption of the Snijders and Baerveldt method is not met and we have to rely upon the Fisher tests. The presented tables do not show whether the effects differ significantly across classes, but we will discuss this in this section.

We find evidence for our first hypothesis that friends influence adolescents' problematic school behavior. For homework inactivity

Table 2
Effects included in the model expressed mathematically.

	Mathematical formula	Description
<i>Network: selection process</i>		
Homework/attention homophily	$\sum_j x_{ij}((R_z - z_i - z_j)/R_z) - c$	Tendency to choose a friend based on having a similar value on behavior z
Homework inactivity/attention problems ego	$z_i \sum_j x_{ij}$	Effect of ego's behavior z on ego's number of friends
Homework inactivity/attention problems alter	$\sum_j x_{ij} z_j$	Effect of alter's behavior z on selection
Outdegree	$\sum_j x_{ij}$	Tendency to have outgoing friendship ties
Reciprocity	$\sum_j x_{ij} x_{ji}$	Tendency to reciprocate a friendship tie
Transitive triplets	$\sum_{j,h} x_{ij} x_{jh} x_{ih}$	Tendency to befriend a friend of a friend
Male ego	$v_{1i} \sum_j x_{ij}$	Effect of being a male on ego's number of friends
Male alter	$\sum_j x_{ij} v_{1j}$	Effect of alter being a male on selection
Gender similarity	$\sum_j x_{ij} I\{v_{1i} = v_{1j}\}$	Tendency to choose a friend based on having the same gender
Dutch ego	$v_{2i} \sum_j x_{ij}$	Effect of being Dutch on ego's number of friends
Dutch alter	$\sum_j x_{ij} v_{2j}$	Effect of alter being Dutch on selection
Ethnic similarity	$\sum_j x_{ij} I\{v_{2i} = v_{2j}\}$	Tendency to choose a friend based on being Dutch or not
Friends primary	$\sum_j x_{ij} P_{ij}$	Effect of a friendship tie from i to j in primary school on selection
<i>Behavior</i>		
Linear shape	z_i	Tendency to score high values on z
Quadratic shape	z_i^2	Feedback effect of the behavioral variable z
Ego indegree	$z_i \sum_j x_{ji}$	Effect of indegree ego on ego's behavior z
Alter indegree	$(z_i \sum_j x_{ij} x_{+j}) / (\sum_j x_{ij})$	Effect of the average indegree of ego's alter on ego's behavior z
Reciprocated degree	$z_i \sum_j x_{ij} x_{ji}$	Effect of the number of reciprocated ties that ego has on ego's behavior z
Average similarity (Av.Sim)	$(\sum_j x_{ij}((R_z - z_i - z_j)/R_z) - c) / (\sum_j x_{ij})$	Effect of the average behavior of ego's friends on ego's behavior z
Av.Sim × ego indegree	$(\sum_j x_{ij} \sum_j x_{ij} x_{+j}((R_z - z_i - z_j)/R_z) - c) / (\sum_j x_{ij})$	Average similarity between ego and his/her friends weighted by the indegree of ego
Av.Sim × alter indegree	$(\sum_j x_{ij} x_{+j}((R_z - z_i - z_j)/R_z) - c) / (\sum_j x_{ij})$	Similarity between ego and a friend weighted by the indegree of this friend; averaged over all friends
Av.Sim × reciprocity	$(\sum_j x_{ij} x_{ji}((R_z - z_i - z_j)/R_z) - c) / (\sum_j x_{ij})$	Average similarity between ego and his/her reciprocal friends on z
Male	$z_i v_{1i}$	Effect of being a male on z
Parental opinions	$z_i v_{3i}$	Effect of parental opinions on z

