

**Adolescent problem behavior in school:  
the role of peer networks**

Sara Geven

**Manuscript committee:** Prof. dr. C. Finkenauer (Utrecht Univeristy)  
Prof. dr. M. van Houtte (Ghent University)  
Prof. dr. A. van de Rijt (Utrecht University)  
Prof. dr. R. Veenstra (University of Groningen)  
Prof. dr. H.G. van de Werfhorst (Univeristy of Amsterdam)

Cover design: Daan Geven  
Lay-out and Printing: Ridderprint BV, the Netherlands

ISBN 978-90-393-6603-5

© 2016 Sara Geven

All rights reserved. No part of this publication may be copied, reproduced or transmitted in any form of by any means, electronic or mechanical, including photocopy, recording, or any information storage or retrieval system, without the prior written permission of the author. The copyright of the articles that have been published, has been transferred to the respective journals.

**Adolescent problem behavior in school:  
the role of peer networks**

**Probleemgedrag van adolescenten op school:  
de rol van sociale netwerken tussen leeftijdsgenoten**  
(met een samenvatting in het Nederlands)

**Proefschrift**

ter verkrijging van de graad van doctor aan de Universiteit Utrecht  
op gezag van de rector magnificus, prof.dr. G.J. van der Zwaan,  
ingevolge het besluit van het college voor promoties in het openbaar te verdedigen  
op vrijdag 30 september 2016 des middags te 12.45 uur

door

**Sara Allegonda Johanna Geven**  
geboren op 26 oktober 1987  
te Nijmegen

**Promotor:** Prof. dr. F.A. van Tubergen

**Copromotor:** Dr. H.M. Weesie

This study was financed by the Netherlands Organisation for Scientific Research (NWO) as part of the program "Immigrants, Natives and the Occupational Career: Do Social Contacts Matter?", grant no: 452-09-011.

This book has been printed with financial support from the J.E. Jurriaanse stichting.

# Contents

<b>1. Synthesis</b>	<b>9</b>
1.1 Introduction	10
1.2 Previous research: theory and findings	13
1.3 Context of the study and data sources	21
1.4 Methods	24
1.5 Research questions, contributions, and findings	28
1.6 Conclusion	38
<b>2. The ethnic composition of schools and students' problem behavior in four European countries: the role of friends</b>	<b>53</b>
2.1 Introduction	54
2.2 Theory	55
2.3 Context of the study	61
2.4 Data	62
2.5 Measurements	63
2.6 Methods	69
2.7 Results	70
2.8 Conclusion	77
<b>3. The academic performance level of school classes and student problem behavior in school: comparative or normative reference group processes?</b>	<b>81</b>
3.1 Introduction	82
3.2 Theory	84
3.3 Context of the study	89
3.4 Data	90
3.5 Methods	91
3.6 Measurements	95
3.7 Results	99
3.8 Conclusion	107
<b>4. Peers in transition: students' problem behavior in school across their transition to a new school class</b>	<b>115</b>
4.1 Introduction	116
4.2 Theory	118
4.3 Context of the study	126
4.4 Data	127

4.5 Measurements	128
4.6 Methods	133
4.7 Results	134
4.8 Conclusion	138
<b>5. Why do boys exhibit more problem behavior in school?</b>	<b>145</b>
<b>The role of peer influence</b>	
5.1 Introduction	146
5.2 Theory	148
5.3 Data	155
5.4 Context of the study	156
5.5 Methods	156
5.6 Measurements	159
5.7 Results	165
5.8 Conclusion	171
<b>6. The influence of friends on adolescents' problem behavior in school: the role of ego, alter, and dyadic characteristics</b>	<b>175</b>
6.1 Introduction	176
6.2 Theory	178
6.3 Data	181
6.4 Methods	182
6.5 Measurements	185
6.6 Results	191
6.7 Conclusion	196
<b>Appendices</b>	<b>201</b>
Appendices chapter 2	202
Appendices chapter 3	207
Appendices chapter 4	301
Appendices chapter 5	215
Appendices chapter 6	219
<b>Nederlandse samenvatting</b>	<b>225</b>
<b>References</b>	<b>243</b>
<b>Acknowledgements</b>	<b>259</b>
<b>Curriculum Vitae</b>	<b>265</b>
<b>ICS dissertation series</b>	<b>269</b>







# Chapter 1

## Synthesis

## 1.1 Introduction

In 2010, I helped administering questionnaires to adolescents in Dutch secondary schools for my work as a student assistant. Going back to school was an interesting experience for me. While in most classes the atmosphere was peaceful and the vast bulk of students participated in the questionnaires very seriously, I also remember more difficult situations. Once, a teacher approached me and my colleague just before we entered the classroom. With a defeated voice she said: “you can try, but it’s not gonna happen”. I initially thought that she was maybe a bit suspicious of our classroom management skills. When we started administering the questionnaires, I actually started to doubt these skills myself, as several students were shouting through the classroom. Later, I heard that this class was generally regarded as ‘impossible’ by the teachers in the school. Another time my colleagues went to a class with even less success: half of the pupils had decided to skip the hour. It often seemed to me that problem behavior in class was fostered by a few ‘disobedient’ kids. Students in different classes in the same school were sometimes a lot easier to handle, indicating that we did not just observe this behavior because we were visiting a supposedly ‘bad’ school. These experiences struck me and I wondered: Why is disobedient behavior more prevalent in some classes than others? And which pupils tend to engage in this behavior, and why? Who starts, and who follows?

In this dissertation we try to understand student disobedience to school rules and norms, which we will refer to as problem behavior in school. Problem behavior in school includes both rebellious behavior, such as arguing with teachers, as well as withdrawal from school(work), such as skipping class, not putting effort into school work<sup>1</sup> and coming late to class. These behaviors have also been labeled as school misconduct (Demagnet & Van Houtte, 2011, 2012; Van Houtte & Stevens, 2008), school maladjustment (Berndt & Keefe, 1995; Berndt, Hawkins, & Jiao, 1999; Berndt, 1999), and behavioral disengagement in school (Demagnet & Van Houtte, 2014; Finn & Zimmer, 2012; Fredricks, Blumenfeld, & Paris, 2004; Johnson, Crosnoe, & Elder Jr, 2001; Ryan & Patrick, 2001). Problem behavior in school also bears resemblance to the concept of school resistance. However some researchers only include the rebellious component of problem behavior, and not school withdrawal, in their definition of school resistance (see McFarland 2001).

---

1 Some scholars may argue that this is a cognitive aspect of school disengagement, rather than a behavioral aspect. However, we follow the definition by Fredricks et al. (2004) of behavioral engagement, which: “includes behaviors such as effort, persistence, concentration, attention, asking questions, and contributing to class discussion” (p. 62). Cognitive engagement moves beyond this and involves more than ‘just’ putting effort into school (p. 64).

While students usually follow the school rules and norms, a fair share sometimes exhibits problem behavior. Table 1.1 illustrates this point with cross-nationally comparative data on problem behavior in school in England, Germany, the Netherlands, and Sweden. For example, when we look at skipping class, about 25% of the Swedish and 15% of the English, German and Dutch 14-year-olds occasionally skip class, albeit most of them do so less than once a month. In addition, about 70% of the English 14-year-old student population occasionally argues with their teacher, and 42% does so once or more a month. In Germany, the Netherlands, and Sweden these percentages are lower, yet also here 45-60% of the 14-year-old students sometimes argue with their teachers and 12-20% of the students have such arguments once or multiple times a month. Research shows that students who exhibit more problem behavior in school receive lower grades (Bryant, Schulenberg, Bachman, O'Malley, & Johnston, 2000; Fredricks et al., 2004), and are more likely to drop out of school (Fredricks et al., 2004; Rumberger, 1995).

**Table 1.1** Prevalence of problem behavior in school among the 14-year-old school population in England, Germany, the Netherlands, and Sweden (percentages)

	England	Germany	The Netherlands	Sweden
Skip class				
Never	84	84	81	73
Less than once a month	12	12	14	18
Once a month or more	4	5	4	8
Have arguments with teachers				
Never	27	41	51	57
Less than once a month	31	39	30	31
Once a month or more	42	20	20	12
Receive a punishment in school				
Never	31	53	29	72
Less than once a month	39	37	40	11
Once a month or more	29	10	31	7
Come late to class				
Never	29	50	34	35
Less than once a month	37	37	39	39
Once a month or more	33	14	28	26
Put a great deal of effort into school				
Strongly agree	21	11	10	21
Agree	56	50	44	47
Neither agree, nor disagree	18	29	34	26
Disagree or strongly disagree	5	10	12	7

As students' engagement in problem behavior in school appears to be an important predictor of their further school career and human capital acquisition, it is highly important to understand its determinants. Problem behavior in school has often been related to the ethnicity and socio-economic background of students (McFarland, 2001). Researchers have argued that, compared to ethnic majority students and students from higher socio-economic backgrounds, ethnic minority students and students from lower socio-economic backgrounds exhibit more problem behavior in school (Ainsworth-Darnell & Downey, 1998; Bingham & Okagaki, 2012; Ogbu, 1987; Van Tubergen & Van Gaans, 2016; Willis, 1977). A key explanation for this are the relatively poor prospects for occupational opportunities that these students face, which leads them to estrange from conventional society and to devalue school. In addition, researchers have attributed high levels of student problem behavior – also among ethnic minority and lower class youths – to parental characteristics, including parental support, parenting style (e.g., authoritative parenting) and parental involvement in school (Blondal & Adalbjarnardottir, 2014; Davies, 1999; McNeal, 1999). However, by focusing on the socio-ethnic and family origins of students, the classroom context – in which students make their decisions to be defiant – is largely ignored (McFarland, 2001). McFarland (2001) defines the classroom context as the dynamics between the teacher and the students, as well as the dynamics among the students (i.e., the peer context). This dissertation will focus on the latter in explaining student problem behavior in school<sup>2</sup>. Previous research has focused more on teacher-student interactions than on the peer context (Fredricks et al., 2004; Ryan, 2000).

Research on the role of peers in class or school has been steadily increasing. Especially during (early and middle) adolescence, peers are found to play an important role in affecting school behavior. As children move from childhood into adolescence, relationships with peers become increasingly intimate (Mahatmya, Lohman, Matjasko, & Feldman Farb, 2012). Moreover, conformity to the (deviant) behavior of peers intensifies across these years, while conformity to parents and teachers weakens (Berndt, 1979; McCormick & Cappella, 2015). Yet, conformity to the deviant behavior of peers has been found to drop again at the age of 16

---

2 Some scholars argue that the anti-school behaviors of students from lower socio-economic backgrounds (A. K. Cohen, 1955; Davies, 1999) and ethnic minority students (Demanet & Van Houtte, 2011; Fordham & Ogbu, 1986) are reinforced by group members, including peers. However, ethnic and SES group membership is not dependent on the school or school class that students attend. Ethnic minority students and low SES youths are thus expected to experience pressure to conform to these behavioral norms irrespective of the school or school class they attend (see for example Ogbu, 1986, p.200).

(Berndt, 1979). Hence, we examine the peer determinants of problem behavior in school among adolescents between 12 and 15 years of age. By focusing on peer determinants of adolescent problem behavior in school, we aim to understand why some adolescents exhibit more problem behavior in school than others and why problem behavior in school is more prevalent in certain school classes.

While this dissertation focuses on adolescent problem behavior in school, it relies on theories that generally describe peer group processes during adolescence. These processes may also apply to other outcomes than adolescent problem behavior in school, such as health-risk behaviors or attitudes (e.g., smoking and drinking behavior or attitudes), delinquent behavior, or depressive symptoms. Hence this dissertation may contribute to our wider understanding of how adolescents' behavior and attitudes are shaped by the peer context.

## 1.2 Previous research: theory and findings

Broadly speaking there are two complementary lines of research on the role of peers in shaping student behaviors and attitudes. The first line of research focuses on the effect of students' relationships with peers or their belongingness in the peer group. According to *belongingness theory* people have a need for belonging and a lack thereof is expected to have negative effects on people's adjustment (Baumeister & Leary, 1995). Researchers have for example related students' lack of belongingness in the peer group to depressive symptoms (Falci & McNeely, 2009; Ueno, 2005), feelings of loneliness (Parker & Asher, 1993), and delinquent involvement (Hirschi, 1969).

The second line of research focuses on the effect of the attributes (e.g., attitudes, behavior, or performance) of peers on adolescents' attitudes and behavior. According to this research line, peers function as a normative and/or comparative reference group (Merton, 1968; Richer, 1976). *Normative social influence theory* posits that peers set behavioral norms that influence student behavior. For example, research shows that peers influence the school performance (e.g., grades and test scores), risk-behaviors (e.g., smoking and drinking), depressive symptoms, and delinquent involvement of students (Brechwald & Prinstein, 2011; Sacerdote, 2011; Veenstra & Dijkstra, 2011). According to *comparative reference group theory*, peers set (academic) performance standards by which students evaluate their own performance (Richer, 1976). When a student's performance compares negatively to the performance of his/her peers, this can have repercussions on his/her attitudes

and behavior. For example, when the relative academic performance of students is lower, students make less ambitious educational choices and have lower educational aspirations (Jonsson & Mood, 2008; Nagengast & Marsh, 2012).

In this section we will elaborate on belongingness theory, normative social influence theory, and comparative reference group theory. We specifically focus on the applications of these theories to student problem behavior in school. In the literature no explicit definition of the peer group is provided. The term ‘peers’ may refer to friends, the larger clique of age mates that students hang out with, or even all class- or schoolmates. When discussing empirical findings of previous research we will try to state precisely which peer group is implied.

### **1.2.1 Belongingness theory**

According to belongingness theory, positive relationships with others are a fundamental human need (Baumeister & Leary, 1995). Research has supported this assumption by showing that most people strive for positive relations to others (i.e., the need is almost universal) and that the absence of positive relationships is associated with negative outcomes with respect to well-being, health, and behavioral adjustment (Baumeister & Leary, 1995). The satisfaction of the need for belongingness has been applied to students’ adjustment in the school context as well. Belongingness in school has been found to be related to positive school outcomes, including higher levels of school achievement, school enjoyment and pro-school behaviors, and lower levels of school suspension, truancy, and school drop-out (Osterman, 2000; Voelkl, 2012).

One important aspect of student belongingness in school, especially during adolescence, is belongingness in the peer group in school. Positive peer relationships in school – such as supportive friendships – have been found to contribute to student belongingness in school, while negative peer relations in school – such as experiences of victimization – hamper this belongingness (Hamm & Faircloth, 2005; Juvonen, Espinoza, & Knifsend, 2012; Vaquera & Kao, 2008; Vaquera, 2009; Voelkl, 2012). Students who have more positive peer relationships (e.g., high-quality friendships), and less negative peer relationships in school (e.g., foes) are thus assumed to value and bond to the school context more, which is expected to lead them to refrain less from school (e.g., skip class) and to make them more committed to school rules and norms. Similar predictions with respect to student problem behavior in school have been derived from the early version of Hirschi’s (1969) social control theory (Battistich & Hom, 1997) or attachment theory (Berndt & Keefe, 1995).

Empirical research has not shown consistent support for belongingness theory with respect to student problem behavior in school. Some empirical findings are consistent with belongingness theory. Various studies indicate that students who are negatively related to peers in school exhibit higher levels of problem behavior in school. Students who are rejected or victimized skip class more often and are less involved and attentive in school (Cillessen & Van den Berg, 2012; Juvonen, Nishina, & Graham, 2000; Juvonen, Wang, & Espinoza, 2010; Juvonen et al., 2012; Juvonen & Graham, 2014; Ladd, Kochenderfer-Ladd, & Sechler, 2012). Some studies also find that supportive friendships in school negatively affect student problem behavior in school. For example, Berndt & Keefe (1995) show that students with more stable friendships are more involved and less disruptive in school and that students with more supportive friends become increasingly involved over time. Research findings suggest that especially across the transition to a new school, students who have and maintain friendships are more committed to school (Juvonen et al., 2012). For example, having a mutual friendship before the transition to a new school is positively correlated to school involvement before and after the transition to a new school (Kingery & Erdley, 2007). However, this association is strongly reduced when accounting for the extent to which a student is liked by his/her classmates. Students who maintain their friends across the transition to a new school have also been found to adjust to their new school better (Aikins, Bierman, & Parker, 2005). In this study adjustment to school includes, among others, less engagement in problem behavior in school. Some researchers have observed that not all friendships are supportive, and that people with unsupportive friendships in school exhibit more problem behavior in school (Ladd et al., 2012). For example, Berndt & Keefe (1995) find that students with friendships with more negative features (such as conflict and rivalry) increase their disruptive behavior in school more across the school year.

Scholars have also tested belongingness theory more indirectly by using compositional characteristics of schools as a proxy for student belongingness in school. Scholars assume that peer belongingness in school is higher when there is a greater match between the composition of the larger student body in school or class and the characteristics of the individual student (Benner, 2011; Driessen, 2007). This match has also been referred to as congruence, and has mainly focused on the extent to which students are surrounded by co-ethnics in school. Most findings on the (mis)match between the ethnicity of a student and the ethnic composition of the larger student body are consistent with belongingness theory. For example, African-American and Latino students in the U.S. have been found to increase their school absences more after

transitioning to a high school with a lower share of co-ethnics (Benner & Graham, 2009). Similarly, students who are surrounded by fewer co-ethnics in school exhibit more externalizing problems, such as skipping class, getting drunk, and fighting in school (Benner & Crosnoe, 2011; Georgiades, Boyle, & Fife, 2013).

There are several empirical findings which are inconsistent with belongingness theory. These mostly concern findings with respect to the supposed effect of positive relationships to peers in school on student problem behavior in school. For example, Veenstra et al. (2010) find no association between students' positive relatedness to classmates and persistence of truancy between elementary and secondary school in the north of the Netherlands. A cross-sectional study by Johnson, Crosnoe, and Elder Jr (2001) find that the share of co-ethnics in U.S. schools is positively related to student attachment to school, but not to pro-school behavior. Moreover, both a cross-sectional (Demanet & Van Houtte, 2012) and a longitudinal (Wang & Eccles, 2012) study show that students exhibit *higher* levels of problem behavior when they perceive to receive more support from friends. Similarly, a case study on two U.S.-based high schools indicates that students with a larger friendship network in class exhibit *more* disruptive behavior (McFarland, 2001). In this study the friendship network is measured by the number of classmates that consider a particular student to be a friend.

### 1.2.2 Normative social influence theory

A possible reason for the inconsistent findings with respect to the effect of students' positive relationships to peers on their problem behavior in school, is that peers may convey anti-school norms. The need for belongingness in the peer group may lead adolescents to be influenced by the behavioral norms of peers that adolescents are positively related to, such as friends.

According to normative social influence theory<sup>3</sup> (Deutsch & Gerard, 1955), people conform to the behavioral norms of others as a way to gain their social approval

---

3 The social influence literature distinguishes between informational and normative social influence processes (Deutsch & Gerard, 1955). We focus on normative social influence processes, because we believe that adolescents are mainly influenced by the problem behavior of their peers through these processes. Informational influence refers to the process by which people use others as a source of information about reality. Informational influence is largest in ambiguous situations in which a person cannot behave according to an objective standard (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990). We believe that school rules and norms (e.g., whether it is allowed to skip class and to come late to class) are not ambiguous and, if they are, that teachers will be primarily used as a source of information.



and to avoid social sanctions (Cialdini & Goldstein, 2004). Obtaining approval from others is not only a goal in itself, but is also related to higher feelings of self-worth. Similar to belongingness theory, normative social influence theory thus starts from the premise that students aim for belongingness in the peer group. While, according to belongingness theory, student integration in the peer group in school will lead to pro-school behaviors, according to normative social influence theory integration in the peer group in school will only lead to pro-school behaviors when peers exhibit pro-school behavioral norms. When peers hold anti-school behavioral norms, students will develop more anti-school behaviors.

Researchers on normative social influence processes have distinguished between injunctive and descriptive norms. Injunctive norms represent the average attitudes, or the attitudes of most group members, on how people ought to behave. Descriptive norms are the group's average, or most performed, actual behaviors (Cialdini, Reno, & Kallgren, 1990; Hamm, Schmid, Farmer, & Locke, 2011). Injunctive and descriptive norms tend to be related to each other. Adolescents may observe the actual behavior of their peers to get informed about the injunctive norms of their peers (Lapinski & Rimal, 2005). Most research on the influence of peer norms on (school-specific) problem behavior among adolescents relies on descriptive norms, i.e., the actual behaviors of peers (e.g. Berndt & Keefe, 1995; Muller, Hofmann, Fleischli & Studer, 2015a, 2015b; Rambaran et al., 2016; Shin & Ryan, 2014).

Which peers set the behavioral norms, or in other words, serve as the normative reference group? According to Leenders (2002), this depends on whether people are influenced by the behavior of others via verbal communication or via comparison. Influence via verbal communication occurs between people who are directly tied to each other. The more often people interact with the peers they are directly tied to, the more they are influenced by the ideas and opinions of these peers. Influence via comparison can occur between people who are not directly tied to each other, but who are able to observe each other's behavior. For example, by observing the behavior of classmates, adolescents determine what the accepted school behavior is for people of their age. It may be difficult to determine beforehand whether comparison and/or verbal communication is/are underlying the normative influence

process<sup>4</sup>. Nevertheless, the behaviors of others can only influence the behavior of adolescents when these behaviors are *observed* (or known) to the adolescent (Merton, 1968; Richer, 1976). The better observable the behavior of peers is to the adolescent, the more likely the adolescent is to use these peers as a normative reference group. Relatedly, when the behavior of an adolescent is more visible to peers, peers are more likely to socially reward or socially punish this behavior (Merton, 1968). This means that there is a greater incentive for the adolescent to follow the norms of peers when peers are better able to observe the adolescent's behavior. Peers who are better able to observe the adolescent's behavior are therefore more likely to serve as the adolescent's normative reference group.

Which peers will serve as a normative reference group may also depend on the extent to which a peer is considered to be *salient*, also referred to as meaningful (Friedkin, 1998; Richer, 1976). With respect to normative influence processes, a peer is more salient when adolescents particularly want to be socially accepted and avoid social rejection by this peer. Researchers tend to assume that friends are salient, as the friendship in itself indicates that the adolescent values this peer (Hallinan, 1981). Adolescents are assumed to desire to keep these friendships. However, the extended peer group, such as classmates, to which the adolescent is not (yet) directly tied can also be salient. This group can include potential friends, popular peers, and peers that are perceived to be cool (Frank et al., 2008). Supposedly, adolescents do not just try to gain their friends' approval, but strive for a good social position within the larger peer group as well. Moreover, they do not only avoid social punishments from their friends, but generally avoid being banished from the peers that they are surrounded by.

Most studies provide support for normative social influence theory with respect to problem behavior in school. For example, Swiss students in their first year of secondary school are influenced by the actual and perceived behavior of peers in class (Müller, Hofmann, Fleischli, & Studer, 2015, 2016b). Longitudinal research shows that when the average self-reported disruptive behavior of classmates (Müller, Hofmann, Fleischli, & Studer, 2015), the perceived disruptive behavior of classmates, the perceived disruptive behavior of friends in class, or the perceived

---

4 In general it is difficult to empirically distinguish between these processes. Peers to whom the adolescent is directly tied may also influence the adolescent via comparison processes. Moreover, direct peers may communicate the behavior of others to whom the adolescent is not directly tied. Finally, adolescents may be or become similar to peers to whom they are directly tied and to whom they are not directly tied via indirect comparison or communication. This means that adolescents observe or communicate with the same third parties as their peers (Leenders, 2002). These third parties may be other peers, but could also be other adults (e.g., teachers) or even TV personalities.

disruptive behavior of dominant classmates is higher (Müller, Hofmann, Fleischli, & Studer, 2016b), Swiss secondary school students increase their disruptive behavior in school more (Müller, Hofmann, Fleischli, & Studer, 2016b). Similarly, adolescents have been found to adjust their behavior to the average disruptive behavior (Shin & Ryan, 2014), effort (Shin & Ryan, 2014), school-specific externalizing problem behavior (Fortuin, Van Geel, & Vedder, 2015), and truant behavior (Rambaran et al., 2016) of their friends in school. However, exceptions exist. For example, a study on pupils in the north of the Netherlands finds no association between the average level of misbehavior in a school and the misbehavior of individual pupils, when accounting for a pupil's background characteristics and parental misbehavior (Van de Werfhorst, Bergstra, & Veenstra, 2012). Moreover, Knecht (2008) finds that Dutch students in their first year of secondary school do not converge to the school attitudes of their friends. These school attitudes include students' attitudes about getting good grades in school, being on time in class, being attentive in class, doing homework, and attending each class.

### 1.2.3 Comparative reference group theory

Peers are not only expected to set behavioral norms that influence adolescents' behavior, but peers are also expected to set performance standards that influence adolescents' behavior (Richer, 1976). According to comparative reference group theory, people evaluate their performance by comparing their own performance to the performances of others (Festinger, 1954; Marsh et al., 2008; Richer, 1976). When people do not meet the performance standards set by others, this will lead to experiences of failure and incompetence (Festinger, 1954) – also referred to as 'relative deprivation' (Richer, 1976) – which will subsequently affect people's behavior. Within the school context, comparative reference group theory has been mainly applied to the *academic* performance standard that is set by peers. The lower students' relative academic performance is, the higher their feelings of relative deprivation will be in school (Marsh et al., 2008; Richer, 1976). These feelings may subsequently lead to higher levels of problem behavior in school (Finn, 1989).

Comparative reference group theory relies on similar assumptions as normative reference group theory (Merton, 1968; Richer, 1976). More specifically, when the performance of peers is better *observable* to the adolescent, and the peers are more *salient* to the adolescent, peers are more likely to serve as the adolescent's *comparative* reference group. Most research in schools has treated classmates or schoolmates as the comparative reference group. Hence, the reference group is

usually not restricted to peers that the adolescent is directly tied to. Instead, it is assumed that the mere exposure to the academic performance of others may lead to feelings of relative deprivation.

Research has convincingly shown that students who are surrounded by classmates or schoolmates whose academic performance is high have a lower academic self-concept than their equally performing counterparts who are surrounded by classmates or schoolmates whose academic performance is low (for a review see Marsh et al. (2008)). This has also been referred to as the Big Fish Little Pond Effect (BFLPE) (Marsh, 1987; Marsh et al., 2008). Moreover, students who have a lower self-view, especially a lower academic self-concept, have quite consistently been found to engage in more anti-school behaviors (Aunola, Stattin, & Nurmi, 2000; Green et al., 2012; Rosenberg, Schooler, & Schoenbach, 1989; Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995).

#### **1.2.4 Differentiation-polarization theory**

According to differentiation-polarization theory, students who are confined to a lower track or stream are deprived of their status in the academic realm (Hargreaves, 1967; Van Houtte, 2006). Conversely, students who are placed in higher tracks gain status from their high track placement. The loss of academic status that students in lower tracks experience would lead them to exhibit more anti-school attitudes and behaviors, whereas the gain in academic status that students in higher tracks experience would lead them to exhibit more pro-school attitudes and behaviors. Students are mostly surrounded by peers who attend the same track or stream and are assumed to be influenced by the school behavior and attitudes of these peers within their track or stream. In this way differences in anti-school behaviors and attitudes between the tracks or streams become larger over time (i.e., polarize). Several case studies have provided support for this theory (Abraham, 1989; Hargreaves, 1967). Moreover, cross-sectional findings on large scale data indicate that an anti-school culture is more prevalent among lower educational tracks (Van Houtte, 2006) and that students in lower tracks exhibit more problem behavior in school (Kelly, 1976; Van de Werfhorst, et al., 2012; Van Houtte & Stevens, 2008). Finally, Müller and Hofmann (2016) show in a longitudinal study that students in lower tracks increase their problem behavior more over time. However, Wiatrowski (1982) does not find this with respect to the delinquent involvement of lower track students.

We argue that differentiation-polarization theory actually combines comparative and normative reference group processes. Based on comparative reference group theory, it can be argued that students in lower tracks experience relative deprivation in the academic domain through their comparison with students in higher tracks (a similar argument is also made by Van Houtte and Stevens (2009b)). The spread of anti-school norms among students in lower tracks is a normative reference group process. Hence, in this dissertation we derive hypotheses on the basis of the more general reference group theories (i.e., normative social influence theory and comparative reference group theory).

### 1.3 Context of the study and data sources

To examine peer processes in adolescent problem behavior in school, we rely on two datasets. In chapter 2 we use the first wave, and in chapter 3-5 the first two waves, of data from the ‘Children of Immigrants Longitudinal Survey in Four European Countries’ (CILS4EU) (Kalter et al., 2013). The first wave of the CILS4EU project was gathered among the  $\pm 14$ -year-old school population in England, Germany, the Netherlands, and Sweden (i.e., 10<sup>th</sup> grade in England, 9<sup>th</sup> grade in Germany, 3<sup>rd</sup> grade in the Netherlands, and 8<sup>th</sup> grade in Sweden) in the school year of 2010-2011. The CILS4EU project used a three-stage-stratified sampling design. At the first stage schools were sampled. Large schools and schools with a higher immigrant proportion were oversampled, otherwise the sampling of schools was random. The response rate among the initially sampled schools varied between 14.7% (England) to 76.8% (Sweden). When initially sampled schools refused to participate, replacement schools that were similar to the initially sampled school in terms of the ‘stratification criteria’ (i.e., proportion of immigrant students and, depending on the country, their educational level, or region) were approached in England, Germany, and the Netherlands. After this replacement strategy, the response rate at the school-level ranged between 65.5% (i.e., England) and 98.6% (i.e., Germany). At the second sampling stage, two classes of the  $\pm 14$ -year-old school population were randomly selected to participate. The response rates at the class-level varied between 94.5-100%.

All students in the sampled classes were invited to participate (i.e., the third sampling stage). At the student-level, the response rates varied between 80.5% (i.e., England) and 91.1% (i.e., The Netherlands) in the first wave. One year after the first wave, all students that were part of the initial sample were approached to partake

in the second round of the study. New students who entered the school class of a sampled student in between wave 1 and wave 2 were also invited to participate. In the Netherlands a large group of new students became part of the sample, as school classes were restructured in between wave 1 and 2. Of the initially sampled group of students, 65.5% participated in the second wave in England, 80.7% participated in the second wave in Germany, 76.1% participated in the second wave in the Netherlands, and 77.7% participated in the second wave in Sweden. In both waves questionnaires were administered by trained assistants during school hours. Notes were made on the atmosphere in class and whether students participated seriously in the survey.

In chapter 6 we make use of the ‘Networks and actor attributes in early adolescence [2003/04]’ dataset (Knecht, 2006). As part of this study, four waves of data were collected among 3171 students in their first year of secondary school in the Netherlands. 14 schools were selected from a dataset containing all but the 10% smallest and 10% largest secondary schools in the Netherlands. Schools of different denominations and from different geographical areas (i.e., rural as well as urban) are included in the study. The data contain 126 classes of all educational tracks. Data collection for the first wave took place in the first few weeks after students entered their new school in the school year of 2003-2004. Thereafter, data were collected every three months. Students were usually 12 years old at the beginning of the data collection, and turned 13 during the year in which the data was gathered. Filling out the questionnaires took about 40 minutes. Questionnaires were administered during class hours by trained assistants. The response rate for students was 98% in wave 1, 93% in wave 2, 94% in wave 3, and 96% in wave 4.

There are several advantages to these datasets. First, they provide longitudinal information on students’ peer relationships in class, their peers’ problem behavior in school, and their own problem behavior in school. This enables us to make better inferences about the causal direction of the associations that will be studied in this dissertation as compared to prior work that relied on cross-sectional data (e.g., Kelly, 1976; Van Houtte, 2006; Vaquera & Kao, 2008; Vaquera, 2009). Second, both datasets provide information on the relationships between (almost) all of the students in class (e.g., friendships) and the problem behavior in school of (almost) all of these students. The datasets thus contain so-called ‘complete’ network data (i.e., they provide information on all the relationships in a given group). In order to examine influence processes among friends, we must control for friendship selection processes. Friends may exhibit similar behaviors because they influenced each

other's behavior, or because they selected each other as a friend on the basis of their behavioral similarity. To account for friendship selection processes adequately, the friendship opportunities that people have should be controlled for. Complete network data provide information on the friendship opportunities in a given setting (Steglich et al., 2010).

The data also allow us to use the self-reported behavior of peers, rather than the adolescent's perception of the behavior of peers. This is important, as people tend to report inaccurately about the behavior of others. First, people tend to think that their own attitudes and behaviors are more widespread than they actually are (i.e., also referred to as false consensus) (Ross, Greene, & House, 1977). Second, people tend to project their own behavior or attributes to *specific* others (i.e., projection bias) (Holmes, 1978).

On top of these shared advantages, each of these two datasets also has their own advantages. The advantage of the CILS4EU data is that they contain a large number of schools in four different countries. The student populations of these schools greatly vary (i.e., different educational tracks, varying immigrant proportions, and multiple regions are represented in the data). The CILS4EU data are thus well designed to examine differences in problem behavior across different student bodies. Since the data contain a multitude of school classes, we are able to examine class-level effects, such as the influence of the behavior or academic performance of classmates. Finally, these data enable us to explore country differences in peer processes.

The advantage of the 'Networks and actor attributes in early adolescence [2003/04]' data is that they include students who just entered a new school and who are thus exposed to many peers that they do not yet know. In this new school environment, most of the students have not yet obtained social approval from their classmates, and are presumably looking for new friendships. Hence, during this period, students may be especially likely to be influenced by their peers in class. Moreover, this dataset contains four waves. Hence there is more statistical power to examine changes in adolescents' behavior and friendship networks over time than in the CILS4EU data. Students are observed frequently, with little time in between the subsequent waves. Hence, subtle fluctuations in friendship networks and behavior can be captured.

A shared disadvantage of both datasets is that they only include complete network data among students within school classes. Hence, the influence of the behavior of peers outside the class cannot be taken into account.

## 1.4 Methods

Students in the data that we use are nested in their sparse networks of friends and foes (i.e., peer groups), which are nested in the ‘complete’ network of classmates in grades/schools. The nesting of students in their groups of friends and foes tends to be non-hierarchical. For example, students have a friendship group themselves, and at the same time they are part of another student’s friendship group (Steglich et al., 2010). Individuals who are part of the same grade, same class, or same friendship group are not independent from each other (Hox, 2010). They are exposed to the same contexts and omitted variables may thus be shared. Hence, ideally, multi-level techniques should be applied that do not assume that these observations are independent from each other (Hox, 2010).

When examining normative social influence processes, there is more to consider than the nesting structure of the data. Similarity in the behavior of adolescents and their peers is not necessarily due to normative influence. Adolescents and their classmates may exhibit similar behaviors, because they are exposed to the same contexts (i.e., school rules, teachers, or neighborhoods). To establish whether students actually *change* their behavior in response to the behavior of their peers, we need longitudinal methods. In addition, similarity between adolescents and their *friends* can also be due to endogenous friendship network processes. First, friends may be similar as a result of friendship selection processes, since adolescents tend to befriend peers who are similar to themselves (McPherson, Smith-Lovin, & Cook, 2001). Second, adolescents may be similar to their friends as a result of other dyadic and triadic network processes, such as people’s tendency to reciprocate friendships and to be friends with friends of friends (Steglich et al., 2010). Both the behavior of adolescents, as well as the behavior of peers (i.e., friends or classmates), are endogenous and reciprocal processes (Steglich et al., 2010). Adolescents may influence the behavior of peers, and peers may influence the behavior of adolescents. Ideally, these reciprocal processes should be modelled.

Stochastic actor based models (i.e., SIENA) are longitudinal network models especially designed to estimate the influence of the behavior and characteristics



of network ties, such as friends, on people's behavior (Snijders, Van de Bunt, & Steglich, 2010). Moreover, SIENA models are well suited to assess the effect of students' network position (e.g., number of friends or foes) on their behavior. SIENA has several important assets (Steglich et al., 2010). First, SIENA models take into account the non-hierarchical nesting structure of students in friendship groups (i.e., accounts for the interdependency between students and friends). Second, SIENA models normative influence processes by controlling for friendship selection processes and other triadic and dyadic endogenous friendship network processes that could cause similarity in the behaviors of adolescents and their friends. In this way SIENA takes into account the reciprocal relationship between the behavior of students and the behavior of friends.

Finally, the SIENA model is a continuous-time stochastic process for changes in student behavior and networks. The estimation method is suitable for panel data common in the social sciences in which respondents are not observed continuously, but at discrete time points. The model allows for unobserved alterations in student friendships and behaviors that occur in between the observation points. The fact that SIENA models social *processes* in continuous time makes SIENA distinct from traditional panel models. Traditional panel models are data models that try to predict (changes in) data observations at multiple discrete time points. However, they do not model social processes that occur in between these data observations. This can lead to biases when we are trying to understand continuous processes (e.g., social influence processes and friendship selection processes). For example, a person may exhibit the same behavior at time point 1 and time point 2. In a traditional panel data model we would not find support for normative social influence processes, because a person's behavior is the same at both observation points. Nevertheless, it may be that in between the observation points, a person increased or decreased his/her problem behavior, but also changed back to his/her initial behavior. For example, imagine that an adolescent becomes friends with someone who influences him/her to engage in deviant behavior. However, the other friends of the adolescent disapprove of the adolescent's new deviant friend and deviant behavior. Because the adolescent prefers to maintain these other friendships, rather than this one new friendship, the adolescent goes back to his/her initial behavior and the new friendship may be dropped. In SIENA such processes can be modeled, rather than assumed to be non-existent.

While SIENA – a process model – is preferable to a data model, SIENA models are not applied in all chapters of this dissertation. This is because some data forms

or statistical tests cannot be handled in the current version of SIENA (SIENA version 4, also see table 1). First, SIENA can only model the relationship between network processes and behavioral processes on longitudinal data (in chapter 2 cross-sectional data is used). Second, (multi-level) mediational paths cannot be formally tested yet in the SIENA framework (research questions of chapter 2 and 3 involve multi-level mediational paths). Third, SIENA is designed to model the influence of the behavior of peers that the adolescent is directly tied to, such as friends<sup>5</sup>. Hitherto, the influence of the behavior of all (non-befriended) classmates could not be assessed. Finally, SIENA cannot model social influence processes when too many people leave or enter the context in which the social influence processes are assessed (i.e., guidelines by Lubbers, Snijders and Van der Werf (2011) suggest that more than 60% of the people in the context should be consistently part of this context over time). In chapter 4 we study whether changes in students' peer context in class across the transition to a new school class affect student problem behavior in school. Hence, we examine students whose class context is highly unstable across the waves. In table 1.2 we summarize which statistical method is applied in each chapter. It shows the number of waves that are used and the multi-level structure of the data that is accounted for by the model. Table 1.2 lists the disadvantages of the data models that are applied in this dissertation in comparison to SIENA. Besides the fact that the data models do not model processes, table 1.2 indicates that most of them only account for the nesting of students in grades and/or school classes, but ignore the nesting of students in their specific peer groups in class (i.e., friendship or foe networks). Finally, the reciprocal relationship between the behavior of classmates and the behavior of students is not accounted for. When the behavior of classmates is shaped by prior behavior of the adolescent, the effect of the behavior of classmates on the subsequent behavior of the adolescent could be biased (i.e., in chapter 3, 4 and 5)<sup>6</sup>.

The table also lists the advantages of each specific method. Besides the fact that SIENA models could not always be used to assess certain research questions, some of the models also have other advantages. First, SIENA assumes that all important predictors of network change and behavioral change are included in the model (i.e., observed). Hence, it does not account for unobserved variables that are related to changes in the network and the behavior of people (Steglich et al., 2010). This

---

5 In the current version of SIENA, it has become possible to model the influence of the behavior of certain peers that a person is not directly tied to, i.e., the behavior of ties of ties (e.g., friends of friends that are not the adolescent's friend).

6 Since we found no support for the influence of the behavioral norms of classmates, we are not afraid that we have overestimated their influence in the conclusions.

Table 1.2 Statistical methods in each empirical chapter

Chapter	Methods	Nr. of waves	Multi-level structure	Disadvantage to SIENA for the specific research question addressed in the chapter	Advantage to SIENA for the specific research question addressed in the chapter
2	Multi-level structural equation models	1	1) Students 2) Grades <sup>a</sup>	<ul style="list-style-type: none"> <li>- No inferences with respect to the causal direction of the relationships can be made (i.e. cross-sectional analyses)</li> <li>- Ignores nesting in friendship groups</li> </ul>	<ul style="list-style-type: none"> <li>- Allows for formally testing (multi-level) mediational paths</li> <li>- Accounts for measurement error in problem behavior in school</li> </ul>
3	Multi-level structural equation models	2	1) Students 2) School classes	<ul style="list-style-type: none"> <li>- Does not model the social processes that are underlying the data observations</li> <li>- Reciprocal behavioral influence between adolescents and classmates ignored.</li> </ul>	<ul style="list-style-type: none"> <li>- Allows for formally testing (multi-level) mediational paths</li> <li>- Allows for analyzing the influence of the behavior of the extended peer group (i.e., all classmates)</li> <li>- Accounts for measurement error in problem behavior in school</li> </ul>
4	Cross-classified multi-level models	2	1) Students 2) School classes 3) Grade	<ul style="list-style-type: none"> <li>- Does not model the social processes that are underlying the data observations</li> <li>- Ignores nesting in friendship groups</li> <li>- Reciprocal behavioral influence between adolescents and classmates ignored.</li> </ul>	<ul style="list-style-type: none"> <li>- Allows for analyzing influence processes in school classes of which the composition changes over time</li> <li>- Allows for analyzing the influence of the behavior of the extended peer group (i.e., all classmates)</li> </ul>
5	SIENA	2	1) Students / Friends (cross-classified) <sup>b</sup>	N.A.	N.A.
	Fixed effect models		1) Time points 2) Students 3) School classes <sup>c</sup> 4) Grade <sup>c</sup>	<ul style="list-style-type: none"> <li>- Does not model the social processes that are underlying the data observations</li> <li>- Reciprocal behavioral influence between adolescents and classmates ignored.</li> </ul>	<ul style="list-style-type: none"> <li>- Allows for analyzing the influence of the behavior of the extended peer group (i.e., all non-befriended classmates)</li> <li>- Accounts for time-invariant unobserved variables</li> </ul>
6	SIENA	4	1) Students / Friends (cross-classified) 2) School classes	N.A.	N.A.

Notes: Accounting for the nesting in grades is equivalent to accounting for the nesting in schools, since we only use data on students from one specific grade in each school. <sup>a</sup> Data from multiple countries are pooled, and the nesting of students in countries is ignored. <sup>b</sup> The SIENA analyses in this chapter do not fully account for the nesting of students in school classes. Because there was not enough statistical power, school classes had to be analyzed together in larger groups. <sup>c</sup> Student fixed effect models account for class and grade nesting, because school class and grade are time invariant characteristics of students.

can lead to an overestimation of the influence of peers on student behavior. Fixed effect methods that are applied in chapter 5 do account for unobserved time-invariant characteristics. Second, the behavior and networks that are described by adolescents at each time point are assumed to be perfect observations (Steglich et al., 2010). Measurement error is thus not taken into account and this can lead to biased estimates. (Multi-level) Structural Equation Models that are applied in chapter 2 and 3 can take into account measurement error in the observed behavior of classmates and the adolescent (Preacher, Zhang, & Zyphur, 2011).

## **1.5 Research questions, contributions, and findings**

In this dissertation we test hypotheses on peer determinants of adolescent problem behavior in school derived from three general theories: belongingness theory, normative social influence theory, and comparative reference group theory. By studying peer determinants, we aim to contribute to the understanding of why some adolescents exhibit more problem behavior in school than others and why problem behavior in school is more prevalent in certain school classes. We pose the following overarching research question:

*To what extent does the peer context in class and school affect student problem behavior in school?*

The empirical chapters of this dissertation are focused around two larger topics. In the first part of the dissertation we examine the relation between compositional characteristics of schools or school classes and student problem behavior in school. In the second part we take a closer look at normative reference group processes and examine the conditions under which normative reference group processes are amplified or mitigated. In this section we outline the rationale behind these two overarching topics and describe the research question and findings of each chapter.

### **1.5.1 Part 1: School (class) composition and student problem behavior in school**

Scholars often observe variations in students' school behaviors across school classes or entire schools, and ascribe this to peer processes. Multiple researchers have related compositional characteristics of the student body to problem behavior in school (Finn & Voelkl, 1993), such as the ethnic composition (Benner & Crosnoe,

2011; Demanet & Van Houtte, 2011, 2014; Finn & Voelkl, 1993) and the educational-track of a school or class (Müller & Hofmann, 2016; Van Houtte & Stevens, 2008). These compositional characteristics have been assumed to be representative of the school norms within the larger student body (also referred to as '(sub)culture') (Demanet & Van Houtte, 2011) or are supposed to affect a student's sense of belonging in school (Benner & Crosnoe, 2011; Finn & Voelkl, 1993). However, still relatively little is known about the mechanisms underlying the relationship between the composition of schools and student problem behavior (for examples of some recent studies that *do* examine possible mechanisms, see: Demanet & Van Houtte, 2011, 2014; Georgiades et al., 2013). This dissertation contributes to previous research by more explicitly testing the peer processes that have often been assumed to underlie school composition effects on student problem behavior.

### ***Chapter 2: The ethnic composition of schools***

Chapter 2 focuses on the relationship between the ethnic composition of schools and student problem behavior in school. Most studies have related the share of *ethnic minorities* in school to (school-specific) problem behaviors of students (Demanet & Van Houtte, 2011, 2014; Finn & Voelkl, 1993; Gieling, Vollebergh, & Van Dorselaer, 2010). However, empirical findings with respect to both the existence and the direction of this relationship are mixed. Researchers have criticized using the share of ethnic minorities in school as an ethnic composition indicator (Fleischmann, Phalet, Deboosere, & Neels, 2012). The measure is perceived to be 'blind' to the different ethnic groups that the ethnic minority group consists of. Moreover, the share of ethnic minorities in school is negatively related to the share of in-group members for students from the ethnic majority.

Instead of using the share of *ethnic minorities* in school, some recent studies relate the share of *co-ethnics* in school to student problem behavior (Benner & Crosnoe, 2011; Georgiades et al., 2013; Johnson et al., 2001). The empirical findings of these studies are more consistent. Students who are surrounded by more co-ethnics in school have usually been found to exhibit lower levels of problem behavior. Inquiries on this relationship have been confined to the U.S. In this dissertation we extend this research area to Western Europe, a context in which ethnic diversity has been steadily increasing since the 1940s.

We contribute to previous research by looking at students' friendships to explain the relationship between the share of co-ethnics in school and student problem behavior. We argue that students who are surrounded by fewer co-ethnics in school

are less able to satisfy their friendship preferences within the school context. Students prefer co-ethnic friendships (McPherson et al., 2001; Smith, Maas, & Van Tubergen, 2014). Hence, when co-ethnics in school are lacking, students are expected to have more of their best friendships based outside, rather than inside, the school context. The students that, despite of this, still form their friendships in school are confined to form inter-ethnic friendships, rather than co-ethnic ones. Yet, research shows that inter-ethnic friends are of lower quality and more likely to dissolve than co-ethnic friends (Aboud, Mendelson, & Purdy, 2003; Kao & Joyner, 2004; Schneider, Dixon, & Udvari, 2007). Moreover both out-of-school friendships (as compared to in school friends) (Vaquera, 2009; Witkow, Gillen-O'Neel, & Fuligni, 2012), as well as inter-ethnic friends in school (as compared to co-ethnic friends) (Ueno, 2009) contribute less to students' feelings of belonging in school. Because students are expected to be less able to satisfy their friendship wishes within the school context when they are surrounded by fewer co-ethnics, we expect on the basis of *belongingness theory* that these students exhibit more problem behavior in school. The main research question of chapter 2 is:

*To what extent can the relationship between the proportion of co-ethnics in school and students' problem behavior in school be explained by students' friendships?*

We examine this research question by estimating multi-level structural equation models on the first wave of the CILS4EU data. The data include more than 16,000 students in 452 schools with different ethnic compositions in 4 European countries (i.e., England, Sweden, The Netherlands, and Germany). In line with belongingness theory, results indicate that students who are surrounded by fewer co-ethnics in school exhibit more problem behavior, albeit the effect size is small. Findings suggest that students' friendships are underlying this relationships. Students who attend a school with more co-ethnics have more in-school (rather than out-of-school) friends and more co-ethnic (rather than inter-ethnic) friends in class. These friendships are in turn related to lower levels of problem behavior in school.

### ***Chapter 3: The academic performance of school classes***

Chapter 3 focuses on the relationship between the academic performance of school classes and student problem behavior in school. Most existing studies focus on variations in problem behavior in school across different educational tracks in which students are placed on the basis of their academic performance. These studies are mostly case studies or large-scale cross-sectional studies. They indicate that, in lower educational tracks, there is more of an anti-school culture and student

problem behavior is higher (Abraham, 1989; Hargreaves, 1967; Van Houtte, 2006; Van Houtte & Stevens, 2008). A recent longitudinal study suggests that students in lower tracks also increase their problem behavior more over time (Müller & Hofmann, 2016). However, a different longitudinal study has not found support for this (Wiatrowski et al., 1982).

We argue that two complementary, but counterbalancing, mechanisms may underlie the relationship between the academic performance of a school class and student problem behavior in school. This may explain the ambiguous longitudinal research findings. According to *comparative reference group* theory, students who are surrounded by peers in class whose academic performance is higher will suffer more from a lower academic self-concept than their equally performing counterparts who are surrounded by peers whose academic performance is lower (i.e., The Big Fish Little Pond Effect, BFLPE) (Marsh et al., 2008; Richer, 1976). This will lead them to exhibit *more* problem behavior in school (Finn, 1989). According to *normative social influence* theory, students who are surrounded by peers whose academic performance is higher *increase* their pro-school behavior more (Richer, 1976; Van Houtte & Stevens, 2009b). Peers with a higher academic performance would namely set more pro-school behavioral norms. Using longitudinal data from three European countries, we contribute to previous research by explicitly testing these two complementary mechanisms. We pose the following research question:

*To what extent do the comparative reference group mechanism and the normative reference group mechanism account for the relationship between the average academic performance of the school class and student problem behavior in school?*

We examine this question in two countries in which explicit tracking on the basis of students' academic performance is relatively low, namely England and Sweden, and in one country in which explicit tracking on the basis of students' academic performance is relatively high, namely the Netherlands. For the Netherlands we are able to examine whether the average academic performance and/or educational track of a class affect student problem behavior in school. Students who attend a higher track are generally surrounded by higher performing peers in class. According to *comparative reference group* theory, being surrounded by higher performing peers in class will lead to a lower academic self-concept (i.e., the BFLP effect). However, explicit track placement may also lead students to *compare* their academic performance to students who attend a different educational track (Belfi, Goos, De Fraine, & Van Damme, 2012; Chmielewski, Dumont, & Trautwein,

2013). This process is expected to enhance the academic self-concept of students in higher tracks and to deprive students in the lower tracks of their academic self-concept (i.e., the assimilation effect) (Salchegger, 2016). The BFLP effect and the assimilation effect are thus expected to affect students' academic self-concept in opposite directions (Chmielewski et al., 2013). Based on these arguments we expect that the academic performance-level of a class will be negatively related to student academic self-concept, while the educational track of a class will be positively related to student academic self-concept. Since students who are placed in lower tracks are hypothesized to experience a loss of status and self-concept in the academic realm, they are also expected to exhibit more problem behavior in school (Finn, 1989; Hargreaves, 1967; Van Houtte, 2006). We expect that the higher the educational track of a class is, the lower the level of problem behavior of that class will be.

We study these hypotheses by analyzing multi-level structural equation models on the first two waves of the CILS4EU data. For each country more than 4000 students in more than 200 school classes are included in the analyses. Past research has indicated that the relationship between the academic performance of a class and a student's self-concept is larger when performance and self-concept are assessed for specific subjects than when they are assessed for academics in general (Salchegger, 2016). Hence, we examine the relation between the language performance of a class and student problem behavior in school via a student's language self-concept and the relation between the more general academic performance-level of a class and student problem behavior in school via a student's general academic self-concept.

Results indicate that comparative reference group processes do not contribute to student problem behavior in school. A student who attends a class with a higher academic performance-level does not have a lower general academic self-concept. We do find a negative relationship between a student's general academic self-concept and his/her problem behavior in school in all countries. Moreover, a student who attends a school class with a higher *language* performance level has a lower *language* self-concept in the Netherlands and Sweden, but not in England. However, we only find a negative relationship between a student's language self-concept and his/her problem behavior in school in England, and not in the Netherlands and Sweden. We find no support for the assimilation effect. Dutch students in higher educational tracks have not a higher, but rather a lower general academic and language self-concept than Dutch students in lower tracks. Moreover, when accounting for educational tracking, the negative relationship between the language



performance-level of a class and a student's language self-concept disappears.

In all countries we find that school classes with a lower academic performance level are composed of more problematic students. We do not find that this relationship (partly) reflects a negative relationship between track-level and student problem behavior. Instead, results indicate that the performance level of a class, rather than its educational track-level, is negatively related to student problem behavior in school. Inconsistent with predictions derived from normative social influence theory, we do not find that students increase their problem behavior more over time when they are surrounded by more problematic peers in class.

#### ***Chapter 4: The transition to a new class-context***

Observing the same students who transition to a new class or school may shed more light on the extent to which student problem behavior in school is actually dependent on peers in class or school. After transitioning to a new class or school, students are exposed to – and may therefore be influenced by – the behavioral norms of different peers. In addition, students may not be surrounded anymore by the peers they used to be positively (e.g., friends) or negatively tied to (e.g., foes) in their old educational setting. In other words, their belongingness to their peers in class or school may be altered.

A few previous studies have examined students' behavioral changes across the transition to a new school (Benner, 2011; Juvonen, 2007). However, when students transition to a new school students do not only experience changes in their peer context. Other aspects of their educational context are also altered, such as school rules, school customs and school size. Hence, it is unclear whether students' behavioral changes across a school transition are actually due to changes in the peer context. In chapter 4 we circumvent this problem by examining students' behavioral changes across the transition to a new *class*, whilst staying in the same school. In other words, students enter a new peer context, but experience little changes in the formal organization of the school. We pose the following research question:

*To what extent do changes in the peer context in the class affect changes in students' problem behavior in school?*

Changes in the peer context are defined as changes in the *normative reference group* that students are exposed to in class and changes in students' *belongingness*

*in class* (i.e., the presence of friends and foes in class). Based on normative social influence theory, we expect that the problem behavior in school of a student is more strongly influenced by the problem behavior of peers who stay in class or who enter the class than the problem behavior of peers who leave the class. Because students spend most of their time in school with their classmates, peers who leave the class are less likely to be used as a normative reference group. Based on belongingness theory we expect that when foes leave a student's school class, a student will decrease his/her problem behavior more. When peers enter a student's school class who are, or become, foes of the student (i.e., foes join the school class), a student is hypothesized to increase his/her problem behavior more.

Based on *belongingness* theory we also expect that when more friends leave a student's school class, a student will increase his/her problem behavior in school more. When a student befriends more peers who enter his/her school class (i.e., more friends join the school class), a student is expected to decrease his/her problem behavior in school more. The positive relation between the number of friends that leave a student's school class and problem behavior in school is expected to be smaller when the problem behavior of friends who leave the school class is higher. Adolescents may only increase their problem behavior in school when obedient friends leave the class. However, when disobedient friends leave the class they may even reduce their problem behavior in school.

We use cross classified multi-level models to analyze two-wave panel data on 2783 Dutch adolescents across their transition to a new school class. Findings provide little support for *normative social influence* theory. We find no robust positive relationship between the level of problem behavior of (current and/or previous) classmates and students' increase in problem behavior in school. Adolescents' problem behavior in school is not more strongly influenced by peers who enter or stay in the adolescent's school class than by peers who leave the adolescent's school class.

Results provide some support for *belongingness* theory. More specifically, when students move to a new class in which their previous foes are no longer present, students decrease their problem behavior in school more. The number of friends that leave the school class is not significantly related to changes in student problem behavior in school. This relationship is also not conditional on the level of problem behavior of friends who leave the school class. Opposite to belongingness theory, we find that when more friends join the school class, students increase their problem behavior in school more.

### 1.5.2 Part 2: Moderators of normative peer reference group processes

Chapters 3 and 4 provide little support for the hypothesis, derived from normative social influence theory, that the average problem behavior in school of all classmates influences adolescents' problem behavior in school. However, not all adolescents may be equally susceptible to the problem behavior in school of their classmates. Moreover, some classmates may influence adolescents' school behavior more than others. Hence, in the second part of this dissertation we examine factors that could alter *normative peer influence processes*. More specifically, we study the following research question:

*To what extent are normative peer influence processes with respect to problem behavior in school dependent on (1) characteristics of the student, (2) characteristics of the peers, and (3) the combination of these two (e.g., similarity between the characteristics of peers and characteristics of the adolescent)?*

Research on factors that amplify or buffer normative social influence processes is still scarce (Brechwald & Prinstein, 2011; Veenstra & Dijkstra, 2011) and existing studies often suffer from methodological problems. Studying these factors may help us to understand which peers mostly serve as the adolescent's normative reference group and which adolescents mostly rely on peers as a normative reference group. Moreover, in this way we hope to shed more light on why certain individuals engage in more problem behavior in school than others.

#### ***Chapter 5: Gender-specific reference group processes***

Chapter 5 is an example of a study in which normative peer influence processes are used to understand why certain individuals exhibit more problem behavior in school than others. In this chapter we examine whether gender-specific normative influence processes contribute to the well-established gender gap in problem behavior in school (Buchmann, DiPrete, & McDaniel, 2008; Driessen & Van Langen, 2013). Within the criminological literature it is argued that gender differences in delinquency are partly due to the fact that boys and girls are (1) exposed to, and therefore influenced by the behavior of, different peers, and (2) respond differently to the behavior of (different) peers (Haynie, Doogan, & Soller, 2014; Mears, Ploeger, & Warr, 1998). We apply these ideas to understand the gender gap in student problem behavior in school.

First, we argue that friendship selection processes entail that boys are exposed to more school-specific problem behavior in their friendship group in class than girls. Boys tend to befriend boys, whereas girls tend to befriend girls (McPherson et al., 2001; Shrum, Cheek Jr, & Hunter, 1988). In addition, adolescents tend to befriend peers who exhibit similar levels of problem behavior in school (Fortuin et al., 2015; Geven, Weesie, & Van Tubergen, 2013). Since boys' initial level of problem behavior in school is higher than that of girls, these friendship selection processes expose boys to more school-specific problem behavior in their friendship group than girls. Because of this, boys will, compared to girls, be influenced by friends who exhibit higher levels of problem behavior in school, and will therefore increase their problem behavior in school more.

Girls and boys are also hypothesized to respond differently to the problem behavior in school of (different) peers. Ethnographic research suggests that boys derive more social status from engaging in anti-school behaviors (Adler, Kless, & Adler, 1992; Warrington, Younger, & Williams, 2000). Compared to girls, boys experience more peer pressure to not engage in pro-school behaviors, as they would run a greater risk of being socially punished by peers for engaging in pro-school behaviors (Warrington et al., 2000). Hence, we expect that boys, rather than girls, increase their problem behavior more when the problem behavior of befriended or non-befriended classmates is higher. Finally, we expect that the anti-school behavior of same-sex peers, rather than the anti-school behavior of opposite-sex peers, influences adolescents' problem behavior in school. Because of this, a feedback process may emerge. Girls, who have a lower initial inclination to exhibit problem behavior are less likely to reinforce this behavior than boys. To summarize, we address the following research question:

*To what extent do (1) gender differences in the exposure to problem behavior in school within the peer group and (2) gender differences in the response to problem behavior in school within the peer group contribute to the gender gap in problem behavior in school?*

We test these expectations by using SIENA models and fixed effect models on the first two waves of the CILS4EU data in Sweden. We find support for gender difference in the exposure to school-specific problem behavior in friendship groups. Compared to girls, boys seem to be exposed to more school-specific problem behavior in their friendship group (i.e., friends who put less effort into school and argue more with teachers). In addition, SIENA models indicate that adolescents

are influenced by the problem behavior in school of their friends. However, these dynamic processes do not explain why, compared to girls, boys increase their problem behavior in school more over time.

We find that there are no gender differences in the extent to which boys and girls *respond* to the problem behavior in school of their friends in class. However, we find some gender differences in adolescents' response to the problem behavior of non-befriended peers in class. Fixed effect models indicate that especially boys increase their lack of effort in school when non-befriended classmates increase their lack of effort in school. Nevertheless, this does not explain why boys increase their lack of effort in school more than girls over time. We find that boys and girls are equally influenced by non-friends' arguments with teachers. Finally, adolescents are not influenced more by the problem behavior of classmates of the same-sex rather than classmates of the opposite sex.

#### ***Chapter 6: social status and friendship reciprocity as moderators***

In chapter 6 we focus on the *normative influence* of befriended classmates. Here we examine whether the normative influence of friends with respect to problem behavior in school depends on (1) the social status of the adolescent, (2) the social status of a friend, and (3) friendship reciprocity. Social status is defined as the number of received friendship nominations. Adolescents with a lower social status are assumed to desire the social approval of peers more, and are thereby expected to be more susceptible to the school behavior of friends. Peers with a higher social status are expected to be more influential, because their social approval is assumed to be desired more. Finally, an unreciprocated friendship is marked by social inequality. An unreciprocated friendship can be seen as a desire for a friendship tie that is not 'gained' yet. Adolescents are therefore assumed to adjust their behavior to the behavior of an unreciprocated friendship tie for strategic reasons, namely as a way to lure this friend into reciprocating the friendship tie. Hence the school behavior of unreciprocated friends is expected to be more influential than the school behavior of reciprocated friends.

We test these expectations on 4-wave panel data among adolescents in the Netherlands in their first year of secondary school. We find that students are influenced by the inattentiveness and homework avoidance of friends, and that this influence is stronger when students have fewer friends. We do not find that students are influenced more by the behavior of friends who have a higher social status. Finally, unreciprocated friendships are not found to be more influential than reciprocated friends. Influence

processes with respect to inattentiveness in class are found to be more robust than influence processes with respect to not doing homework.

## 1.6 Conclusion

### 1.6.1 Discussion

To what extent is student problem behavior in school dependent on the peer context in school? We will review our findings for the three main theories: belongingness theory, normative social influence theory, and comparative reference group theory (see table 1.3 for a more general overview).

#### *Belongingness theory*

In line with belongingness theory, this dissertation suggests that students who are surrounded by more co-ethnics in school exhibit less problem behavior in school. It seems that in these schools students are better able to fulfill their friendship preferences. However, inconsistent with belongingness theory, we find that students do not alter their problem behavior in school when they are separated from their school friends in their specific class context. This applies to adolescents who are separated from ‘obedient’ friends as well as adolescents who are separated from ‘disobedient’ friends in their school class. Friends outside the school class –but inside school – may thus equally contribute to students’ belongingness to school as friends inside the school class. Unexpectedly, when students befriend more peers who enter their school class after school class reshufflings, they *increase* their problem behavior in school more. It may be that adolescents try to gain social status amongst their ‘new’ (potential) friends in class by exhibiting more problem behavior in school. Exhibiting deviant behaviors has been related to higher levels of adolescents’ social status in the peer group (Allen, Weissberg, & Hawkins, 1989; Moffitt, 1993). Alternatively, exhibiting problem behavior in school may be less costly when adolescents are supported by a larger peer network in class (McFarland, 2001). Adolescents who exhibit deviant behavior, but who lack peer support in class run the risk of being ridiculed by peers. Moreover, when adolescents are backed by fewer peers in class, they are more likely to be punished by teachers. Hence, when adolescents increase their number of friends in a new class, they may be more emboldened to exhibit problem behavior. A study on two U.S.-based high schools indeed finds that students with a larger friendship network in class exhibit more rebellious behavior in class (McFarland, 2001).

This dissertation shows that students who are separated from their foes in class *decrease* their problem behavior more. This finding is in line with belongingness theory and inconsistent with the idea that students who receive more support from peers exhibit more problem behavior in school. It namely suggests that students exhibit less problem behavior when they are – through the removal of their foes in the school class – supposedly more accepted by their classmates. The finding that students who are separated from their foes in class decrease their problem behavior in school is important. There are still few longitudinal studies on the effect of negative peer relations on students' adjustment in school, including student problem behaviors (Juvonen et al., 2012). Moreover, we make use of a quasi-experimental design, as we study the same students who transition to a new peer context in class.

### *Comparative reference group theory*

Research has repeatedly shown that students in high performing classes have a lower academic self-concept than their equally-performing counterparts in low performing classes (i.e., also referred to as the BFLPE) (Marsh et al., 2008). Students with a higher academic self-concept have in turn been found to exhibit less problem behavior in school (Finn, 1989). This dissertation contributes to previous research by explicitly testing this indirect relationship. Moreover, we do so by applying state-of-the art statistical techniques that are able to accurately test this multi-level mediation (i.e., multi-level structural equation modelling) (Preacher, Zyphur, & Zhang, 2010; Preacher et al., 2011).

We find little support for the idea that comparative reference group processes contribute to student problem behavior in school. Students who are surrounded by classmates with a higher general academic performance level are not more deprived of their general academic self-concept. Some findings do indicate that students who are surrounded by classmates with a higher language performance level are more deprived of their language self-concept. However, only general academic self-concept, and not language self-concept, is substantively and consistently related to student problem behavior in school. Previous research also indicates that the effect of schoolmates' subject-specific performance on a student's subject-specific self-concept is larger than the effect of schoolmates' general academic performance on a student's general academic self-concept (Salchegger, 2016). We think that students may be more *aware* of their relative performance in a specific school subject than their relative overall performance in school. Even the least-performing students in school may not be the worst of the class in all subjects. For example, a student who is bottom of the class for math, may still have an average performance with respect

to languages. A student who is not able to meet the performance standard in a specific subject may thus still be able to obtain some academic self-worth through his/her performance in other subjects. Hence, a lower academic self-concept in one specific subject will not lead a student to exhibit more problem behavior in school in general. Nevertheless, it may be that students who are deprived of their language self-concept are more likely to be truant or rebel during language class.

We find no support for the idea that students in higher educational tracks evaluate their academic performance more positively than students in lower educational tracks (i.e., an assimilation effect). Instead, students in higher tracks have not a higher, but a lower academic self-concept than students in lower tracks in the Netherlands. When accounting for educational tracking, the negative relation between the language performance of a class on a student's language self-concept disappears (i.e., the BFLPE). We argue that higher tracks are academically more challenging, which may lower the academic self-concept of students in higher tracks. Moreover, some students may attend a track in which the standard of teaching does not match their own academic abilities. In the higher tracks there may be some students whose academic abilities are lower than the academic standard of the track and who will therefore be deprived of their academic self-concept. In the lower tracks there will be some students whose academic abilities are higher than the academic standard of the track whose academic self-concept will be boosted.

Our findings are in contradiction to differentiation-polarization theory. This theory suggest that students who are placed in lower tracks exhibit more problem behavior in school due to their status deprivation in the academic realm (see Abraham (1989); Hargreaves, (1967); Van Houtte, (2006)). We find that school classes with a lower academic performance level are composed of students who exhibit more problem behavior in school. Crucially, however, this relationship is not confined to educational systems in which students are tracked on the basis of their performance. Moreover, the performance level of a class seems to be more strongly related to the level of student problem behavior in school than the educational track of a class. For the Netherlands we namely find that when the relationship between educational tracking and student problem behavior in school is examined alongside the relationship between the overall academic performance-level of a class and student problem behavior in school, there is only a significant and negative relation between the overall performance-level of a class and student problem behavior in school. These findings are important, as they seem to contradict the widely established belief that the explicit placement of students into tracks or streams on



the basis of students' academic performance leads to more anti-school attitudes and behaviors<sup>7</sup> among students who are placed in lower tracks. More research is warranted.

### *Normative social influence theory*

With respect to normative social influence theory, we find that friends in class influence the problem behavior of adolescents, but we find little support for the idea that the problem behavior of all (current or past) classmates influences the problem behavior of adolescents. We must note that findings are somewhat inconsistent with respect to the influence of the problem behavior of all (current or past) classmates. For the Netherlands, some findings indicate that when peers who stay in the adolescent's school class after school classes are reshuffled exhibit more problem behavior in school, adolescents increase their problem behavior in school more (see chapter 4). However, this relationship disappears in school fixed effect models. We argue that some schools may be stricter in letting (problematic) students pass on to the next grade. In schools in which problematic students are required to repeat a year or to leave school, the problem behavior of the peers who stay in the adolescent's class will be lower. At the same time, adolescents may be less likely to increase their problem behavior in these schools.

For Sweden, SIENA models and individual fixed effect models suggest that both befriended and non-befriended classmates influence students' effort in school and their arguments with teachers (chapter 5). However, multi-level structural equation models indicate that the problem behavior of all classmates is not significantly related to a student's increase in problem behavior in school (chapter 3). In contrast to chapter 5, in chapter 3 the problem behavior of classmates and adolescents is measured by multiple indicators and measurement error in the constructs is taken into account. Additional analyses show that when measurement error is not taken into account in chapter 3, the problem behavior of all classmates is significantly and positively related to an increase in a student's problem behavior in Sweden. This may imply that measurement error biases the conclusions in favor of normative social influence theory<sup>8</sup>. This dissertation thereby shows the importance of testing

---

7 This conclusion is not in contrast to studies that indicate that students in lower tracks increase their problem behavior more just after they are tracked on the basis of their academic performance (e.g., Abraham, 1989; Müller & Hofmann, 2016). When more problematic students are sorted into lower track classes, normative reference group processes may lead lower track students to intensify their problem behavior more over time.

8 Note that SIENA does not correct for measurement error either (Steglich, Snijders, & Pearson, 2010).

the same theory with different statistical methods that all have their own strengths and weaknesses.

Past research did find support for the influence of the average problem behavior of classmates on students' problem behavior in school (e.g. Barth, Dunlap, Dane, Lochman, & Wells, 2004; Müller, et al. 2015, 2016a; Thomas, Bierman, & Powers, 2011). These studies did not account for measurement error in the problem behavior of the adolescent and the problem behavior of classmates. Moreover, most of these past studies focus on students who just entered a new school, while we examine students who have been attending the same school for several years. It might be that students only *change* their behavior in response to their peers just after they enter a new school. In the first years of secondary school, students try to establish friendship and aim to become part of a specific peer group in school. Moreover, the social hierarchy in school still has to be established. Once the peer groups and the social hierarchy in school have been determined, normative influence processes may fade out. Empirically we indeed observe that friendship groups become more and more stable over the course of the first school year in the Netherlands (i.e., as indicated by a higher average Jaccard index between later waves than between earlier waves).

Although we find little support for the effect of school behavioral norms of the entire school class on student problem behavior in school, school behavioral norms of *specific* peer groups in class do affect student problem behavior in school. More specifically, by using state-of-the-art statistical techniques (i.e., SIENA), we show that adolescents adjust to the school-specific problem behavior of their friends in class. Influence processes among friends are not only found among students who just entered a new school (i.e., Dutch students in their first year of secondary school), but also among students who have been attending the same school for several years (i.e., Swedish students across 8<sup>th</sup> and 9<sup>th</sup> grade). The finding that friends influence adolescent problem behavior in school is in line with other recent studies that use SIENA models (Rambaran et al., 2016; Shin & Ryan, 2014), as well as research applying traditional panel models (Berndt & Keefe, 1995; Kindermann, 2007).

Based on the findings of this dissertation we should be careful in concluding that the behavior of friends in class is more influential than the behavior of classmates in general. While the influence of the behavior of classmates is examined with traditional panel models, the influence of the behavior of friends in class is

examined with SIENA models. SIENA models social influence as a continuous process, and thereby reduces bias in the estimates. This may be a reason why we find support for influence processes among friends, but not among classmates. Even if adolescents are not directly influenced by the problem behavior of their classmates, compositional characteristics of a class may still indirectly contribute to normative social influence processes among friends. The composition of a school class namely structures students' friendships in class (see Smith (2015) with respect to ethnic composition of school classes and Kubitschek and Hallinan (1998) with respect to tracking). For example, students who attend a lower track class have a greater opportunity to befriend a peer in class who exhibits higher levels of problem behavior in school.

This dissertation contributes to previous research by examining which adolescents are mainly influenced by their friends' problem behavior in school and which friends are most influential. SIENA analyses show that students are influenced more by the inattentiveness and homework avoidance of friends when they have fewer friends. This finding is highly important, as it provides insights into the mechanisms underlying normative social influence processes. Normative social influence theory assumes that people are influenced by the behavior of peers, because they desire to be socially accepted by these peers (Cialdini & Goldstein, 2004). In line with this assumption, this finding suggests that when the desire for peer acceptance has been satisfied more (i.e., people have more friends), students are influenced less by the school behavior of their friends. Students who have many friends who support them may worry less about social rejection (Cillessen & Van den Berg, 2012) and the loss of a friend will be less costly.

Friends' social status, friendship reciprocity and the adolescent's gender do not significantly moderate social influence processes among friends. This may imply that influence processes among friends are quite general and are not confined to specific students or friendships (similar conclusions are drawn by Pattiselanno (2016) with respect to the influence of friends on risk behaviors during adolescence). However, there are also other plausible reasons for these null findings. The finding that students are not influenced more by friends who have a higher social status (i.e., friends who receive more friendship nominations by pupils in class) may imply that friendship nominations are not the best measure of a friend's influential power. Rather than influential power, friendship nominations may indicate the extent to which students are liked by their peers in class (Cillessen & Van den Berg, 2012; Sandstrom, 2011). The extent to which friends are perceived to be popular in class

may be more indicative of their influential power. A recent study on ninth-grade students in a U.S. school indeed indicates that the truant behavior of mutual friends influences student truant behavior more, when these friends are perceived to be more popular in the grade (Rambaran et al., 2016). Popular friends were not found to be more influential when both mutual and unilateral friends were considered.

The finding that reciprocated friends are not more influential than unilateral friends may be due to the fact that friendship reciprocity may reduce as well as amplify influence processes. On the one hand, reciprocated friends may be less influential because their ‘approval’ and ‘acceptance’ is already gained. On the other hand, reciprocated friends may be more influential because adolescents are likely to be more emotionally close to them. The finding that boys are not more susceptible to their friends’ problem behavior in school than girls may also be due to the fact that adolescents’ gender affects the susceptibility to friends’ problem behavior in school in more complex ways. Boys’ status in the peer group is assumed to be more dependent on their school-specific behavior than girls’ status in the peer group (Warrington et al., 2000). Compared to girls, boys thus have a greater incentive to increase their problem behavior in school when their friends exhibit higher levels of problem behavior in school. However, female friendship groups tend to be closer than male friendship groups and girls may therefore be generally more susceptible to the influence of the behavior of friends (Haynie et al., 2014). With respect to problem behavior in school the susceptibility of boys and girls thus becomes equal.

Findings of this dissertation seem to suggest that influence processes among friends in class are stronger on specific types of behaviors. Although differences between influences processes on different types of behavior could not be formally tested, results indicate that influence processes among friends with respect to inattention in class are stronger than influence processes with respect to homework inactivity. We suggest that adolescents are better able to observe whether their friends are paying attention in class than whether their friends are doing homework, as the latter behavior is not acted out within the class context.

## **1.6.2 Research limitations and future research**

### *Data and statistical limitations*

In chapter 2 we rely on cross-sectional data. This means that the hypothesized causal direction with respect to the relationships between the ethnic composition

of schools, students' in-school and inter-ethnic friendships and problem behavior in school cannot be assessed empirically. While the analyses in the other empirical chapters are based on longitudinal data, they mostly rely on two-wave panel data and thus only contain one moment of change. The statistical power to find significant predictors of adolescents' behavioral changes over time is thus limited. Relatedly, scholars have argued that students engage in anti-school behavior sporadically (Davies, 1999) and normative influence processes with respect to problem behavior in school may only occur sporadically. Hence, we may have had to measure the behavior of students more frequently in order to capture these sporadic processes. For example, students may be influenced by their classmates to skip class a couple of times a year. However, students may not change their general view of their problem behavior across a school year based on these rare events.

In this dissertation the boundary of students' social network is usually the school class. We analyze the influence of (befriended) classmates, rather than (befriended) grade or schoolmates. Moreover, students may have influential friends or acquaintances outside their school class. In the first wave of the CILS4EU data between 66% (Germany) and 81% (England)<sup>9</sup> of students' best friends are based in school. Moreover, between 41% (England) and 77% (Germany) of the in-school friends are based in class. Out-of-school friends may be especially influential when they are also tied to the adolescents' in-school friends.

Another disadvantage of analyzing the role of friendship in class, rather than friendships in school or the grade, is that the analyses have less statistical power. For example, in chapter 6, we analyze each school class separately in SIENA. As there are relatively few people in a class, the sample size to examine (moderators of) normative social influence processes among friends is small. We may have had little power to find support for our hypotheses. Conducting power analyses before data is gathered or analyzed is still relatively uncommon in sociology. Nevertheless we realize on the hindsight that power analyses may be insightful when researchers intend to use data on small networks. Awareness of power analyses among sociologists may have to be raised. Moreover, there are still little tools available to perform power analyses for more complex models, including SIENA models. It should be noted that SIENA models that rely on complete network data of entire schools or grades have more statistical power, however may violate some of the assumptions that are underlying the SIENA model (e.g. that students have full information on

---

<sup>9</sup> Data are weighted according to the sampling design and the non-response at the school, class and student-level.

the relationships and behaviors of the people in the complete network).

***Assumptions about reference group processes***

Reference group processes continue to be an area for further examination. The current theories do often not allow us to examine these processes without making crucial a priori assumptions. The determination of the relevant reference groups may be considered to be one of the most important assumptions (Leenders, 2002). Most studies on adolescent behavior, including this one, assume that classmates (or even schoolmates) and/or friends are the ‘basic’ normative and comparative reference group. But are these indeed the relevant actors? With hindsight, this assumption may be imprecise. The group of classmates could be too broad to act as a normative reference group. Probably, the group of classmates does not only include desired friends and peers who are perceived to be cool or popular, but also comprises peers that are seen as ‘uncool’ or even disliked by the adolescent. Conversely, the friendship group may also not serve as an adolescent’s most important normative reference group (see Frank et al. (2008)), since friends’ social acceptance is already obtained and adolescents do not have to impress their friends anymore. Instead, adolescents may be more likely to exhibit certain behaviors for strategic reasons: they may adjust their behavior to the behavior of peers that they want to *become* friends with. In light of this, future research should explicitly incorporate multiple sources of influence simultaneously, for example the influence of peers that are perceived to be ‘cool’ or ‘popular’ could be examined alongside the influence of friends. This type of analysis requires information on multiple types of relationships in a specific context. Alternatively, if this information is not available, researchers could focus on the structural positions of peers in the network. For example, according to balance theory (Cartwright & Harary, 1956; Heider, 1946), people have a tendency to become friends with the friends of their friends. When a person is not friends with the friends of his/her friends, this namely leads to “psychological” strain. Hence, friends of friends could be assumed to be ‘desired’ friends and therefore an important reference group. It is now possible to examine this within the most recent version of SIENA. Future studies should also examine who constitutes the most important reference group in comparative reference group processes. Research on comparative reference group processes generally considers *all* schoolmates or classmates as the reference group. Although adolescents may observe the performance of all their classmates, (the performance of) some classmates may not be salient to the adolescent. For example, classmates whose performance differs ‘too’ much from their own performance-level (see Richer (1976) and Festinger (1954)).

**Table 1.3** *Summary of the main research findings*

	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6
<b>Belongingness theory</b>					
% co-ethnics in school	+				
% in-school friends	+				
% co-ethnic friends in class	+				
# friends leave the class			0		
# friends enter the class			-		
Foes leave the class			+		
Foes enter the class			0		
-----					
Comparative reference group theory (via academic self-concept)					
General academic performance of class		0			
Language performance of class		0			
-----					
<b>Normative social influence theory</b>					
Problem behavior of all peers in class		0			
Moderators:					
Peers who stay v.s. peers who leave the class			0		
Peers who enter v.s. peers who leave the class			0		
Problem behavior of non-friends in class				+	
Moderators:					
Male adolescent				+/0	
Same-sex v.s. opposite sex non-friends				0	
Problem behavior of friends in class				+	+
Moderators:					
Male adolescent				0	+
# friends of adolescent					0
# friends of friend					0
Reciprocated friends v.s. unreciprocated friends					

*Note: + relationship/effect is found in the expected direction; 0 no relationship/effect is found; - opposite effect is found*

Even when we know who constitutes the relevant reference group, reference group processes are difficult to unravel as they are network processes. An adolescent is usually not only surrounded by one peer, but by multiple peers that may set behavioral norms or academic standards (i.e., multiple classmates, multiple friends). The attributes of these peers could be different from each other and are subject to change (Friedkin, 1998). The question is whether we can even speak of a behavioral norm or academic standard when the behaviors or academic performance of different peers are highly heterogeneous. For example, scholars explicitly define behavioral

norms as *shared* ideas within a group on appropriate behaviors (Veenstra, Dijkstra, & Kreager, 2017). However, most empirical tests of normative social influence theory and comparative reference group theory – including the tests in this dissertation – do not examine the implications of heterogeneity in the attributes of peers on the influence of these attributes on adolescent behavior (an exception is the study by Müller et al. 2016a<sup>10</sup>). It is implicitly assumed that there is ‘enough’ homogeneity in the behaviors or academic performance of different peers for there to be a norm or standard. It could be that the influence of a peer group’s average score on a specific attribute is smaller when the peer group is more heterogeneous on this attribute (e.g., the variance is higher). Nevertheless, it is difficult to examine the role of attribute heterogeneity in reference group processes. The average score on classmates’ attributes is often highly correlated with the variance in these attributes<sup>11</sup> (Müller, Hofmann, Fleischli, & Studer, 2016a). Moreover, within the most recent version of SIENA it is not yet possible to condition the influence of the attributes of peers on the variance in the attributes of peers (e.g., friendship group).

Heterogeneity in peer attributes is not the only ‘network’ factor that complicates the understanding of reference group processes. Adolescents may be subjected to the behavior or academic performance of multiple peers, and each peer may try to influence the behavior of multiple adolescents. Hence, it is difficult to determine the extent to which the attributes of a particular peer will influence the adolescent.

---

10 This study examines, for both aggressive and delinquent behavior, an effect of the mean behavior of the class and an interaction between the mean behavior of the class and the variance of the behavior in class. However, for both behaviors, the class mean and the class variance are highly correlated (.86 for aggressive behavior and .91 for delinquent behavior). Müller et al. (2016a) therefore cannot control for the main effect of the class variance. Results suggest that the positive influence of the aggressive behavior of a class on the aggressive behavior of an individual student is weaker when there is more heterogeneity in aggressive behavior in class. They do not find this interaction for delinquent behavior. However, it is hard to interpret the findings given the high correlations between the mean behavior of a class and the variance of the behavior in class.

11 Irrespective of multi-collinearity issues, it may generally be difficult to disentangle the effect of the attribute heterogeneity of a class from the interaction effect between the attribute heterogeneity of a class and the attribute mean of a class. Some scholars argue that a measure of heterogeneity (i.e., inequality) should be relative, or in other words, scale invariant (Allison, 1978; Sen, 1973). For example consider one class in which half of the students skips class once a week and the other half skips class twice a week, and a second class in which half of the students skips class twice a week and the other half skips class four times a week. The absolute heterogeneity in the second class will be larger than in the first class (e.g. the variance will be 4 times larger). However in both classes, half of the students skips class twice as much as the other half of the students. A scale-invariant, or ‘relative’, measure of heterogeneity with respect to skipping class will be equal in both classes (Sen, 1973) (e.g., the school class variance divided by the school class mean). However, when using a ‘relative’ heterogeneity measure, the interaction between the attribute heterogeneity of a class and the attribute mean of a class becomes equivalent to the non-scale invariant measure of heterogeneity. Hence, it becomes difficult to interpret this as the intended interaction effect.