Formulas: *i* = adolescent; *j, h* = peers; x_{ij} = friendship tie from *i* to *j*; x_{ji} = friendship tie from *j* to *i*; *Z* = the dependent behavior variable, which could be homework inactivity or attention problems; V_1 = male; V_2 = ethnicity; V_3 = parental opinions; P_{ij} = a friendship tie from *i* to *j* in primary school; R_z = range of the behavioral variable *z*. *C* = mean of all similarity scores $(R_z - |z_i - z_j|)/R_z$; x_{+j} = indegree of alter $\sum_h x_{hj}$; $I\{v_{2i} = v_{2j}\} = 1$ when *i* and *j* have the same value on covariate *v*.

and attention problems both Fisher tests are insignificant. While this indicates that the average similarity effect (i.e. influence) is not different from zero in any of the classes, we find that the mean estimates for both homework inactivity and attention problems are significant and positive. This implies that the extent to which adolescents fail to do their homework is influenced by the average homework inactivity of friends ($OR = e^{1.09} = 2.97$; model 1 of Table 4); and when friends are on average more inattentive in class, adolescents are also more likely to be inattentive ($OR = 7.17$). The average similarity effect does not vary significantly between classes for both behavioral outcome variables. We want to note that the insignificance of the Fisher tests might be due to a lack of power to find influence effects in a separate school class, since the sample size within classes is small (on average 25) and behavioral changes are relatively uncommon.

We tested the influence that friends exert on adolescents' homework inactivity while controlling for friendship selection effects. People's friendship choices are significantly affected by the similarity in homework inactivity and inattentiveness in class. These homophily effects do not vary significantly across classes.

In models 2–4 the results are shown for the moderators. We find support for our second hypothesis that adolescents with a higher indegree are less likely to be influenced by the problematic school behavior of their friends. While the Fisher type tests are insignificant, we find significant and negative mean estimates. Model 2 in Table 4 shows that adolescents with a higher indegree are less likely to be influenced by the average homework inactivity of their friends ($OR = 0.84$). Similarly, model 2 of Table 5 shows that the higher the indegree of ego is, the less his/her attention behavior

will be influenced by the average attention problems of his/her friends ($OR = 0.84$). The moderating effect of ego's indegree does not differ significantly across classes for both homework inactivity and attention problems. We do not find that friends with a higher indegree tend to influence ego's problematic school behavior more (hypothesis 3; model 3 in Tables 4 and 5), neither do we find that unreciprocated friends influence the problematic school behavior of adolescents more than reciprocated friends (hypothesis 4; model 4 in Tables 4 and 5).

There are several behavioral control variables that have a consistent significant effect on both homework inactivity and being inattentive in class. In all models there is a significant negative quadratic shape effect, which means that people are self-correcting with respect to problematic school behavior. For example, people who do not do their homework tend to do more homework over time, whereas people who do a lot of homework tend to do less homework over time. This effect does not significantly vary across the school classes. Besides, in all models we find a significant positive effect of the opinion of parents with respect to problematic school behavior and the problematic school behavior of adolescents. The less importance parents attach to the problematic school behavior of their child, the more likely adolescents are to not pay attention in class and to not do their homework.

As visible from Tables 4 and 5, we find evidence for several friendship selection effects (Ripley et al., 2011; Snijders et al., 2010). We find a significant negative effect for outdegree, which means that friendships are costly. Moreover, adolescents tend to reciprocate friendships, are likely to become friends with friends of friends and select peers of the same gender and with the same (non)-Dutch

Table 3
Descriptives of network and individual characteristics.