For example, the behavior of a particular peer may influence the behavior of an adolescent less, when adolescents have to respond to the behaviors of more peers. In addition, the behavior of a peer may have less influential power when this peer tries to influence the behavior of more adolescents. The way in which the influential power of a particular peer is dependent on the size of the network has been discussed as ‘normalization’ in the literature (Leenders, 2002). In practice, most studies – including this one – assume that the influential power of the attributes of a particular peer is smaller when adolescents are exposed to more peers (i.e., researchers use the *average* behavior of peers and the *average* academic performance of peers).

We hope that future studies are able to shed more light on how heterogeneity in peer attributes and the size of the peer group affect reference group processes. Perhaps when network data is gathered in several large schools with many observation points, this will be possible. Alternatively, in an experiment researchers can expose students to peer groups whose average score and heterogeneity on a certain attribute remain constant, but that vary in size. Similarly, students can be exposed to peer groups whose size and average score on a certain attribute remain constant, but that vary in their attribute heterogeneity. Such research may also help us to understand how educational tracking affects reference group processes. In comprehensive schools in which students are not tracked on the basis of their academic performance, students’ attributes – especially their academic performance – tend to be more heterogeneous than in schools in which kids are tracked (Sørensen, 1970).

To summarize, we agree with Leenders (2002) that the specification of the relevant reference group and the specification of the influence of a specific peer within a larger network is not trivial and may affect whether we find support for reference group processes or not. When we have a better understanding of how reference group processes work, we will be more able to disentangle whether they are an underlying process of other relationships, including the relationship between the academic performance level of the class and student problem behavior in school.

Another remaining question is whether reference group processes are linear processes. For example, we assume that adolescents exhibit more problem behavior in school when the level of their peers’ problem behavior in school is higher. However, adolescents may not be aware of the extent to which their peers exhibit problem behavior in school, but may only notice whether or not peers exhibit problem

behavior in school. Discrete or non-linear models of reference group processes, such as a threshold model, may then be better able to predict student problem behavior in school (Granovetter, 1978; Mason, Conrey, & Smith, 2007). A threshold model assumes that individuals will rebel in class once enough of their peers rebel in class (i.e., their personal threshold has been reached). Personal thresholds could be determined on the basis of the adolescent's susceptibility to the behavior of peers, such as their social status in class. Relatedly, future research may want to examine whether normative influence processes are constant in time, or whether they – as we suggest – fade out after a while.

Most applications of normative reference group processes assume a tendency to conformity. However, sometimes adolescents may not be influenced to act in accordance with the behavior of their peers, but may be influenced to act in the exact opposite way (i.e., negative influence processes). For example, some adolescent cultures, such as goths, actively distance themselves from the crowd (Mason et al., 2007). Moreover, students may not only want to become similar to liked peers, but may also want to distance themselves from disliked peers. For example, students want to belong to the 'popular' peers and may not want to be associated with the 'nerds'. To avoid this, they may engage in defiant behavior.

### *The interplay between peers, parents, and teachers*

This dissertation focuses on peer reference group processes, and largely ignores the role of other important actors, including parents, siblings and teachers. However, these actors could affect the behavior and performance of adolescents and their peers. Teachers are important as they shape the opportunities for defiant behavior in class (McFarland, 2001) and have the means to punish this behavior. Parents could dampen the influence of the defiant behavior of peers and may back school norms and rules. However, parents could also openly question the authority and decisions of teachers (e.g., see McFarland (2001)).

We think that social network methods and techniques offer great possibilities to address the role of teachers, parents, siblings, and peers jointly. Theoretically, we think of schools as a context of interrelated actors. Students, siblings, parents and teachers are all tied amongst each other both in and outside of schools (e.g., as neighbors, friends or members of the same club) (McFarland, Diehl, & Rawlings, 2011). Social network techniques, such as SIENA, are able to actually account for these interdependencies and allow for the joint analyses of these multiple networks (i.e., multiplex networks). Scholars could, for example, examine how relationships

among teachers lead to consistent school rules that avoid the diffusion of problem behavior in school. Moreover, in line with Coleman's idea on intergenerational closure, researchers could analyze whether dense relationships among parents lead to pro-school behaviors among students (Coleman, 1988).

1



## Chapter 2

# The ethnic composition of schools and students' problem behavior in four European countries: the role of friends <sup>1</sup>

*This study examines the relation between the proportion of co-ethnics in school and adolescents' problem behavior in school (e.g., skipping class and arguing with teachers) and whether friendship patterns are underlying this relationship. We use data from the Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU) on ±16,000 students in England, Germany, The Netherlands, and Sweden and find that children display less problem behavior when the proportion of co-ethnics in school is higher. This relationship is mediated by the characteristics of the friends that students have: the proportion of co-ethnics in school positively relates to students' proportion of in-school friends and co-ethnic friends in class, which are in turn negatively associated with problem behavior in school. The strength and significance of these paths depend on students' ethnicity and country of residence. Implications of this study are discussed in the conclusion.*

---

<sup>1</sup> A slightly different version of this article is published as: Geven, S., Van Tubergen, F. & Kalmijn, M. (2016) The ethnic composition of schools and students' problem behavior in four European countries: the role of friends, early view: Journal of Ethnic and Migration Studies. doi:10.1080/1369183X.2015.1121806. Geven wrote the main part of the manuscript and conducted the analyses. Van Tubergen and Kalmijn substantially contributed to the manuscript. The authors jointly developed the idea and design of the study. An earlier version of this paper was presented at the MASS seminar at ICS-Utrecht, 2013; at the "Dag van de Sociologie", Radboud Universiteit Nijmegen, 2013; at the Sunbelt XXXIII conference of the International Network for Social Network Analysis, Hamburg, 2013; at the 5<sup>th</sup> Norface Migration Conference, Berlin, 2013 and at the CILS-NOR conference, Oslo, 2015. We thank all audiences for their valuable questions and comments. We also thank the anonymous reviewers of the Journal of Ethnic and Migration Studies for their helpful suggestions. This work was supported by The Netherlands Organisation for Scientific Research (NWO) and the NORFACE research programme on Migration in Europe – Social, Economic, Cultural and Policy Dynamics.

## 2.1 Introduction

The effect of a school's ethnic composition on students' school outcomes has received considerable attention in the scientific as well as the political debate. Most of these studies have focused on the effect of the ethnic composition of schools on school performance, such as standardized test scores (Bankston & Caldas, 1996; Driessen, 2002) and grades (Szulkin & Jonsson, 2007). This line of research has shown that especially for ethnic minority students, the proportion of ethnic minorities in school tends to have a detrimental effect on cognitive school outcomes (Hallinan, 1998; Thijs & Verkuyten, 2014) and thereby calls for the ethnic integration of schools.

Much less research has examined the effect of the ethnic composition of schools on *non-cognitive school outcomes* and existing studies on this relationship seem to provide a different picture. Recent U.S.-based studies indicate that students who are surrounded by more co-ethnics in school exhibit less problem behavior in school (Benner & Crosnoe, 2011; Eitle & Eitle, 2004; Georgiades et al., 2013) (with the exception of the study by Johnson, Crosnoe and Elder Jr. (2001)). This association has been found for ethnic minority students as well as for ethnic majority students (Benner & Crosnoe, 2011; Georgiades et al., 2013).

Although various U.S. based studies show support for the relation between the proportion of co-ethnics – also referred to as ethnic density (Fleischmann et al., 2012) or ethnic congruence (Benner & Graham, 2007; Georgiades et al., 2013) – and problem behavior in school, Western-European research on this relationship is scarce. After the Second World War, ethnic diversity has risen steadily in Western-Europe (Castles & Miller, 2009). Hence, ethnic majority students are increasingly surrounded by minority students, while ethnic minority students are increasingly surrounded by co-ethnics in school. In order to better understand how students are affected by this, the first research question is: “To what extent does the proportion of co-ethnics in school affect students' problem behavior in school in Western-Europe?” Problem behavior in school – sometimes also referred to as behavioral disengagement (Fredricks et al., 2004) or adjustment problems (Berndt & Keefe, 1995) – is the extent to which students do not follow the school rules, such as skipping class, coming late, or arguing with teachers.

To be able to tackle the possible aversive effects of being surrounded by fewer co-ethnics in school, it is important to understand *why* this association exists. The ethnic density hypothesis (Halpern, 1993) and belongingness theory (Baumeister &

Leary, 1995) posit a possible explanation for the relationship. According to these theoretical accounts, students receive more social support from peers and feel more at home at school when they are surrounded by more co-ethnics. Because of this, they would engage in less problem behavior (Benner and Crosnoe 2011; Johnson, Crosnoe and Elder Jr. 2001). However, the proposed underlying mechanism has rarely been explicitly measured and tested in the school context. The second research question is: “To what extent can the relationship between the proportion of co-ethnics in school and students’ problem behavior in school be explained by students’ friendships?”

A recent U.S.-based study provides some preliminary answers to this question (Georgiades et al., 2013). Georgiades et al. (2013) show that the relationship between the share of co-ethnics in school and problem behavior is mediated to some extent by students’ sense of school belonging. A possible reason why only a small mediation effect is found, is that, in this study, belongingness in school refers to feelings of relatedness to teachers and a general connectedness to (people in) the school. However, the share of co-ethnics in school is a characteristic of the peer context and may therefore only affect students’ relationships to peers in school. Hence, we contribute to previous research by explicitly focusing on students’ friendships as an underlying mechanism between the share of co-ethnics and students’ problem behavior. We answer the research questions by using cross-national comparative data on adolescents in Germany, England, Sweden, and the Netherlands (Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU) (Kalter et al., 2013). These data contain information on 18,716 adolescents in 480 schools with different ethnic compositions and thus offer a unique opportunity to examine the research questions.

## 2.2 Theory

### 2.2.1 Ethnic composition of schools and problem behavior in school

Several studies have examined the effect of the ethnic composition in school on students’ problem behavior. Much of this research has examined the consequences of the overall *share of ethnic minority students* in school (rather than the proportion of co-ethnics). Empirical evidence on the association between the share of ethnic minority students in school and problem behavior is mixed. While Finn and Voelkl

(1993) find that students exhibit more school-related problem behavior when they attend a school with a higher share of ethnic minority students, Demanet & Van Houtte (2012) find no significant association. In contrast, Gieling et al. (2010), who focus on more severe indicators of misbehavior, show that ethnic minority students who attend a school with a higher share of ethnic minority students exhibit less delinquent and aggressive behavior. Demanet & Van Houtte, (2014) even report that *both* ethnic minority and ethnic majority students engage in less school-related problem behavior in schools with a higher share of ethnic minority students. However, a different study by the same authors indicates that only ethnic majority students exhibit less school misconduct in schools with a high concentration of ethnic minority students (as compared to schools with a medium concentration) (Demanet & Van Houtte, 2011). For minority students, no association is found. Note that variations in the findings of different studies may be explained by differences in the school features that are accounted for. For example, some studies account for the average socio-economic status of the school (Demanet & van Houtte, 2011, 2012, 2014), while others do not (Finn & Voelkl, 1993; Gieling et al., 2010).

Scholars have criticized the use of *the share of ethnic minorities* as an indicator of ethnic composition, since it does not distinguish between different ethnic minority groups. For people from the ethnic minority, the presence of ethnic in-group members is not separated from the presence of ethnic out-group members (Fleischmann et al., 2012; Halpern, 1993). Moreover, for ethnic majority students, the share of ethnic minority students is inversely related to the presence of co-ethnics. The importance of this distinction was highlighted first in mental health research, which used *the share of co-ethnics* as an indicator and showed that this measure was positively related to mental health outcomes for all ethnic groups (Halpern, 1993). Later, the share of co-ethnics has also been applied in research on ethnic composition effects on educational outcomes (Fleischmann et al., 2012), including problem behavior in school. U.S. based studies indicate that the proportion of co-ethnics in school is negatively related to general problem behavior, such as getting drunk and fighting (Benner & Crosnoe, 2011; Georgiades et al., 2013), as well as school-specific problem behavior, such as school absences (Benner & Graham, 2009) and school suspension (Eitle & Eitle, 2004). However, Johnson, Crosnoe and Elder Jr. (2001), do not find a significant relationship between the share of co-ethnics in school and school-specific problem behavior.



### 2.2.2 Explaining the school composition effect

The ethnic density hypothesis provides one explanation for the benefits of being surrounded by co-ethnics. It states that the presence of co-ethnics heightens social support,<sup>2</sup> and buffers against discrimination, victimization, exclusion, and feelings of alienation (Fleischmann et al., 2012; Halpern, 1993).

The ethnic density hypothesis closely resembles predictions derived from belongingness theory. When people are surrounded by more co-ethnics in school, they are more likely to feel that they fit in and to feel connected to their peers (Benner & Crosnoe, 2011). People are expected to find it easier to make friends in such a context (Georgiades et al., 2013) and this adds to a person's sense of security and safety in school. To summarize, it contributes to feelings of school belonging and relatedness (Benner & Crosnoe, 2011). Research indeed shows that students have higher levels of school belonging when the proportion of co-ethnics in school is higher (Benner, Graham, & Mistry, 2008; Johnson et al., 2001).

According to belongingness theory, the need for positive interpersonal relationships (i.e., belongingness) is a basic human need essential to human development. A need is considered to be a basic human need when it meets certain criteria (Baumeister & Leary, 1995). Among others, it has to be universal and a lack thereof should cause negative effects on health, adjustment, or well-being. Baumeister & Leary (1995) show that belongingness meets these criteria. With respect to school outcomes belonging is found to be associated with, among others, higher levels of school motivation and orientation, enjoyment of school, school attendance, lower levels of school suspension, better grades, and lower levels of school dropout (see Osterman (2000) for a review).

Belongingness in school is therefore expected to be negatively related to problem behavior. Belongingness in school through positive relationship with peers makes spending time at school and doing schoolwork more enjoyable (Witkow & Fuligni, 2010) and provides students a reason to go to school (e.g., to not skip class) (Hamm & Faircloth, 2005; Johnson et al., 2001). Hence, it leads to school involvement and

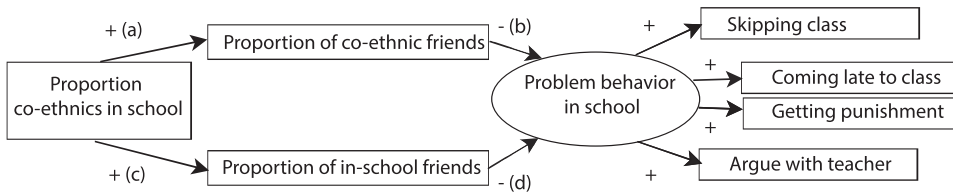
---

<sup>2</sup> Social support is usually defined as a multidimensional concept including emotional, informational, appraisal, and instrumental support (Schaffer 2013). Moreover, social support may be negative. While accounts on the ethnic density hypothesis tend to use the generic term 'social support', positive social support is implied. More concretely, Halpern (1993, p.603) specifies that the absence of co-ethnics leads to a lack of emotional and instrumental support. For reasons of readability, we sometimes use the generic term 'social support'.

buffers against disaffection from school (Furrer & Skinner, 2003). Moreover, when students identify more with school and have a higher sense of school belonging, they value the school-environment more, which makes them more likely to adhere to the norms and rules of that environment (Finn, 1989). We hypothesize:

*H1) When the proportion of co-ethnics in school is higher, a student's problem behavior in school is lower*

In this chapter we test the belongingness and social support ideas via friendships. Belongingness and important aspects of social support (e.g., emotional and instrumental support) in school are to a large extent determined by friendships in school (Hamm & Faircloth, 2005; Juvonen et al., 2012). We examine two friendship characteristics that are expected to promote belonging (or social support) in school: (1) the proportion of co-ethnic friends (as compared to inter-ethnic friends) in class and (2) the proportion of in-school (as compared to out-of-school) friends.



**Figure 2.1** *Conceptual model*

The idea that positive co-ethnic ties, such as co-ethnic friendships, provide social support and belonging that tie the share of co-ethnics in school to educational outcomes is not new (Benner & Crosnoe, 2011; Georgiades et al., 2013). First, a student's share of co-ethnic friendship is expected to be larger in schools with a higher share of co-ethnics. According to homophily theory people prefer friendships with co-ethnic peers, since they are (perceived) to be more similar with respect to tastes, worldviews, and behavior (McPherson et al., 2001). The extent to which people will actually satisfy this preference depends on their *opportunity* to do so (Blau, 1977; Moody, 2001). This opportunity will be larger in schools with a higher share of co-ethnics. We hypothesize:

*H2) When the proportion of co-ethnics in school is higher, a student has a higher proportion of co-ethnic – as compared to inter-ethnic – friends in class (see figure 2.1, path a).*

Based on homophily theory, co-ethnic friendships are also assumed to be more intimate and provide more emotional support (which are seen as (sub)dimensions of social support (Brandt & Weinert, 1981)) than inter-ethnic friends. Because co-ethnic friends are preferred friends that are (perceived) to be more similar with respect to tastes, worldviews, and behavior (McPherson et al., 2001), they are less likely to disagree and run into conflicts (Smith, 2015). Co-ethnic friendships have therefore been argued to be of higher quality than inter-ethnic friendships. High-quality friendships are an example of supportive relationships and are marked by the presence of positive features (e.g., closeness and intimacy) and the absence of negative features (e.g., conflict) (Berndt, 1989, 1999). Moreover they tend to be more stable than low-quality friendships (Berndt, 1999).

Previous research shows that co-ethnic friendships are of higher quality than inter-ethnic friendships, albeit differences are sometimes small. Co-ethnic friends are more likely to engage in shared activities (Kao & Joyner, 2004), are less likely to dissolve their friendship (Aboud et al., 2003; Schneider et al., 2007; Smith, 2015), and are closer and more intimate (Aboud et al., 2003; Schneider et al., 2007) than inter-ethnic friends.

Co-ethnic friends may likewise enhance belongingness in school (Ueno, 2009). Students who are ethnically different from their friends in school are assumed to feel more out of place in school than students with co-ethnic friends in school. The ethnic composition of one's friendship group in school may affect belongingness even more than the ethnic composition of the larger peer context, as students are closer to their friends and compare themselves more to friends than to non-friends. Ueno (2009) indeed finds a significant relationship between students' share of same-race friendships in school and school attachment.

We focus on the share of co-ethnic friends (as compared to inter-ethnic friends) in class. Students spend most of their time in their school class and especially the social support that they receive from their friends in class may thus be related to their problem behavior in school. Hamm & Faircloth (2005) show in a small-scale qualitative study that high-quality friends in class motivated students to go to school.

*H3) The more co-ethnic – as compared to inter-ethnic – friends in class a student has, the less he/she engages in problem behavior in school (see figure 2.1, path b).*

Besides co-ethnic friends, in-school friends (as compared to out-of-school friends)

are assumed to provide social support and belongingness in school, and are expected to link the share of co-ethnics in school to problem behavior in school. When there is less opportunity to realize the preference for co-ethnic friends within the school context, adolescents might try to find their preferred friends outside school (Van Houtte & Stevens, 2009a; Witkow & Fuligni, 2010). We hypothesize:

*H4) When the proportion of co-ethnics in school is higher, a student has a higher proportion of in-school – as compared to out-of-school – friends (see figure 2.1, path c).*

A lack of in-school friendships might hamper students' social support and belongingness in school (Witkow & Fuligni, 2010). For example, a U.S.-based study shows that college students with a higher proportion of friends who attend the same college identify more with school (Witkow et al., 2012). Similarly, Vaquera (2009) finds that adolescents whose best friend attends the same school have a higher sense of school belonging. According to belongingness theory, in-school friends will therefore reduce a student's problem behavior in school. We hypothesize:

*H5) The more in-school – as compared to out-of-school – friends a student has, the less he/she engage in problem behavior in school (see figure 2.1, path d).*

Although friendships are expected to have behavioral benefits, these benefits may be suppressed when friends display problem behavior in school. Previous research shows that adolescents match their problem behavior in school to the problem behavior of their friends (Geven et al., 2013). Hence when in-school and/or co-ethnic friends engage in higher levels of problem behavior, they might encourage adolescents to also engage in problem behavior. Despite these possible counterworking effects, we expect that, in general in-school and co-ethnic friendships have a negative effect on problem behavior in school by the social support and belongingness they offer. Hence, overall, we expect a negative effect.

#### ***Differences between ethnic minority and ethnic majority students?***

In England, Germany, The Netherlands, and Sweden, native ethnic group members are in the numerical majority compared to members of other ethnic groups. Moreover, many ethnic minority groups tend to have a lower socio-economic status than their native counterparts and suffer from ethnic discrimination in school and the labor market (Heath, Rothon, & Kilpi, 2008; Luciak, 2004; Van Tubergen & Van Gaans, 2016). Discrimination is not limited to ethnic minority groups with a relatively low

socio-economic status. For example, South Asians outperform the ethnic majority in school in Britain, but report relatively high levels of racial harassment by peers in school (Heath et al., 2008). Because ethnic minority students are in the (numerical) subordinate position, they may be more in need for belongingness and a buffer against victimization and discrimination in school (Benner & Crosnoe, 2011). A lack of belongingness in school may thus especially harm the school adjustment of ethnic minority students. Hence, we expect that a higher share of co-ethnic friends and in-school friends is more negatively related to the problem behavior of ethnic minority students than that of ethnic majority students.

Using a similar line of reasoning, Benner and Crosnoe (2011) hypothesize that the effect of co-ethnics in school on externalizing problem behavior will be larger for ethnic minority students than for ethnic majority students in the U.S. However, they do not find support for this. Similarly, Georgiades et al. (2013) find small ethnic group differences in the strength of the association between the share of co-ethnics in school and problem behavior in the U.S. The association was found for almost all ethnic groups in the study (i.e., native Americans and non-Hispanic Whites, Blacks, Hispanics, and Asians from the first, second, and third generation), except for Black students from the third generation. For Asians from the third generation the negative association was significantly stronger than for third generation Non-Hispanic Whites. Although U.S. based research has found few/small ethnic group differences for the direct effect, we hypothesize for the European context:

*H6) The effect of having co-ethnic friends in class (as compared to inter-ethnic friends) on problem behavior in school is stronger for students from the ethnic minority group than for students from the ethnic majority group.*

*H7) The effect of having in-school friends (as compared to out-of-school friends) on problem behavior in school is stronger for students from the ethnic minority group than for students from the ethnic majority group.*

### **2.3 Context of the study**

Ethnic diversity has been increasing in England, Germany, the Netherlands, and Sweden after the Second World War. About 19% of the English and Welsh population (Office for National Statistics (ONS), 2012), 20% of the German population (The Federal Statistical Office Germany, 2013), 32% of the Dutch population (Statistics Netherlands, 2014), and 26 % of the Swedish population

(Statistics Sweden, 2014) are now part of an ethnic minority group. There are various similarities between the migration histories of these four countries. First, both Germany and The Netherlands received a large share of guest workers from southern European countries during the 1940s and 1950s, and from Turkey and Morocco during the 1960s and 1970s (Castles & Miller, 2009; Heath et al., 2008). While these guest-workers were assumed to be temporary, they tended to stay and establish (or reunite) their families in the destination country. Sweden also received guest-workers from Turkey in the 1960s and 70s, though the guest-worker system was less formalized (Heath et al., 2008).

Since the 1940s several Western European countries have experienced an influx of migrants from former colonies. England received migrants from Ireland, the Caribbean, India, and Africa, while the Netherlands received migrants from East India (i.e., Indonesia), Suriname, and the Caribbean's (Castles & Miller, 2009). In the 1990s, a large group of asylum seekers came to Western Europe after political upheavals in various world regions. Examples of migrants that were part of this influx are Bosnians in Sweden (who fled from the Yugoslavian civil wars), and Nigerians in England. Finally, the opening of the European Union (EU) borders has stimulated migration within the EU. Migration from neighboring countries is common (e.g., Poles in Germany, Germans in the Netherlands, and Finns in Sweden). Although there are similarities between the migration histories of England, Germany, the Netherlands, and Sweden, we will explore country variations in the hypothesized paths as countries differ in their migration and integration policies.

## 2.4 Data

We use the CILS4EU data collected in the school year of 2010-2011 among 18,716 adolescents between 14 and 15 years old in 480 schools in England, the Netherlands, Germany, and Sweden (Kalter et al., 2013). Respondents were sampled according to a stratified three-stage sampling design. First, schools were selected with a probability proportional to their size, so that larger schools were more likely to be selected. Schools with a high share of students with an immigrant background were oversampled. In the second sampling stage two classes were randomly selected. Finally, all students in each class were invited to participate. The response rate at the student level varied between 80.5% (England) and 91.1% (The Netherlands). In the analyses we excluded classes (6.2% of all classes) with a high share of erroneous nominations (e.g., nominations of people outside class).

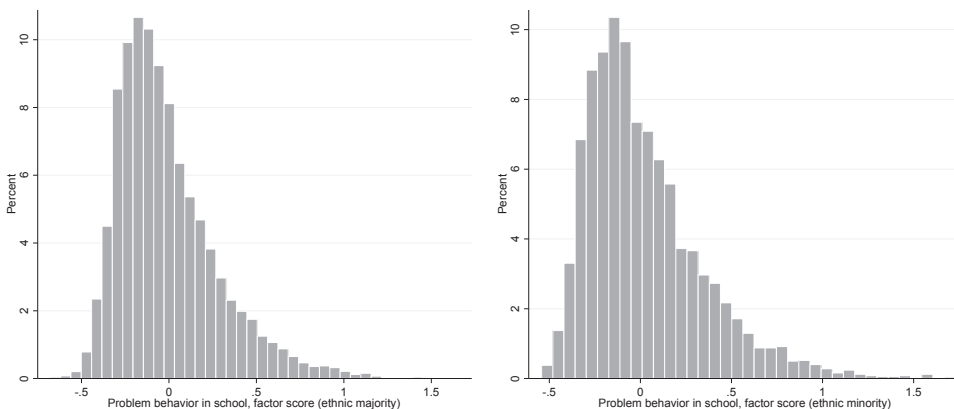
## 2.5 Measurements

### 2.5.1 Dependent variable

*Problem behavior in school* is measured with four items asking students how often they argue with their teachers, get a punishment in school, skip a lesson without permission, and come late to school ( $\alpha = 0.695$ ). Answer categories are on a five point scale and range from every day to never. We recode the items, so that higher scores refer to more problem behavior.

We conduct a multi-level confirmatory factor analysis of these items at the individual-level and the school-level (i.e., the school population of  $\pm 14$  years old). Based on the modification indices, we release the covariance at both levels between the errors of the students' argument with teachers item and their received punishment in school item. Because both items involve relationship with school authorities, they seem theoretically related. The model fit is good (*Satorra-Bentler*  $\chi^2(3) = 22.609, p < 0.001$ ; *CFI* = 0.998; *TLI* = 0.992; *RMSEA* = 0.020).

Appendix A2.1 (in Appendices chapter 2) provides information on measurement invariance across countries and between ethnic minority and ethnic majority students. Figure 2.2 shows the distribution of the factor scores for both ethnic majority students and ethnic minority students.



**Figure 2.2** Distribution of the factor score of problem behavior in school for ethnic majority students (left figure) and ethnic minority students (right figure)

## 2.5.2 Mediators

To measure the *proportion of co-ethnic friends* in class we use student reports about their five best friends in class. Because all classmates were sampled to participate in the study, we have information on the ethnic background of most friends in class. We did not consider friendship nominations to classmates who did not participate in the study. Although 17.6% nominated someone who did not participate in the study, analyses in which we control for this lead to similar conclusions. The ethnicity of a student is based on his/her self-identified ethnicity.<sup>3</sup> Students were asked to which group(s), other than the native-origin group, they feel they belong. If a student identifies with more than one group (5.6% of the cases),<sup>4</sup> we use the self-identified group that matches the parental country of birth. If this is not possible, the first identity is chosen (2.4%). If the self-identified ethnicity is missing, ethnicity is based on parental country of birth, or if this was missing, on the student's country of birth. Students whose ethnic background was missing after this procedure were dropped from the analyses (about 1%). The data contain 138 ethnic groups. The ten largest ethnic minority groups are (in decreasing order): Turks (5.8%), Russians, Moroccans, Poles, Italians, Pakistanis, Indians, Fins, Assyrians, and Surinamese (0.9%).

After determining the ethnic background of all students and their friends, we construct the respondent's *proportion of co-ethnic friends* in class. Co-ethnic friends are those friends who belong to the same ethnic group as the adolescent (based on the 138 ethnic groups described above). Students' proportion was set to zero when they did not nominate any friends in class (5.3%). On average 57.2% of the friendships are co-ethnic friendships (table 2.1). However, the standard deviation on this variable is high, which indicates that there are many students who either have (almost) no or (almost) only co-ethnic friends in class.

We construct the *proportion of friends in school* by using students' reports about their five best friends. For each reported friend, respondents indicated whether this friend attended their school. On average 70.8% of all friends are in-school friends (see table 2.1).

---

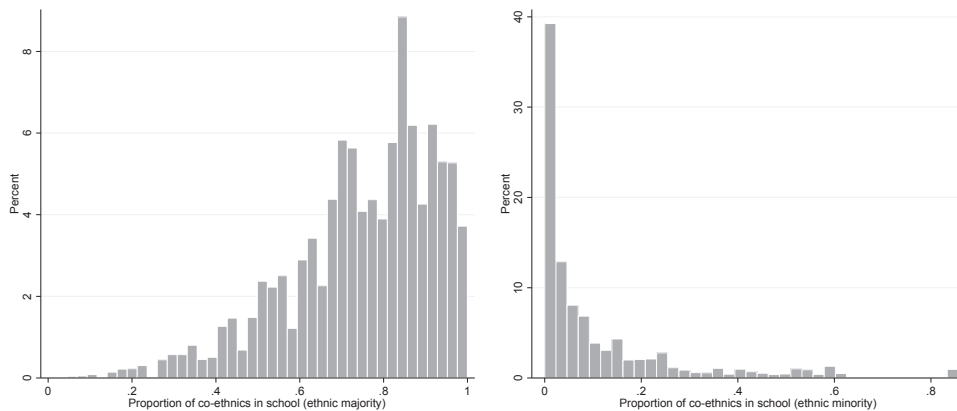
3 Pooled analyses in which ethnicity is based on parental country of birth lead to similar conclusions. The total indirect effect and the total effect of the share of co-ethnics in school on problem behavior in school are respectively -0.099 and -0.065.

4 Pooled analyses in which we control for whether students identify with more than one group or not lead to similar conclusions.



### 2.5.3 Independent variable

The proportion of co-ethnics in school is the proportion of participants in school who belong to the same ethnic group as the respondent (of the 138 groups described above). Note that the data only contain participants from the, on average, 14-year old school population (i.e., grade mates). We do not think this is problematic, since students mostly interact with grade mates (indicated by the fact that 93.8% of the friends in school are either classmates or between 14 and 15 years of age). The proportion of co-ethnics in school is an individual-level variable, since it is dependent on a student's ethnicity. Figure 3 shows the distribution of this variable for ethnic majority students and ethnic minority students.



**Figure 2.3** Distribution of a student's share of co-ethnics in school for ethnic majority students (left figure) and ethnic minority students (right figure)

### 2.5.4 Individual-level controls

The level of problem behavior in school may vary across different ethnic groups. While for the construction of the proportion of co-ethnics in school and the proportion of co-ethnics friends in class we distinguish between 138 ethnic groups, we cannot include a dummy for all these ethnic groups in the analyses. Hence, to control for ethnic differences in students' problem behavior in school, we collapse multiple ethnic groups into larger groups that are relatively homogeneous. We create these larger groups on the basis of world regions that the ethnic group stems from, namely: *Anglo-America* (including Australia, New Zealand, and neighboring

Islands), *North and Western Europe*, *Southern Europe*, *Eastern Europe*, *Latin America*, *Caribbean*, *Asia*, *Islamic*, and *African*. Natives are the reference category. When ethnic groups fall into multiple categories (e.g., Roma's), the category was based on the parental country of birth. If this was not possible, we based the category on the region that most people from this ethnic group stemmed from (e.g., Eastern Europe for Roma's).

We control for gender (*male*) and for the following family characteristics: the *number of siblings* at home, whether *parents are divorced/separated*, and *parental education*. *Parental education* indicates the educational level of the parent with the highest educational attainment as provided by the parent of the child. In Sweden, England, and Germany parents reported their educational attainment on a four-point-scale: no degree, degree below upper secondary, degree from upper secondary, and university degree. In the Netherlands, parents answered on a six-point-scale. We recoded these answers into the four-point-scale. If the educational attainment of both parents was missing, we relied on respondents' reports about their parents' educational attainment. There are many missings on the parental education variable (i.e., 25.48%). Hence, we made it part of the model by estimating its variance<sup>5</sup>. Because we rely on the Full Information Maximum Likelihood approach (FIML), non-missing values for students with a missing on parental education are in this way still used for the estimation. While more cases are retained through this procedure, it implies that parental education is treated as being normally distributed.

Finally, we control for the *problem behavior in school of adolescents' friends in class*. Research shows that students converge to the problem behavior of their friends in class (Geven et al., 2013). The behavioral advantage of having co-ethnic and in-school friends may be suppressed by the problem behavior of these friends. For example, a Dutch study indicates that some ethnic minority groups skip class more often than the majority group (Van Tubergen & Van Gaans, 2016). For these ethnic minority groups, having more co-ethnic friends in class might imply that they are more exposed to, and influenced by anti-school norms. This could suppress the expected protective effect of co-ethnic friends. The *problem behavior in school of adolescents' friends in class* controls for the problem behavior of friends in class, and serves as a proxy for the problem behavior of friends in school. We construct the variable by calculating the average score on the *problem behavior in school* items for each of the respondent's five best friends in class. Subsequently, we take the average score of all five friends.

---

5 Pooled analyses in which this is not done lead to the same main conclusions.

### 2.5.5 School-level controls

We control for the socio-economic composition of the school by including the school's average parental educational attainment (*mean parental education*). For this measure we rely on the non-missing observations within a school.

We control for respondents' country of residence and for the educational level/track that students follow within a country. Because only the Netherlands and Germany have a tracked school system (both based on academic performance-level), we make several dummy variables that combine the country of residence and the educational track of the school (*Country/Track*). For Sweden we create one dummy variable, since there are no tracks in Sweden. In the Netherlands we include the dummies: *NL-VMBO-BK* (the most basic vocational tracks), *NL-VMBO-GT* (the follow-up vocational tracks), *NL-HAVO* (senior secondary education track), and *NL-VWO* (pre-university track). For Germany we include: *GE-lower* (the most basic track), *GE-intermediate*, *GE-upper* (pre-university track in Germany), *GE-comprehensive* (schools in which children with different abilities are integrated), *GE-special* (schools for students with special needs), and *GE-combination* (schools in which several tracks are combined). England serves as the reference category.

The central independent variable and mediators – the proportion of co-ethnics in school, the proportion of friends in school, and the proportion of co-ethnic friends in class – are all individual-level (i.e., within-level) variables. Individual-level variables often have variance at both the school-level (i.e., between-level) and the individual-level (Preacher et al., 2010). To establish whether the relationships between these variables occur, as hypothesized, at the individual-level and not at the school-level, we control for the relationship between these variables at the school-level (Preacher et al., 2010). At the school-level the variables have a slightly different meaning. The *proportion of co-ethnics in school* at the school-level indicates the average proportion of co-ethnics by which students in a school are surrounded. It can be interpreted as a measure of ethnic homogeneity: the higher the average proportion of co-ethnics in school by which students are surrounded, the more ethnically homogeneous the school is. This measure is almost perfectly correlated (.965) to the Herfindahl index. The *proportion of friends in school* and the *proportion of co-ethnic friends in class* at the school-level respectively indicate the average proportion of co-ethnic friends in class and the average proportion of friends in school that students have at the school-level.

**Table 2.1** Descriptive statistics. *N* individual-level = 16 892 when there are no missings on that variable, *N* school-level = 452

	Mean	S.D.	Range	% missing
<b>Individual-level</b>				
<i>Dependent variables</i>				
Late to class	1.052	1.018	0-4	0.40
Argue with teacher	0.906	1.064	0-4	0.35
Punished in school	0.774	0.919	0-4	0.38
Skip class	0.307	0.679	0-4	0.46
<i>Mediators</i>				
Prop. co-ethnic friends in class	0.572	0.407	0-1	0.11
Prop. in-school friends	0.708	0.297	0-1	0.47
<i>Independent variables</i>				
Prop. co-ethnics school	0.558	0.339	0-1	0
<i>Control variables</i>				
Male	0.497		0/1	0.08
Parental education	2.919	0.924	1-4	25.48
Region of origin				
Native-born (ref.)	0.703		0/1	0
Anglo-countries	0.005		0/1	0
North- and West- Europe	0.022		0/1	0
South Europe	0.018		0/1	0
Eastern Europe	0.056		0/1	0
Latin America	0.004		0/1	0
Caribbean	0.020		0/1	0
Asia	0.045		0/1	0
Islamic	0.111		0/1	0
Africa	0.017		0/1	0
Number of siblings	1.439	1.332	0-25	2.88
Problem behavior friends	0.723	0.506	0-4	0.09
Parents divorced	0.249		0/1	3.21

**Table 2.1** *Continued*

	Mean	S.D.	Range	% missing
<b>School-Level</b>				
<i>Control variables</i>				
Mean parental education	2.902	0.574	1.714-4	0
Prop. co-ethnics school (ethnic homogeneity)	0.550	0.229	0.106-1	0
Prop. co-ethnic friends in class	0.562	0.211	0.092-1	0
Prop. in-school friends	0.702	0.124	0.244-1	0
Country/Track				
EN (ref.)	0.195		0/1	0
NL-VMBO-BK	0.073		0/1	0
NL-VMBO-GT	0.066		0/1	0
NL-HAVO	0.038		0/1	0
NL-VWO	0.044		0/1	0
GE-Lower	0.108		0/1	0
GE-inter	0.069		0/1	0
GE-upper	0.049		0/1	0
GE-combination	0.018		0/1	0
GE-comprehensive	0.042		0/1	0
GE-special	0.027		0/1	0
SW	0.272		0/1	0

*Note: data are not weighted according to non-response and the sampling design of the study*

## 2.6 Methods

We use Multi-level Structural Equation Modelling (MSEM) in Mplus 7 to test the hypotheses (Muthén & Muthén, 1998-2012).<sup>6</sup> MSEM enables us to test for the significance of direct and indirect paths, while taking into account the nesting of students within school (Preacher et al., 2011). In traditional multi-level models, between-level effects and within-level effects cannot be distinguished from each other in an appropriate way. While these models report a single effect that

<sup>6</sup> Longitudinal methods are better suited to establish the causality of the relationships and account for unobserved characteristics of individuals. Unfortunately, part of the second wave of the data was not publicly available at the time this manuscript was written. In a robustness test we examined whether the results were confounded by unobserved characteristics of schools. School fixed effect analyses performed in STATA on the pooled data lead to similar conclusions as the results reported in the text. In these analyses we used Bartlett factor scores obtained in STATA as the dependent variable.

combines the between- and the within-level effect, researchers are able to accurately decompose these effects in MSEM (Preacher et al., 2011). By estimating both within- and between-level effects we can, for example, establish whether the extent to which students are surrounded by co-ethnics at the individual-level or ethnic homogeneity in school is related to problem behavior in school. The individual-level effects need to be significant to find support for the hypotheses. Because (the items of) the endogenous variables are not normally distributed, we use Maximum Likelihood Estimation with Robust Standard Errors (MLR) (Kline, 2011). We use the Full Information Maximum Likelihood (FIML) estimation for missing data, which implies that observations with missings on one of the endogenous variables are not excluded from the analyses. Instead, estimations make use of all available information. Observations with missings on one of the exogenous variables (i.e., 682 cases – 4.052% in total) or all endogenous variables (i.e., 13 additional cases – 0.077 % in total) are excluded. Table 2.1 presents descriptive statistics obtained in STATA. To test the hypotheses we conduct pooled analyses on ethnic majority and ethnic minority students in all four countries. We estimate models with and without mediators. Subsequently, we examine ethnic group differences and country differences by means of multiple group analyses.

## 2.7 Results

Table 2.2 presents the results of the MSEM model without mediators. We find a significant negative relationship between the extent to which a student is surrounded by co-ethnics in school and problem behavior in school (H1). A one-standard-deviation increase in the proportion of co-ethnics in school at the individual-level is associated with a reduction of 0.068 standard deviations in a student’s level of problem behavior. While this effect is significant, it is small.<sup>7</sup>

As explained in the methods and measurement section, we examine the hypothesized relationships also at the school-level. The results indicate that at the school-level there is a significant negative relationship between students’ average proportion of co-ethnics in a school (i.e., a level of ethnic homogeneity) and the collective problem behavior in school.

---

<sup>7</sup> We test for a non-linear relationship between the proportion of co-ethnics in school and problem behavior in school. A model in which we include a quadratic term for this relationship at both the individual and the school-level does not fit the data better than a model without quadratic terms (Satorra-Bentler scaled  $\chi^2$  difference test ( $T$ ) = 5.243,  $p$  = 0.630). The quadratic term was not significant at the individual-level.

In table 2.3 we present the MSEM model with friendship mediators. The table shows the relationships between the proportion of co-ethnics in school and the two mediators (column 2 and 3 in table 2.3), and the relationships between the mediators and problem behavior in school (column 1 in table 2.3). We find that a student who is surrounded by more co-ethnics in school has a higher proportion of co-ethnic friendships: a one-standard-deviation increase in the proportion of co-ethnics in school is associated with a 0.784 standard deviation increase in the proportion of co-ethnic friendships (H2). The proportion of co-ethnic friendships is in turn negatively related to a student's problem behavior in school (H3). A one-standard-deviation increase in the proportion of co-ethnic friends in class is related to a 0.119 standard deviation decrease in problem behavior in school.

The proportion of co-ethnics in school is positively related to the proportion of in-school friends (as compared to out-of-school friends) (H4), which is in turn negatively related to a student's problem behavior in school (H5). When the proportion of co-ethnics in school is one standard deviation higher, a student's proportion of in-school friends is 0.116 standard deviations higher. A one standard deviation increase in the proportion of in-school friends is in turn associated with a 0.107 standard deviation decrease in problem behavior in school.<sup>8</sup>

Table 2.4 presents the direct, indirect, and total effects of the proportion of co-ethnics in school on problem behavior in school. There is a significant negative indirect relationship between the proportion of co-ethnics in school and problem behavior in school via a student's friendship characteristics. After adding the friendship mediators to the model, the direct relationship between the proportion of co-ethnics in school and problem behavior in school becomes positive and insignificant. Hence, the small negative overall effect of the proportion of co-ethnics in school is fully mediated by a student's friendship characteristics.

---

<sup>8</sup> We test whether relationships are non-linear by estimating a model in which we add quadratic effects of the proportion of co-ethnics in school on (1) problem behavior in school and (2) the mediators. This analysis shows that there is a diminishing positive effect of the share of co-ethnics in school on the proportion of co-ethnic friends in class at the individual-level. This model does not have a significant better fit than a model without quadratic effects (Satorra-Bentler scaled  $\chi^2$  difference test (7) = 5.454,  $p$  = 0.605)

**Table 2.2** Multi-level structural equation model without mediators on problem behavior in school, standardized model estimates. Model fit: Satorra-Bentler  $\chi^2(101) = 1729.662$ ,  $p < 0.001$ ; CFI = 0.877; TLI = 0.832; RMSEA = 0.032.

Individual-level (N=16,197)	H	Coef. (S.E.)	p-value
Prop. co-ethnics school	-	-0.068** (0.023)	0.003
Male		0.093** (0.011)	0.000
Parental education		0.020 (0.015)	0.199
Region of origin			
Anglo-countries		0.004 (0.010)	0.701
North- and West- Europe		0.004 (0.013)	0.740
South Europe		0.012 (0.012)	0.333
Eastern Europe		0.003 (0.016)	0.835
Latin America		-0.001 (0.012)	0.938
Caribbean		0.029* (0.013)	0.020
Asia		-0.047** (0.015)	0.002
Islamic		0.001 (0.016)	0.949
Africa		0.015 (0.011)	0.205
Number of siblings		0.055** (0.012)	0.000
Parents divorced/separated		0.121** (0.010)	0.000
Problem behavior friends		0.344** (0.017)	0.000



Table 2.2 *Continued*

School-Level (N=443)	H	Coef. (S.E.)	p-value
Prop. co-ethnics school (i.e., ethnic homogeneity)		-0.225** (0.050)	0.000
Mean parental education		0.264** (0.100)	0.009
Country/Track (ref. England)			
NL-VMBO-BK		0.012 (0.073)	0.871
NL-VMBO-GT		0.013 (0.071)	0.858
NL-HAVO		-0.031 (0.057)	0.584
NL-VWO		-0.020 (0.069)	0.769
GE-Lower		-0.339** (0.077)	0.000
GE-inter		-0.318** (0.059)	0.000
GE-upper		-0.177** (0.052)	0.001
GE-combination		-0.160** (0.054)	0.003
GE-comprehensive		-0.211** (0.048)	0.000
GE-special		-0.166* (0.082)	0.041
Sweden		-0.043 (0.110)	0.697

Note: \* $p < 0.05$ , \*\* $p < 0.01$ ; hypothesized effects are tested one-sided, other effects two-sided. *H* indicates the hypothesized effects: - negative hypothesized effect, + positive hypothesized effect. Data are not weighted according to non-response and the sampling design of the study.

**Table 2.3** Multi-level structural equation model with mediators, standardized estimates. Model fit: Satorra-Bentler  $\chi^2(115) = 1883.705$ ,  $p < 0.001$ ; CFI = 0.925; TLI = 0.861; RMSEA = 0.031.

Individual-level (N= 16,197)	Problem behavior in school			Prop. co-ethnic friends (mediator)			Prop. in-school friends (mediator)		
	H	Coef. (S.E.)	p-value	H	Coef. (S.E.)	p-value	H	Coef. (S.E.)	p-value
Prop. co-ethnics in school		0.035 (0.025)	0.161	+	0.784** (0.018)	0.000	+	0.116** (0.023)	0.000
Prop. co-ethnic friends	-	-0.119** (0.013)	0.000						
Prop. in-school friends	-	-0.107** (0.010)	0.000						
Male		0.091** (0.010)	0.000		-0.008 (0.008)	0.292		0.009 (0.010)	0.389
Parental education		0.017 (0.015)	0.279		0.000 (0.008)	0.963		-0.017 (0.011)	0.136
Region of origin (ref. native)									
Anglo-countries		0.006 (0.010)	0.552		0.008* (0.004)	0.030		0.016 (0.009)	0.080
North- and West- Europe		0.009 (0.013)	0.456		0.021** (0.008)	0.007		0.027* (0.012)	0.025
South Europe		0.016 (0.012)	0.196		0.017* (0.007)	0.013		0.026* (0.012)	0.033
Eastern Europe		0.011 (0.016)	0.488		0.041** (0.011)	0.000		0.029* (0.015)	0.047
Latin America		0.001 (0.012)	0.953		0.005 (0.003)	0.169		0.011 (0.008)	0.147
Caribbean		0.034** (0.012)	0.006		0.021* (0.008)	0.013		0.031** (0.010)	0.003
Asia		-0.036** (0.015)	0.017		0.043** (0.010)	0.000		0.060** (0.015)	0.000
Islamic		0.019 (0.016)	0.231		0.091** (0.013)	0.000		0.074** (0.016)	0.000
Africa		0.018 (0.012)	0.119		0.018** (0.006)	0.005		0.018 (0.011)	0.099
Number of siblings		0.056** (0.012)	0.000		-0.009 (0.007)	0.172		0.012 (0.010)	0.219
Parents divorced/ separated		0.115** (0.010)	0.000		-0.019** (0.006)	0.001		-0.030** (0.008)	0.000
Problem behavior friends		0.360** (0.017)	0.000		0.111 (0.011)	0.000		0.036 (0.010)	0.001

Table 2.3 *Continued*

School-level (N=443)	Problematic school behavior			Prop. co-ethnic friends (mediator)			Prop. in-school friends (mediator)		
	H	Coef. (S.E.)	p-value	H	Coef. (S.E.)	p-value	H	Est (S.E.)	p-value
Prop. co-ethnics school (i.e., ethnic homogeneity)		0.060 (0.177)	0.734		0.889** (0.022)	0.000		0.198** (0.041)	0.000
Prop. co-ethnic friends		-0.253 (0.192)	0.189						
Prop. in-school friends		-0.282** (0.099)	0.005						
Mean parental education		0.194* (0.096)	0.044		-0.043 (0.052)	0.404		-0.240** (0.075)	0.001
Country/Track (ref. England)									
NL-VMBO-BK		-0.123 (0.084)	0.145		0.010 (0.043)	0.814		-0.485** (0.055)	0.000
NL-VMBO-GT		-0.064 (0.080)	0.424		0.092** (0.034)	0.008		-0.346** (0.046)	0.000
NL-HAVO		-0.076 (0.062)	0.223		0.032 (0.024)	0.190		-0.183** (0.041)	0.000
NL-VWO		-0.028 (0.073)	0.704		0.084** (0.021)	0.000		-0.090* (0.040)	0.023
GE-Lower		-0.512** (0.097)	0.000		0.043 (0.046)	0.347		-0.654** (0.059)	0.000
GE-inter		-0.409** (0.073)	0.000		0.098** (0.034)	0.004		-0.403** (0.047)	0.000
GE-upper		-0.212** (0.060)	0.000		0.089** (0.025)	0.000		-0.193** (0.036)	0.000
GE-combination		-0.213** (0.056)	0.000		0.030 (0.026)	0.258		-0.211** (0.040)	0.000
GE-comprehensive		-0.251** (0.054)	0.000		0.077** (0.028)	0.006		-0.211** (0.046)	0.000
GE-special		-0.297** (0.092)	0.001		-0.046 (0.047)	0.328		-0.426** (0.056)	0.000
Sweden		-0.024 (0.105)	0.821		0.091* (0.045)	0.043		0.015 (0.055)	0.785

Note: \* $p < 0.05$ , \*\* $p < 0.01$ ; hypothesized effects are tested one-sided, other effects two-sided. *H* indicates the hypothesized effects: - negative hypothesized effect, + positive hypothesized effect. Data are not weighted according to non-response and the sampling design of the study.

**Table 2.4:** Overview of direct, indirect and total effect of the (individual-level) proportion of co-ethnics in school on a student's problem behavior in school, standardized estimates.

	H	Coef. (S.E.)	p-value
<b>Proportion of co-ethnics in school</b>			
Direct effect		0.035 (0.025)	0.161
Indirect effect via proportion of co-ethnic friends	-	-0.093** (0.011)	0.000
Indirect effect via proportion of in-school friends	-	-0.012** (0.003)	0.000
Total indirect effect	-	-0.106** (0.011)	0.000
Total effect	-	-0.071** (0.023)	0.002

Note: \* $p < 0.05$ , \*\* $p < 0.01$ ; hypothesized effects are tested one-sided, other effects two-sided. *H* indicates the hypothesized effects: - negative hypothesized effect, + positive hypothesized effect. Data are not weighted according to non-response and the sampling design of the study.

Although we have no specific hypotheses about school-level effects, relationships are also tested at the school-level in model 2. Findings indicate that in schools in which students are on average surrounded by a higher proportion of co-ethnics (i.e., more ethnically homogeneity), the average proportion of co-ethnic friendships and in-school friendships is higher. In schools in which students have on average a higher proportion of in-school friends, the collective problem behavior in school is lower.

### 2.7.1 Differences by ethnic groups and countries

We conduct two multiple group analyses of the model with mediators to examine differences across ethnic groups and countries. First, we examine differences between ethnic minority students and ethnic majority students (see Appendices chapter 2, A2.2). For both groups we find that the relationships are significant and in the expected direction. However, the effect sizes differ across the groups. First, the positive association between the proportion of co-ethnics in school and the proportion of co-ethnic friendships in class is significantly larger for ethnic minority students (the effect is 1.3 times larger,  $p < 0.001$ ). Second, the negative association between the proportion of co-ethnic friends in class and problem behavior is smaller for ethnic minority students, a pattern that is opposite of what was expected (H6) (the effect is 2.4 times smaller,  $p = 0.005$ ). The relationship between the proportion of in-school friends and problem behavior in school does not differ for ethnic minority and ethnic

majority students. This does not support the hypothesis (H7).

We also examine difference across the countries. Since measurement invariance is not obtained for Sweden (see Appendices chapter 2, A2.1), we exclude Sweden from the multiple group analysis. A separate analysis on Sweden indicates that all hypothesized paths are significant and in the expected direction in Sweden (see Appendices chapter 2, A2.3). A multiple group analysis on the model with mediators shows that all paths of the mediation model are also significant and in the expected direction in the other three countries (see Appendices chapter 2, A2.2). However, we find differences in the sizes of the effects. The positive relationship between the proportion of co-ethnics in school and the proportion of co-ethnic friends in class is slightly weaker in England than in the Netherlands (the effect is 1.05 times larger in the Netherlands,  $p = 0.005$ ). Moreover, the direct relationship between the proportion of co-ethnics in school and problem behavior in school differs across the countries. When taking into account the mediators, the direct relationship between the proportion of co-ethnics in school and a student's problem behavior in school is significant and positive in the Netherlands whereas it is insignificant in England, Germany, and Sweden. The multiple group analysis on the Netherlands, England, and Germany shows that the insignificant effect in Germany significantly differs from the positive effect in the Netherlands ( $p = 0.028$ ).

## 2.8 Conclusion

In this chapter we examined the extent to which the proportion of co-ethnics in school is related to problem behavior in school and whether this relationship can be explained by students' friendship characteristics in Western Europe. MSEM analyses on large-scale cross-national comparative data of four European countries (England, Germany, the Netherlands, and Sweden) indicated that there is a small negative association between the proportion of co-ethnics in school and problem behavior in school. In addition, we found that a student who is surrounded by more co-ethnics in school has a higher share of co-ethnic friends and a higher share of in-school friends, and these friendship patterns are in turn related to lower levels of problem behavior in school.

The finding that the relative size of one's own ethnic group in school is related to an increase in in-school friendships diverges from the results of a study by Joyner and Kao (Joyner & Kao, 2000) which found no relationship between the proportion of

same-race students in school and in-school friendships. The difference in empirical findings might be due to the fact that we use a more specific measure of ethnicity. Whereas the groups in this study were based on *ethnic* self-identification, Joyner and Kao (2000) studied broader *racial* groups. It is possible that students attend a school in which they are surrounded by many same-race students (e.g., Asians), but not by students with the same specific ethnicity (e.g., Japanese). Consequently, these students might still try to find co-ethnic friends outside of school.

Some effects differed depending on a student's ethnic background. The relationship between the proportion of co-ethnics in school and the proportion of co-ethnic friendships in school was larger for ethnic minority students than for ethnic majority students. Additional analyses<sup>9</sup> showed that there is a diminishing positive relationship between the proportion of co-ethnics in school and the proportion of co-ethnic friends. Since, ethnic majority students are generally surrounded by more co-ethnics in school than ethnic minority students (see figure 3), an increase in the proportion of co-ethnics in school leads to a greater increase in co-ethnic friends for ethnic minority students.

Results did not indicate that the social support or belongingness provided by in-school and/or co-ethnic friends have more behavioral benefits for ethnic minority students than for ethnic majority students. To the contrary, we found that the negative relationship between the proportion of co-ethnic friends in class and problem behavior in school is stronger for ethnic majority students. Perhaps this could be explained by the fact that ethnic minority students are used to be surrounded by few co-ethnics. In contrast, ethnic majority students are in the numerical majority in the society at large and are rarely surrounded by inter-ethnic peers. Ethnic majority students may therefore be more likely to experience themselves to be (ethnically) different when they are embedded in an inter-ethnic friendship group than ethnic minority students. Students who are ethnically different from their friends in school may feel that they are not fitting in or are more likely to think that their friends in school do not understand them. This may lead to heightened levels of problem behavior in school.

Hypothesized effects also differed across countries. One interesting finding is that when taking into account the negative indirect relationship between the proportion of co-ethnics in school on problem behavior in school (via in-school and co-ethnic

---

9 See note 8

friendships), a significant and positive direct relationship between the proportion of co-ethnics in school and problem behavior was found in The Netherlands. This might indicate that in this country students' behavior in school does not always benefit from being surrounded by more co-ethnics in school. Instead, positive as well as negative mechanisms may be underlying the relationship between the proportion of co-ethnics in school and problem behavior. Country differences need to be addressed in future research.

Future research may also want to study the direction of the proposed relationships between friendship characteristics and problem behavior in school. Students' problem behavior in school could affect their friendships, rather than the other way around. For example, students who skip class might be more likely to meet their friends outside school.

In multiple Western-European countries, such as the Netherlands and Belgium, the media and policy makers have stressed the disadvantages related to schools with a high immigrant proportion (Merry, 2005). Moreover, scholars have emphasized these disadvantages by focusing on the negative effect of the share of immigrants in school on immigrants' cognitive school outcomes. This study suggests that there are also advantages related to schools with a high immigrant proportion, as a higher share of co-ethnics in schools is negatively related to problem behavior in school. To provide a nuanced vision on ethnic school composition effects we argue that scholars and policy makers should consider its effects on cognitive, as well as non-cognitive school outcomes. This is especially important since students' final school attainment is affected by both types of school-outcomes. More specifically, research shows that school performance, but also school-behavior and attitudes towards schools predict eventual school dropout (Rumberger, 1995). In line with what Benner and Crosnoe (2011) propose, students might be best off in diverse schools in which they are surrounded by sufficient co-ethnics.

We want to emphasize that the results do not necessarily imply that the ethnically mixing of schools will hamper non-cognitive school outcomes. Maybe more attention has to be paid to the social integration of ethnic groups in schools, so that students will feel equally "at home" in schools with many co-ethnics and schools with few co-ethnics. Perhaps the proportion of co-ethnics in school affects non-cognitive school outcomes less in schools in which inter-ethnic contacts are stimulated. In line with belongingness theory, a social environment in which all ethnic groups profit from supportive relationships may prevent problem behavior and, in the long run, even school dropout.





## Chapter 3

# The academic performance level of school classes and student problem behavior in school: comparative or normative reference group processes? <sup>1</sup>

*The relationship between the academic performance-level of a school class and student problem behavior in school is examined in three countries (The Netherlands, Sweden, and England). Based on comparative reference group theory we predict that the academic performance-level of a class will negatively affect a student's academic self-concept. However, when students are explicitly placed in a class on the basis of their academic performance-level (i.e., tracked), the track level of a class will positively affect a student's academic self-concept. Students with a higher academic self-concept are in turn hypothesized to exhibit less problem behavior in school. Based on normative social influence theory, we expect that students who attend a school class with a higher academic performance-level intensify their problem behavior in school less. Inconsistent with comparative reference group theory, multi-level path models on panel data indicate that the general academic performance-level of a class does not affect a student's general academic self-concept. However, students who attend a class with a higher language performance level, have a lower language self-concept in Sweden and the Netherlands. Only a student's general academic self-concept, and not his/her language self-concept, is substantially and consistently related to problem behavior in school. For the Netherlands, we find not a positive, but rather a negative relationship, between the track level of a class and a student's academic or language self-concept. While in lower performing school classes student problem behavior is higher, this does not lead students to intensify their problem behavior more. The higher level of problem behavior in lower performing school classes does not seem to be connected to educational tracking.*

---

<sup>1</sup> This work is single-authored. I would like to thank Frank van Tubergen for his valuable suggestions and recommendations. An earlier version of this work was presented at the MASS seminar at ICS-Utrecht, 2015. I thank all the members of the seminar for their valuable comments. This work was supported by The Netherlands Organisation for Scientific Research (NWO) and the NORFACE research programme on Migration in Europe – Social, Economic, Cultural and Policy Dynamics.

## 3.1 Introduction

The composition of schools with respect to the academic performance of its students has been of great concern to educational scientists as well as policy makers. Debates on educational policies, such as educational tracking or the ethnic and socio-economic integration of schools, are often (implicitly) also about the effect of the academic performance composition of schools (Bol, Witschge, Van de Werfhorst, & Dronkers, 2014; Driessen, 2007; Zimmer, 2003). Various scholars have shown that the school achievement of students improves more when they attend classes or schools with peers with a higher academic performance-level (Hanushek, Kain, Markman, & Rivkin, 2003; Zimmer & Toma, 2000; Zimmer, 2003). However, it is less clear how being surrounded by higher performing peers affects non-performance related school outcomes, including problem behavior in school. This is unfortunate, as problem behavior in school is related to school drop-out (Rumberger, 1995) and delinquency (Jenkins, 1995), and thereby an important predictor of school success.

Existing research on the relationship between the academic performance-level of schools or school classes and student problem behavior has focused on educational systems in which students are tracked on the basis of their academic performance. These studies suggest that the educational track of a school (class) is associated with the level of problem behavior of students. Case-studies as well as large-scale cross-sectional studies indicate that an anti-school culture is more prevalent in lower educational tracks (Hargreaves, 1967; Van Houtte, 2006). In addition, researchers have reported higher levels of disciplinary problems (Van de Werfhorst et al., 2012)<sup>2</sup> and school misconduct (Kelly, 1976; Van Houtte & Stevens, 2008) among students in lower educational tracks. Longitudinal research is scarce, but a recent panel study in Switzerland finds that students in the most basic tracks increase their deviant behavior more than students in the most advanced tracks in the first year in which they are tracked (Müller & Hofmann, 2016). In this study, deviant behavior includes, among others, violating school rules and breaking the law. Similarly, a case study of a school in England indicates that students who are streamed in lower sets increasingly receive teacher reports of bad behavior (e.g., due to absenteeism, coming late) and miss more assignments just after they are streamed (Abraham, 1989). However, a longitudinal U.S. based study suggests that differences in problem behavior across educational tracks are driven by selection effects (Wiatrowski et al., 1982). This study indicates that differences

---

<sup>2</sup> This study uses longitudinal data, but the relationship between track-level and disciplinary problems is not assessed longitudinally.

in delinquency between students attending different educational tracks exist before track placement, and track placements is not related to an increase in delinquency.

One explanation for the ambiguous findings of previous research is that two counter-balancing mechanisms may underlie the relation between the academic performance of schools and student problem behavior (Van Houtte & Stevens, 2009b). First, according to comparative reference group theory, students judge their own academic performance by comparing their performance to that of their peers (Festinger, 1954; Richer, 1976). When students are surrounded by higher performing peers, their academic self-concept will be lower and they will suffer more from feelings of frustration (Agnew, 1985; Festinger, 1954; Finn, 1989; Marsh & Hau, 2003; Richer, 1976). This in turn is expected to lead to problem behavior, and especially school-specific problem behavior (Finn, 1989). Second, according to normative social influence theory, students will decrease their problem behavior in school when they are surrounded by peers whose academic performance is higher, because students would be socialized by the pro-school norms of higher performing students (Richer, 1976; Van Houtte & Stevens, 2009b).

Previous studies have not yet explicitly examined whether these complementary, but counter-balancing, mechanisms might explain some of the null and contradictory findings of previous research. Hence, this chapter contributes to past research by studying the following research question: “To what extent do the comparative reference group mechanism and the normative reference group mechanism account for the relationship between the average performance of the school class and student problem behavior in school”? Problem behavior in school, which is also referred to as behavioral disengagement (Fredricks et al., 2004), implies students’ disobedience to school rules and norms, such as skipping class.

We examine the research question in three European countries with different educational systems (i.e., Sweden, England, and The Netherlands). Previous research has focused on behavioral differences between higher and lower performing schools or classes in countries in which students are explicitly tracked on the basis of their academic performance. In this study, we also examine countries in which children are not explicitly tracked on the basis of their academic performance (i.e., England and Sweden). In this way we can examine whether the results generalize across different settings. Moreover, for the Netherlands we are able to examine whether educational tracking or the academic performance-level of a class mainly contributes to student problem behavior in school. We use the first two waves of the

Children of Immigrants Longitudinal Study in 4 European countries (CILS4EU) which includes students from more than 200 school classes in each of the 3 countries in the study (Kalter et al., 2013). We employ state-of-the-art multi-level structural equation techniques to analyze the data.

## 3.2 Theory

### 3.2.1 Comparative reference group processes

According to comparative reference group theory, people feel inherently motivated to evaluate their abilities and performances (Festinger, 1954; Richer, 1976). One way by which people do this, is by comparing their abilities or performances to the abilities or performances of others. When students experience that (similar) others outperform them in school, this can lead to feelings of ‘relative deprivation’ (Richer, 1976). Students may sense frustration or embarrassment when they feel incompetent and unable to reach the standard of school performance, and this can damage their self-view (Finn, 1989). The self-view of students may be further deprived by peers, parents and teachers, because peers, parents and teachers are also more likely to think less of them (Jonsson & Mood, 2008). According to Finn (1989) self-view can refer to general self-esteem, feelings of being able to attain certain goals (i.e., personal agency beliefs and the opposite of a sense of futility), and academic self-concept (i.e., people’s ideas about their capabilities in the academic domain (Belfi et al., 2012; Chmielewski et al., 2013)). The academic performance of class- or schoolmates especially has a negative effect on students’ academic self-concept. This effect has also been referred to as the big-fish-little-pond effect (BFLPE) (Marsh, 1987; Marsh et al., 2008; Marsh et al., 2009; Marsh et al., 2012; Nagengast & Marsh, 2012). Support for this effect is compelling, and the effect has been found to be equally applicable to students whose individual academic performance level is low, and students whose individual academic performance level is high (Marsh et al., 2008).

Scholars have posited two reasons why students with a lower academic self-concept engage in more problem behavior in school. First, students may try to reestablish their loss of status in the academic realm through engagement in school-resistant behavior. School-resistant behavior may lead to positive reactions from classmates (i.e., social status), which makes students feel better about themselves again (Finn, 1989; Rosenberg et al., 1995). Second, students may be intended to turn against

the context (i.e., school) that is perceived to be accountable for their negative experiences and loss of status (Finn, 1989). This argumentation is in line with Agnew's revised strain theory, which posits that people are more likely to engage in deviant behavior when they are prevented from achieving a goal (such as performing well in school), and are unable to circumvent this situation (e.g., because they are compelled to go to school) (Agnew, 1985; Tygart, 1988). In line with these ideas, research shows that adolescents with a lower self-esteem exhibit lower levels of school adjustment (Aunola et al., 2000). Similarly, academic self-concept has been found to be negatively related to delinquent behavior (Leung & Lau, 1988) and truancy (Corville-Smith et al. 1998; Reid 2005). Finally, longitudinal research shows that academic self-concept negatively affects school absenteeism and positively affects class participation and homework completion via positive school attitudes (Green et al., 2012).

*H1) Students who are surrounded by classmates with a high academic performance-level will have a lower academic self-concept than equally performing students who are surrounded by classmates with a low academic performance-level (h1a), and students who have a lower academic self-concept will engage in more problem behavior in school (h1b) (see figure 3.1).*

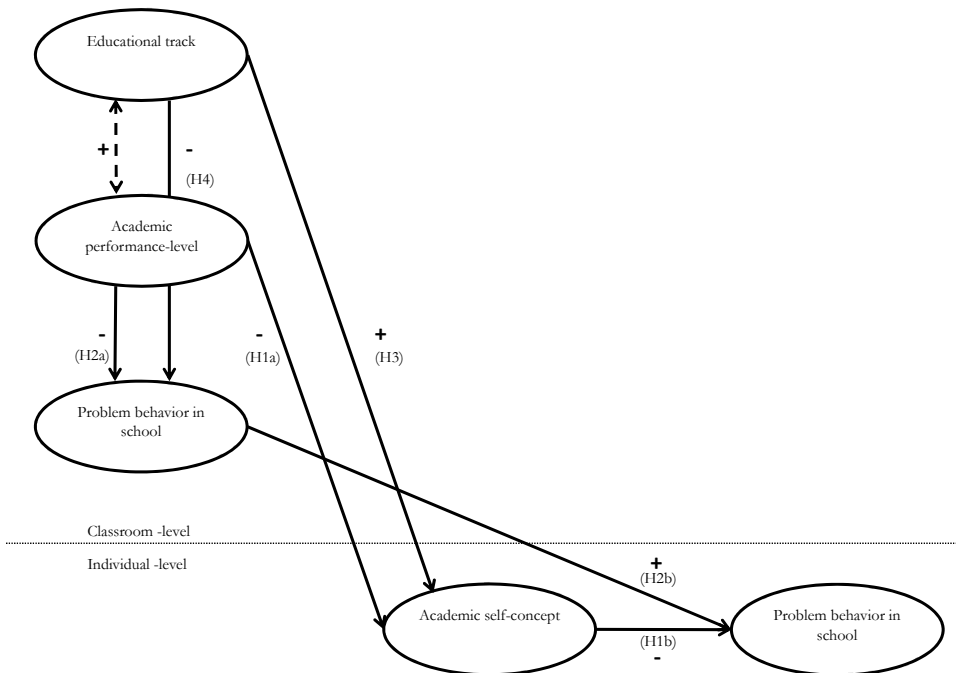
### 3.2.2 Normative reference group processes

Based on normative social influence theory, a student's level of problem behavior in school is expected to be lower when he/she is surrounded by peers who perform better in school. Higher performing peers are not only more able to provide school-specific help and resources, but they are also assumed to have more pro-school norms (Driessen, 2007; Jonsson & Mood, 2008; Van Houtte & Stevens, 2009b). According to normative social influence theory, these pro-school norms of classmates are expected positively influence a student's pro-school behavior (Richer, 1976; Van Houtte & Stevens, 2009b). Note that the relationship between the performance level of the school class and the initial school norms of classmates is not expected to be a causal relation, but is merely a composition effect. However, the normative social influence effect is hypothesized to be causal.

Scholars have distinguished between injunctive norms and descriptive norms. Injunctive norms are ideas or values on how people should behave, while descriptive norms represent how people are actually behaving (Cialdini et al., 1990). Injunctive norms and descriptive norms are often related, and people may use the actual

behavior of people in a group (i.e., descriptive norms) to derive how one is expected to behave in a specific situation (i.e., the injunctive norm) (Lapinski & Rimal, 2005). Past research on the effect of behavioral school norms on a student's behavior has merely examined descriptive norms. Most studies have found support for the influence of classmates' descriptive norms. For example, Barth et al. (2004) show that primary school children decrease their academic focus more if they are placed in a school class with a poorer average academic focus. Moreover, Swiss adolescents have been found to be influenced by the average aggressive, delinquent, and school-defiant behavior of classmates (Müller, Hofmann, Fleischli, & Studer, 2015; Müller, Hofmann, Fleischli, & Studer, 2016a). In line with previous research we focus on descriptive norms and hypothesize:

*H2) Students who are surrounded by higher performing classmates are less exposed to problem behavior in school (h2a), and students who are less exposed to problem behavior in school will engage in less subsequent problem behavior in school (h2b) (see figure 3.1).*



**Figure 3.1** Model with hypothesized relationships. The arrow of  $H_4$  represents the relationship between educational track and problem behavior in school. It does not go via academic performance-level.

### 3.2.3 Reference group processes in tracked educational systems

In educational systems in which students are explicitly tracked or streamed on the basis of their academic performance, students who attend a higher track or stream will generally be surrounded by higher performing peers in class (see dotted arrow in figure 3.1). This in turn will lower their academic self-concept (i.e., see hypothesis 1a). However, when students are aware of the academic-level or status of their study program, they may not *only* compare their academic performance to that of their classmates, but *also* to that of peers who attend different study programs (Belfi et al., 2012; Chmielewski et al., 2013). Based on comparative reference group theory, students' academic self-concept is expected to be enhanced when the academic status or level of their study program is relatively high, while students' academic self-concept is expected to be deprived when the academic status or level of their study program is relatively low. This effect has also been referred to as the assimilation effect (Chmielewski et al., 2013; Marsh, Kong, & Hau, 2000).

One of the key assumptions behind the assimilation effect is that a student is aware of the status of his/her study program (Salchegger, 2016; Trautwein, Lüdtke, Marsh, Köller, & Baumert, 2006). In educational systems in which students are explicitly tracked on the basis of their academic performance, the status of a school or study program is often clear to students. Status hierarchies across schools and study programs are visible to students, teachers, and parents, because they are labelled accordingly. This assumption is supported by research. For example, students in lower educational tracks are much more likely to think that others look down on them because of the studies they follow than students in higher tracks (Spruyt, Van Droogenbroeck, & Kavadias, 2015). Moreover, teachers have lower expectations of students in lower educational tracks and adjust their teaching strategies accordingly (Stevens & Vermeersch, 2010). Based on this we expect an assimilation effect in educational systems in which students are explicitly tracked on the basis of their academic performance.

Previous research has not consistently found support for the supposed assimilation effect. For example, researchers have found an assimilation effect in Hong-Kong (Marsh et al., 2000): Hong Kong students who perceive their school to be of a higher status have a more positive academic self-concept. However, inconsistent with the supposed assimilation effect, German students in higher tracks do not

have higher math self-concept than German students in lower tracks (Trautwein et al., 2006). A recent cross-national study only finds support for assimilation effects among 15-year-old students who are tracked on the basis of their academic performance for some courses, but not among students who are tracked on the basis of their academic performance for all their courses (Chmielewski et al., 2013). Nevertheless, Van Houtte, Demanet and Stevens (2012) find that in Belgium – a country in which students are tracked for all their courses – students in lower tracks have a lower global self-esteem. This relation seems to be more pronounced when students in lower tracks are surrounded by higher-track students in their school. Despite the inconsistencies in previous findings, we hypothesize:

*H3) Students in higher track classes have a higher academic self-concept than students in lower track classes, given the academic performance-level of the class (see figure 3.1).*

Track placement may also affect students' attitudes and behaviors towards school. As low track placement is expected to lead to a loss in student's academic self-concept, students in lower tracks are expected to withdraw or turn against the school context more (Finn, 1989). Some scholars argue that anti-school norms among students in lower tracks may also be fostered by their insecure occupational prospects, because unemployment rates for less skilled jobs are higher in Western societies (Van Houtte & Stevens, 2015). Anti-school behaviors are thus expected to be more prevalent in lower-track classes. These ideas are highly in line with predictions based on the differentiation-polarization theory (Abraham, 1989; Hargreaves, 1967; Van Houtte, 2006). According to this theory, students who are confined to a lower track or stream are deprived of their status in the academic realm. Conversely, students who are placed in higher tracks gain status from their high track placement. This would lead to an anti-school culture in lower tracks, and a pro-school culture in higher tracks, such that differences in anti-school behaviors and attitudes between the tracks polarizes over time. Several cross-sectional studies and case studies have indicated that an anti-school culture is present in lower educational tracks and that students in lower educational tracks exhibit more (school-specific) problem behavior in school (Hargreaves, 1967; Kelly, 1976; Van de Werfhorst et al., 2012; Van Houtte, 2006; Van Houtte & Stevens, 2008).

The average academic performance-level of lower track classes tends to be lower than that of higher track classes. Hence, the level of school-specific problem behavior may be higher in lower track classes, only because these classes are composed of lower



performing students (see hypothesis 2a). However, the above-mentioned arguments suggest that the *explicit* placement of students in educational tracks is related to students' anti-school behaviors and attitudes above and beyond the performance-level of the class. Hence, we derive a separate hypothesis for educational tracking:

*H<sub>4</sub>) Students in higher track classes are less exposed to problem behavior in school than students in lower track classes, even given the academic performance-level of the class (see figure 3.1).*

3

### 3.3 Context of the study

We study adolescents in secondary school between 14 and 15 years of age in England, the Netherlands, and Sweden. The educational systems in these countries differ. Most notably, there are differences in the extent to which students are explicitly and implicitly tracked on the basis of their school performance (Salchegger, 2016). Explicit school tracking implies that students are placed into different schools or classes on the basis of formal standards, such as test scores or school grades. Bol and Van de Werfhorst (2013) specified an index on the basis of three criteria of the level of explicit educational tracking in a country. According to this index, the level of explicit educational tracking is higher when the age of first selection is lower, when there are more different tracks available, and when a greater share of the curriculum is tracked. Table 3.1 shows that the level of explicit educational tracking is relatively high in the Netherlands, and relatively low in England and Sweden. In the Netherlands, students of different educational tracks are generally placed in different school classes. Hence, for this country we are able to examine hypothesis 3 and 4. Although Dutch students are explicitly tracked according to their academic performance, students who are placed in different tracks often attend the same school (i.e., are located in the same building) (i.e., 73% of the 14-year-old student population in the CILS4EU data attend a school with students from other educational tracks)<sup>3</sup>.

Even in countries in which students are not formally tracked on the basis of their performance, students may be *implicitly* tracked on the basis of their performance.

<sup>3</sup> It would have been interesting to examine whether the effect of the educational track of a class depends on whether students attend a school only together with peers who attend the same track or also with peers who attend a different track. However, including such an interaction effect led to estimation problems in several of our models.

Implicit school-level tracking refers to the informal placement of students of different socio-economic backgrounds into different schools or classes (Salchegger, 2016). Students with different academic performance levels are not deliberately placed into different schools, but the separation of students on the basis of their academic performance is a side-effect of the socio-economic segregation of schools, neighborhoods, or areas in a country. Implicit tracking has been measured by the variation in the economic, social, and cultural status composition of schools across a country, while accounting for explicit school-level tracking (Salchegger, 2016). When this variation in the economic, social, and cultural status across schools is higher, the level of implicit school tracking is also higher. Although students in England and Sweden are both attending comprehensive school, the level of implicit school tracking is higher in England (see table 3.1).

**Table 3.1** *Different levels of implicit and explicit educational tracking in The Netherlands, the U.K., and Sweden*

	Index of explicit school tracking	Index of implicit school tracking
U.K.	-1.08	0.18
The Netherlands	0.97	0.22
Sweden	-1.06	0.11

*Note: Indices of explicit school tracking are obtained from Bol and Van de Werfhorst (2013) and indices of implicit school tracking are obtained from Salchegger (2016). The level of explicit school tracking was standardized across 29 countries in the study by Bol and Van de Werfhorst (2013). The average level of implicit school tracking was 0.23 with a standard deviation of 0.07 across 41 countries in Salchegger's (2016) study.*

### 3.4 Data

The Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU) data are used to test the hypotheses (Kalter et al., 2013). Nationally-comparative data were gathered in England, Germany, The Netherlands, and Sweden. Germany is excluded from the analyses in this chapter, since no measurement invariance could be obtained for problem behavior in school across the two time points. In each country trained assistants collected data between 4000-5000 students in  $\pm 100$  schools. Large schools and schools with a high immigrant proportion were oversampled, but other than that the school selection procedure was random. When invited schools refused to participate, replacement schools were approached in England and the Netherlands. Replacement schools were similar to the initially invited schools with respect to immigrant proportion and school type in the Netherlands and immigrant

proportion and region in England. Response rates at the school-level ranged between 14.7% (England) and 76.8% (Sweden) before replacement and increased to 65.5% for England and 91.7% for the Netherlands after replacement.

In each school, all students in two randomly selected 10<sup>th</sup> grade classes in England, 3<sup>rd</sup> grade classes in the Netherlands, and 8<sup>th</sup> grade classes in Sweden were invited to participate (i.e., 14-year old school population in all countries). At the student level response rates ranged between 80.5% (England) and 91.1% (The Netherlands) in the first wave. One year later, schools were invited to partake again in the study. Between 86% (England) and 98.5% (Sweden) of the schools participated again in the second wave. Of all the sampled respondents who stayed in school (i.e., did not drop out or transferred to another school), between 69.9% (England) and 78.6% (Sweden) participated in the second wave. We include all people who either participated in the first wave or the second wave, except when they dropped out of school or changed schools in wave 2. This led to a sample of 4539 students in 222 school classes in the Netherlands, 5441 students in 251 school classes in Sweden, and 4400 students in 208 school classes in England.

### 3.5 Methods

We analyze the data by means of multi-level structural equation modelling (MSEM) in Mplus 7 that accounts for the nesting of students in school classes<sup>4</sup>. MSEM enables us to test mediational paths that involve relationships between school class-level (hereafter class-level) variables and individual-level variables<sup>5</sup> (Preacher et al., 2010; Preacher et al., 2011). Such paths cannot be adequately tested in standard regression models.

In the MSEM approach, a variable that is measured at the individual-level is separated into two latent parts: a class-level variance and an individual-level variance (Preacher et al., 2010; Preacher et al., 2011). The class-level part represents

<sup>4</sup> In the Netherlands and England, a large share of students transition to a new class between the first and the second waves (around 50% in the Netherlands, and 30% in England). This implies that students are exposed to different peers in their wave 1 class than in their wave 2 class, and may not only use their wave 1 classmates, but also other grade mates, as a reference group. We examined whether the conclusions for the between-level effects and the contextual effects were altered when we studied grade mates instead of classmates as a reference group. Because the power of these analyses was limited, we ran into estimation problems for some of the models. Nevertheless, the main conclusions were similar to the ones that are discussed in the text.

<sup>5</sup> Unfortunately, we were unable to account for the cross-classified nesting of students in school classes.

the class-average of the variable. Through this decomposition, class-level effects can be appropriately distinguished from individual-level effects. Hypothesized relationships between individual-level variables (i.e., individual-level effects) are modelled at the individual-level *and* at the class-level (see figure 3.2). In this way individual-level effects are not biased by variation that purely exists at the class-level. Hypothesized relationships between class-level variables are modelled at the class-level *and* at the individual-level, when the class-level variables are aggregates of individual-level variables (e.g., the academic performance-level of a class and the level of problem behavior in a class; see figure 3.2). In this way class-level effects are not biased by variation that purely exists at the individual-level. It is especially important to model the hypothesized relationship at the (dis)aggregate level when examining indirect paths. Otherwise, the estimation of an indirect path can become biased by effects that are not hypothesized to be part of the indirect path. For example, the part of an indirect path that is hypothesized to be at the class-level may be biased by variation that exists at the individual-level. In addition, the part of an indirect path that is hypothesized to be at the class-level may be biased by variation that exists at the individual-level.

In this study, some of the class-level variables are not hypothesized to have class-level effects, but are hypothesized to have *contextual* effects (Marsh et al., 2009; Marsh et al., 2012; Nagengast & Marsh, 2012). A contextual effect is an effect of a class-level variable, while controlling for the *effect* of the individual-level variable that the class-level variable is an aggregate of. For example, hypothesis 1a involves a contextual effect, as it predicts that students in high performing school classes have a lower academic self-concept than their *equally-able* counterparts who attend low-performing school classes. More specifically, this relationship accounts for the effect of the academic performance of the individual student. While MPLUS models class-level effects by default, contextual effects can be obtained by subtracting the individual-level effect from the class-level effect (Marsh et al., 2009). Figure 3.2 displays the model that will be tested in all countries (i.e., without educational tracks) and shows which of the paths in the model are contextual effect. We calculate the indirect paths by means of the delta-method in MPLUS<sup>6</sup>.

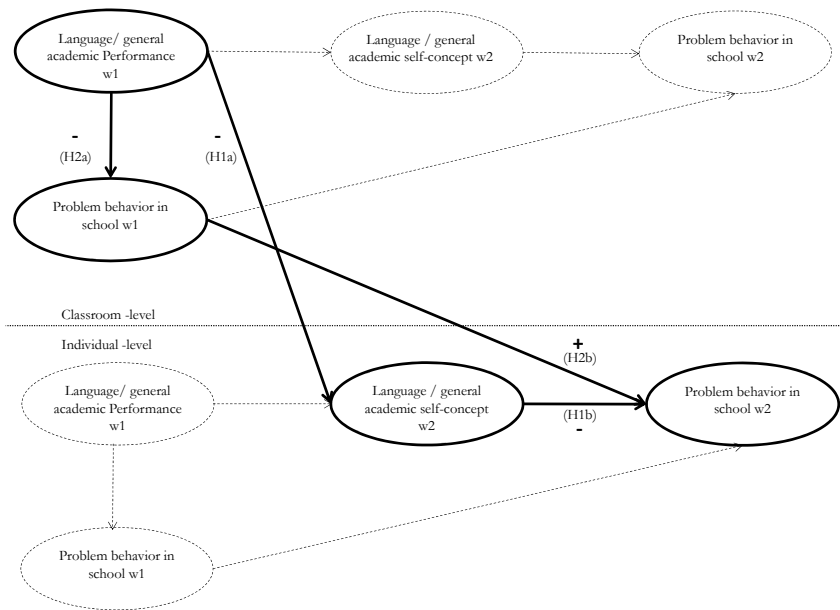
We make use of longitudinal data to be able to test whether students engage in more subsequent problem behavior in school when they attend school classes in which

---

6 Mediators with variance at the within-level and at the between-level can mediate a contextual effect via a 2-1-1 chain as well as a 2-2-1 chain (Nagengast & Marsh, 2012). While this could be the case in this study too, we only calculate the hypothesized indirect paths.

the average level of problem behavior is higher (H3b). More specifically, we test a contextual effect of class-average problem behavior in the first wave on a student’s problem behavior in the second wave. This effect indicates whether students who attend a school class with a high level of problem behavior in wave 1 exhibit more problem behavior in wave 2 than their *equally* problematic counterparts who attend a school class with a low level of problem behavior in wave 1.