	All classes (classes N = 122; pupils N = 3068)			Excluded classes (Jaccard < 0.3, classes N = 12; pupils N = 302)			Included classes (Jaccard > 0.3, classes N = 110; pupils N = 2766)		
	Mean	SD	% Missing	Mean	SD	% Missing	Mean	SD	% Missing
<i>Dependent variables</i>									
Inattentive in class									
Wave 1	2.38	0.73	5.02	2.34	0.71	5.30	2.39	0.73	4.99
Wave 2	2.44	0.73	9.49	2.41	0.75	9.27	2.44	0.73	9.51
Wave 3	2.43	0.76	8.02	2.36	0.74	9.93	2.44	0.76	7.81
Wave 4	2.43	0.79	7.53	2.36	0.77	8.61	2.44	0.79	7.41
Homework inactivity									
Wave 1	1.86	0.76	5.02	1.87	0.75	5.30	1.86	0.76	4.99
Wave 2	2.28	0.86	9.35	2.31	0.90	9.27	2.27	0.86	9.36
Wave 3	2.35	0.87	8.08	2.33	0.93	10.26	2.36	0.87	7.85
Wave 4	2.51	0.90	7.59	2.44	0.94	8.28	2.51	0.90	7.52
<i>Friendship variables</i>									
Number of friends									
Wave 1	3.58	2.58	4.50	3.72	3.06	4.64	3.56	2.52	4.48
Wave 2	4.23	2.58	9.09	4.02	2.60	9.27	4.25	2.58	9.07
Wave 3	4.30	2.65	7.72	4.33	2.66	9.93	4.30	2.65	7.48
Wave 4	4.06	2.51	7.27	4.07	2.58	7.62	4.06	2.51	7.23
Reciprocity (edgewise) ^a									
Wave 1	59.67%	8.50		52.51%	8.20		60.46%	8.19	
Wave 2	62.15%	8.88		57.24%	8.42		62.69%	8.80	
Wave 3	62.52%	8.50		62.34%	9.09		62.54%	8.47	
Wave 4	61.24%	7.93		60.57%	11.05		61.31%	7.58	
Density ^b									
Wave 1	15.11%	4.02		14.82%	3.26		15.14%	4.10	
Wave 2	17.63%	3.70		17.13%	4.74		17.69%	3.59	
Wave 3	17.95%	3.75		17.92%	2.65		17.95%	3.86	
Wave 4	17.06%	4.23		16.60%	2.03		17.11%	0.41	
Transitivity ^c									
Wave 1	54.63%	9.49		53.54%	9.92		54.75%	9.48	
Wave 2	55.72%	10.30		52.40%	10.08		56.08%	10.30	
Wave 3	56.07%	8.82		57.28%	7.72		55.94%	8.96	
Wave 4	55.97%	10.04		57.29%	10.37		55.83%	10.04	
<i>Control variables</i>									
Parental opinions	1.48	0.50	10.63	1.37	0.43	10.60	1.49	0.51	10.63
Number of friends primary	1.75	1.84	4.50	1.65	1.24	4.64	1.80	1.86	4.48
Male	51.01		0.10	50.66		0.33	51.05		0.07
Dutch native	69.33		8.21	60.26		8.61	70.32		8.17

^a Probability of two actors to be reciprocally connected given that there is a tie in at least one direction.

^b Proportion of ties that is present out of the potentially observed ties.

^c The fraction of triads in which a friend of a friend is a friend (out of those triads that could potentially be closed).

background. All these selection effects differ significantly across classes. Finally, as expected, adolescents tend to be friends with people in secondary school that they were already friends with in primary school. Again, this effect significantly differs across classes.

6.1. Robustness checks

We conducted some additional analyses to see whether our results are robust (available upon request). For both dependent variables we estimated models that are similar to model 1, but each time we changed one aspect of the model. Firstly, we analyzed a model in which *parental opinions* is a changing covariate. It could be argued that parents alter the importance they attach to school as a response to the (mis)behavior of their children at school. Because not all parental opinion items were measured in all waves, we could only make use of two items (the importance parents attach to the extent to which the adolescent is paying attention in class and doing his/her best at school). The parental effect was slightly smaller compared to the parental effect we found in the models presented in this paper (0.24 for homework inactivity and 0.24 for being inattentive). While the conclusion with respect to the average similarity (i.e. influence) effect was not altered by

including parental opinions as a changing covariate for being inattentive in class, the mean estimate became slightly smaller (1.29). However, the average similarity effect for homework inactivity turned to insignificance (0.30; SE 0.29).