We also examine the effect of student performance on academic self-concept longitudinally. More specifically, we estimate the effect of class-level and individual-level academic performance at wave 1 on class-level and individual-level academic self-concept at wave 2, while controlling for individual-level academic self-concept at wave 1. A student’s performance level may not only affect his/her academic self-



**Figure 3.2** Conceptual model without educational tracks.

The solid lines represent hypothesized relationships. Paths at the classroom-level represent class-level effects, paths at the individual-level represent individual-level effects, and paths that diagonally cross both levels represent contextual-effects. A dotted line is either a relationship that is used to calculate a hypothesized contextual effect (Marsh et al., 2009) or is a relationship at the (dis)aggregate level of a hypothesized effect that is modelled to estimate the hypothesized effect accurately (Preacher et al., 2010). All variables in the model are latent. Problem behavior in school is measured by a factor with four items. Performance-level and self-concept are measured at the individual-level, and are represented by latent variances at the within and the between-level in the MSEM approach (Preacher et al., 2010).

concept, but a student's academic self-concept may also affect his/her performance on academic tests (Nagengast & Marsh, 2012). An accurate estimation of the individual-level effect is crucial to estimate the contextual effect of school class-level performance correctly. Because we only have two waves of data, we assess the relationship between academic self-concept and problem behavior at the same time point (both wave 2).

Research on the BFLPE indicates that the effect of the average performance-level of a school (class) on a student's academic self-concept is more pronounced when students' performance level and academic self-concept are measured for a specific subject, rather than when they are measured in general (Salchegger, 2016). Hence, we examine the effect of the general academic performance level of the class on a student's general academic self-concept, but also the effect of the language performance of the class on a student's language self-concept.

In all the analyses we account for the non-response and sampling design of the study at the school-level<sup>7</sup>. Because some of the endogenous variables are not normally distributed, a robust maximum likelihood estimator (MLR) is used. The MLR estimator in MPLUS relies on a Full Information Maximum Likelihood approach (FIML). Hence, cases with missings are not excluded, but estimates are based on all the available information. The FIML approach should yield unbiased estimates in case the MAR assumption holds (Enders, 2001). Cases with missings on exogenous variables are usually list-wise deleted in Mplus, but can be kept by estimating their (co)-variances and means. While this avoids list-wise deletion, this assumes that the x-variables are normally distributed<sup>8</sup>.

---

7 Analyses in which the data are not weighted lead to similar conclusions for all countries. The only notable difference is found in the analyses in which both educational tracks and language performance-levels at the class-level are included in the Netherlands. In these analyses, both school class language performance-levels and the academic track were significantly and negatively related to w1 problem behavior at the class-level.

8 We also conduct analyses in which missings on exogenous variables are list-wise deleted. The conclusions are highly similar to the ones discussed in the chapter. The only notable difference is found in the analyses in which both educational tracks and language performance-levels at the class-level are included in the Netherlands. In the analyses in which missings on exogenous variables are list-wise deleted, the two-sided p-value of the negative relationship between educational track and language self-concept is higher (above 0.05). Moreover, no significant relation between language performance level and problem behavior w1 is found at the class-level. However, the patterns found in these analyses are in the same direction as the ones presented here (i.e., educational tracks, rather than language performance levels, are more negatively related to academic self-concept; language performance levels, rather than educational tracks are more negatively related to student problem behavior in school).

For significant effects we inspect effect sizes by using the following formula:  $b^2 \cdot SD_x / SD_y$ .  $b$  represents the unstandardized coefficient.  $SD_x$  represents the standard deviation of the predictor variable at the class-level (i.e., for contextual-level effects and class-level effects) or the individual-level.  $SD_y$  represents the standard deviation of the predictor variable at the class-level (i.e., for class-level effects) or the individual-level (i.e., for individual-level and contextual-effect) (Marsh et al., 2009; Nagengast & Marsh, 2012).

## 3.6 Measurements

### 3.6.1 Dependent, mediator, and main independent variables

In both waves *problem behavior* in school is measured by four items that indicate the extent to which students skip class, come late to class, argue with their teachers, and are punished in school (Cronbach's alpha: 0.702 in the first wave and 0.745 in the second wave). We conduct a multi-level confirmatory factor analysis of these items at the individual-level and the class-level in each country. Modification indices show that the model fit for the Netherlands and England improves when releasing the covariance between the errors of the skipping class item and coming late to class item, and for Sweden when releasing the covariance between the errors of the arguing with teachers item and the getting punished in school item. These error covariances are released, as the items are also theoretically related to each other (i.e., are about non-presence in class or disobeying school authorities). Partial scalar measurement invariance is obtained across the two waves and across the individual and the school class-level in all countries (see Appendices chapter 3, A3.1). The final measurement model fits the data well (see Appendices chapter 3, A3.1).

General academic performance is measured by a student's score on a language test and a cognitive test that were administered in the first wave (i.e., *general performance*). In all countries, cognitive ability is measured by a standard German cognitive test that consisted of 27 questions in which no language was used (for more information, see the technical report of the CILS4EU (CILS4EU, 2016)). The language test differed across the countries. In the Netherlands, students were provided with 30 words of which they had to indicate the synonym among 5 options. In England, students had to do the same for 25 words. In Sweden, students had to select antonyms for 30 words among 4 options. Test scores for both the language and the cognitive test were standardized in each country and then added

(correlation between the two test scores was 0.40). *Language performance* is solely measured by standardized scores on the language tests. At the class-level, *general performance* and *language performance* represent the average *general performance* and average language *performance* of the class (see section on class-level variables).

Unfortunately, it is impossible to include school grades in the analyses, as students had not yet received grades in England and Sweden. It has been argued that grades are more important for academic self-concept than test scores, because students are aware of their academic potential via the grades they obtain in school (Marsh, 1987). Nevertheless, a study by Marsh (1987) indicates that the effect of test scores on academic self-concept does not run completely via GPA, and that the direct effect of test scores is actually larger than the direct effect of GPA. Hence, students do not only base their academic standing on their GPA, but also use other sources of inference. This especially applies to older students (Marsh, 1987). An advantage of using test scores instead of GPA is that test scores are less affected by teacher prejudice than grades. Moreover, grades are likely to be adjusted to the educational track that students attend.

General *academic self-concept* is measured by two items in the second wave “I am sure that I can do well at school” and “I am sure that I can get good grades at school”. Answer categories are on a 5-point scale that range from strongly agree to strongly disagree, and are reverse coded so that higher values indicate a higher self-concept. The correlation between the two items is 0.486. *Language self-concept* is measured by one item that asks students how well they are doing in their survey country language in school. Answers are on a 5 point category, ranging from “very well” to “not well at all”. Answers are reverse coded.

The behavioral school norm of classmates is measured by the *average w1 problem behavior* in class. This is represented by the problem behavior in school factor at the class-level (see section on class-level effects).

### **3.6.2 Individual-level control variables**

We include several control variables and estimate their effect on problem-behavior in wave 1, problem behavior in wave 2, and academic self-concept in wave 2 at the individual-level (i.e., the dependent variable and the mediators). First, we control for a respondent’s *academic self-concept* in wave 1 or *language self-concept* in wave 1 which are measured by the same items as in wave 2.



We control for a student's *general self-esteem* in wave 1 as this may be related to academic self-concept, as well as academic performance. Students indicated the extent to which they agreed with the following four items on a 5 point scale: "I have a lot of good qualities", "I have a lot to be proud of", "I like myself just the way I am", and "I think things will go well for me in the future" (Cronbach's alpha = 0.816). We calculate the average score on these items. In all countries the general self-esteem items load on a different factor than the wave 1 items of academic self-concept. Moreover, the wave 1 language self-concept measure does not load substantially on the general self-esteem factor.

We account for whether the respondent is a *boy*. Boys exhibit more problem behavior in school, tend to score lower in standardized language tests, and higher in standardized math tests (Buchmann et al., 2008). Moreover, we account for whether the respondent's parents are *divorced* in the first wave of the survey. Missing values on the first wave were replaced with non-missing values on the second wave.

The socio-economic background of the student is accounted for by controlling for *parental occupational status* (measured by ISEI 08). In a separate questionnaire, parents and caregivers provided their own and their partner's occupational status and indicated whether they and their partners are the respondent's biological parents. The occupational status of the biological parent with the highest occupational status is used. When the occupational status of both parents is missing, the parental occupational status that is provided by the child is used (correlation between occupational status provided by the child and provided by the parent was between 0.70 and 0.76 for mothers and 0.72 and 0.77 for fathers).

We take into account whether a student belongs to a non-western ethnic minority group. A dummy *non-western* background indicates whether at least one of the parents of a student is born in a non-western country. Table 3.2 provides the descriptives for all individual-level variables.

### 3.6.3 Class-level variables

All hypothesized relationships at the individual-level are also modelled at the class-level (see figure 3.2 and section 3.5) (Preacher et al., 2010; Preacher et al., 2011). The class-level part represents the average of the individual-level variable in the school class.

We have to be careful with controlling for additional class-level variables in the analyses, because the statistical power at the class-level is relatively low. At the class-level academic performance is in most of the countries highly correlated with *problem behavior w1* and/or *academic/language self-concept w2* (see table 3.3 for the correlations between general performance, problem behavior, and academic self-concept). Since these three variables are all included as predictors of *problem behavior w2*, adding extra class-level controls on *problem behavior w2* may lead to multi-collinearity. Hence, we do not do this.

We do control for the effect of *non-western* on *academic self-concept w2* and *problem behavior w1* at the class-level. This represents the effect of the share of students with a non-western background in class. School classes with a higher share of students with a non-western background tend to have a lower average academic performance level, while students' academic self-concept has found to be higher in these classes (Agirdag, Van Houtte, & Van Avermaet, 2012). The share of students with a non-western background may positively affect students' self-concept as a result of comparative reference group processes. Students may experience lower levels of relative deprivation when they are surrounded by a higher share of non-western students whose performance level tends to be lower than that of native students. In this case, the share of non-western students in class will not be a confounder of the effect of the class' average performance level. However, research indicates that the share of non-western immigrants in school may also affect a student's academic self-concept for different reasons (Agirdag et al., 2012). In that case it can be a confounder.

We do not control for the average parental occupational status at the class-level. Especially in England this variable is very highly correlated with a class' average performance score (correlation is 0.782). Hence, we are likely to run into multi-collinearity issues.

For the Netherlands we also conduct analyses in which we include the *educational track* of the school class. We distinguish between the *vocational tracks* (reference group, i.e., VMBO-b, VMBO-k, VMBO-g, VMBO-t), the *general track* (i.e., HAVO) and the *academic track* (i.e., VWO)<sup>9</sup>.

---

<sup>9</sup> The educational tracks are also highly correlated to the academic performance-level of the class. Multi-collinearity could thus be an issue. However, estimates and standard errors seem to remain quite stable when including both the performance-level of the class and the educational track for the Netherlands.

### 3.7 Results

Figure 3.3 shows the results for the Netherlands, figure 3.4 for Sweden, and figure 3.5 for England with respect to student *general performance* in wave 1 and *general academic self-concept* in wave 2. These results do not yet include the educational tracks in the Netherlands. In none of the countries we find a contextual effect between a class' average performance level in wave 1 and a student's general academic self-concept in wave 2 (H1a). However, we find support for hypothesis 1a with respect to the *language performance* of a class and a student's *language self-concept* in Sweden and the Netherlands (see table 3.4). Swedish or Dutch students who attend a school class with a higher average wave 1 language performance level have a lower language self-concept in wave 2, given their own language performance level in wave 1 (table 3.4; standardized effect sizes are respectively -0.203 (S.E. 0.084) and -0.280 (S.E. 0.087)).

In all countries we find that students with a higher *general academic self-concept* in wave 2 engage in, ceteris paribus, lower levels of problem behavior in wave 2 (H1b) (see figure 3.3, 3.4 and 3.5). A two standard deviation increase in academic self-concept is related to a 0.410 standard deviation decrease in problem behavior in school in Sweden, a 0.321 standard deviation decrease in problem behavior in England, and a 0.184 standard deviation decrease in problem behavior in the Netherlands. A student's *language self-concept* is only significantly related to a decrease in problem behavior between wave 1 and 2 in England (see table 3.4). In England, a two standard deviation increase in language self-concept is related to a 0.257 standard deviation decrease in problem behavior in school.

Class performance levels thus only seem to affect a student's language self-concept and not his/her general academic self-concept. However, a student's general academic self-concept, rather than his/her language self-concept, is more strongly and consistently related to problem behavior in school. All in all, we do not find support for a full positive indirect path between the average performance level of a class and a student's problem behavior via a student's academic self-concept (H1).

**Table 3.2** Descriptive statistics. Netherlands:  $N$  school-level = 100,  $N$  classroom-level = 222,  $N$  individual-level = 4539; Sweden:  $N$  school-level = 129,  $N$  classroom-level = 251,  $N$  individual-level = 5444; England:  $N$  school-level = 208,  $N$  classroom-level = 107,  $N$  individual-level = 4400

	The Netherlands			Sweden			England			
	Mean / S.D.	Range	% Missing	Mean / S.D.	Range	% Missing	Mean / S.D.	Range	% Missing	
<b>Argue with teacher w2</b>										
Argue with teacher w2	0.683	0-4	21.78	0.584	0-4	16.65	1.173	1.176	0-4	30.90
Skipping class w2	0.298	0-4	22.11	0.460	0-4	17.32	0.197	0.569	0-4	31.22
Coming late to class w2	0.964	0-4	22.25	1.131	0-4	17.21	1.111	1.036	0-4	31.17
Punishment in class w2	0.800	0-4	22.14	0.310	0-4	17.02	0.798	0.850	0-4	31.03
Argue with teacher w1	0.794	0-4	4.50	0.633	0-4	8.84	1.482	1.291	0-4	2.01
Skipping class w1	0.257	0-4	4.51	0.386	0-4	8.99	0.216	0.576	0-4	2.00
Coming late to class w1	1.052	0-4	4.52	1.049	0-4	9.01	1.217	1.070	0-4	2.04
Punishment in class w1	1.084	0-4	4.51	0.398	0-4	8.76	1.102	1.024	0-4	2.03
Academic self-concept w2	6.350	0-8	21.87	6.719	0-8	17.21	6.620	1.212	0-8	30.98
Language self-concept w2	2.393	0-4	21.89	3.041	0-4	16.65	2.880	0.834	0-4	31.41
<b>Independent and control variables at the individual level</b>										
Cognitive performance w1	19.874	3.651	6.51	17.923	4.836	12.72	18.690	4.079	0-26	4.45
Language performance w1	17.654	4.280	6.02	18.996	4.973	12.26	16.740	3.431	0-24	3.18
Academic self-concept w1	6.371	1.025	4.75	6.702	1.330	9.67	6.584	1.158	0-8	3.02
Language self-concept w1	2.445	.760	4.49	2.964	0.797	8.72	2.865	0.818	0-4	2.20
General self-esteem	2.858	0.539	4.77	3.115	0.699	9.71	2.815	0.717	0-4	3.25
Boy	0.482	0/1	0.89	0.507	0/1	0.45	0.473	0/1	0/1	0.35
Occupational status (ISEI)	48.560	19.685	6.80	50.604	20.803	11.74-88.96	51.881	21.326	11.01-88.70	8.45
Divorced	0.172	0/1	0.09	0.254	0/1	0.09	0.277	0/1	0/1	0.27
Non-western background	0.112	0/1	0.72	0.144	0/1	1.10	0.152	0/1	0/1	2.04
<b>Outcome variables measured at the classroom level</b>										
Argue with teacher w2	0.697	0.331	0.42	0.606	0.289	0.043-1.500	1.190	0.442	0.111-2.875	12.48
Skipping class w2	0.299	0.220	0.42	0.463	0.274	0-1.571	0.206	0.205	0-0.909	12.48

Table 3.2 Continued

Argue with teacher w2	The Netherlands				Sweden				England			
	Mean / Prop.	S.D.	Range	% Missing	Mean / Prop.	S.D.	Range	% Missing	Mean / Prop.	S.D.	Range	% Missing
Coming late to class w2	0.957	0.342	0-2.000	0.42	1.126	0.379	0.2500-2.316	4.44	1.124	0.364	0.429-2.462	12.48
Punishment in class w2	0.791	0.293	0-1.600	0.42	0.329	0.275	0-1.400	4.44	0.772	0.321	0.143-1.500	12.48
Argue with teacher w1	0.819	0.353	0.200-2.111	0	0.681	0.395	0-1.917	0	1.487	0.466	0.308-2.895	0
Skipping class w1	0.263	0.231	0-1.500	0	0.417	0.349	0-1.667	0	0.213	0.200	0-0.857	0
Coming late to class w1	1.076	0.383	0.250-2.143	0	1.083	0.444	0.238-2.500	0	1.222	0.378	0.500-2.800	0
Punishment in class w1	1.089	0.348	0.188-2.000	0	0.452	0.390	0-2.000	0	1.088	0.389	0.231-2.053	0
Academic self-concept w2	6.345	0.346	5.333-8.000	0.42	6.734	0.355	5.75-7.778	4.44	6.572	0.461	5.450-7.714	12.48
Language self-concept w2	2.402	0.292	0.292-1.632	0.42	3.038	0.224	2.529-3.750	4.44	2.874	0.317	2.083-3.583	12.48
<b>Independent and control variables at the classroom level</b>												
Cognitive performance w1	19.605	1.984	10.875-23.611	0.57	17.783	2.025	9.688-21.947	0	18.604	2.029	12.700-24	0.39
Language performance w1	17.274	2.671	8.625-24.407	0.29	18.867	2.032	9.000-23.158	0	16.594	1.674	8.000-20.640	0.19
Vocational track (ref)	0.639		0/1	0								
General track	0.184		0/1	0								
Academic track	0.177		0/1	0								
Non-western background	0.123	0.163	0-1	0	0.139	0.184	0-1	0	0.154	0.193	0-0.875	0

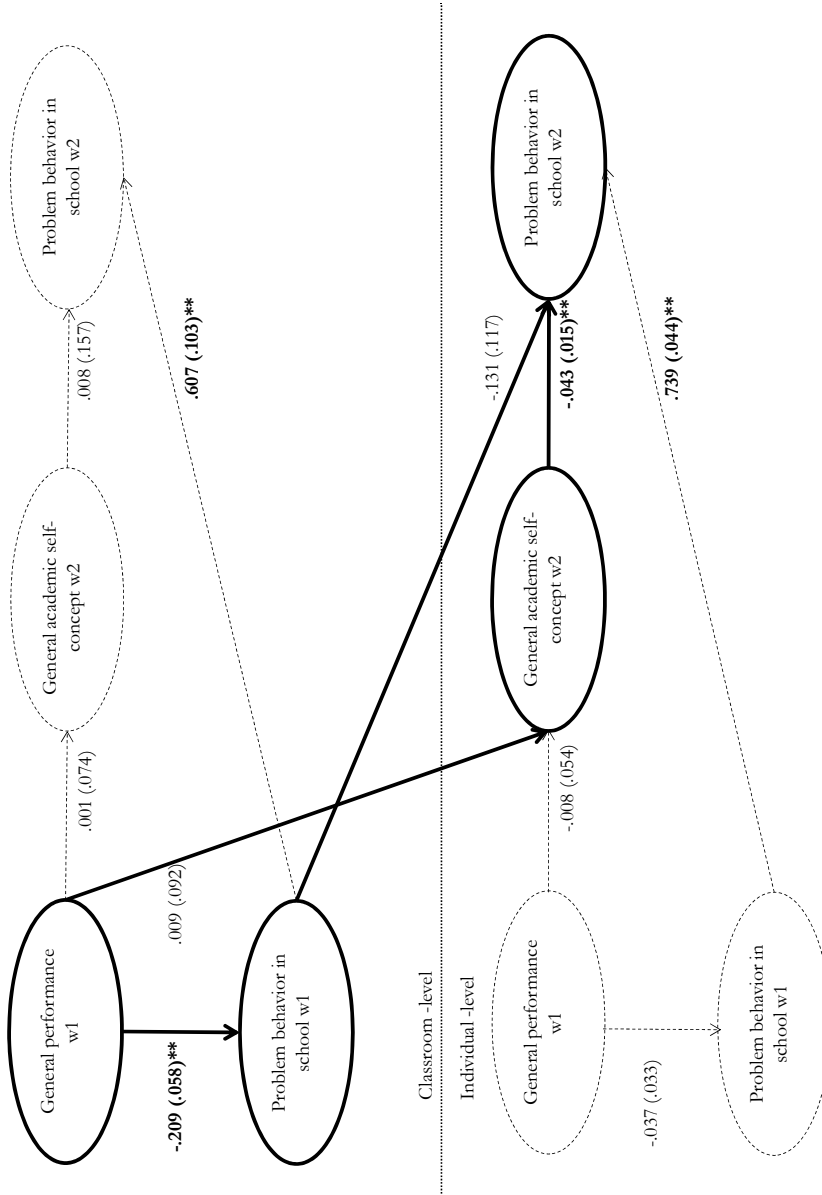
Note: Numbers are adjusted for the sampling design and non-response at the school-level. % missing at the classroom level refers to the share of classes for which this information is missing for all students in that class.

**Table 3.3** Correlations between the main variables at the individual-level and the classroom-level. Netherlands:  $N$  classroom-level = 222;  $N$  individual-level = 4539; Sweden:  $N$  classroom level = 251,  $N$  individual level = 5441; England:  $N$  classroom-level = 208,  $N$  individual-level = 4400

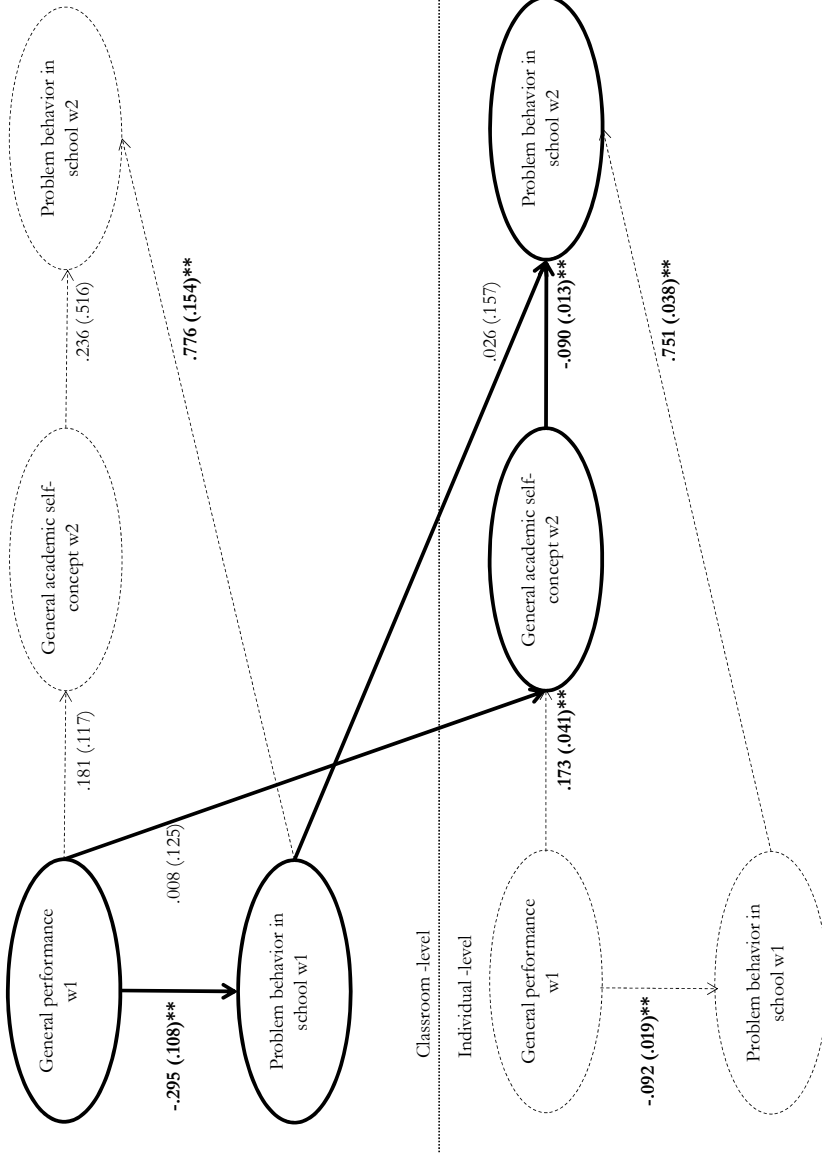
	The Netherlands			Sweden			England		
	PER 1	PB1	AS	PER 1	PB1	AS	PER 1	PB1	AS
<b>Individual-level</b>									
Problem behavior w2 (PB2)	-0.022	0.812	-0.123	-0.215	0.800	-0.424	-0.118	0.836	-0.297
General performance w1 (PER 1)	-	-0.047	0.020	-	-0.208	0.256	-	-0.150	0.209
Problem behavior w1 (PB1)	-	-	-0.183	-	-	-0.344	-	-	-0.240
<b>Classroom-level</b>									
Problem behavior w2 (PB2)	-0.633	0.976	0.017	-0.322	0.855	-0.096	-0.757	0.993	-0.369
General performance w1 (PER 1)	-	-0.574	0.006	-	-0.478	0.475	-	-0.684	0.416
Problem behavior w1 (PB1)	-	-	-0.009	-	-	-0.222	-	-	-0.304

*Note:* Correlations are weighted according to the sampling design and non-response at the school-level. PB2 = problem behavior w2, PER 1= General performance w1; PB1= Problem behavior w1; AS=Academic self-concept w2.

In all countries a negative association is found between the average performance level of the school class and the average problem behavior in class (H2a) (see figure 3.3, 3.4, and 3.5). The standardized effect size is -1.102 in the Netherlands, -0.950 in Sweden, and -1.390 in England. Students do not increase their problem behavior in school more between wave 1 and wave 2 when they attend a school class in which the average level of wave 1 problem behavior in school is higher (H2b). No support is found for the full negative indirect path between a class' average performance level and a student's problem behavior in school via a class' average problem behavior in school (H2).

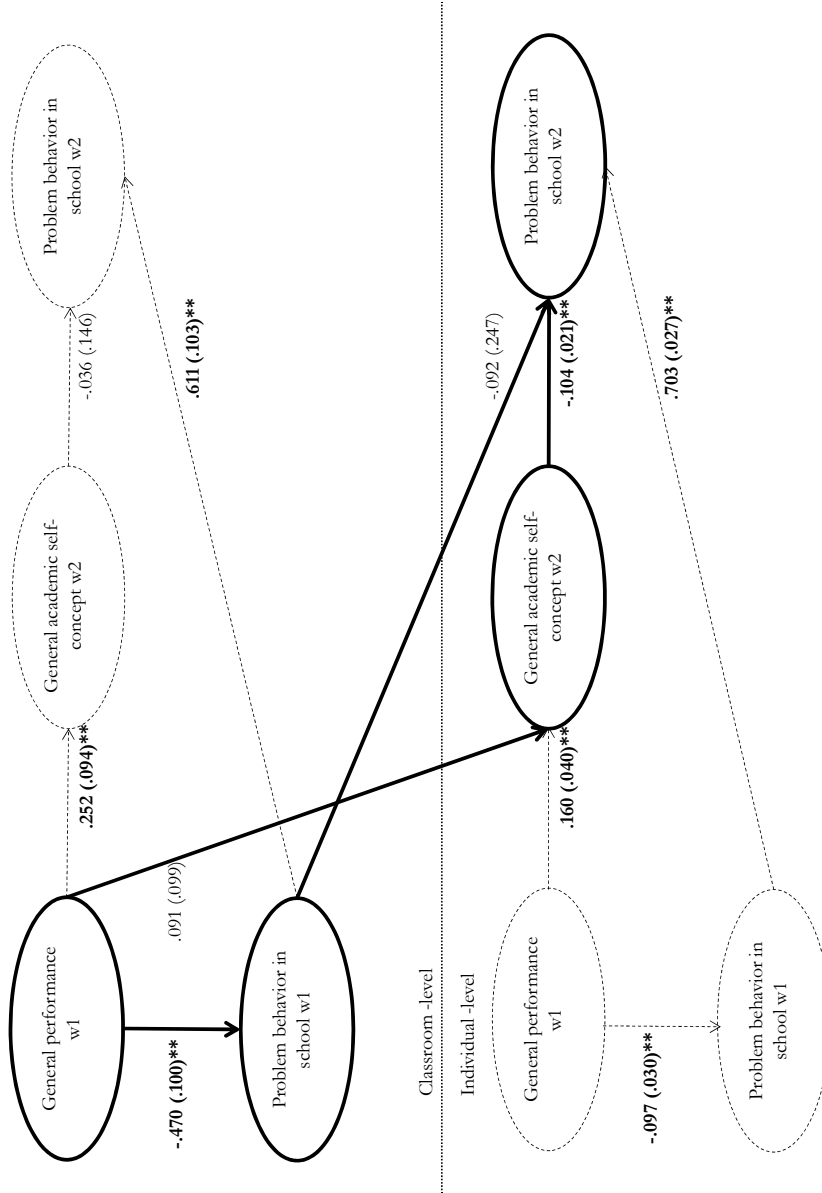


**Figure 3.3** MSEM results (unstandardized effects) for the Netherlands. Estimates are weighted according to the sampling design and non-response at the school-level. \* $p < 0.05$ , \*\* $p < 0.01$ , hypothesized effects (bold arrows) are tested one-sided, other effects two-sided. Model fit: Satorra-Bentler  $\chi^2(103) = 173.445$ ,  $p < 0.001$ ; CFI = 0.985; TLI = 0.975; RMSEA = 0.012.



**Figure 3.4** MSEM results (unstandardized effects) for Sweden. Estimates are weighted according to the sampling design and non-response at the school-level. \* $p < 0.05$ , \*\* $p < 0.01$ , hypothesized effects (bold arrows) are tested one-sided, other effects two-sided. Model fit: Satorra-Bentler  $\chi^2(103) = 400.728$ ,  $p < 0.001$ ; CFI = 0.967; TLI = 0.943; RMSEA = 0.023





**Figure 3.5** MSEM results (unstandardized effects) for England. Estimates are weighted according to the sampling design and non-response at the school-level. \* $p < 0.05$ , \*\* $p < 0.01$ , hypothesized effects (bold arrows) are tested one-sided, other effects two-sided. Model fit: Satorra-Bentler  $\chi^2(104) = 249.022$ ,  $p < 0.001$ ; CFI = 0.977; TLI = 0.962; RMSEA = 0.018

**Table 3.4** Multi-level structural equation results with language performance levels and language self-concept. Netherlands:  $N$  at classroom-level = 222;  $N$  at individual-level = 4539; Sweden:  $N$  at classroom level = 251,  $N$  at individual level = 5441; England:  $N$  at classroom-level = 208,  $N$  at individual-level = 4400

	H	The Netherlands		Sweden		England	
		b	S.E.	b	S.E.	b	S.E.
Individual-level effects							
A.S. lang 2 → P.B. 2	-	-0.004	0.018	-0.027	0.021	-0.122**	0.027
L.P. → A.S. lang 2		0.021	0.026	0.142**	0.021	0.121**	0.025
Classroom-level effects							
A.S. lang 2 → P.B. 2		0.167	0.188	-0.444	0.375	0.019	0.152
L.P. → A.S. lang 2		-0.163**	0.048	-0.124	0.104	0.085	0.069
Contextual effects							
L.P. → A.S. lang 2	-	-0.184**	0.057	-0.266**	0.110	-0.036	0.069

Note: Estimates are weighted according to the sampling design and non-response at the school-level. \* $p < 0.05$ , \*\* $p < 0.01$ ; hypothesized effects are tested one-sided, other effects two-sided. H indicates the hypothesized effects: - negative hypothesized effect, + positive hypothesized effect. Estimates are weighted according to the sampling design and non-response at the school-level. L.P. refers to language performance level, A.S. lang 2 refers to academic self-concept in the survey-country language in wave 2, P.B. 2 refers to problem behavior in wave 2. The paths presented above were not tested separately, but were tested in the full conceptual model as depicted in figure 3.2 and included all the control variables as described in the text. Model fit in The Netherlands: Satorra-Bentler  $\chi^2(104) = 174.373$ ,  $p < 0.001$ ; CFI=0.984; TLI=0.974; RMSEA=0.012. Model fit in Sweden: Satorra-Bentler  $\chi^2(103) = 380.240$ ,  $p < 0.001$ ; CFI=0.965; TLI=0.941; RMSEA=0.022. Model fit in England: Satorra-Bentler  $\chi^2(104) = 231.208$ ,  $p < 0.001$ ; CFI=0.978; TLI=0.963; RMSEA=0.017.

In the Netherlands students are explicitly tracked on the basis of their school performance. For this country we examine whether students in higher tracks have a higher academic self-concept (H3). The first models in table 3.5 present the relationships between educational tracking and the two types of academic self-concepts (i.e., general academic self-concept and language self-concept). In these models we do not yet account for the average performance-level of the class. Students in the general and the academic track seem to have a *lower*, rather than a higher, general academic self-concept and language self-concept than students in the vocational track (with respect to general academic self-concept:  $p$  (two-sided) = 0.042 for general track and  $p$  (two-sided) = 0.375 for academic track; with respect to language self-concept:  $p$  (two-sided) = 0.008 for general track and  $p$  (two-sided) < 0.001 for academic-track). However, the educational track of a class is positively associated with the academic performance level of a class. Hence, these relationships may represent the negative relationship between the performance level of the class and students' academic self-concept. In model 2 in table 3.5 we therefore include the average-performance level of the school class. We still find that the academic self-concept of students in the general track and students in the academic track

are not higher, but rather lower, than the academic self-concept of students in the vocational tracks ( $p$  (two-sided) = 0.015 for general track;  $p$  (two-sided) = 0.078 for academic track). Similarly, the language self-concept of students in the general track and students in the academic track are lower than the language self-concept of students in the vocational track ( $p$  (two-sided) = 0.050 for general track;  $p$  (two-sided) = 0.009 for academic track). Moreover, the contextual effect between the language performance-level of a class and a student's language self-concept turns positive (i.e., the BFLPE disappears;  $p$  (two-sided) = 0.131).

We also examine the relationships between the educational tracks and class-level problem behavior in school. In line with hypothesis 4, we find that students in the academic track exhibit lower levels of problem behavior in school in wave 1 than students in the vocational tracks (table 3.5, model 1). Because the educational track of a class is positively associated with the academic performance-level of the class, this relationship may purely represent the negative relationship between the performance-level of a class and student problem behavior in school. Hence, in model 2 we account for the performance-level of the class. When we account for the language performance level of the class, class-level problem behavior in school does not significantly vary anymore with the educational track of the class. The negative relation between the language performance-level of the class and class-level problem behavior in wave 1 is close to significance ( $p$  (one-sided) = 0.077). When we account for the overall performance level of a class in wave 1 (i.e., the combination of its cognitive and language performance level), problem behavior in school in wave 1 does not differ across the educational tracks. However, the relationship between the overall performance-level of a class and student problem behavior in school remains negative and significant. Inconsistent with our expectations, this suggests that the academic performance-level of a class – rather than the track-level of a class – is negatively related to student problem behavior in school.

### 3.8 Conclusion

Various studies have examined the effect of a school's academic performance level on a student's school achievement or performance. However, much less is known about the effect of a school's academic performance-level on non-cognitive school outcomes, including problem behavior in school. Existing research has mainly focused on differences in problem behavior across educational tracks in countries in which students are explicitly tracked on the basis of their academic performance. Most of this research

**Table 3.5** Multi-level structural equation results of educational-tracks on problem behavior in school at the classroom-level in the Netherlands.  $N$  at classroom-level = 222;  $N$  at individual-level = 4539

	General performance and academic self-concept						Language performance and language self-concept					
	Model 1: only educational tracks			Model 2: educational tracks + average performance levels			Model 1: only educational tracks			Model 2: educational tracks + average performance levels		
	H	b	S.E.	b	S.E.	S.E.	b	S.E.	b	S.E.	b	S.E.
Classroom-level effects												
Effect on problem behavior w2												
Problem behavior w1		0.602**	0.083	0.608**	0.100		0.599**	0.081	0.626**	0.088		
Academic self-concept w2		-0.008	0.164	-0.062	0.219		0.059	0.156	0.069	0.163		
Performance-level w1				0.016	0.053				0.052	0.037		
General track (i.e., HAVO)		0.006	0.042	-0.007	0.061		0.008	0.038	-0.010	0.040		
Academic track (i.e., VWO)		-0.055	0.037	-0.066	0.063		-0.052	0.046	-0.082	0.043		
Effect on problem behavior w1												
Performance-level w1	-			-0.210*	0.096							
General track (i.e., HAVO)	-	-0.002	0.064	0.072	0.088		-0.024	0.065	0.041	0.092		
Academic track (i.e., VWO)	-	-0.170**	0.070	-0.018	0.112		-0.211**	0.066	-0.092	0.116		
Non-western background		0.222	0.205	0.060	0.178		0.298	0.224	0.145	0.213		
Effect on academic self-concept w2												
Performance-level w1				0.217	0.122				0.005	0.069		
General track (i.e., HAVO)	+ <sup>a</sup>	-0.170*	0.083	-0.255	0.105		-0.129**	0.048	-0.120	0.061		
Academic track (i.e., VWO)	+ <sup>a</sup>	-0.083	0.093	-0.257	0.146		-0.256**	0.062	-0.239	0.092		
Non-Western background		0.105	0.268	0.288	0.257		0.236	0.170	0.219	0.182		
Contextual effects												
Performance-level w1 → Academic self-concept w2	-			0.222	0.147				-0.016	0.077		
Problem behavior w1 → Problem behavior w2	+			-0.130	0.108				-0.112	0.093		

Note: Estimates are weighted according to the sampling design and non-response at the school-level. \* $p < 0.05$ , \*\* $p < 0.01$ , hypothesized effects are tested one-sided, other effects two-sided. H indicates the hypothesized effects: - negative hypothesized effect, + positive hypothesized effect. <sup>a</sup> These effects are only hypothesized to be positive when accounting for performance-level w1. Performance-level w1 represents general academic performance level in the model including general academic self-concept, and language performance level in the model including language self-concept. Individual-level effects are accounted for in the model.

is cross-sectional and the findings of existing longitudinal studies are equivocal.

In this chapter we aimed to shed more light on the inconsistent findings of longitudinal research by focusing on two counter-balancing, but complementary, mechanisms that may underlie the relation between the academic performance-level of a school class and student problem behavior in school. Based on comparative reference group theory students in higher performing classes were expected to have a lower academic self-concept (Marsh et al., 2008; Richer, 1976), which in turn would lead them to exhibit more problem behavior in school (Finn, 1989; Richer, 1976; Van Houtte & Stevens, 2009b). Based on normative social influence theory we expected that the academic performance-level of a class negatively affects student problem behavior in school. In higher performing school classes, class-level problem behavior was hypothesized to be lower, which in turn would lead a student to intensify his/her problem behavior in school less (Van Houtte & Stevens, 2009b). We studied these relationships in three countries with different educational systems (i.e., the Netherlands, England, and Sweden). In this way we were able to examine whether findings generalized across different settings.

Multi-level structural equation models on nationally comparative data of  $\pm 5000$  adolescents in more than 200 school classes in each country provided support for some of the hypothesized relationships, but little support for any of the full indirect paths. Hence, neither comparative reference group processes, nor normative reference group processes were found to contribute to changes in student problem behavior.

With respect to comparative reference group theory, results indicated that the general performance-level of a school class did not affect a student's general academic self-concept. We did find that Swedish and Dutch students who attended a school class with a higher language performance level had a lower language self-concept. However, only general academic self-concept, and not language self-concept, was negatively related to student problem behavior in school. Previous research also suggests that the effect of the subject-specific performance level of a class on a student's subject-specific self-concept is more substantive than the effect of the general academic performance-level of a class on a student's general academic self-concept (Salchegger, 2015). Students may be more aware of their performance in a specific subject than of their overall performance in school. A student who is bottom of the class for one subject may perform better in another subject and this makes it difficult for him/her to judge his/her overall school

performance-level. Moreover, students could obtain some academic self-worth in their best subjects that may compensate for the deprivation of academic self-worth that they experience in their worst subjects. This may also explain why students with a lower language self-concept do not exhibit more problem behavior in school. When students have a higher self-concept in other subjects (e.g., mathematics), they may keep committed to school in general. However, it could be that students who have a lower language self-concept are more likely to exhibit problem behavior during language classes. Future research should examine this.

For the Netherlands, we also examined relationships between educational tracking and students' academic and language self-concepts. Results suggested that students in higher educational tracks have lower, rather than higher, academic and language self-concepts. Moreover, the language performance level of a class did not significantly affect a student's language self-concept anymore when accounting for educational tracking. These results are inconsistent with our expectations and findings of a Belgium study that indicated that students in higher tracks have a higher general self-esteem (Van Houtte et al., 2012). Nevertheless, our findings are in line with a recent cross-national study (Chmielewski et al., 2013). This study showed that, in educational systems in which students attend the same track for all their courses (e.g., the Netherlands), students in higher tracks have a lower math self-concept. This relationship was found when accounting for the math performance-level of the individual student and the school. Chmielewski et al. (2013) argue that students may only compare their own academic performance to that of their peers in different tracks when students are confronted with their educational track or stream on a daily basis, for example when students are only tracked for some – but not all – courses. This is why students who attend a high-track for all their courses do not have a higher academic self-concept than students who attend a low track for all their courses

Chmielewski et al. (2013) propose that in some countries students in lower tracks may have a higher academic self-concept, as teachers may deliberately try to promote the academic self-concept of students in lower tracks. In addition, we think that teacher instruction and course material may be more challenging in higher tracks, which may lower the academic self-concept of students in higher tracks. This effect may be exacerbated by the fact that some students attend a track that does not match their academic performance level. In higher tracks, the academic standard of the educational-track may exceed the academic abilities of some students, which may lead to a deprivation of their academic self-concept.

In lower tracks, the academic abilities of some students may exceed the academic standard of the track, which may boost those students' academic self-concept. In the Netherlands, the educational track of a pupil is determined by the advice of the primary school and, until recently, a standardized test score. A student's performance level may be under- or over-estimated in his/her test score or by the primary school. Parents may also play a role in this, as they try to influence the advice of the primary school (Driessen, 2006). Data from 2002 indicated that 84% of the primary schools experienced pressure from parental wishes on the advice and 40% of the schools determined the advice together with parents. Parents may especially influence schools to give their child a 'higher' advice (i.e., for a higher track). Future research may want to investigate the consequences of students who attend an educational track that does not match their academic performance level on student academic self-concept in more detail.

We found that lower performing classes were composed of more problematic students. Differences in problem behavior in school between lower and higher performing school classes did not intensify over time. This finding is inconsistent with normative social influence theory and contradicts the findings of a recent study by Müller and Hoffman (2016). This study found that differences in problem behavior across educational tracks increased over time in Switzerland. Students' changes in problem behavior were administered in the one-year period just after they entered a new school on the basis of their academic performance. In the present study, we analyzed students who had been attending the same school for a few years before they participated in the survey. Normative reference group processes may only take place just after students enter a new school, and could fade out after a while. Future research should examine this in more detail.

As found by earlier studies (Van de Werfhorst et al., 2012; Van Houtte, 2006), the average level of problem behavior in school was lower in academic tracks than in vocational tracks in the Netherlands. However, the present study indicates that this relationship may not be connected to the educational-*track* of a class, but rather to the performance-*level* of a class. The relationship between the educational track of a class and student problem behavior in school disappeared when accounting for the academic performance-level of the class. However, the relationship between the academic performance-level of the class tended to remain negatively related to student problem behavior, above and beyond the educational track of a class. Moreover, we also found a negative relationship between the academic performance-level of a class and student problem behavior in England and Sweden. In these

countries students are not explicitly placed in different school classes on the basis of their academic performance-level. These findings seem to challenge differentiation-polarization theory, which posits that students who are placed in a lower track experience status deprivation in the academic realm that leads them to turn against school<sup>10</sup>.

The present study indicates that students in lower performing school classes are more exposed to ill-behaved peers in class. In the classroom setting, these students thus have a greater chance to befriend peers who exhibit relatively high levels of problem behavior in school. While students may not be influenced by the problem behavior of all their classmates, they may be influenced by the problem behavior of their friends in class. Previous research indeed shows that adolescents are influenced by the school-specific behavior of their friends in class (Geven et al., 2013). Future research could investigate whether students in schools with a lower performance level tend to have friends who exhibit higher levels of problem behavior in school, and are subsequently influenced by the behavior of these friends.

---

10 This conclusion does not contradict the finding of previous studies that students in lower tracks intensify their problem behavior more than students in higher tracks just after track placement (Abraham, 1989; Müller & Hofmann, 2016). More problematic students may be sorted into lower tracks. After track placement, students in lower tracks will therefore be more exposed to more problem behavior in class than before track placement. Students in higher tracks will be exposed to less problem behavior in class than before track placement. This may lead lower track students to intensify their problem behavior more just after track placement than higher track students.







## Chapter 4

# Peers in transition: students' problem behavior in school across their transition to a new school class <sup>1</sup>

*This chapter examines changes in problem behavior in school (e.g., skipping class, arguing with teachers) of ±3000 Dutch adolescents across their transition to a new school class. The reshuffling of school classes serves as a natural experiment to investigate the effect of the behavioral norms of peers and peer belongingness in class on student problem behavior in school. Based on normative social influence theory, we expect that the problem behavior of peers who enter or stay in the adolescent's class will influence the adolescent's problem behavior in school more than the problem behavior of peers who leave the adolescent's class. We find no support for this. In line with belongingness theory, we find that adolescents decrease their problem behavior in school more when foes leave their school class. Adolescents' problem behavior in school is not altered when friends leave their school class. Instead, adolescents increase their problem behavior in school more when they befriend more peers who enter their school class after classes are reshuffled.*

---

<sup>1</sup> This chapter is co-authored with Jeroen Weesie and Frank van Tubergen. Sara Geven is the first author. Geven wrote the main part of the manuscript and conducted the analyses. Van Tubergen and Weesie substantially contributed to the manuscript. The authors jointly developed the idea and design of the study. An earlier version of this manuscript was presented at Sunbelt XXXV, Brighton, United Kingdom, 2015. We thank the audience for their helpful comments and suggestions. This work was supported by The Netherlands Organisation for Scientific Research (NWO) and the NORFACE research programme on Migration in Europe – Social, Economic, Cultural and Policy Dynamics. The authors also thank Jan-Kornelis Dijkstra, René Veenstra and Loes van Rijsewijk for their valuable comments during the ICS forum day.

## 4.1 Introduction

Peers constitute an important part of the social context in school and have been found to affect students' engagement in school, including their problem behavior (Juvonen et al., 2012). Problem behavior in school refers to student disobedience to school rules and norms (e.g., skipping class and not paying attention in class). Other terms for this behavior are adjustment problems in school (Berndt & Keefe, 1995), school misconduct (Demantet & Van Houtte, 2012), and behavioral disengagement (Fredricks et al., 2004; Ryan & Patrick, 2001). There are two important ways in which peers affect problem behavior in school. First, according to normative social influence theory, students are socialized by the behavior of their peers (i.e., *peer norms*) (Berndt & Keefe, 1995; Berndt, 1999; Hamm et al., 2011; Richer, 1976). Past studies indicate that the problem behavior of classmates (Carrell & Hoekstra, 2010; Figlio, 2007; Müller, Hofmann, Fleischli, & Studer, 2015; Thomas, Bierman, & Powers, 2011), and befriended classmates (Berndt & Keefe, 1995; Berndt, 1999; Geven et al., 2013), influences student problem behavior in school. Second, according to belongingness theory, *belongingness to peers* in school affects students' problem behavior in school (Juvonen et al., 2012; Osterman, 2000). Research shows that students are more involved and better behaved in school when they are more accepted by their schoolmates, and when schoolmates do not socially isolate, victimize, or reject them (Fredricks et al., 2004; Furrer & Skinner, 2003; Juvonen et al., 2012; Osterman, 2000).

Students do not usually stay in the same peer environment throughout their school career, but enter a new peer context from time to time when they transition to a new school or school class. Such a transition may lead to changes in problem behavior in school, (partly) due to the related changes that students experience in the peer context. School- or school class transitions imply that students will be exposed to, and may therefore be influenced by, the behavioral *norms* of different peers. In other words, the normative peer reference group might change. In addition, students' *belongingness* to peers in school could be altered when they enter a new context: students may no longer be in the same school or class as the peers they used to be positively (e.g., friends) or negatively (e.g., foes) tied to. School- and school class transitions offer a unique opportunity to examine the effect of peers, as they can serve as a natural experiment: if *belongingness to peers* and *peer norms* affect the behavior of students, then we expect that changes in the peer context in school or in class will be related to changes in student behavior in school.

Although in theory, school and school class transitions are of great research potential, existing research has not yet investigated the peer aspect of these transitions to its fullest potential. Existing research has merely focused on school transitions. A first line of research has examined the overall effect of school transitions on problem behavior in school. While most of these studies show that students exhibit higher levels of problem behavior after a school transition, e.g., higher levels of absenteeism and disruptive behavior (Benner, 2011; Juvonen, 2007), they do not reveal which aspects of the school transition lead to students' increase in problem behavior in school. A second line of research has studied the effect of peer norms and peer belongingness on problem behavior in school across a school transition (e.g., Aikins et al., 2005; Berndt et al., 1999; Bowes et al., 2013; Weiss & Bearman, 2007). However, these studies have not fully examined – or taken into account – the extent to which the peer context actually changes across the school transition. More specifically, most scholars do not investigate whether students transition to a new school with or without their previous schoolmates, including their friends and foes (i.e., also referred to as feeder patterns (Benner, 2011)). Relatedly, the extent to which students' normative reference group changes when they transition to a new school has remained unexamined.

In this chapter we try to overcome the shortcomings of these previous studies in two ways. First, we investigate changes in students' problem behavior in school across their transition to a new school *class* in the same school. Research that examines changes in the behavior of students across a school transition has often been unable to disentangle which aspects of the school transition lead to behavioral changes. Changes in the peer context that occur across a school transition cannot easily be separated from other contextual changes - such as new school policies, rules, or school size (Benner, 2011). We aim to bypass this issue by studying adolescents who transition to a *new class* – and thereby enter a new peer context – but who stay in the *same school* – and thus experience little changes in their larger school context. We address the following research question: “To what extent do changes in the peer context in class affect changes in students' problem behavior in school”? Second, we contribute to previous research, by more closely examining the changes in students' peer context in class across a school class transition. More specifically, we study the extent to which changes in *belongingness* to peers in class (i.e. the presence of friends and foes in class) affect changes in student problem behavior in school. In addition, we examine the extent to which the *behavioral norms* of current and past classmates differentially influence student problem behavior in school. In this way we aim to shed light on the extent to which the normative reference group changes across a school class transition.

As far as we are aware, only one previous study has examined student problem behavior in school among students who move to a new class. This U.S.-based study focuses on the influence of the behavior of classmates on the behavior of elementary school children. It indicates that the level of aggression, poor peer relationships and academic focus of current classmates is related to an increase in students' level of aggression, poor peer relationships and academic focus (Barth et al., 2004). However, the behavior of past classmates does not affect students' current behavior. Barth et al. (2004) think that the behavior of classmates may influence a student's behavior more when classmates stay in the student's class from one year to the next. In the present study, we are able to explicitly test this idea by comparing the influence of the behavior of peers who stay or enter the adolescent's school class to the influence of the behavior of peers who leave the adolescent's school class.

In multiple countries, school classes are restructured from one year to the next (Sørensen, 1970). The present study may illuminate which students increase (or decrease) their problem behavior in school in response to changes in their school class context. Accordingly, we may be able to advise school officers and policy makers on the possible effects of school class reshufflings and how they can be performed in the most effective ways. We address our research question by employing data on Dutch adolescents who move to a new school class across the transition from third (14-15 years old) to fourth grade (15-16 years old).

## 4.2 Theory

### 4.2.1 Peer norms

According to normative social influence theory (Deutsch & Gerard, 1955), people are influenced by the behavioral norms of others, referred to as reference persons or groups. People adjust to the behavioral norms of reference persons, as this is supposed to lead them to gain the social approval of reference persons and to reduce social punishments (Cialdini & Goldstein, 2004). People may be influenced by the ideas of reference persons on how people ought to behave (i.e., injunctive norms) or by the actual behavior of reference persons (i.e., descriptive norms) (Cialdini et al., 1990). Most research on normative social influence processes among adolescents has examined the extent to which the *behavior* of peers influences the behavior of adolescents and thereby focuses on descriptive norms (e.g., Barth et al. 2004; Müller et al. 2015, 2016a). In this chapter we follow this line of research.

While scholars argue that people's desire to avoid social sanctions and to obtain social approval is reflected more in their conformity to injunctive norms, injunctive norms and descriptive norms are often related to each other (Lapinski & Rimal, 2005). People may use descriptive norms as a heuristic to determine how they should behave in an appropriate way in a given situation. In line with this, research indicates that non-conformity to descriptive norms has social consequences: people who behave in accordance with the descriptive norm of a group are more likely to be accepted and less likely to be punished or rejected by group members (Chang, 2004; Irwin & Horne, 2013; Juvonen & Gross, 2005; Mikami, Lerner, & Lun, 2010; Wright, Giammarino, & Parad, 1986).

Normative social influence processes depend on two conditions. The first condition is visibility. This implies that people need to *observe* the behavior of a reference person in order to be influenced by his/her behavior (Friedkin, 1998; Merton, 1968; Richer, 1976). In addition, the reference person needs to *observe* people's behavior to be able to reward their conformity, and to punish their non-conformity, to his/her behavioral norms (Merton, 1968). The second condition is the *salience* of the reference person, which has also been referred to as meaningfulness (Friedkin, 1998; Richer, 1976). This implies that people are more likely to be influenced by the behavior of a reference person when they desire the social approval and aim to circumvent the social rejection of this reference person more.

We assume that classmates observe each other's behavior (i.e., the behavior is visible) and that students desire to be socially accepted and avoid being rejected by their classmates. Students spend a lot of time in their specific school class, and are thus assumed to be aware of the behavior of classmates. Adolescents have a basic need to feel accepted in the social contexts that they are part of (Furrer & Skinner, 2003). Moreover, classmates may include (potential) friends and admired peers that students want to be socially accepted by (Frank et al., 2008). Various studies indicate that the problem behavior of school- or classmates influences students' problem behavior in school. For example, the disruptive and aggressive behavior of classmates positively affects the disruptive and aggressive behavior of elementary and middle school children in the U.S. (Barth et al., 2004; Kellam, Ling, Merisca, Brown, & Ialongo, 1998; Thomas et al., 2011). Similarly, a Swiss study shows that when the aggressive, delinquent, and school-defiant behavior of classmates is higher, first-year secondary school students increase these behaviors more (Müller, Hofmann, Fleischli, & Studer, 2015; Müller, Hofmann, Fleischli, & Studer, 2016a). However, exceptions exist. Van de Werfhorst et al. (2012) do not find that teacher

estimates of the prevalence of aggressive and delinquent behavior in school is related to school-related misbehavior or non-school related misbehavior of students in the Netherlands. Similarly, a study among young children in the U.S. do not find that the externalizing problems of classmates in pre-school affect a child's externalizing problems in kindergarten (Neidell & Waldfogel, 2010).

When students move to a new school class, the visibility and salience of peers who leave their school class is assumed to decline. First, the interactions with previous classmates are supposed to decrease and will generally become limited to the hours outside class (e.g., after school time or in school breaks). Because of this, adolescents will be less aware of the behavior of their previous classmates than the behavior of classmates who stay in their class. This will especially apply to behaviors that are performed within the school class. Problem behavior in school, such as arguing with teachers and coming late to class, tends to be acted out in class. Although, adolescents might maintain to be aware of the behavior of *friends* who attend a different class, a small-scale study by Neckerman (1996) suggests that even contact among friends decreases after school classes are reshuffled. This study shows that friendships are more likely to dissolve when friends move to different school classes in the same school.

In addition, the behavior of an adolescent is assumed to be more visible to peers who attend the same class than to peers who attend a different class. Previous classmates of the adolescent who transition to a different class are thus less able to monitor the adolescent's behavior and to socially reward or punish this behavior than classmates who stay in the adolescent's school class. In other words, an adolescent's incentives, or expected social gains, for adjusting his/her behavior to the behavior of peers who leave the school class is smaller than the social gains for adjusting his/her behavior to peers who stay in the school class. We hypothesize:

*H1a) The level of problem behavior in school of peers who stay in the adolescent's school class is related to a stronger increase in the adolescent's level of problem behavior in school than the level of problem behavior of peers who leave the adolescent's school class.*

School class reshufflings also imply that new classmates – that used to be in a different class – become part of the adolescent's school class. Again, we assume that peers who attend the same school class are better able to monitor the behavior of the adolescent than peers who attend a different school class. Hence, there will



be a greater incentive for adolescents to adjust to the behavior of peers who enter their new class than to adjust to the behavior of peers who leave their school class. In line with this, a study by Barth et al. (2004) indicates that only the behavior of students' *current* classmates, and not the behavior of students' *previous* classmates, influences the behavior of U.S. elementary school students who move to a different school class from one year to the next. The study focuses on the influence of classmates on aggression, poor peer relations, and poor academic focus. We hypothesize:

*H1b) The level of problem behavior in school of peers who enter the adolescent's school class is related to a stronger increase in the adolescent's level of problem behavior in school than the level of problem behavior of peers who leave the adolescent's school class.*

#### 4.2.2 Peer belongingness

Scholars have relied on belongingness theory (Juvonen et al., 2012) or the early version of Hirschi's social bonding theory (Battistich & Hom, 1997) to make predictions about the effect of relatedness to peers in school on problem behavior in school. Because both theories are in line with each other and lead to similar expectations, we solely derive hypotheses based on belongingness theory. According to this theory, belongingness is a basic human need, such that a lack of belongingness is related to lower levels of well-being, and higher levels of disengagement and adjustment problems (Baumeister & Leary, 1995). Relatedly, a higher level of belongingness in school has been found to be related to higher levels of school motivation, school enjoyment, and school orientation; and lower levels of suspension, truancy, and drop-out (Juvonen et al., 2012; Osterman, 2000). When students feel safe in school and value the school environment more, they are assumed to adhere to school rules more (Finn, 1989).

School belonging is partly determined by the presence of positive relationships and the absence of negative relationships with schoolmates (Furrer & Skinner, 2003; Hamm & Faircloth, 2005; Juvonen et al., 2012; Osterman, 2000). When students are more positively related to their peers in school (e.g., they are accepted, they have friends), they will feel more connected to school and are therefore expected to adhere to school rules and norms more. Conversely, when students are negatively related to peers in school, they will be less committed to school, and may even try to avoid school, for example by skipping class (Johnson et al., 2001). In addition,

students who are less accepted by peers in school may have to worry more about fitting in, peer rejection, or peer victimization (Cillessen & Van den Berg, 2012). This could distract students from their school work, and might make it difficult for them to focus on school and to be engaged in school.

In this chapter we specifically focus on students' positive and negative relationships to peers in class. Students spend most of their time in school within their specific class. Their positive and negative relationships to classmates are therefore assumed to be important determinants of their behavior in school. Based on belongingness theory, we expect that having foes in class will be related to higher levels of student problem behavior in school. Past studies found that peer rejection or victimization in school is positively associated with truancy, school disengagement, school misbehavior, and grade retention (Fredricks et al., 2004; Juvonen et al., 2012). Nevertheless, relatively few studies have investigated these relationships longitudinally (Juvonen et al., 2012), and longitudinal studies are often restricted to children in elementary school (Juvonen et al., 2010). A few exceptions exist. For example, Juvonen, et al. (2010) find that students who are victimized more across the three years of middle school in the United States (i.e., early adolescence) are judged by teachers as being less engaged in school, such as being less concentrated on their school work. However, they do not find that changes in the level of victimization that a student experiences over time are related to changes in school engagement. This may be due to the fact that the level of victimization that students experience hardly changes over time. Moreover, longitudinal research among middle school students in the U.S. indicates that peer victimization is associated with higher levels of psychological maladjustment, and this in turn is related to lower levels of school functioning, including more school absences (Juvonen et al., 2000; Nishina, Juvonen, & Witkow, 2005).

We expect that students decrease their problem behavior in school when they move to a new school class without their foes. Students are assumed to feel safer and experience higher levels of belongingness in class when their foes leave their class. As far as we are aware, no studies have examined the extent to which students alter their problem behavior in school when they move to a different school class than their foes. However, a few studies have investigated the relationship between peer victimization and problem behavior across a school transition. Bowes et al. (2013) show that British students who are victimized in both primary school and secondary school engage in more externalizing problem behavior in secondary school compared to students who are never victimized, or students who are only

victimized in primary school. Students who became victimized in secondary school did not differ from students who were both victimized in primary and secondary school with respect to problem behavior in school. Inconsistent with the findings of Bowes et al. (2013), Scholte et al. (2007) do not find that Dutch respondents who are only victimized during childhood engage in less disruptive or aggressive behavior in adolescence than respondents who are victimized during childhood and adolescence. In addition, students who are only victimized in adolescence do not differ from students who are victimized in adolescence and childhood with respect to aggressive or disruptive behavior. In both studies it is unknown whether victimized students move to a new school with or without the bullies from their previous school. We hypothesize:

*H2a) When foes leave the adolescent's school class, an adolescent increases his/her problem behavior in school less.*

We focus on students' friendships in class as an indicator of their positive relationships to classmates and, thereby, their belongingness in class (Berndt, 1999; Hamm & Faircloth, 2005). Friends in school, especially those of high quality, are supposed to offer security: adolescents can rely on their friends for emotional and practical support and they make adolescents feel comfortable at school (Hamm & Faircloth, 2005). In line with this, research indicates that students with a same-sex best friend in school report higher levels of school belonging than adolescents without a same-sex best friend, or a same-sex best friend outside of school (Vaquera, 2009). The study by Ham & Faircloth (2005) suggests that especially friends in class contribute to students' belongingness in school, as adolescents report that friends in class provide a reason to go to school. Based on this we think that when more friends leave the adolescent's class across a class transition, the adolescent's belongingness in class decreases. Hence, the adolescent's problem behavior in school will increase. We hypothesize:

*H2b) When more friends leave the adolescent's school class, an adolescent increases his/her problem behavior in school more.*

The transition to a new school class also implies that new peers enter the adolescent's class. These peers could be or become foes of the adolescent (i.e., foes enter the adolescent's class). Based on belongingness theory, we think that when foes enter the adolescent's school class, adolescent's belongingness and security in class will

decrease. This is expected to lead to an increase in his/her level of problem behavior in school. We hypothesize:

*H3a) When foes enter the adolescent's school class, an adolescent increases his/her problem behavior in school more*

When adolescents transition to a new class, they may also be or become friends with new peers that enter their school class. This is expected to enhance the adolescent's belongingness in his/her class. We hypothesize:

*H3b) When more friends enter the adolescent's school class, an adolescent increases his/her problem behavior in school less.*

### **4.2.3 The interplay between peer belongingness and peer norms**

In line with belongingness theory, past studies have consistently found that negative relations to peers in school, such as peer rejection and peer victimization, are negatively associated with students' school engagement and achievement, including their problem behavior in school (Juvonen et al., 2000; Juvonen et al., 2010; Juvonen et al., 2012; Ladd et al., 2012). However, there is less consistent support for the supposed effect of students' positive relations to peers (e.g., friendships) on their school outcomes. In line with belongingness theory, Furrer & Skinner (2003) for example show that U.S. elementary school students who feel more accepted by their classmates and friends exhibit more pro-school behaviors, such as higher levels of effort and attention in school. Moreover, research indicates that peer acceptance and the presence of friends are positively related to students' adjustment to school after their transition to a new school (Juvonen et al., 2012). For instance, Aikins et al. (2005) find that students who maintain their friends over the transition to junior high school show higher levels of school adjustment in junior high, including lower levels of problem behavior in school. The study does not take into account whether students move to their new school together with their friends or not. In addition, Langenkamp (2010) indicates that high-achieving – but not low achieving – students with a higher social status in middle school (i.e. who are considered to be a friend by more middle school classmates) are less likely to be placed in a low math course and to fail a course in their first year of high school. However, some previous research findings are inconsistent with belongingness theory. For example, scholars find that adolescents who perceive more support from friends in school

exhibit more problem behavior in school (Demagnet & Van Houtte, 2012; Wang & Eccles, 2012) and that adolescents who have a higher social status in class engage in more rebellious behavior in class (McFarland, 2001).

A reason for these inconsistent findings may be that – in line with normative social influence theory – students adjust their behavior to the behavior of peers whose social approval is desired (e.g., friends). Especially during adolescence, peers may exhibit deviant behavior, including problem behavior in school (Allen et al., 1989; Demagnet & Van Houtte, 2012; Moffitt, 1993). Engaging in deviant behavior may be a way for adolescents to show their autonomy and independence from adults (Moffitt, 1993) and deviant behavior has been found to be positively related to adolescent social status (Allen et al., 1989; Moffitt, 1993). Having supportive friends in class may thus not enhance, but rather impede, pro-school behavior when these friends promote anti-school behavioral norms (Hartup, 1996). Research indeed indicates that the school behavior of friends influences the school behavior of adolescents, including their disruptive behavior (Berndt & Keefe, 1995), truant behavior (Rambaran et al., 2016), inattentive behavior in class, and refusal to do homework (Geven et al., 2013).

Based on this we believe that the relationship between the number of friends that leave the adolescent's class and problem behavior in school is dependent on the problem behavior of friends that leave the class. Adolescents are expected to increase their problem behavior in school when friends who exhibit relatively low levels of problem behavior leave their class. However, adolescents may not increase, and may even decrease their problem behavior in school, when friends who exhibit relatively high levels of problem behavior leave their class. A study by Berndt, Hawkins, and Jiao (1999) indicates that students may reduce their problem behavior in class when they are separated from misbehaving peers. This study namely shows that students *decrease* their level of misbehavior in school across their transition from primary school to junior high when their friendships with misbehaving peers are mostly unstable across this transition. Adolescents do *increase* their level of misbehavior in school across this school transition when friendships with misbehaving peers are mostly stable. We hypothesize:

*H4) The relationship expressed in H2a is weaker when the friends who leave the adolescent's school class exhibit more problem behavior in school.*

### 4.3 Context of the study

In the Netherlands, students are tracked on the basis of their ability when they enter secondary school. Students either follow one of the vocational tracks (i.e., Vmbo-b, Vmbo-k, Vmbo-g, and Vmbo-t), or one of the upper secondary educational tracks (i.e., Havo and Vwo) (Eurydice, 2005). During secondary school, students are stratified again, because they have to pick a specialization. Students who follow a Vmbo-b, Vmbo-k, or Vmbo-g track usually pick a specialization in economics, care and wellbeing, agriculture, or technology at the end of their second year. The highest vocational track (i.e., Vmbo-t) is less stratified with respect to specialization, but students often choose courses that tend to match one of these specializations at the end of their second or third year (Westerhuis, Neuvel, Huijgen, & Meng, 2012). Students from the higher ability tracks (i.e., Havo and Vwo) choose a specialization at the end of third year in economics and society, nature and health, culture and society, or technology and health (Eurydice, 2005). Moreover, they can pick optional courses outside their specialization.

In this chapter we study the transition from third grade to fourth grade in the Netherlands. While school class reconfigurations are common in both lower and higher ability tracks, they are more frequent in the higher ability tracks (Vmbo-t, Havo and Vwo tracks). This is because class reconfigurations tend to occur just after students have chosen their specialization (Eurydice, 2005). Table 4.1 provides an overview of the extent to which students from different Dutch tracks transition to a new school class in the sample that we use in this chapter. The table shows a student's average share of new classmates in the second wave of the study. The average share of new classmates ranges between 23% to 27% in the Vmbo-b, Vmbo-k, and Vmbo-g tracks, whereas it ranges between 58% to 76% in the Vmbo-t, Havo, and Vwo tracks.

While students follow all courses in the same school class before they pick their specialization, this situation might change after they have picked their specialization. Some students follow all their courses in one fixed school class (i.e., because all classmates follow the same specialization), whereas others only follow several required courses together with their classmates (e.g., physical education, Dutch, English, a basic level of German, and French). This latter group spends a large part of the day within the school class, but switches to other school classes for the specialization-specific and optional courses. In the section on the “robustness checks” we will discuss some tests that indicate the extent to which this may affect the main results.

**Table 4.1** School class changes by track across the transition from third to fourth grade in the Netherlands

Track	A student's average share of new classmates at t1	Number of students
Vmbo-b	26%	196
Vmbo-k	27%	580
Vmbo-g	23%	212
Vmbo-t	59%	752
Havo	76%	462
Vwo	58%	581

*Source: CILS4EU data. Descriptives are not weighted according to non-response and the sampling design of the study.*

## 4.4 Data

We use the first two waves of the Dutch part of the Children of Immigrants Longitudinal Study in 4 European countries (CILS4EU) data (Kalter et al., 2013). The first wave (t0) of the data was gathered in Sweden, England, Germany, and the Netherlands among adolescents between 14 and 15 years old. The second wave was gathered one year later (t1). In the Netherlands, school classes are restructured very frequently across the two time points. Reconfigurations of school classes also occur in Germany and England, but not in Sweden (i.e., In Sweden, 97% of a student's school class at t1 consists of his/her t0 classmates). Unfortunately, we do not have precise information on the extent to which school class changes occur in Germany and England. For these countries, we do not know the school class that students were part of at the time point(s) that they did not participate in the study. This means that also for students who participated in both waves of the study, we do not exactly know which other students were part of their school class at t0 and t1. Hence, we only use data from the Netherlands.

Data were gathered on the basis of a three-stage stratified sampling design. First, schools were sampled. Large schools and schools with a high immigrant proportion were oversampled, but other than that the selection procedure was random. When initially sampled schools refused to participate, replacement schools were approached. These replacement schools were similar to the refusing school in terms of the share of students with an immigrant background and school type. In the Netherlands, the total response rate at the school level was 34.9% without replacement schools and 91.7% with replacement schools. At the second stage of the sampling design, two classes were randomly selected in each school. Finally, all

students in the selected classes were invited to participate. The response rate at the student level was 91.1% at t0.

At t1, a large share of students had moved to a new school class. In order to retain as many t0 respondents as possible, all classes that contain some t0 respondents were asked to take part in the study at t1. Both students that were part of the initial sample, as well as students that were part of the t1 school class of initially sampled students, were invited to participate in the study. Hence, the number of students in the sample increased from 4363 to 6796. When schools were not willing or unable to participate with all classes that included t0 respondents, students were interviewed in their old school class setting. Students whose school refused to take part in the study at t1 or who dropped out of school were approached individually.

We analyze the behavior of respondents who participated at both time points and who were part of the initial sample. In total 4229 students participated at t0 of the data collection<sup>2</sup> and 77% of these students also participated at t1 (3289 students). Because we are interested in students' current and past school class context, we dropped respondents whose school class context was unknown (i.e., respondents who did not participate via school (184 students) and students who did not participate in their original t1 school class setting (216 students)). Finally, we dropped students who did not seriously participate in the study (45 students).

## 4.5 Measurements

### 4.5.1 Dependent variable

At both time points, students were asked to indicate the extent to which they argue with their teacher, skip class, are punished in school, and come late to school on a five-point scale ranging from every day to never (Cronbach's alpha 0.696 at t0 and 0.709 at t1). We recode students' answers on these four items. A principal component factor analysis shows that the items load on one factor. The factor accounts for 52.80% of the variance in the items at t0 and 54.07% of the variance in the items at t1. For each time point, we calculate a student's average score on the four items as a measure of *problem behavior in school*. The correlation between

---

<sup>2</sup> By participation we refer to students who completed both the main survey and the survey about their relationships to their peers in class. Note that students who only participated at one of the two time points were taken into account in the construction of the peer variables.



students' problem behavior at t0 and t1 is 0.678 and the latent correlation between the factors is 0.879. Problem behavior in school at t1 is the dependent variable in the study. The distribution of the dependent variable is skewed: most students exhibit low levels of problem behavior in school.

### 4.5.2 Independent variables

To measure the problem behavior in school of peers who leave, enter or stay in

the adolescent's school class, we use the following formula:  $\frac{\sum j(x_j)}{n}$ . In this formula

$x$  refers to problem behavior in school at t0;  $j$  refers to a peer of a specific type (i.e., a peer who leaves, a peer who enters, or a peer who stays in the adolescent's class) and  $n$  refers to the total number of peers across all different types (i.e., number of peers who are, or were, part of the adolescent's class in t0 or t1). We refer to these three measures as: *Problem behavior leavers*, *Problem behavior joiners* and *Problem behavior stayers*. Note that these measures do not represent the average problem behavior in school of each peer type. Instead, the three measures add up to the *average* t0 problem behavior in school of all (previous and current) classmates of the adolescent. In this way we aim to align with past research on descriptive behavioral norms in class, which usually measures the problem behavior of classmates by the *average* problem behavior of all classmates (Müller et al. 2015, 2016a). In other words, we split the average problem behavior of all (previous and current) classmates among the three types of peers, according to the contribution of each peer type to this average.

We measure whether befriended classmates at t0 leave the adolescent's school class at t1 by using the sociometric questionnaire of the CILS4EU survey. At both t0 and t1 students are asked to list their five *best* friends in class. We calculate the number of befriended classmates at t0 who are not part of the respondent's school class at t1 (*# leaver friends*). The problem behavior of friends who leave the school class is measured by the average problem behavior of these friends (i.e., *problem behavior leaver friends*). We calculate the number of friends in class at t1 who were not part of the respondent's school class at t0, and thus entered his/her class at t1 (*# joiner friends*).

Research indicates that some friendships are marked by negative features, and that adolescents whose friendships are higher in negative features (i.e., conflict and

rivalry) actually increase their disruptive behavior in school more over time (Berndt & Keefe, 1995; Ladd et al., 2012). Because of this, we tried to exclude friendships with negative features. In case a student indicated that a friend “was sometimes mean to them”, this classmate was not considered to be a friend (2.17% of all the friendship nominations at t0 and 2.84% of all the friendship nominations at t1).

Students’ nominations on the question ‘who is sometimes mean to you’ is used to calculate whether foes at t0 leave the adolescent’s school class at t1 (*leaver foes*). In addition, this question is used to calculate whether a peer who enters the adolescent’s school class at t1 is/becomes a foe of the adolescent (*joiner foes*). There were no restrictions on the number of classmates that the respondent was allowed to nominate. In case a foe was also nominated as a friend, this classmate was not counted as a foe. Most people are not victimized in class at t0 and t1 (68% at t0 and 74% at t1). Students who are victimized tend to report only one foe (65% at t0 and 61% at t1). Hence we focus on *whether* or not (a) foe(s) leave(s) or join(s) the adolescent’s school class, rather than the number of foes that leave or join the school class.

### 4.5.3 Control variables

We control for students’ *problem behavior t0* and the *squared problem behavior t0*. Students who exhibit higher levels of problem behavior in school at t0 are likely to exhibit higher levels of problem behavior in school at t1. Moreover, these students might be sorted in schools (or school classes) in which peers engage in relatively high levels of problem behavior in school. When we do not account for students’ t0 problem behavior in school, we may thus overestimate the influence of peers. We include the quadratic term, because the relationship between students’ problem behavior at t0 and t1 could be curvilinear. Students who exhibit higher levels of problem behavior are less likely to increase their problem behavior in school even more, because school authorities are expected to actively avoid problem behavior in school, and students might fear punishments.

We control for gender (i.e., *boy*) and whether both parents of the respondent are born in the Netherlands (*native Dutch*). We account for *parental school support* and *teacher support*. Teacher support is measured by the sum score on two items that indicate the help and encouragement obtained at school from teachers (pairwise correlation = 0.58). Parental school support is measured by the average score on three items that capture the extent to which parents are proud of, and interested in, the respondent’s school achievement, and encourage the respondent to work

hard in school (Cronbach's alpha = 0.66). Parental and teacher school support have been found to be positively related to behavioral engagement in school (Furrer & Skinner, 2003). Moreover, when students' relationship with teachers and/or parents is better, they may be more likely to tell their teachers and/or parents about negative experiences with classmates (i.e., classmates who are mean to them). Consequently, teachers and/or parents may be better able to avoid subsequent mistreatment (Fekkes, Pijpers, & Verloove-Vanhorick, 2005).

We include for each student the number of months that he/she spent in the t0 school class and in the t1 school class in between the two observation points (*nr of months in t0 school class* and *nr of months in t1 school class*). Students are likely to change their peer relationships and problem behavior in school more between t0 and t1 when the interview at t0 took place earlier in the school year and when the interview at t1 took place later in the school year.

Students' *newness in class* indicates the extent to which t1 classmates are 'new' classmates. It is measured by the share of classmates at t1 that were not part of a student's school class at t0.

We account for whether a respondent reports to have a foe at t0 (*foe at t0*). Respondents who do not have any foes at t0 will have no *leaver foes*. At the same time, people who have foes at t0 may increase their problem behavior in school more than people who have no foes at t0, as the experience of having foes at t0 could have lagged effects<sup>3</sup>.

The sorting of adolescents into t1 classes is likely to be affected by the *specialization* adolescents follow at t1. Students from the vocational tracks usually follow a specialization in 'economics', 'care and wellbeing', 'agriculture', or 'technology'. Students from the Havo and Vwo tracks usually follow a specialization in 'economics and society', 'nature and health', 'culture and society', or 'nature and technology'. Some students follow two or more specializations or follow a specialization outside of the regular categories. We combine the specializations from the different tracks into the following categorical variable: *technology (reference group)*, *health*, *economy*, *agriculture*, *culture*, or *other*. The specialization of 2.68% of the students is missing. These missing values are only found among students from the vocational tracks, and mostly among students from the Vmbo-t track (47% of all the missings). This

<sup>3</sup> Results are not altered when we also include a dummy that indicates whether a respondent reports to have a foe at t1. This control variable is not significant.

**Table 4.2** Descriptive statistics. *N student = 2783; N school = 90; N t0 class = 198; N t1 class = 243*

	Mean/Proportion	SD	Range	% Missing
<b>Dependent variable</b>				
Problem behavior in school (t1)	0.707	0.601	0-4	0.07
<b>Independent variables</b>				
Problem behavior leavers <sup>a</sup>	0.280	0.201	0-1.192	0.40
Problem behavior joiners <sup>a</sup>	0.270	0.146	0-0.750	22.39
Problem behavior stayers <sup>a</sup>	0.313	0.288	0-1.813	0.25
# leaver friends	1.738	1.556	0-5	0.07
Leaver foes	0.149		0/1	0
# joiner friends	1.188	1.374	0-5	1.02
Joiner foes	0.116		0/1	1.02
Problem behavior leaver friends	0.645	0.649	0-3.250	1.90
<b>Control variables</b>				
Problem behavior in school (t0)	0.771	0.626	0-3.500	0.07
Newness in class	0.498	0.312	0-1	0.00
Has a foe at t0	0.317		0/1	0.00
Boy	0.479		0/1	0.70
Native Dutch	0.706		0/1	0.04
Teacher support	2.373	0.787	0-4	0.11
Parental school support	3.255	0.561	0-4	0.11
Nr of months t0 school class	7.341	1.425	4.067-9.733	0.00
Nr of months t1 school class	3.030	1.379	1.100-7.967	0.00
Specialization				
Technology (reference group)	0.155		0/1	
Health	0.250		0/1	
Economy	0.385		0/1	
Agriculture	0.047		0/1	
Culture	0.060		0/1	
Other (e.g., combination, unspecified)	0.104		0/1	
Changed track				
No track change	0.902		0/1	0.00
Changed to lower track	0.072		0/1	0.00
Changed to higher track	0.026		0/1	0.00
Track (at school-level)				
Vmbo-b	0.089		0/1	0.00
Vmbo-k	0.244		0/1	0.00
Vmbo-g	0.089		0/1	0.00
Vmbo-t	0.233		0/1	0.00
Havo	0.156		0/1	0.00
Vwo	0.189		0/1	0.00

*Note: Descriptives are not weighted according to the sampling design of the study or non-response.*

<sup>a</sup> Means after imputation.

is likely due to the fact that students in the Vmbo-t track sometimes do not have to pick a specialization (Westerhuis et al., 2012). Hence, we combine these people with the group ‘*other*’ (see table 4.3).

We account for students’ ability *track* at the school-level: *Vmbo-b* (reference category), *Vmbo-k*, *Vmbo-g*, *Vmbo-t*, *Havo*, or *Vwo*. Finally, we control for whether a student changes tracks across the two time points. The categorical variable *changed track* indicates whether the respondent stayed in the same track (ref. category), changed to a lower track, or changed to a higher track. Table 4.2 shows the descriptives for all the variables.

## 4.6 Methods

Missing values on *problem behavior leavers*, *problem behavior joiners*, *problem behavior stayers*, and *problem behavior leaver friends* are imputed. Especially *problem behavior joiners* has a high share of missings (i.e., for 52% of these peers t0 problem behavior in school is missing. For 22% of the adolescents the t0 problem behavior in school of *all* these peers is missing). This is because the group of peers that joins the adolescent’s class includes students who were not part of the initial sample (see section 4.4). We impute missing items on peers’ t0 problem behavior in school by means of multiple imputation by chained equations generating 20 imputation datasets (White, Royston, & Wood, 2011)<sup>4</sup>. The imputation model includes all t0 and t1 problem behavior in school items and school dummies to account for the nesting of students in school<sup>5</sup>. Students with missings on any of the other variables are list-wise deleted. This leaves us with 2783 cases (97.86% of the students that were selected for this study).

The hypotheses are tested by means of a cross-classified multilevel model for normal distributed response variables. This model accounts for the non-hierarchical nesting of students in school classes (i.e., students who attend the same t0 school

4 Highly similar conclusions are obtained when the t0 problem behavior of peers is not imputed or when the t0 problem behavior of peers is imputed by their problem behavior at t1. Some analyses on non-imputed data indicated that the estimate for the problem behavior of peers who stay in class was larger than the estimate for the problem behavior of peers who leave the class. However, this finding was not robust across different model specification.

5 Note that the complex nesting structure of the data (e.g., the cross-classified nesting of peers in school classes) is not accounted for in the imputation model. This was inevitable, as identifiers for the nested structure were missing by default for some peers (e.g., peers who were not part of the initial sample do not have a school class identifier for wave 1).

class can be in different t1 school classes and vice versa) (Hox, 2010). Moreover, we account for the nesting of students in schools. We model problem behavior in school at t1, while controlling for problem behavior in school at t0. Hence, the results should be interpreted as describing students' increase in problem behavior in school between t0 and t1. We use robust standard errors to account for the non-normal distribution of the dependent variable. Unfortunately, we were unable to weight the analyses according to the study's sampling design and non-response, since this led to estimation problems. Hence, the analyses are unweighted.

## 4.7 Results

We first inspect the correlations between the main independent variables and a student's problem behavior at t1 (table 4.3). There is a positive and significant correlation between the t0 problem behavior of peers who stay, enter, or leave the adolescent's class and the problem behavior in school of the adolescent at t1. These correlations do not differ much in magnitude. The number of friends who leave the adolescent's school class is positively correlated to the adolescent's problem behavior in school at t1. Unexpectedly, the number of friends who join the adolescent's school class is also significantly and positively correlated to problem behavior in school at t1. The adolescent's problem behavior at t1 is negatively correlated to *leaver foes* and positively correlated to *joiner foes*. However, the latter correlation is not significant.