Secondly, we tested whether a different specification of the transitivity effect would affect our results. We tested a model in which we used the transitive ties effect instead of the transitive triplets effect and a model in which we used the balance effect instead of the transitive triplets effect. Moreover, we estimated models in which we added a 3-cycle effect. These different model specifications did not alter our conclusions.

Finally we tested whether the average similarity effect would be altered when we would higher the standard error bound for inclusion in the meta-analysis to 10. We realized that quite some classes were dropped in the meta-analysis for the average similarity effect, and that the standard error is usually high for this effect. Our conclusions remained the same, though the mean estimate of the average similarity effect decreased. For being inattentive in class we found a mean estimate of 1.66 (SE 0.36; $N = 49$). For homework inactivity the mean estimate was 0.67 (SE 0.31; $N = 64$). While the mean estimate for homework inactivity was significant, the correlation between the estimates and the standard errors also reached

Table 4
Meta-analysis results on homework inactivity with a standard error bound of 5.

Homework inactivity	Model 1			Model 2			Model 3			Model 4		
	Mean est.	SE	N	Mean est.	SE	N	Mean est.	SE	N	Mean est.	SE	N
<i>Network</i>												
Homophily homework	0.20 [*]	0.08	82	0.17	0.09	78	0.19 [*]	0.09	81	0.20 [*]	0.09	77
Homework inactivity ego	−0.09 ^{FL}	0.02	84	−0.08 ^{FL}	0.02	79	−0.08 ^{FL}	0.02	82	−0.08 ^{FL}	0.02	77
Homework inactivity alter	−0.06 ^{FL}	0.02	83	−0.05 ^{FL}	0.02	79	−0.06 ^{FL}	0.02	82	−0.05 ^{FL}	0.02	77
Outdegree	−2.52 ^{FL}	0.05	82	−2.57 ^{FL}	0.05	78	−2.56 ^{FL}	0.05	80	−2.55 ^{FL}	0.05	76
Reciprocity	1.04^{FR}	0.04	83	1.03^{FR}	0.04	79	1.02^{FR}	0.04	82	1.03^{FR}	0.04	77
Transitive triplets	0.23^{FR}	0.01	84	0.23^{FR}	0.01	80	0.23^{FR}	0.01	82	0.22^{FR}	0.01	78
Male ego	0.00	0.03	83	−0.00	0.04	79	−0.00	0.04	82	−0.00	0.04	78
Male alter	0.02 ^{FR}	0.04	83	0.03 ^{FR}	0.04	80	0.03 ^{FR}	0.04	82	0.04 ^{FR}	0.04	78
Gender similarity	0.95^{FR}	0.05	83	0.98^{FR}	0.05	79	0.97^{FR}	0.05	82	0.98^{FR}	0.05	77
Dutch ego	0.01	0.03	80	0.01	0.03	79	−0.00	0.03	81	0.01	0.03	76
Dutch alter	−0.12 ^{FL}	0.04	80	−0.14 ^{FL}	0.04	78	−0.14 ^{FL}	0.04	81	−0.14 ^{FL}	0.04	76
Ethnic similarity	0.13 ^{FR}	0.04	80	0.16 ^{FR}	0.03	78	0.17 ^{FR}	0.03	81	0.17 ^{FR}	0.03	75
Friends primary	1.00 ^{FR}	0.33	84	0.61 ^{FR}	0.03	79	0.61 ^{FR}	0.03	82	0.60 ^{FR}	0.03	78
<i>Behavior</i>												
Linear shape	0.08	0.09	58	0.10	0.10	59	0.10	0.10	56	0.09	0.10	54
Quadratic shape	−0.38 ^{FL}	0.03	72	−0.38 ^{FL}	0.03	67	−0.35 ^{FL}	0.03	68	−0.35 ^{FL}	0.03	68
Ego indegree	0.01	0.02	75	0.01	0.02	74	0.02	0.02	75	0.02	0.02	71
Alter indegree	0.02	0.03	73	0.02	0.03	66	0.01	0.02	72	0.03	0.03	71
Reciprocated degree	−0.02	0.03	75	−0.01	0.03	67	−0.01	0.02	72	−0.03	0.03	70
Average similarity (Av.Sim)	1.09 [*]	0.28	35	1.09 ^{FL}	N.A.	76	1.09	N.A.	82	1.09	N.A.	78
Av.Sim × ego indegree				−0.18 [*]	0.06	68						
Av.Sim × alter indegree							−0.06	0.06	70			
Av.Sim × reciprocity										−0.22	0.25	43
Male	0.07	0.05	72	0.09	0.06	66	0.09	0.06	67	0.09	0.06	66
Parental opinions	0.33^{FR}	0.05	74	0.27^{FR}	0.05	69	0.31^{FR}	0.05	73	−0.30 ^{FR}	0.05	70