**Table 4.3** Correlations between independent variables and problem behavior in school (t1)

	Problem behavior in school (t1)
Problem behavior leaver	0.077**
Problem behavior joiners	0.078**
Problem behavior stayers	0.069**
# leaver friends	0.041*
Leaver foes	-0.041*
# joiner friends	0.084**
Joiner foes	0.025

*Note: \* $p < 0.05$ , \*\* $p < 0.01$  (two-sided  $p$ -values). All continuous independent variables are grand-mean centered. Correlations are not weighted according to non-response and the sampling design of the study.*

We continue with the multi-level cross-classified models in which we predict student problem behavior at t1, while controlling for their problem behavior at t0 (table 4.4). Note that none of the control variables are reported in the table for reasons

of readability. A full table including all the variables can be found in Appendix A4.1 (see Appendices chapter 4). We first estimate a model in which none of the independent and control variables are included (i.e., an intercept-only model, model 1 in table 4.4). This model indicates that 91% of the variance is at the individual-level ( $0.328 / (0.328 + 0.015 + 0.010 + 0.008) * 100$ ), 4% is at the t0 class level, 3% is at the t1 class level, and 2% is at the school-level.

In the second model hypotheses h1a – h3b are tested (i.e., model 2, table 4.4). Consistent with normative social influence theory, we find a significant positive relationship between the t0 problem behavior of peers who stay in the adolescent's school class and students' increase in problem behavior in school. The t0 problem behavior of peers who leave or join the adolescent's school class is not significantly related to changes in adolescent problem behavior in school. Superficially these findings seem to support hypothesis 1a. However, there is no significant difference between the influence of the behavior of peers who leave and the behavior of peers who stay in the adolescent's school class (F test:  $F(1, 16934.9) = 1.49$ ;  $p$  (one-sided) = 0.111). Inconsistent with hypothesis 1b, there is also no significant difference between the influence of the problem behavior of peers who leave and the influence of the problem behavior of peers who enter the adolescent's school class (F test:  $F(1, 1242.6) = 0.66$ ;  $p$  (one-sided) = 0.417)<sup>6</sup>. This means that we find no support for the hypotheses derived from normative social influence theory.

We find limited support for the hypotheses derived from belongingness theory. In line with hypothesis 2a, students increase their problem behavior in school less (or decrease it more) when they transition to a new class without their t0 foes, albeit the effect size is small. Students who transition to a new school class without their t0 foes increase their problem behavior in school 0.064 less than students who transition to a new class with at least one of their t0 foes. Students do not significantly alter their problem behavior in school when more friends leave their school class at t1<sup>7</sup> (hypothesis 2b), or when foes join their school class at t1 (hypothesis 3a). In contradiction to hypothesis 3b, we find that students who befriend more peers that enter their school class at t1 increase their problem behavior in school more (two-sided  $p$ -value=.001).

6 The inclusion of the problem behavior of friends who leave the school class may reduce the effect of the problem behavior of the whole group of peers who leave the school class. Hence, we also estimate a model without this effect. In this model the positive estimate of the problem behavior of peers who leave the class is larger, but conclusions remain the same.

7 We also estimate models in which we incorporate a dummy that indicates whether all friends leave the respondent's school class. These models lead to the same conclusions.

In model 3 we test hypothesis 4. We do not find support for an interaction effect between *#leaver friends* and *problem behavior leaver friends*. This indicates that the relation between the number of friends that leave the t0 class and adolescent problem behavior in school is not dependent on the problem behavior in school of leaver friends. The problem behavior of friends who leave the adolescent's school class is positively related to an increase in students' problem behavior in school. This suggests that friends who leave the adolescent's school class still influence adolescent's problem behavior in school.

**Table 4.4** Multi-level cross-classified model of students' problem behavior in school. *N* student = 2783; *N* school = 90; *N* t0 class = 198; *N* t1class = 243

	H	Model 1		Model 2		Model 3	
		Est	S.E.	Coef.	S.E.	Coef.	S.E.
<i>Intercept</i>		0.711**	0.019	0.615**	0.073	0.627**	0.071
Problem behavior leavers				0.015	0.088	0.030	0.087
Problem behavior joiners	+ <sup>a</sup>			-0.100	0.120	-0.088	0.119
Problem behavior stayers	+ <sup>a</sup>			0.142*	0.075	0.148*	0.076
#Leaver friends	+			-0.012	0.009	-0.012	0.008
Leaver foes	-			-0.064*	0.033	-0.063*	0.033
#Joiner friends	-			0.026	0.008	0.027	0.008
Joiner foes	+			0.022	0.028	0.022	0.029
Problem behavior leaver friends				0.047**	0.016	0.041*	0.017
#Leaver friends * Problem behavior leaver friends	-					-0.017	0.014
<i>School variance</i>		7.615e-03		4.527e-04		5.035e-04	
<i>Class t0 variance</i>		0.015		2.343e-03		2.128e-03	
<i>Class t1 variance</i>		0.010		2.921e-03		3.000e-03	
<i>Individual variance</i>		0.328		0.183		0.183	

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , hypothesized effects are tested one sided, other effects two-sided. H indicates the hypothesized effect: - negative hypothesized effect, + positive hypothesized effect. Continuous variables are grand-mean centered. All control variables described in the measurement section are included in the model (not shown in the table). Estimates are not weighted according to non-response and the sampling design of the study. <sup>a</sup> No explicit hypotheses are formulated about these effects in the text (i.e. hypotheses are on the differences between the influence of the behavior of different peers). However, we argue that students will be positively influenced by the behavior of their current classmates.

Some of the control variables are also significant in the model (see Appendices chapter 4, Appendix A4.1). Results indicate that there is a diminishing positive relationship between a student's problem behavior in school at t0 and his/her problem behavior in school at t1 (i.e. there is a positive linear term, and a negative



quadratic term for problem behavior in school  $t_0$ ). Moreover, boys increase their problem behavior in school more between  $t_0$  and  $t_1$  than girls. The other control variables are not significant related to changes in student problem behavior in school. This also implies that the extent to which a student's school class composition changes in between  $t_0$  and  $t_1$  is not significantly related to changes in the student's problem behavior in school (i.e., the variable newness in class is not significant).

#### 4.7.1 Robustness checks

In this section we will discuss the results of several robustness checks (the complete models are reported in Appendix A4.2). First, we estimate a model in which we take into account whether a “leaver friend” follows the same specialization as the adolescent. At  $t_1$  adolescents may follow courses together with friends who left their school class, but who follow the same specialization. Because of this, we may have not found a relation between the number of friends who leave the adolescent's school class and changes in the adolescent's problem behavior in school. We re-estimate the second model, but replace the *number  $t_0$  friends that leave class* by the number of friends that leave the class *and* follow a different specialization. In this way we examine whether students who attend no courses together with their  $t_0$  befriended classmates, increase their problem behavior more. We find no support for this idea. The conclusions with respect to hypothesis 2b are not altered.

The findings reported in table 4.4 provide only limited support for the idea that the school-specific problem behavior of classmates influences the school-specific problem behavior of the adolescent. This may be due to the fact that adolescents are only influenced by the behavior of peers who attend the same class *and* who follow the same specialization as the adolescent. Hence, as a second robustness check, we re-estimate the second model, but distinguish between the problem behavior of peers who follow the same specialization as the adolescent and the problem behavior of peers who follow a different specialization. We also still differentiate between peers who leave, join, and stay in the adolescent's class. Again we find that the problem behavior of peers who enter or leave the class is not significantly related to a change in the adolescent's problem behavior in school, no matter whether these peers follow the same or a different specialization as the adolescent. With respect to the behavior of peers who stay in the adolescent's school class, we find that only the behavior of those who follow a different specialization has a significant positive effect on the adolescent's changes in problem behavior in school. However, an F-test indicates that there are no significant differences between the influence

of the problem behavior in school of peers who follow the same specialization and the influence of the problem behavior in school of peers who follow a different specialization (for leavers:  $F(1, 58983.5) = 0.04$ ,  $p$  (two-sided) = 0.846), for joiners:  $F(1, 7130.1) = 1.54$ ,  $p$  (two-sided) = 0.214) and for stayers:  $F(1, 107407.4) = 2.80$ ,  $p$  (two-sided) = 0.094)<sup>8</sup>.

As a third robustness check, we estimate school fixed effect models (table A4.2.2, Appendix A4.2). These models account for all time-invariant unobserved heterogeneity across schools (e.g., differences in school policies across schools). Estimated coefficients are thus based on variation between classes within the same school. The models correct for the non-random sorting of students into schools and control for contextual characteristics of the school that may cause similarity between students and their peers. However, they do not account for the non-hierarchical nesting of students in school classes. In the school fixed effect models, the school behavior of peers who stay in the adolescent's class is not significantly related to changes in student problem behavior in school any more. All the other conclusions remain the same.

## 4.8 Conclusion

Previous research has repeatedly indicated that the peer context in school or class is related to student problem behavior in school. This study has been one of the first attempts to examine how alterations in students' peer context in class affect student problem behavior in school. More specifically, we studied changes in problem behavior of  $\pm 3000$  Dutch adolescents who transition to a new school class and thereby entered a new peer environment.

Based on normative social influence theory, we expected that the problem behavior of peers who enter or stay in the adolescent's school class influence the adolescent's problem behavior in school more than peers who leave the adolescent's school class after a school class transition. We found no support for this hypothesis. Cross-classified multi-level models indicated that when the problem behavior in school of peers who stay in the adolescent's class is higher, an adolescent increases his/her problem behavior in school more. However, this relationship was not significant

---

<sup>8</sup> Note that in these models less individuals were included, because for several respondents and their classmates we could not establish whether they followed the same specialization (e.g., respondents and/or classmates whose specialization was unknown)

in school fixed effect models. This indicates that unobserved time-invariant school characteristics may relate to the level of problem behavior of peers who stay in the adolescent's school class as well as changes in the adolescent's problem behavior in school. It may be that some schools are stricter in allowing problematic students to pass on to the next school year. In schools in which problematic students are more likely to have to repeat a year, the problem behavior of peers who stay in class will be lower. In these schools, students may also be more deterred to increase their problem behavior in school.

The present study's finding that the problem behavior of current or previous classmates is not significantly related to changes problem behavior in school is inconsistent with findings from previous studies. Previous research found that the aggressive, deviant, and disruptive school behavior of classmates positively influences a student's aggressive, deviant, and disruptive school behavior (Barth et al., 2004; Kellam et al., 1998; Müller, et al. 2015, 2016a; Thomas et al., 2011). Most of these previous studies are on younger children (e.g., Barth et al. 2004; Kellam et al. 1998; Thomas, Bierman, and Powers 2011), or focus on adolescents who just entered secondary school and attend the same class for almost all their courses (Müller et al., 2015, 2016a). In the present study, adolescents had attended the same school for several years. Hence, influence processes may have taken place before the observational period started. Moreover, we studied adolescents who sometimes changed classes for some of their courses. The school class context, and the behavior of peers in class, may therefore be less salient to the adolescents in this study. Future research should aim to investigate whether peer influence processes tend to vane across the school years or whether they are only present in schools in which students attend the same class for all their courses.

Based on belongingness theory, we hypothesized that when more friends leave the adolescent's school class, an adolescent increase his/her problem behavior in school more. We expected that this relationship would be weaker when friends who left the adolescent's school class exhibited higher levels of problem behavior in school. These expectation were not supported by the data. It may be that the effect of friends leaving the school class is dependent on friendship quality and support. Research namely shows that students increase their involvement in school when their friendships are higher in positive features, such as support and intimacy (Berndt & Keefe, 1995). However, when supportive friendships are characterized by more negative features, such as rivalry and competition, students tend to increase their disruptive behavior in school more (Berndt & Keefe, 1995). Although we

excluded ‘mean’ friends and we only considered a student’s *best* friends in class, it may still be that some of the student’s best friends provide little support and intimacy, or are characterized by negative features.

We found that adolescents increase their problem behavior in school more when more friends join their school class after school classes are reshuffled. This challenges belongingness theory. It could be that adolescents feel the need to impress these new friends in class by engaging in defiant behavior. Scholars argue that engagement in deviant behavior is a way for adolescents to show their autonomy from parents (Demanet & Van Houtte, 2012; Moffitt, 1993) and research indicates that deviant behavior is positively related to social status during adolescence (Allen et al., 1989; Cillessen & Van den Berg, 2012; Moffitt, 1993).

In line with belongingness theory, results indicated that students decrease their problem behavior in school more when foes leave their school class. This finding is highly important, as relatively few longitudinal studies have examined the role of negative peer relationships in student problem behavior in school. Moreover, it indicates that by eliminating foes in a student’s school class, students may improve their adjustment in school. In this chapter, classmates who are sometimes mean to the adolescent were considered to be foes. We think that the relationship we have found may even be stronger when more severe negative relationships amongst classmates are considered, such as bullying relationships.

Social scientists are generally interested in the effect of the social context on people’s behavior and attitudes. However, studying social context effects is difficult as people sort themselves into specific contexts and usually tend to stay in these contexts for a considerable amount of time. Scholars have therefore started to make use of quasi-experimental designs to study these effects (Legewie & DiPrete, 2012). In this chapter we examined social context effects by making use of a new quasi-experimental design: we investigated the extent to which adolescents change their behavior when they become part of a *new* class context. In this study we focused on student problem behavior in school, but we think that this new design can be extended to other (school) outcomes, such as experiences of victimization in school or school enjoyment. Moreover, this approach can be extended to research on other social context effects, including job contexts effects (e.g., by studying people who move organizations or who move teams within the same organization) or neighborhood effects.

This study also knows some limitations. First, we did not have precise information on the school class composition for each specific course a student follows. Ideally data should contain information on this, including the number of hours a student follows each course. Moreover, we relied on sociometric data that only allowed students to nominate friends and foes within their school class, and not within their whole grade. Hence, we did not know whether friends or foes that entered the school class were ‘new’ friends or foes, or had already been friends or foes before school classes were reshuffled. ‘New’ friends or foes that enter the school class may differently affect student problem behavior in school than ‘old’ friends or foes that enter the school class. For example, when old foes enter the school class, adolescents may withdraw from school faster than when new foes enter the school class. Students may be afraid of old foes before something has actually happened in class.

In this chapter we examined differences between the influence of the behavior of classmates who join, leave, and stay in the adolescent’s school class. However, the data were less suited for examining these differences for specific peer groups in class, such as *befriended* classmates. With our data it would be problematic to examine this, because we were likely to overestimate the influence of friends who join the adolescent’s school class as compared to the influence of friends who stay or leave the adolescent’s school class. Similarity in the behavior of adolescents and their friends may be due to influence processes (adolescents are influenced by the behavior of their friends) or selection processes (adolescents select friends who engage in similar behaviors) (Kandel, 1978; Knecht, 2008; Veenstra & Dijkstra, 2011). When the t0 problem behavior of friends who leave or stay in the school class is related to an increase in adolescent problem behavior in school, we can establish with some certainty that adolescents changed their behavior after the friendship was formed. However, when the t0 problem behavior of friends who join the school class is related to an adolescent’s increase in problem behavior in school, we cannot establish whether adolescents changed their behavior before (i.e., selection) or after (i.e., influence) they befriended the new classmate. Selection processes may thus bias the influence effects for friends who join the school class more than for friends who leave or stay in the school class. It is unfortunate that we were unable to examine how the influence of friends in class is affected by school class transitions, as several studies indicate that friends are influential with respect to problem behavior in school (e.g. Berndt & Keefe 1995; Geven et al. 2013; Rambaran et al. 2016).

We propose that future research should try to replicate and extend the findings of this chapter with data that include students' positive and negative relationships to peers within their grade across a school class transition. Such a study may be able to perform social network analyses that can account for other structural network effects that could cause similarity between adolescents and their friends, i.e., SIENA (Snijders et al., 2010). While the analyses performed in this study assume that adolescents do not change their behavior and their friendships in between observation points, SIENA models the changes that are likely to occur in between observations.

Despite its limitations, this is one of the first studies that relates changes in the school class context to student problem behavior in school. Research along these lines may help us to comprehend the effect of school class changes more, and will also improve our understanding of the role of the peer context in student behavior. This may help policy makers and school administrators to make school class changes in more effective ways. The present study suggests that school administrators should try to place students in different school classes than their foes.







## Chapter 5

# Why do boys exhibit more problem behavior in school? The role of peer influence <sup>1</sup>

*This study examines whether dynamic peer processes contribute to the gender gap in student problem behavior in school. Compared to girls, we expect that boys are more exposed to peers who exhibit problem behavior in school and are more responsive to their peers' problem behavior in school. Analyses on Swedish panel data show that, for some types of behavior (i.e., lack of effort in school and arguing with teachers), the gender gap increases over the course of a year. Boys are found to be more exposed to these types of problem behavior in their friendship group than girls. Stochastic actor based models (SIENA) indicate that adolescents are influenced by their friends' arguments with teachers and lack of effort in school. However, these influence processes do not substantially contribute to the increasing gender gap in these types of problem behavior in school. Boys and girls do not respond differently to their friends' arguments with teachers and lack of effort in school. Fixed effect models indicate that when non-befriended classmates increase their arguments with teachers and lack of effort in school more, adolescents increase these types of behavior more. Compared to girls, boys respond more to non-friends' lack of effort in school, but not to non-friends' arguments with teachers. However, the influence of the behavior of non-befriended classmates does not contribute to the widening gender gap in student problem behavior in school. We discuss the contributions of this chapter to research on the gender gap in school outcomes and peer influence processes.*

---

<sup>1</sup> This chapter is co-authored with Janne Jonsson and Frank van Tubergen. Sara Geven is the first author. Geven wrote the main part of the manuscript and conducted the analyses. Van Tubergen and Jonsson substantially contributed to the manuscript. Jonsson provided the sociometric data for Sweden, which was not publicly available at the time this article was written. An earlier version of this study was presented at the International Conference on Social Informatics (SocInfo 2014), Barcelona, Spain, 2014. This work was supported by The Netherlands Organisation for Scientific Research (NWO) and the NORFACE research programme on Migration in Europe – Social, Economic, Cultural and Policy Dynamics.

## 5.1 Introduction

In highly developed countries, girls have been outperforming boys in school at least since the 1990s (Driessen & Van Langen, 2013; Van Houtte, 2004b; Vantieghem, Vermeersch, & Van Houtte, 2014). Girls obtain higher reading and language test scores than boys (Buchmann et al., 2008; Francis, 2002; Legewie & DiPrete, 2012; Van de Gaer, Pustjens, Van Damme, & De Munter, 2007), their grade point averages are higher (Buchmann et al., 2008; Van Houtte, 2004b), they are less likely to drop out of school, and they more often pursue tertiary education (Buchmann et al., 2008). Furthermore, research indicates that girls' problem behavior in school is lower than that of boys (Demanet, Vanderwegen, Vermeersch, & Van Houtte, 2013; Francis, 1999; Gibb, Fergusson, & Horwood, 2008; Jackson, 2003; Warrington et al., 2000). Problem behavior in school refers to students' non-adherence to school rules and norms, such as defying teacher authority and refusing to put effort into school work. Researchers have also referred to this as school resistance (McFarland, 2001; Willis, 1977) or behavioral disengagement in school (Fredricks et al., 2004). Previous studies have indicated that gender differences in problem behavior in school partly explain the gender gap in school achievement (Buchmann et al., 2008).

Relatively few researchers aim to explain *why* boys exhibit more problem behavior in school than girls. According to McFarland (2001) problem behavior in school should be understood within the classroom context in which the behavior is enacted. The social networks among peers are an important aspect of the classroom context that may condition student problem behavior in school. In this chapter we examine the extent to which peer network processes contribute to gender differences in problem behavior in school.

Criminologists have postulated two ways in which peers may contribute to the gender gap in deviance and delinquency that may also apply to the gender gap in problem behavior in school. First, girls are less exposed to peers that increase the likelihood to engage in deviant acts (i.e., the differential exposure explanation), and second, girls are less susceptible to the influence of deviant peer norms than boys (i.e., the differential reaction explanation) (Haynie et al., 2014; Mears et al., 1998).

Peer processes have also been posited as a possible explanation for the gender gap in problem behavior in school (Driessen & Van Langen, 2013). Scholars argue that boys are exposed to relatively anti-school norms prevalent among male peers, while

girls are exposed to relatively pro-school norms among female peers (Francis, 1999; Legewie & DiPrete, 2012; Van Houtte, 2004b; Warrington et al., 2000). Researchers have tested this idea cross-sectionally by comparing classes or schools that varied on characteristics that were expected to affect this differential exposure (Demagnet et al., 2013; Legewie & DiPrete, 2012; Van Houtte, 2004a). For example, boys' and girls' school norms have been compared across schools differing in gender composition (Demagnet et al., 2013; Van Houtte, 2004a). The idea is that students tend to interact with, and are thus mainly influenced by the norms of, same-sex peers in school (Van Houtte, 2004b). However, this tendency is expected to be weaker when a student's own sex group is less numerically dominant in school. Demagnet et al. (2013) indeed show that in schools with a higher share of girls, boys' problem behavior in school is lower, while girls' problem behavior in school is higher when attending a school with more boys.

We contribute to previous research on the role of peers in the gender gap in problem behavior in school in two ways. First, we study the role of befriended *and* non-befriended peers in class separately. Past studies have focused on the role of classmates or schoolmates in boys' and girls' school behaviors and attitudes. These studies thus considered classmates or schoolmates as one large normative reference group. However, classmates that students are directly tied to (i.e., friends) may influence student behavior in different ways and for different reasons than classmates that students are not directly tied to (Leenders, 2002). Depending on how and why adolescents are influenced by the problem behavior of classmates, either befriended or non-befriended classmates may contribute more to the gender gap in problem behavior school. Previous research has not unequivocally shown whether befriended or non-befriended classmates are more influential with respect to school outcomes. A recent study suggests that adolescents' effort in school is more influenced by friends in class than by classmates that adolescents are less strongly connected to (Molloy, Gest, & Rulison, 2011). However, another study indicates that girls' decision to advance in math is not influenced by friends, but is influenced by more distant peer groups (i.e., female schoolmates and female students who follow the same courses) (Frank et al., 2008). Finally, Müller et al. (2016b) indicates that the perceived disruptive behavior of classmates, befriended classmates, and dominant classmates all equally influence the disruptive behavior of secondary school students in Switzerland.

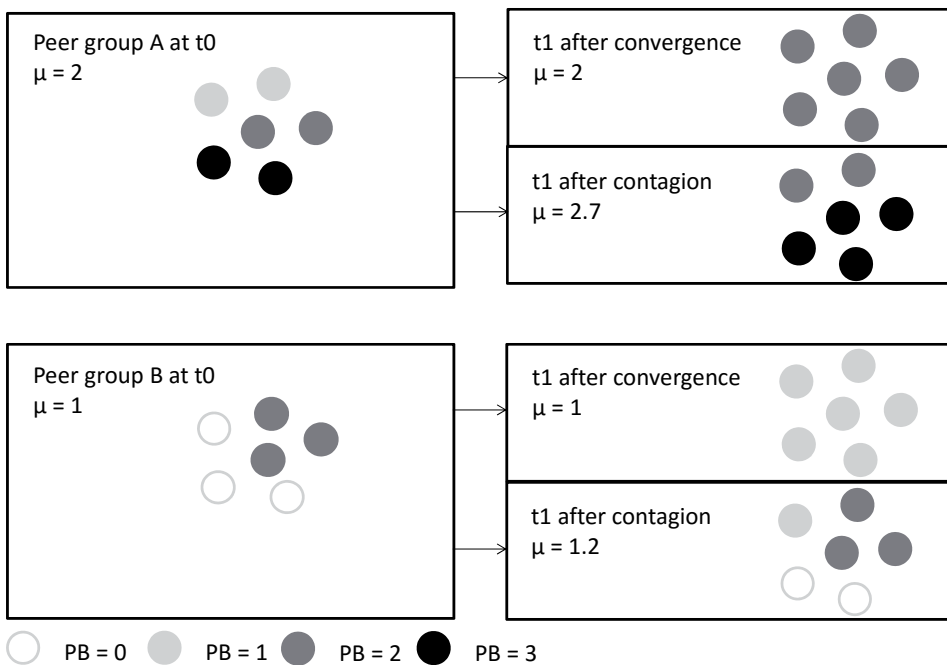
Second, we contribute to previous research by examining the role of peers in class on the gender gap in resistance to school *longitudinally*. Since peer socialization

processes are dynamic, and imply that students change their behavior over time in response to their peer environment, a longitudinal approach is preferred over the cross-sectional approach that most previous studies on this topic have relied on. A longitudinal approach allows us to make better inferences about the causal direction of the relationships, as it enables us to account for sorting and selection processes (Hallinan, 1981). Sorting processes imply that adolescents might be relatively similar to their class- or schoolmates, not (only) because adolescents are influenced by their class- or schoolmates, but (also) because adolescents who are more similar to each other are more likely to attend the same schools. Selection processes imply that adolescents are relatively similar to their friends, not (only) because they are *influenced* by their friends, but (also) because they tend to befriend peers who are more similar to them. Cross-sectional studies are unable to (fully) account for these sorting and selection mechanisms. We use large scale panel data on adolescents' friendships in class and their school behavior in Sweden, drawn from the CILS4EU project (Kalter et al. 2013).

## 5.2 Theory

Based on the criminological literature, we distinguish between two ways in which peers may contribute to the gender gap in resistance to school. First, the differential peer exposure explanation posits that girls are surrounded, and thus socialized, by less deviant peers than boys (Haynie et al., 2014; Mears et al., 1998). Because of this, boys would become more deviant than girls over time. Research indeed shows that boys are more exposed to delinquent peers than girls (Hartjen & Priyadarsini, 2003; Mears et al., 1998; Piquero, Gover, MacDonald, & Piquero, 2005). Some findings indicate that this explains part of the gender gap in delinquency (Mears et al., 1998), yet other research does not provide support for this (Piquero et al., 2005). Second, according to the differential peer reaction explanation, girls are less susceptible to the influence of deviant peer norms than boys (Haynie et al., 2014; Mears et al., 1998). Although several studies suggest that boys and girls respond similarly to the influence of delinquent peers (Hartjen & Priyadarsini, 2003; Wong, Slotboom, & Bijleveld, 2010), other studies show that delinquent peers influence boys more than girls (Mears et al., 1998; Piquero et al., 2005). Haynie et al. (2014) find that both boys and girls increase their delinquent behavior in response to delinquent friends, however only girls tend to reduce their delinquency when exposed to less delinquent friends.

Both the differential peer exposure and the differential peer reaction explanation rely on the assumption that adolescents are influenced by the problem behavior of peers. However, the criminological literature does not specify *how* adolescents are influenced by these behaviors. Past research on normative social influence theory has distinguished between convergence and contagion processes (Brechwald & Prinstein, 2011; Veenstra, Dijkstra, Steglich, & Van Zalk, 2013). Convergence implies that adolescents try to gain social rewards from their peers by behaving *similarly* to them. Hence, students who exhibit relatively high levels of problem behavior will decrease and students with relatively low levels of problem behavior will increase their problem behavior to match their peers' behavior (see figure 5.1). Contagion implies that a student is not necessarily inclined to behave similarly to his/her peers,



**Figure 5.1** Examples of convergence and contagion processes.

Each circle represents a person. The color of the circle indicates his/her level of problem behavior (PB). The left pictures illustrate two different peer groups at time point 0. The right pictures show the level of PB after convergence (top picture) and after contagion (bottom picture) at time point 1. The average PB of a group is the same before and after convergence, yet individuals altered their PB. In group A the initial level of PB is higher than in group B. The picture shows that in a situation of contagion, people in group A are more likely to increase their PB than people in group B. The picture also shows that after contagion processes, the average PB of a group may be altered (i.e., people do not move to the  $t_0$  average PB of the group, but move to a level of PB that exceeds this average).

but that a student is inclined to intensify his/her behavior more when this behavior is stimulated by peers, or is more prevalent among peers (Kiuru, Burk, Laursen, Nurmi, & Salmela-Aro, 2012). In this way, certain behaviors can become increasingly prevalent in the peer group over time (i.e., behaviors are contagious) (see figure 5.1). An example of behavior that tends to be contagious is adolescents' smoking behavior. Initially only a few adolescents will smoke, but this behavior will spread from one adolescent to the next. Influence processes with respect to problem behavior in school could also be contagious. While adolescents will usually exhibit little problem behavior in school<sup>2</sup>, problem behavior may be reinforced by peers. Research indicates that engagement in problem behavior is related to social rewards in the peer group (e.g., popularity) during adolescence (Allen et al., 1989; Moffitt, 1993). Problem behavior may thus also spread from one adolescents to the next.

Theoretically we are unable to determine whether contagion or convergence processes will underlie peer influence with respect to problem behavior in school. Research has found support for convergence processes among friends with respect to behavior in school (Fortuin et al., 2015; Geven et al., 2013; Rambaran et al., 2016), and for contagion processes among peers with respect to adolescents' rule-breaking behavior (Brechtwald & Prinstein, 2011). While both processes may apply to the influence of peers on problem behavior in school, we will argue in the theory section that contagion processes will mainly contribute to the gender gap in problem behavior in school. Hence in the empirical part of this chapter we will focus less on convergence processes.

We make a distinction between the influence of the behavior of befriended and non-befriended classmates. People can be influenced by the behavior of others through communication or comparison (Leenders, 2002). Adolescents who are directly tied to each other, such as friends, can influence each other's behavior through direct communication, such as making plans to skip class. Influence through comparison can also occur between adolescents who are not directly tied to each other, but who observe each other's behaviors (such as non-friends in class). We assume that the problem behavior in school of all classmates – both friends and non-friends – is observable for the adolescent, as this behavior is enacted in the classroom context.

According to normative social influence theory, people are influenced by the behavior of their peers to avoid social sanctions and to gain social approval by

---

<sup>2</sup> Research indicates that problem behavior in school tends to be skewed to the 'obedient side' of the scale (Demagnet & Van Houtte, 2012)

them (Cialdini & Goldstein, 2004; Frank et al., 2008). The behavior of a classmate is assumed to be influential when adolescents desire the social acceptance and aim to avoid the social sanctions of this classmate (Frank et al., 2008). Based on this, friends in class are assumed to be influential, because friends are considered to be valued peers and adolescents strive to maintain their friendships (Hallinan, 1981). However, non-befriended classmates could also be influential, as these classmates can still *become* friends and adolescents may try to impress these potential friends (Frank et al., 2008). Moreover, adolescents may be influenced by the behavior of non-befriended peers to avoid social sanctions in class. Compared to friends, non-friends may be less accepting of ‘inappropriate’ behaviors. To summarize, different mechanisms underlie the influence of the behavior of befriended and non-befriended peers. We do not know which of these mechanisms is most important with respect to problem behavior in school. Hence, we examine the role of befriended and non-befriended peers in the gender gap in problem behavior in school separately.

### 5.2.1 Differential peer exposure approach

Why are boys and girls differentially exposed to ‘problematic’ peers in class and how does this contribute to the gender gap in problem behavior in school? While boys and girls who attend the same school class are exposed to the same classmates, they tend to interact with different classmates. We will focus on gender differences in their friendship groups. Boys may not deliberately befriend peers who exhibit higher levels of problem behavior in school. However, friendship formation processes are expected to expose boys to higher levels of problem behavior in school in their friendship group than girls. First, boys’ friendship groups differ from girls’ friendship groups because of gender homophily, implying that girls tend to befriend girls whereas boys tend to befriend boys (Bagwell & Schmidt, 2013; Shrum et al., 1988). Because boys generally exhibit more problem behavior in school than girls (Buchmann et al., 2008; Demanet et al., 2013; Lam et al., 2012; Legewie & DiPrete, 2012; Van Houtte, 2004b), boys will on average also be exposed to more anti-school norms in their friendship groups.

Based on homophily theory, we also expect that adolescents tend to befriend classmates who are more similar to them with respect to problem behavior in school. In principle, people want to befriend others who understand them and who have similar values and tastes (McPherson et al., 2001). Classmates’ problem behavior in school is assumed to be highly visible in class, and adolescents may use similarities with respect to problem behavior as a proxy for similarities with

respect to visions, values, and tastes. Moreover, adolescents might engage in problem behavior in school, such as skipping class, together with other classmates. Such shared “activities” can lead to friendships. Previous studies have found that adolescents indeed tend to befriend peers who are similar with respect to their homework behavior and attentive behavior in school (Geven et al., 2013), externalizing problem behavior in school (Fortuin et al., 2015), truancy (Rambaran et al. 2016), and academic achievement (Flashman, 2012). Since boys generally engage in more problem behavior in school than girls, the homophily tendency with respect to problem behavior in school implies that boys are more likely to befriend peers who exhibit higher levels of problem behavior in school than girls. Gender homophily and homophily<sup>3</sup> with respect to school behavior contribute to the gender gap in problem behavior in school when friends influence student problem behavior in school via contagion processes. This implies that boys, who tend to be more exposed to anti-school norms in their friendship group than girls, will increase their problem behavior in school more than girls. We hypothesize:

*H1) Friendship formation processes (e.g., preferences for gender homophily and homophily with respect to school behavior) expose boys to higher levels of problem behavior in school in their friendship groups than girls (h1a). Adolescents are intended to increase their problem behavior in school more when their friends exhibit higher levels of problem behavior in school (h1b).*

Boys’ greater exposure to problem behavior in school is less likely<sup>4</sup> to lead to a larger gender gap in problem behavior in school when adolescents only converge their behavior to the behavior of their friends. When boys converge to the average behavior of their male friends and girls converge to the average behavior of their female friends, the gender gap is likely to remain stable. Simulation studies on opinion polarization indicate that when people interact with others with similar opinions (homophily), and converge to the opinions of these interaction partners, segregated opinion clusters will emerge in the population (Mäs & Flache, 2013).

---

3 Gender homophily and homophily with respect to school behavior are not just an outcome of friendship preferences, but can also result from other friendship formation processes, such as transitivity. For example, a friend of a friend is also likely to share behavioral and background characteristics with the adolescent. Befriending a friend of a friend may therefore make adolescents even more exposed to same-sex and equally problematic peers in their friendship groups than friendship preferences alone.

4 When additional assumptions are made, convergence may contribute to the gap in school-problem behavior between girls and boys. For example, when we assume that students do not only converge to the behavior of same-sex peers, but also move away from the behavior of opposite-sex peers. However, we are not aware of any evidence that supports this additional assumption with respect to problem behavior in school.



However, the difference between the opinions of these clusters will not become larger over time. Moreover, friendship formation processes do not only include the tendency of people to befriend same-gender and equally problematic peers, but also include other tendencies, such as the tendency to befriend same-ethnic peers. People may thus sometimes befriend peers of the opposite gender and/or with dissimilar school-behaviors, who are similar in other respects. Simulation studies show that when just a few people interact with others with dissimilar opinions, the opinion gap between clusters even tends to become smaller over time (Mäs & Flache, 2013). Hence, convergence processes may even lead to the disappearance of the gender gap.

### 5.2.2 Differential peer reaction approach

Why are boys and girls differentially influenced by their peers? According to normative social influence theory, people are influenced by the behavior and opinions of their peers, because they aim to gain their social acceptance and avoid social sanctions (Cialdini & Goldstein, 2004). Based on this, we derive that people are more likely to be influenced to engage in types of behavior that lead to social acceptance. Scholars argue that gender-typical behavior is more socially accepted (Cillessen, Schwartz, & Mayeux, 2011). According to Adler et al (1992), boys' gender roles have traditionally been marked by their 'active' nature, whereas girls' gender roles have been described as being more 'passive'. Adler et al.'s (1992) ethnographic study suggests that the 'active' nature of the male gender role is visible in the behavior of popular boys in school. Boys receive their status from, among others, breaking the rules and disobeying adult authority (such as teachers). Although high school performance is neither for adolescent boys, nor for adolescent girls, an important source of social status (Coleman, 1961), pro-school behaviors may even be detrimental to boys' social status. Ethnographic research by Warrington et al. (2000) suggests that, compared to girls, boys experience more peer pressure to exhibit anti-school behaviors. Engaging in pro-school behaviors is less accepted for boys, and boys who engage in pro-school behaviors would risk social punishments by peers more than girls who engage in pro-school behaviors.

Although several researchers have posited that anti-school behavior is less related to the status of girls than to the status of boys and that pro-school behavior is in conflict with the male image (Francis, 1999; Jackson, 2003; Legewie & DiPrete, 2012), there is no quantitative support for this (Cillessen et al., 2011). Existing quantitative research has mainly focused on gender differences with respect to

status related to academic performance and attendance. However, ethnographic work suggests that boys derive their status mostly from their active disengagement and rejection of school. Hence, despite a lack of quantitative support, we still assume that exhibiting problem behavior in school carries more social value for boys than for girls. Based on this, we hypothesize:

*H2a) Boys, rather than girls, increase their problem behavior in school more when their befriended classmates' problem behavior in school is higher.*

*H2b) Boys, rather than girls, increase their problem behavior in school more when their non-befriended classmates' problem behavior in school is higher.*

Boys and girls may not only be differentially susceptible to the school-specific problem behavior of peers, but they may also be susceptible to the school-specific problem behavior of different peers. Based on normative social influence theory, people are assumed to be influenced more by the norms of others they deem to be more important (Friedkin, 1998; Geven et al., 2013; Richer, 1976). The norms of others are deemed to be more important when people perceive others to be more similar to themselves, especially in terms of aspects that are central to their identity (e.g., sex) (Festinger, 1954). The behavior of in-group members namely forms a reference on how one should behave as a member of this group (Mason et al., 2007; Wood, 2000). For example, boys look at other boys to learn how to behave as males.

In-group members are even more influential on attitudes and behaviors that are important to the identity of the group (Wood, 2000). As argued before, adolescents might express their femininity or masculinity through their behavior in school, and aspects of masculinity include anti-school behaviors (Adler et al., 1992; Francis, 1999; Morris, 2008; Willis, 1977). Hence we expect that same-sex peers influence adolescents' behavior more than peers of the opposite sex. We will only test this hypothesis for non-befriended classmates, because most adolescents do not have opposite-sex friends (in our data less than 15% of the students has opposite-sex friends). Hence we cannot compare the effect of the behavior of opposite-sex friends to the effect of the behavior of same-sex friends. We hypothesize:

*H3) The problem behavior in school of non-befriended classmates of the same-sex has a stronger positive influence on adolescents' problem behavior in school than the problem behavior in school of non-befriended classmates of the opposite sex.*

When influence processes occur via contagion, a feedback process may emerge that causes boys – who have a higher initial propensity to exhibit problem behavior in school – to increase such behavior even more. Hence, gender differences in problem behavior in school will widen. However, the gender gap in problem behavior in school will remain stable when adolescents tend to converge more to the problem behavior in school of same-sex peers rather than the problem behavior in school of peers of the opposite sex. In this case, boys will adjust their behavior to the average norm for boys, while girls will adjust their behavior to the average norm for girls. The gender gap will thus not widen.

## 5.3 Data

We use two waves of Swedish panel data which are part of the larger Children of Immigrants Longitudinal Survey in 4 European countries (CILS4EU) project (Kalter et al., 2013). The first wave was collected in 2010-2011 among adolescents (age 14 -15) in Germany, England, the Netherlands, and Sweden. The second wave was collected one year later. The CILS4EU data contain student reports on their friendships in class (i.e., complete network data) and their problem behavior in school.

Adolescents were sampled on the basis of a multi-stage stratified sampling design. First, schools were divided into strata according to the proportion of minority students, and schools with a high proportion were over-sampled. Within strata, schools were randomly selected with the sampling probability being proportional to the number of students. Subsequently, all students in two randomly selected classes were invited to participate. Questionnaires were filled out in class and supervised by a professional interviewer. Our analyses require that student absenteeism and changes in the composition of school classes are low. Because of this, we only use data from Sweden in which these criteria are met for a relatively high share of classes. In Sweden, the response rate was 83.2% at the school level. 81.75% of the students in the responding schools participated in both waves.

## 5.4 Context of the study

Swedish respondents in the CILS4EU data are observed in 8<sup>th</sup> and 9<sup>th</sup> grade. During these final years of middle school, students attend comprehensive school. The vast majority of students goes to a public school (Jonsson & Mood, 2008). During middle school, mobility across school classes is very low (Liljeberg, Eklund, Fritz, & af Klinteberg, 2011).

We believe that the case of Sweden is quite possible to generalize from, as we expect that social influence and homophily processes are fairly generic. Although gender equality is generally high in Sweden, a substantial gender segregation is apparent in educational choices, and girls have outperformed boys since the early 1980s (Jonsson, 1999).

With the CILS4EU data we are able to observe whether the gender gap in problem behavior in school in Sweden is similar to the gender gap in problem behavior in school in England, Germany, and the Netherlands. We perform ordered logistic regressions on students' lack of effort in school and their arguments with teachers (i.e., the dependent variables in this chapter, see measurement section) in which we weight for the sampling design of the study and school, class, and student non-response in the first wave. These analyses indicate that, in both waves, the gender gap with respect to students' arguments with teachers is larger in England and Germany than in Sweden in both waves. Sweden and the Netherlands do not significantly differ with respect to the gender gap in students' arguments with teachers. Moreover, the gender gap with respect to lack of effort in school does not differ across the countries.

## 5.5 Methods

We conduct two different types of analyses. First, we use longitudinal social network analyses, Simulation Investigation for Empirical Network Analysis (i.e., SIENA) to test all the hypotheses with respect to *befriended classmates*. SIENA enables us to model friendship selection processes (i.e., the fact that people who are more similar with respect to their behavior are more likely to become friends) and friendship influence processes (i.e., the process by which the behavior of friends becomes similar over time) as endogenous and interdependent processes (Steglich et al., 2010). SIENA accounts for the fact that friendship groups are nested in students and that students may be nested in friendship groups themselves (i.e., observations

are not independent). Traditional panel data models that researchers have used to disentangle selection processes from influence processes, are unable to account for this dependency (Steglich et al., 2010). Moreover, SIENA improves upon traditional panel methods, as it controls for other important network characteristics that may lead to the similarity of friends, such as the inclination to reciprocate friendships and to befriend friends of friends. Finally, SIENA assumes that changes in people's behavior and their network may occur in between observation points (Snijders et al., 2010; Steglich et al., 2010). This is a great advancement compared to other longitudinal methods in which individuals are implicitly assumed not to change their behavior in between observation points.