Estimates and standard errors are obtained according to the Snijders and Baerveldt (2003) method.

^{*} p -value < 0.05 (one-sided t -test for hypothesized effects; other effects tested two-sided). N = number of classes used for the calculation of the standard error and mean estimate. FL = p -value of Fisher's left sided test < 0.025; FR = p -value of Fisher's right sided test < 0.025. When the estimates, standard errors and number of classes are printed bold, it means that the correlation between the estimate and standard error is significant. In model 2–4 the average similarity effect is fixed. Significance is tested with a Fisher type test.

Table 5
Meta-analysis results on inattention in class with a standard error bound of 5.

Inattention	Model 1			Model 2			Model 3			Model 4		
	Mean est.	SE	N	Mean est.	SE	N	Mean est.	SE	N	Mean est.	SE	N
<i>Network</i>												
Homophily inattention	0.22 ^{FR}	0.08	77	0.17^{FR}	0.08	74	0.19 ^{FR}	0.08	72	0.21^{FR}	0.08	72
Inattentive ego	−0.04 ^{FL}	0.03	77	−0.05 ^{FL}	0.02	74	−0.04 ^{FL}	0.02	72	−0.04 ^{FL}	0.03	73
Inattentive alter	−0.02	0.02	77	−0.02	0.02	74	−0.02	0.02	72	−0.03 ^{FL}	0.02	73
Outdegree	−2.51 ^{FL}	0.05	76	−2.52 ^{FL}	0.04	74	−2.49 ^{FL}	0.04	71	−2.54 ^{FL}	0.05	72
Reciprocity	1.04^{FR}	0.04	77	1.05^{FR}	0.04	74	1.03^{FR}	0.04	72	1.03^{FR}	0.04	73
Transitive triplets	0.23^{FR}	0.01	77	0.23^{FR}	0.01	74	0.22^{FR}	0.01	72	0.22^{FR}	0.01	73
Male ego	−0.03 ^{FL}	0.04	77	−0.04 ^{FL}	0.04	74	−0.04 ^{FL}	0.04	72	−0.03 ^{FL}	0.03	73
Male alter	0.03 ^{FR}	0.04	77	0.04 ^{FR}	0.04	74	0.05 ^{FR}	0.04	72	0.03 ^{FR}	0.04	73
Gender similarity	0.94^{FR}	0.05	77	0.92^{FR}	0.05	74	0.90^{FR}	0.05	72	0.93^{FR}	0.05	73
Dutch ego	−0.01 ^{FL}	0.04	75	−0.02 ^{FL}	0.04	73	−0.02 ^{FL}	0.04	71	−0.04 ^{FL}	0.04	72
Dutch alter	−0.10 ^{FL}	0.04	75	−0.13 ^{FL}	0.04	73	−0.11 ^{FL}	0.04	71	−0.12 ^{FL}	0.04	72
Ethnic similarity	0.13 ^{FR}	0.04	75	0.17 ^{FR}	0.03	73	0.16 ^{FR}	0.03	71	0.15 ^{FR}	0.03	72
Friends primary	0.78 [*]	0.24	77	0.62 ^{FR}	0.03	73	0.61 ^{FR}	0.03	71	0.62 ^{FR}	0.03	72
<i>Behavior</i>												
Linear shape	0.18	0.11	48	0.11	0.13	42	0.09	0.12	41	0.15	0.13	46
Quadratic shape	−0.30 ^{FL}	0.05	67	−0.39 ^{FL}	0.05	62	−0.36 ^{FL}	0.05	58	−0.34 ^{FL}	0.06	67
Ego indegree	0.00	0.03	71	−0.01	0.03	60	0.01	0.03	64	−0.01	0.03	67
Alter indegree	−0.01	0.03	71	−0.01	0.03	65	−0.02	0.03	63	−0.03	0.03	65
Reciprocated degree	−0.03	0.04	69	0.00	0.04	61	−0.02	0.04	61	−0.01	0.04	66
Average similarity (Av.Sim)	1.97 [*]	0.46	20	1.97	N.A.	74	1.97	N.A.	72	1.97	N.A.	73
Av.Sim × ego indegree				−0.18 [*]	0.07	61						
Av.Sim × alter indegree							−0.08	0.07	57			
Av.Sim × reciprocity										−0.19	0.38	27
Male	−0.09	0.07	69	−0.07	0.07	63	−0.08	0.07	61	−0.04	0.07	64
Parental opinions	0.38[*]	0.07	69	0.39[*]	0.08	57	0.39[*]	0.08	57	0.43^{FR}	0.08	62

Estimates and standard errors are obtained according to the Snijders and Baerveldt (2003) method.

^{*} p -value < 0.05 (one-sided t -test for hypothesized effects; other effects tested two-sided). N = number of classes used for the calculation of the standard error and mean estimate. FL = p -value of Fisher's left sided test < 0.025; FR = p -value of Fisher's right sided test < 0.025. When the estimates, standard errors and number of classes are printed bold, it means that the correlation between the estimate and standard error is significant. In model 2–4 the average similarity effect is fixed. Significance is tested with a Fisher type test.

significance (Spearman's rank correlation $\rho = -0.40$, $p < 0.01$). The Fisher type tests were both insignificant.

7. Conclusion

We have investigated friends' influence on adolescents' problematic school behavior, and possible moderators of such peer influence. We analyzed influence processes by making use of a four wave panel dataset on friendship ties and school behavior among Dutch pupils in their first year of secondary school. Our SIENA analyses showed that, as expected, adolescents are influenced by the homework inactivity (i.e. the extent to which friends are not doing their homework) and inattention of friends in class (i.e. the extent to which friends do not pay attention in class). Thus, there is clearly a social gradient to problematic school behavior. Adolescents are influenced by the problematic school behavior of their friends, so that adolescents become more similar to their friends over time with respect to homework inactivity and not paying attention in class. While we found significant influence effects for both aspects of problematic school behavior, the influence effects on not paying attention in class turned out to be more robust, since it reached significance in all our different model specifications. Peer influence effects with respect to inattention in class might be more pronounced than peer influence effects with respect to homework inactivity, since inattention behavior is more visible in the class context.

Beside significant influence effects, we found that adolescents also select friends who are similar to them with respect to problematic school behavior. This might imply that students' school behavior will be maintained or strengthened by their friends: the 'problematic' students will remain 'problematic' or become even more 'problematic', while the academically engaged students will keep on being the engaged students or will become even more engaged.

In this study we have not only examined the influence of the average problematic school behavior of friends on adolescents' problematic school behavior, but we have also investigated several ego, alter and dyadic characteristics that might moderate influence on problematic school behavior among friends. Studying moderators is important, since it can deepen our understanding of who is most likely to be influenced by the problematic school behavior of their friends and by whom adolescents are most likely to be influenced. In this way it might shed light on how the engagement level (or study atmosphere) of a class spreads. We found that adolescents with a higher indegree (i.e. who are considered to be a friend by more classmates) are less likely to be influenced by the problematic school behavior of their friends. However, we did not find evidence for the hypothesis that friends with a higher indegree influence adolescents' problematic school behavior more. While indegree probably reflects the extent to which alter is liked by his/her classmate, it might not be the best indicator of his/her dominance or influential power. Future research should investigate whether alters who are perceived as being more popular by their classmates are more influential. Adolescents who are perceived to be popular have been found to be more associated with dominance, leadership and influential power than adolescents who are liked by their classmates (Sandstrom, 2011). Unfortunately there was no popularity measure available in our data.

We did not find that friendship reciprocity enhances or decreases the influence of friends on adolescents' inattention or adolescents' homework inactivity in class. It might be the case that two equally strong mechanisms are simultaneously at work. In some cases, reciprocal friends might influence ego's inattention in class more than unreciprocated friends, because these reciprocal friendships are characterized by a more intimate relationship. In other cases, unreciprocated friends might influence ego's

inattention in class more, because ego wishes that this friendship will be returned. These effects might balance each other out.

Our study has some shortcomings. First, influence might take place before the friendship is being formed. Before adolescents really call each other a friend, it is likely that they have interacted, and mutually influenced each other. In this phase, adolescents might grow more similar, which increases liking and friendship formation. We could not appropriately test this with SIENA. This could have led to an underestimation of the influence effects and its moderators. If people influence each other before the friendship formation process, especially the people who are mostly susceptible to influence might have already been influenced before the friendship was formed. Similarly, especially influential peers might have exerted their influence before friendship formation. Hence, it might be hard to study the factors that moderate friends' influence when investigating influence processes after friendship formation.

The second limitation of our study is that we only investigate the influence of friends, and not the influence of the extended peer group (such as classmates). Adolescents spend a lot of time in their class and the norms prevalent in class might affect them over and above the norms of their friends. Research has for example shown that classmates influence each other's academic achievement (e.g. Lin, 2010). Future research should investigate the influence of friends and classmates jointly in order to distinguish between different sources of influence. However, we believe that friends are the most important source of influence, since the social approval from more valued peers is more important than the social approval from less valued peers.

Finally, we were unable to control for the socio-economic status of the parents, since there were too many missings on these variables. Past research has consistently shown that the socio-economic status affect adolescents school outcomes (Dika and Singh, 2002). Although the socio-economic status of parents might affect the school behavior of a child, we doubt whether it could explain the changes in the behavior of a student over time, since the socio-economic status of parents is a variable that is quite stable over time. Hence, we do not think that the extent to which friends influence ego's school behavior will be affected by the socio-economic status of ego's parents.

All in all, this research has shown that friends are important sources of socialization when it comes to the problematic school behavior of adolescents. Studying the problematic school behavior of adolescents is important, since it has been found to be related to school achievement and school attainment, such as school dropout, grades and scores on achievement tests (Fredricks et al., 2004). Consequently, the influence that friends have on students' school behavior might indirectly affect students' school attainment and achievement.

While the primary goal of this paper was to deepen our understanding of the influence of friends on problematic school behavior, this paper might also provide insights into the peer influence process in general. Empirical studies on factors that could moderate the influence of friends on adolescents' behavior are generally rare in research that deals with peer influence (Brechwald and Prinstein, 2011; Veenstra and Dijkstra, 2011). The mechanisms that we describe in this paper might not only be applicable to the influence of peers on other educational outcomes, such as academic achievement, but might also be applied to the influence of peers on other behavioral outcomes, such as risky behavior (e.g. smoking, drinking and delinquency). We hope that this paper will lead to further research in this area.

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