SIENA uses data on relationships between people within a certain setting, such as a school class (i.e., complete network data). SIENA requires that no more than 40% of the students joins or leaves their school class after the first wave (Lubbers et al., 2011) and that at least 80% of the students participate in each wave (Ripley, Snijders, & Preciado, 2013). Moreover, for estimates to be reliable, friendship networks have to be stable enough (as indicated by a Jaccard index  $> 0.2$ ) (Snijders et al., 2010). 2708 adolescents from 110 classes (46.75% of the total sample) and 79 different schools meet these data requirements. In Appendix A5.1 (Appendices chapter 5) we describe how the students in this sample differ from the students who are excluded from the sample. Although several students have to be excluded from the analyses, the sample is still unique, as other studies using a network approach often rely on samples from more restricted datasets (e.g., all students from a couple of schools (Haas & Schaefer, 2014; Haynie et al., 2014) or students from classes in a particular city (Rambaran, Dijkstra, & Stark, 2013).

Estimates in SIENA are based on simulations that model the *changes* that occur in the respondents' network and behavior in between the measurement points (Snijders et al., 2010). The first observation is used as a starting point for the simulation process. During the simulation process the program randomly selects a respondent that is allowed to make a small change in his or her network (i.e., create or dissolve a friendship tie) or behavior (i.e., increase or decrease his/her behavior by one step on an ordinal scale). The program determines *whether* and in which *direction* an actor will change his/her behavior or network by means of a utility function which evaluates all possible options. There are two separate, but interdependent, utility functions for an actor's behavior and an actor's network. Each term of the utility function represents an effect in the SIENA model. In our case, the estimate of a particular effect reflects the importance of this effect in

the respondent's maximization of his/her utility in his/her friendship network or problem behavior in school.

The CILS4EU data contain multiple networks (i.e., school classes). The best way to analyze multiple school classes in SIENA is to analyze each class separately and to subsequently combine these results in a meta-analysis (Snijders & Baerveldt, 2003). Because we do not have enough power to analyze the school classes separately<sup>5</sup>, we combine classes into 18 groups based on the proportion of boys in class and conduct multiple group analyses (see Appendices chapter 5, Appendix A5.2 for more information on these analyses).

The 18 multiple group analyses are run until a satisfactory model convergence is obtained <sup>6</sup>. For a few multiple group analyses, we have to drop one or two school classes because they cause convergence problems<sup>7</sup>. We combine the multiple group analyses in a meta-analysis that provides a joint significance test and estimate for each effect based on Snijders & Baerveldt's (2003) method. This method assumes that estimates and standard errors of the effects are uncorrelated. If this assumption is not met, we rely on Fisher-type tests. Fisher-type tests indicate whether a parameter is significantly smaller or larger than zero in any of the subgroups. We use a significance level of 0.025 for these tests (Ripley et al., 2013).

We cannot appropriately model the influence of the behavior of *non-befriended* classmates in SIENA<sup>8</sup>. Hypotheses on non-friends will therefore be tested with fixed effects models. Unfortunately, these models cannot model the simultaneous and reciprocal changes in adolescents' friendship networks and adolescents' behavior. Moreover, they do not model the changes that may occur in between the observation points. Nevertheless, they have also two advantages compared to SIENA. First, fixed effect models estimate the effect of a change in non-friends' problem behavior in school on a change in adolescents' problem behavior in school while controlling for all time-invariant characteristics of individuals (such as family and neighborhood

---

5 School classes are relatively small (around 25 pupils per class) and we only have two waves of data per class

6 The absolute value of the t-ratio for convergence of individual parameters  $< 0.1$  and the overall model convergence parameter  $< 0.25$

7 Above each model in table 5.2 and 5.3 we indicate how many school classes are included in the analyses. The number of school classes that are included depend on the model specification.

8 If we would treat non-befriended classmates as a "network", we would be able to model the changes in (the behavior of) adolescents' non-befriended classmates over time on adolescents' changes in their behavior. However such a network would be collinear to the network of friends. Moreover, it is difficult to determine what drives the evolution of such a "network".

characteristics) (Allison, 2009). In SIENA, these possible confounders cannot be controlled for when they are unobserved (Steglich et al., 2010). Second, for the fixed effect models we do not have to rely on a subsample of the data and we are able to use sampling and response weights. To be sure that differences in the result of the fixed effect model and the SIENA model are not due to the sample size and/or weighting, we first conduct fixed effect models on the SIENA sample in which we do not weight according to the study's sampling design and non-response. However, as a robustness check we will conduct analyses on the larger sample that are weighted (i.e., including 4108 adolescents that participated in both waves). This may inform us about the generalizability of our findings to the larger population.

Because the dependent variables are ordinal, and not normally distributed, we estimate OLS fixed effect models with robust standard errors. Moreover, we compare the results of these models with the results that we obtain in an ordered logit regression model with fixed effects estimated with the BUC (blow up and cluster) estimator (Baetschmann, Staub, & Winkelmann, 2015). Since both models lead to the same conclusions we only present the OLS fixed effect models, because these results are more straightforward to interpret.

## 5.6 Measurements

In the fixed effect models only changes in student behavior are modelled. SIENA models the evolution of student behavior and friendship networks jointly. We describe the variables included in the behavioral and the network part of the SIENA model separately.

### 5.6.1 Student behavior

#### *Dependent behavioral variable*

Five items measure problem behavior in school. Four of these items load on a scale (Cronbach's alpha = 0.71 for wave 1; Cronbach's alpha = 0.68 for wave 2): the extent to which adolescents argue with their teachers, get a punishment in school, skip class, and come late to school. The 5-point scale response categories range from "never" to "every day". A separate item indicates the extent to which students put a great deal of effort into their school work and ranges from "strongly agree" to "strongly disagree" on a 5-point scale. Higher values imply that students put less effort into school.

Table 5.1 shows the descriptives of the problem behavior in school items. For both waves we find that boys argue more with their teachers (wave 1:  $t(2301) = -1.930$ ,  $p = 0.027$ ; wave 2:  $t(2269) = -5.389$ ,  $p < 0.001$ ), receive more often a punishment in school (wave 1:  $t(2301) = -5.350$ ,  $p < 0.001$ ; wave 2:  $t(2258) = -4.987$ ,  $p < 0.001$ ), and put less effort in school than girls (wave 1:  $t(2304) = -4.274$ ,  $p < 0.001$ ; wave 2:  $t(2267) = -8.233$ ,  $p < 0.001$ ). In the second wave boys come late to class more often than girls ( $t(2264) = -2.492$ ,  $p = 0.006$ ). However, girls skip class more often than boys in wave 1 ( $t(2297) = 3.092$ ,  $p = 0.001$ ).

Besides the finding that boys generally exhibit more school-specific problem behavior than girls, we find a significant increase in this gender gap for two items: arguing with teachers (increase is 0.119,  $t(2031) = -3.144$ ,  $p < 0.001$ ) and not putting effort in school (increase is 0.155,  $t(2015) = -4.089$ ,  $p < 0.001$ ). Table 5.1 shows that girls decrease their engagement in these behavior, while boys increase their engagement in these behaviors over the course of a year. The increasing gender difference on these items might appear small, however note that it is only measured over a one year period. Students generally spend about 10 years in school and the increase in the gender gap could thus become sizable over this longer period of exposure. Since we study the role of *dynamic* peer processes in the gender gap longitudinally, we will be able to explain changes in the gender gap over time (and not initial differences that remain stable over time). Hence, the chapter will continue by aiming to explain the increase in the gender gap in school with respect students' arguments with teachers and their lack of effort in school.

### ***Independent behavioral variable***

We measure the effect of being a *boy* on adolescents' change in problem behavior in school. In SIENA a positive effect indicates that boys have a higher *tendency* to increase their problem behavior in school than girls. Because fixed effect models automatically control for time-invariant characteristics of individuals, no main effect for gender can be included in the model. However, we can model whether boys *increase* their problem behavior more than girls by including an interaction between gender and time (i.e., *boy\*time*).

Adolescents were asked to list their best friends in class (maximum of 5). The problem behavior of friends is measured by friends' average score on their arguments with teachers (*friends argue*) and their lack of effort in school (*friends lack of effort*). In SIENA the influence of the average behavior of friends is specified by the average alter effect. A positive average alter effect indicates that an adolescent



tends to increase his/her problem behavior in school more (or decrease it less) when the average problem behavior of his/her friends in class is higher. The average alter effect is consistent with contagion theory (Veenstra et al., 2013), and has been used to measure contagion in previous research (Kiuru et al., 2012).

In the fixed effect models, we model the effect of the problem behavior in school of non-friends. We measure the average score on the ‘arguments with teachers’ item (*non-friends argue*) or the ‘lack of effort in school’ item (i.e., *non-friends lack of effort*) of classmates that the adolescent does not nominate as a friend.

The (*non-friends argue*) and (*non-friends lack of effort*) effects aim to capture contagion processes (Kiuru et al., 2012; Veenstra et al., 2013). A convergence process would be specified by the *difference* between the problem behavior of the adolescent and his/her (non-)friends (i.e., the adolescent’s inclination to reduce the distance between his/her own behavior and his/her peers’ behavior) (Kiuru et al., 2012; Veenstra et al., 2013). Unfortunately, contagion and convergence effects are strongly correlated with each other and cannot be modelled simultaneously. We cannot rule out that when we find a significant ‘contagion’ effect, the effect is partly driven by a convergence process. As explained in the theory section, we will focus less on convergence processes primarily because these processes are expected to contribute less to the gender gap in problem behavior in school than contagion processes. To get an idea about convergence processes with respect to problem behavior in school, we perform additional SIENA analyses in which the influence of friends is represented by an effect that aims to capture convergence processes (i.e., the average similarity effect; see Appendix 5.3) (Kiuru et al., 2012; Veenstra et al., 2013). This effect indicates whether adolescents are inclined to adjust their behavior to the average behavior of their friends.

### ***Interactions***

To test whether boys, rather than girls, increase their problem behavior in school more when the problem behavior of their friends is higher, we interact the respondent’s gender with the *argue friends* and the *lack of effort friends* effects. We test these interactions in SIENA by means of score-type tests. These tests indicate whether the effect is significantly larger or smaller than zero, but do not provide an estimate for the interaction effects. However, score type tests are preferred over directly estimating the effects, since the latter is likely to lead to convergence problems (Mercken, Snijders, Steglich, Vartiainen, & De Vries, 2010).

In the fixed effect models we estimate interactions between the respondent's gender and the problem behavior in school of non-friends (*Boy\*argue non-friends* or *Boy\*lack of effort non-friend*). These interaction effects indicate whether boys, rather than girls, increase their problem behavior in school more when non-friends increase their problem behavior in school more.

In the fixed effect model we also compare the effect of the average problem behavior in school of all same-sex non-befriended classmates (*argue with teachers same-sex non-friends* and *lack of effort same-sex non-friends*) to the effect of the problem behavior in school of all opposite-sex non-befriended classmates (*argue with teachers opposite-sex non-friends* and *lack of effort opposite-sex non-friends*).

### ***Behavioral controls***

To correctly estimate social influence processes in SIENA, we have to control for the *linear shape* and the *quadratic shape* effects (Ripley et al., 2013). A positive *linear shape* effect implies that people incline to have high values on the dependent variable. A positive *quadratic shape* effect implies that students reinforce their own problem behavior in school, whereas a negative quadratic shape effect implies that students self-correct their problem behavior in school. In the fixed effect models we include a dummy *time* to model whether students increase or decrease their school-specific problem behavior between the two waves.

In both SIENA and the fixed effect models, we control for the *number of friends* that students nominate. A Swedish study indicates that pre-adolescent boys tend to have more friends than girls, especially in school (Tietjen, 1982). Students' number of friends might in turn be related to problem behavior in school (Juvonen et al., 2012) .

We control for the time-invariant variable *parental education* in the SIENA models. When parents value education and stimulate school work, adolescents might be less likely to be influenced by their friends' problem behavior in school. Parental education is used a proxy for such parental values and support and is measured by the educational level of the parent with the highest acquired qualification. For most parents this information was obtained via register data from Statistics Sweden.

Finally, we account for the proportion of non-befriended classmates that is a boy in the fixed effect models. Similar to the influence of the behavior of non-befriended classmates, this cannot be appropriately modelled in SIENA.

## 5.6.2 Friendship formation processes modelled in SIENA

We model boys' and girls' friendship formation processes in SIENA. The *sex homophily* effect indicates whether adolescents are more likely to befriend same-sex classmates, rather than opposite-sex classmates. We estimate the tendency to become friends with classmates who engage in similar levels of arguments with teachers (*argue homophily*) or who put similar levels of effort in their school work (*lack of effort homophily*).

Homophily effects are dependent on characteristics of the adolescent and his or her friends. Hence, we include the effect of adolescents' problem behavior in school (*argue ego* or *lack of effort ego*) on their tendency to nominate friends and to be nominated as a friend (*argue alter* or *lack of effort alter*). Similarly we control for the effect of the student's sex on the tendency to nominate friends (*Boy ego*) and to be nominated as a friend (*Boy alter*).

National-origin background might affect friendship selection processes. We estimate whether respondents who have two Swedish parents (instead of one or two foreign-born parents) are more likely to nominate classmates as a friend (*Native Ego*) and whether they are more likely to be nominated as a friend (*Native Alter*). The *National-Origin homophily* effect indicates whether adolescents tend to befriend classmates of the same national-origin background. The national-origin background of a respondent is based on the country of birth of the respondent's parents. When parents are not born in the same country, the background of the student is based on the foreign-born parent. When parents are born in different foreign countries, the background of the student is based on the country of birth of the mother. The national-origin background of the respondent is based on the respondent's country of birth when the parental country of birth was missing (less than 2% of the cases).

Finally, we include several structural network effects, since not accounting for these effects may lead to biased estimates (Ripley et al., 2013). The *outdegree* effect expresses a student's tendency to nominate classmates as a friend (Steglich et al., 2010). The *reciprocity* effect refers to the inclination to reciprocate friendship ties. The *transitive triplets* effect controls for the fact that people tend to be friends with friends of friends. Finally, the *3-cycle* effect controls for egalitarian triadic closure (i.e., all members in the triad receive an equal number of nominations).

**Table 5.1** Descriptive statistics of 2708 adolescents in 110 school classes in Sweden for wave 1 (W1) and wave 2 (W2) of the Swedish CILS4EU data

	W1			W2		
	Mean (s.d.)	Range	% missing	Mean (s.d.)	Range	% missing
<b>Friendships</b>						
Outdegree	3.879 (1.313)	0-5	11.52 % absent 5.21 % join class in w2	3.521 (1.676)	0-100	11.67 % absent 4.99 % leave class in w2
Density	15.27 %	0-100		14.22 %	0-100	
Reciprocity	68.98 %	0-100		66.17 %	0-100	
Transitivity	55.82 %	0-100		54.78 %	0-100	
Proportion same-sex	89.596 %	0-100		85.09 %	0-100	
<b>Problem behavior in school boys</b>						
Argue with teacher	1.582 (.836)	1-5	7.32 % <sup>a</sup>	1.643 (.900)	1-5	8.15 % <sup>a</sup>
Punishment in school	1.396 (.688)	1-5	7.49 % <sup>a</sup>	1.337 (.685)	1-5	8.80 % <sup>a</sup>
Skipping class	1.285 (.631)	1-5	7.57 % <sup>a</sup>	1.431 (.751)	1-5	9.21 % <sup>a</sup>
Coming late to class	2.105 (1.029)	1-5	7.65 % <sup>a</sup>	2.250 (1.071)	1-5	9.05 % <sup>a</sup>
Lack of effort in school	2.230 (.827)	1-5	7.65 % <sup>a</sup>	2.348 (.934)	1-5	9.13 % <sup>a</sup>
<b>Problem behavior in school girls</b>						
Argue with teacher	1.516 (.789)	1-5	5.71 % <sup>a</sup>	1.458 (.731)	1-5	8.99 % <sup>a</sup>
Punishment in school	1.258 (.545)	1-5	5.55 % <sup>a</sup>	1.209 (.521)	1-5	9.23 % <sup>a</sup>
Skipping class	1.375 (.744)	1-5	5.79 % <sup>a</sup>	1.426 (.751)	1-5	9.31 % <sup>a</sup>
Coming late to class	2.034 (1.025)	1-5	5.71 % <sup>a</sup>	2.140 (1.062)	1-5	9.39 % <sup>a</sup>
Lack of effort in school	2.073 (.872)	1-5	6.11 % <sup>a</sup>	2.036 (.888)	1-5	9.07% <sup>a</sup>
<b>Individual independent variables <sup>b</sup></b>						
Boy	48.77 %	1/0	5.06 %			
Native	62.22 %	1/0	4.51 %			
Parental education	3.407 (1.458)	0-6	6.02 %			

<sup>a</sup>Missingness is mainly due to the fact that people were absent. For the descriptives of wave 1 we excluded people who joined the school class in wave 2. For the descriptives of wave 2 we excluded people who left the class after wave 1.

<sup>b</sup>All individual-independent variables are time-invariant.

## 5.7 Results

Before we turn to the analyses, we examine whether friends of boys put less effort in school and argue more with teachers than the friends of girls. One-sided t-tests indicate that there is no support for this with respect to students' arguments with teachers in the first wave ( $t(2345) = -1.585$ ,  $p = 0.057$ ). However, in the second wave there is a significant gender difference: the average for arguments with teachers for the friends of girls is 1.294 and for the friends of boys 1.394 ( $t(2251) = -3.423$ ,  $p < 0.001$ ). In both waves the friends of boys put less effort into school than the friends of girls (wave 1:  $t(2340) = -5.026$ ,  $p < 0.001$ ; wave 2:  $t(2123) = -4.480$ ,  $p < 0.001$ ).

Table 5.2 shows the results of the SIENA analyses on students' arguments with their teachers and table 5.3 on students' lack of effort in school. The estimates show the log-odds-ratio of an increase in problem behavior in school compared to no change for a one-unit-change in the predictor variable (Ripley et al., 2013). Model 1 indicates that the odds for boys to increase their arguments with teachers versus staying constant is 1.489 ( $OR = e^{.398} = 1.489$ ) larger than the odds for girls (table 5.2) and their odds to increase their lack of effort in school versus staying constant is 1.476 ( $e^{.389}$ ) larger than the odds for girls (table 5.3).

We argued that boys are more exposed to school-specific problem behavior in their friendship group (as also indicated by the t-tests), because adolescents tend to befriend same-sex peers and peers who exhibit similar levels of school-specific problem behavior. The friendship selection part of the SIENA models suggests that boys indeed have different friends in class than girls. We find that adolescents tend to befriend same-sex classmates. Since boys argue significantly more with their teachers and put significantly less effort in their school work than girls, this implies that boys tend to befriend classmates who engage in higher levels of these types of behaviors than girls.

The positive *argue homophily* effect in model 1 and 2 in table 5.2 shows that adolescents tend to befriend classmates who engage in similar levels of arguments with their teachers. Since boys engage in more arguments with their teachers than girls, boys will, all else equal, be more likely to befriend classmates who engage in arguments with their teachers than girls. Hence boys will be more exposed to this type of behavior in their friendship group than girls. The estimate for the positive *lack of effort homophily* effect in model 2 in table 5.3 is not significant.

**Table 5.2** *SIENA meta-analyses on 18 multiple group analyses on adolescents' friendships networks and their arguments with their teachers in Sweden.*

	H	Model 1 (Based on 103 classes)			Model 2 (Based on 104 classes)		
		Coef.	S.E.	Fisher test	Coef.	S.E.	Fisher test
<b>Network formation</b>							
Outdegree (density)		-2.382**	0.080	FL	-2.355**	0.081	FL
Reciprocity		1.612**	0.065	FR	1.638**	0.075	FR
Transitive triplets		0.622**	0.022	FR	.621**	0.022	FR
3-cycle		-0.439**	0.047	FL	-0.442**	0.047	FL
Argue alter		-0.007	0.051		0.010	0.041	
Argue ego		0.010 <sup>a</sup>	0.073		0.009 <sup>b</sup>	0.079	
Argue homophily	+	0.378*	0.214	FR	0.331*	0.174	FR
National-Origin homophily		0.279**	0.064	FR	0.268**	0.060	FR
Native alter		-0.230** <sup>a</sup>	0.069	FL	-0.206** <sup>a</sup>	0.066	FL
Native ego		0.109 <sup>a</sup>	0.074	FR	0.089 <sup>a</sup>	0.070	FR
Boy alter		0.001	0.041		-0.002	0.041	
Boy ego		0.141*	0.063	FR	0.152*	0.065	FR
Sex homophily	+	0.388**	0.042	FR	0.394**	0.039	FR
<b>Behavior</b>							
Linear shape		-0.904**	0.233	FL	-0.845**	0.233	FL
Quadratic shape		0.109**	0.035		0.112**	0.045	
Argue friends	+				0.021	0.173	
Boy	+	0.398**	0.124	FR	0.334**	0.114	FR
Parental education		-0.046	0.040		-0.065	0.038	
Nr. Friends		-0.065	0.044		-0.071	0.053	

Note: Estimates and standard errors are obtained according to the Snijders and Baerveldt (2003) method; \*  $p$ -value < 0.05, \*\*  $p$ -value < 0.01, one-sided  $t$ -test for hypothesized effects, other effects are tested two-sided; <sup>a</sup> The estimate significantly varies across the 18 groups; 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 and standard errors are printed bold, it means that the correlation between the estimate and standard error is significant. If this is the case, we have to rely on Fisher type tests.

H indicates the hypothesized effect: - negative hypothesized effect, + positive hypothesized effect. Some of these hypothesized effects are not explicitly formulated in the text, but they are implied by an explicitly formulated hypothesis.

However, the significant right-sided Fisher test of this effect indicates that in some school classes, adolescents tend to befriend classmates who are similar with respect to school effort. However, this effect is not robust, as it is not significant in all the models (e.g., model 1, table 5.3).

In model 2 we examine whether students increase their problem behavior in school more when they are exposed to more problematic friends (H1) and whether this

**Table 5.3** *SIENA meta-analyses on 18 multiple group analyses on adolescents' friendships networks and their lack of effort in school in Sweden.*

	H	Model 1 (Based on 106 classes)			Model 2 (Based on 107 classes)		
		Coef.	S.E.	Fisher test	Coef.	S.E.	Fisher Test
<b>Friendship formation</b>							
Outdegree (density)		-2.327**	0.071	FL	-2.327**	0.071	FL
Reciprocity		1.626**	0.067	FR	1.628**	0.065	FR
Transitive triplets		0.617**	0.020	FR	0.626**	0.019	FR
3-cycle		-0.443**	0.044	FL	-0.453**	0.043	FL
Lack effort alter		-0.033	0.029		-0.032	0.031	
Lack effort ego		0.038 <sup>a</sup>	0.066	FR	0.035 <sup>a</sup>	0.066	
Lack effort homophily	+	0.245	0.171		0.225	0.172	FR
National-Origin homophily		0.250**	0.059	FR	0.257** <sup>a</sup>	0.060	FR
Native alter		-0.184** <sup>a</sup>	0.059	FL	-0.199** <sup>a</sup>	0.060	FL
Native ego		0.085 <sup>a</sup>	0.066	FR	0.084 <sup>a</sup>	0.066	FR
Boy alter		-0.008	0.040		0.008	0.038	
Boy ego		0.094 <sup>a</sup>	0.063	FR	0.098 <sup>a</sup>	0.062	FR
Sex homophily	+	0.407**	0.035	FR	0.408**	0.034	FR
<b>Behavior</b>							
Linear shape		-0.310*	0.125		-0.214	0.112	
Quadratic shape		-0.213**	0.028	FL	-0.221	0.039	FL
Lack effort friends	+				0.259*	0.124	
Boy	+	0.389**	0.069	FR	0.303**	0.066	FR
Parental education		-0.050	0.026	FL	-0.041	0.026	
Nr. Friends		-0.020	0.040		-0.052	0.036	

Note: Estimates and standard errors are obtained according to the Snijders and Baerveldt (2003) method; \*  $p$ -value < 0.05, \*\*  $p$ -value < 0.01, one-sided  $t$ -test for hypothesized effects, other effects are tested two-sided; <sup>a</sup> The estimate significantly varies across the 18 groups; 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 and standard errors are printed bold, it means that the correlation between the estimate and standard error is significant. If this is the case, we have to rely on Fisher type tests.

H indicates the hypothesized effect: - negative hypothesized effect, + positive hypothesized effect. Some of these hypothesized effects are not explicitly formulated in the text, but they are implied by an explicitly formulated hypothesis.

can account for the increasing gender gap in problem behavior in school. Model 2 in table 5.2 shows that being exposed to friends who argue more with teachers is not related to an increase in adolescents' arguments with teachers. However, adolescents do increase their lack of effort in school more when they are exposed to friends who put less effort in school: when friends score one point higher on the 'lack of effort in school' item, adolescents odds to increase their lack of effort in school versus staying constant is 1.296 ( $e^{0.259}$ ) larger (i.e., model 2 in table 5.3).

Nevertheless, this does not completely explain the widening gender gap. The boy effect remains significant and strong when accounting for boys' and girls' friendship selection and influence processes<sup>9</sup>.

We want to note that these findings do not imply that friends only influence adolescents' lack of effort in school and not adolescents' arguments with teachers. Additional analyses (see Appendices chapter 5, A5.3) show that adolescents converge to the behavior of their friends with respect to their arguments with teachers and their lack of effort in school. However, as anticipated in the theory section, the convergence processes do not account for the increasing gender gap in problem behavior in school either. Again, the boy effect remains significant and strong when accounting for peer convergence processes.

Finally, we estimate SIENA models in which we test whether boys, rather than girls, increase their problem behavior in school more when the problem behavior of their friends is higher (i.e., hypothesis 2a, results not reported in the tables). Score type tests show that the interactions between gender and the problem behavior of friends are not significant (for students' arguments with teachers, right-sided score-type test:  $\chi^2(36) = 29.356$ ,  $p = 0.776$ ; left-sided score-type test:  $\chi^2(36) = 36.657$ ,  $p = 0.438$ . For students' lack of effort in school, right-sided score-type test:  $\chi^2(36) = 30.006$ ,  $p = 0.749$ ; left-sided score-type test:  $\chi^2(36) = 32.164$ ,  $p = 0.652$ )<sup>10</sup>.

To examine whether non-befriended classmates contribute to the gender gap in problem behavior in school we turn to the fixed effect models (i.e., table 5.4 and 5.5). We find that an increase in the lack of effort in school of non-friends is significantly related to an increase in adolescents' lack of effort in school (model 1). Similarly, an increase in non-friends' arguments with teachers is significantly related to an increase in adolescents' arguments with teachers.

---

9 We cannot formally test for mediation. Estimates are based on simulations and hence might be slightly different in different runs.

10 It may be that boys – rather than girls – increase their problem behavior in school more when friends' problem behavior in school is higher and that girls decrease their problem behavior more when the problem behavior of friends is lower. In this case our interaction effect will be insignificant. In SIENA it is possible to only focus on increases (or decreases) in behavior and thus to specifically test whether boys, rather than girls, are influenced by their friends to change their behavior in an upward fashion (i.e., by means of an interaction between gender and the behavioral creation function). Additional analyses provided no support for this. Since these effects are relatively 'new' in SIENA and the interpretation of such effects is still unsure when behavioral variables have more than 2 values (see SIENA manual p.36, Ripley et al. 2013), they are not discussed in the main text.



**Table 5.4** Individual-level fixed effects models on adolescents' arguments with teachers in school. *N* individuals = 2046. *N* observations = 3999

	H	Model 1		Model 2		Model 3	
		Overall R <sup>2</sup> : 0.088		Overall R <sup>2</sup> : 0.086		Overall R <sup>2</sup> : 0.090	
		Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Time		-0.032	0.022	-0.031	0.022	-0.029	0.022
Boy*time	+	0.081*	0.036	0.080*	0.036	0.077*	0.036
Argue friends	+	0.194**	0.039	0.194**	0.039	0.193**	0.039
Argue non-friends	+	0.182**	0.068	0.144*	0.086		
Boy*Argue non-friends	+			0.077	0.137		
Argue same-sex non-friends	+					0.066*	0.037
Argue opposite-sex non-friends						0.056	0.054
Prop. boys non-friends		0.311	0.318	0.317	0.319	0.302	0.319
Nr. Friends (ref = 0)							
1		-0.342**	0.102	-0.340**	0.102	-0.340**	0.102
2		-0.300**	0.092	-0.298**	0.092	-0.297**	0.092
3		-0.328**	0.092	-0.327**	0.092	-0.325**	0.092
4		-0.333**	0.094	-0.332**	0.094	-0.0330**	0.094
5		-0.368**	0.093	-0.367**	0.093	-0.365**	0.093

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , one-sided tests for hypothesized effects, two-sided tests for non-hypothesized effects. *H* indicates the hypothesized effect: - a negative hypothesized effect, + a positive hypothesized effect. Some of these hypothesized effects are not explicitly formulated in the text, but they are implied by an explicitly formulated hypothesis.

**Table 5.5** Individual-level fixed effects models on adolescents' lack of lack effort in school. *N* individuals = 2032, *N* observations = 3916

	H	Model 1		Model 2		Model 3	
		Overall R <sup>2</sup> : 0.037		Overall R <sup>2</sup> : 0.034		Overall R <sup>2</sup> : 0.025	
		Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Time		-0.034	0.027	-0.034	0.027	-0.061	0.031
Boy*time	+	0.155**	0.039	0.154**	0.039	0.178**	0.040
Lack effort friends	+	0.055*	0.033	0.055*	0.033	0.047	0.034
Lack effort non-friends	+	0.272**	0.070	0.130	0.097		
Boy*Lack effort non-friends	+			0.263*	0.140		
Lack effort same-sex non-friends	+					0.027	0.038
Lack effort opposite-sex non-friends						0.205**	0.055
Prop. boys non-friends		-0.110	0.316	-0.095	0.314	-0.067	0.316
Nr. Friends (ref = 0)							
1		-0.284**	0.109	-0.276*	0.109	-0.268*	0.109
2		-0.187	0.104	-0.178	0.104	-0.172	0.104
3		-0.220*	0.104	-0.216*	0.104	-0.205*	0.104
4		-0.206	0.107	-0.197	0.107	-0.193	0.107
5		-0.272*	0.105	-0.262**	0.105	-0.257*	0.105

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , one-sided tests for hypothesized effects, two-sided tests for non-hypothesized effects. *H* indicates the hypothesized effect: - a negative hypothesized effect, + a positive hypothesized effect. Some of these hypothesized effects are not explicitly formulated in the text, but they are implied by an explicitly formulated hypothesis.



In the second model we test whether only (or mainly) boys are positively influenced by the behavior of non-befriended classmates (hypothesis 2b). We find empirical support for this hypothesis with respect to lack of effort in school, but not with respect to arguments with teachers. We find that an increase in non-befriended classmates' lack of effort in school is only related to an increase in boys' ( $b = 0.393$ ,  $p < 0.001$ ), and not girls' ( $b = 0.130$ ,  $p = 0.097$ ) lack of effort in school. However, this interaction cannot explain the increasing gender gap in students' lack of effort in school. The time\*boy interaction namely remains equally strong as compared to model 1.

Finally, we test whether school-specific problem behavior is reinforced more by the behavior of non-befriended classmates of the same-sex rather than the behavior of non-befriended classmates of the opposite sex (model 3). We find that when non-befriended classmates of the *same sex* increase their arguments with teachers more, adolescents significantly increase this behavior more. Adolescents do not significantly alter their arguments with teachers when non-befriended classmates of the *opposite* sex increase their arguments with teachers more. While this is in line with hypothesis 3, a Wald test indicates that the difference between the influence of the behavior of non-befriended classmates of the opposite sex and non-befriended classmates of the same sex is not significant (Wald (1, 2045) = 0.02,  $p = 0.882$ ). With respect to lack of effort in school, only the behavior of non-befriended classmates of the opposite sex (and not non-befriended classmates of the same-sex) seems to reinforce adolescent's behavior. Inconsistent with hypothesis 3a, this difference is significant (Wald (1, 2031) = 6.77,  $p = 0.009$ ).

We repeat the analyses also on the full sample (see Appendix A5.4, Appendices chapter 5). The estimates are weighted according to the sampling design and non-response at the school, student, and class-level in the first wave. The conclusions are generally the same as the ones presented earlier. However, we do not find that an increase in the lack of effort of non-befriended opposite sex classmates is more positively related to an increase in the adolescent's lack of effort, than an increase in the lack of effort of non-befriended same-sex classmates. The Wald test is insignificant (Wald (1, 4032) = 1.57,  $p = 0.210$ ).

## 5.8 Conclusion

Past research has indicated that boys exhibit more problem behavior in school than girls (Demagnet et al., 2013; Driessen & Van Langen, 2013; Francis, 1999; Gibb et al., 2008; Jackson, 2003; Warrington et al., 2000). We argued that peers may contribute to this gender gap, as boys and girls may be differentially exposed to and may differentially respond to peer problem behavior in school. We contributed to the literature by distinguishing between the role that befriended and non-befriended peers may play in the gender gap in problem behavior in school and by examining these peer processes longitudinally. More specifically, we analyzed panel data among more than 2,000 adolescents (age 14-15 in wave 1) across 79 schools in Sweden. We found that overall, boys exhibit more problem behavior in school than girls, and that, for two types of behavior (i.e., students' lack of effort in school and students' arguments with their teachers), the gender gap widened across a one-year-period.

While SIENA analyses suggested that boys are more *exposed* to friends who argue with teachers and who put little effort into school than girls, this did not seem to contribute much to the widening gender gap. Results indicated that adolescents do not increase their own arguments with teachers more when they are exposed to friends who argue more with teachers. Students who are exposed to friends who put less effort into school do increase their own lack of effort into school more. However, the widening gender gap persisted when accounting for friends' lack of effort in school. Similarly to this finding, Piquero et al. (2005) showed that adolescent boys are more exposed to delinquent friends than adolescent girls, and that adolescents increase their delinquent behavior more when the delinquent behavior of friends is higher. However, they find that this could not explain the widening gender gap in delinquency over time. It may be that boys and girls mainly tend to *converge* to the average deviant behavior (in school) of their same-sex friends. We performed additional analyses that provided strong support for convergence processes among friends with respect to effort in school and arguments with teachers. Dynamic selection and convergence processes among friends may lead to the persistence of, but do not contribute to, the initial gender gap in student problem behavior in school.

We did not find that boys respond more to their friends' problem behavior in school than girls. It may be that girls are generally more susceptible to the influence of the behavior of friends than boys (Haynie et al., 2014). Previous research suggests

that girls' friendships are more intimate and close than boys' friendships, which may lead to stronger normative social influence processes among female friends than among male friends. However, with respect to deviant types of behavior (e.g., problem behavior in school), influence processes among boys may be relatively strong, while influence processes among girls may be relatively weak. Boys and girls may therefore be equally susceptible to the influence of friends' deviant behavior.

We found that boys, rather than girls, increase their lack of effort in school when their non-befriended classmates put less effort into school. However, this did not seem to contribute to the gender gap in students' lack of effort. Compared to girls, boys may be influenced to increase their lack of effort more when the lack of effort of their non-friends is higher, and to *decrease* their lack of effort more when the lack of effort of non-friends is lower. Legewie and Diprete (2012) argue that class contexts that are more learning-oriented may encourage boys to show their masculinity by being academically competitive rather than by being problematic in school. If the school behavior of non-befriended classmates influences some boys to decrease their effort in school more than girls, while it influences other boys to increase their effort in school more than girls, the gender gap will not widen.

Finally, we expected that problem behavior in school is influenced more by the behavior of non-friends of the same-sex than non-friends of the opposite-sex. Fixed effects models did not provide support for this hypothesis. Although our findings should be repeated on other data, they are potentially of great theoretical importance, as they suggests that dynamic peer processes contribute little to initial gender differences with respect to problem behavior in school.

This chapter did not only contribute to research on the gender gap in problem behavior in school, but also to research on peer influence processes. By studying the influence of the behavior of befriended and non-befriend classmates we integrated two different, and rather separated, research lines on peer influence. The first has dealt with the influence of all classmates (or schoolmates), examining, for example, the influence of the school performance or socio-economic status of class- or schoolmates on school outcomes (Driessen, 2007). The second research line has mainly dealt with the influence of the behavior of friends, such as their smoking behavior (Mercken et al., 2010), drinking behavior (Knecht, 2008), delinquency (Weerman, 2011), and behavior in school (Geven et al., 2013). While, the first one has not taken into account that adolescents may be differentially influenced by classmates that they are directly tied to than by classmates that they are not

directly tied to, the second one has not examined the potential influence that non-befriended classmates might have on adolescents.

This study also knows some limitations. First, we could not model the influence of befriended classmates, the influence of non-befriended classmates, and the selection of friends in class in one model. The evolution of problem behavior in school and friendship formation are interdependent processes. Although we have modelled the feedback processes between friendship selection processes and the influence of friends in SIENA, we could not appropriately model feedback processes between friendship selection processes and the influence of non-befriended classmates. Our fixed effects models do not rule out that a *change* in student problem behavior in school is (also) related to a *change* in the problem behavior in school of non-befriended classmates. Moreover, fixed effect models do not take into account the non-hierarchical nesting of students and their peer groups (i.e., friends and non-friends).

A second limitation of this study is that problem behavior in school was not missing completely at random. Adolescents who engaged in higher levels of problem behavior in school were more likely to be absent in one of the two waves. We think that this issue might have led to an underestimation of the peer influence effects. In the analyses influence is estimated by examining whether the behavior of peers affect *changes* in students' behavior. Because the data are skewed to the "well-behaved" side of the scale, most students can only change their behavior by increasing their problem behavior in school. Especially peers who engage in relatively high levels of problem behavior in school in the first wave might influence students to increase their problem behavior in school. Because these peers were more likely to be absent, we cannot fully capture their influence. Irrespective of this issue, the data that we used for this study are unique. Network studies are often based on case studies (e.g., in one school). This study included schools from all over Sweden, which might imply that this study includes a higher share of students who engage in problem behavior in school than most network studies.

This research is the first attempt to explicitly study whether peers contribute to the gender gap in students' problem behavior in school over time. While this longitudinal study found little support for this, future research could investigate boys' and girls' problem behavior in school over a longer period of time and could focus on alternative processes that might explain the widening gender gap. For example, teachers may contribute to the gender gap since their responses to boys' problem behavior may promote stereotypical behavior (Warrington et al., 2000).



## Chapter 6

# The influence of friends on adolescents' problem behavior in school: the role of ego, alter, and dyadic characteristics <sup>1</sup>

*This chapter deals with the influence of friends in class on adolescents' problem behavior in school (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' problem behavior in school. 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.*

---

<sup>1</sup> A slightly different version of this article is published as: Geven, S., Weesie, J., & Van Tubergen, F. (2013). The influence of friends on adolescents' behavior problems at school: The role of ego, alter and dyadic characteristics. *Social Networks*, 35(4), 583-592. doi:10.1016/j.socnet.2013.08.002. Geven is the first author and wrote the main part of the manuscript and conducted the analyses. Van Tubergen and Weesie substantially contributed to the manuscript. The authors jointly developed the idea and design of the study. The authors thank Jelle Sijtsema, Zóltan Lippenyi and the anonymous reviewers of *Social Networks* for their valuable comments. This work was supported by The Netherlands Organisation for Scientific Research (NWO).

## 6.1 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 & Singh, 2002; Jimerson, Campos, & Greif, 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 & 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 (Steinberg, Dornbusch, & Brown, 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 towards school (Altermatt & Pomerantz, 2003; Knecht, 2008), motivation (Ryan & Patrick, 2001), and educational aspirations (J. Cohen, 1983; Hallinan & Williams, 1990; Kandel, 1978).

In this study we focus on the influence of *friends* on adolescents' *problem behavior in school*. In the literature, problem behavior in school is sometimes also referred to as school misconduct (Demant & 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 problem behavior in school is limited (Fredricks et al., 2004). Only a handful of studies have investigated the influence of friends or friendship groups on the engagement (Kindermann, 2007; Molloy et al., 2011), disruptive, and problematic behavior of students at school (Berndt & Keefe, 1995; Berndt, 1999; Crosnoe, Cavanagh, & Elder Jr, 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 problem behavior in school, which has hardly been done before.

Two important indicators of problem behavior in school will be examined: not doing homework and not paying attention in class. While both are indicators of problem behavior in school (Fredricks et al. 2004), their nature is distinct.



Homework is mostly done outside the class context. Hence, 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, the influence of friends on homework inactivity might be less pronounced than the influence of friends on inattention in class.

In this chapter 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 peer influence than others and that some peers are more influential than others (Brechwald & Prinstein, 2011; Veenstra & 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., the friend) that affect 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 & 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 and stability (Berndt & Keefe, 1995; 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 chapter, is that we investigate new moderators of the influence of friends on adolescents' problem behavior in school 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 friends in class influence adolescent problem behavior in school? 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' problem behavior in school, 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 based models, i.e., Simulation Investigation for Empirical Network Analysis (SIENA) (Snijders, 2011; Steglich et al., 2010). SIENA is specifically designed to disentangle friendship selection processes from influence processes in observational panel data. Most previous studies that tried to separate influence from friendship selection effects with respect to student problem behavior in school have made use of discrete panel methods (Berndt & 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 student 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 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).

## 6.2 Theory

The literature on peer influence has been rapidly growing in the past decades (Brechwald & Prinstein, 2011; Veenstra & Dijkstra, 2011). In particular, there is a large literature on risky behavior of adolescents, such as smoking, drinking, and delinquency (Bot, Engels, Knibbe, & Meeus, 2005; Knecht, Snijders, Baerveldt, Steglich, & Raub, 2010; Knecht, Burk, Weesie, & Steglich, 2011; Mercken, Steglich, Sinclair, Holliday, & Moore, 2012). In this study, which is on problem behavior in school, 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 & 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 chapter 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 (Brechwald & Prinstein, 2011; Hallinan, 1981).

Previous research shows that adolescents adjust their smoking and drinking behavior to that of the levels of their friends (Bot et al., 2005; Mercken et al., 2010), and we expect to see a similar tendency with respect to problem behavior in school. For example, when friends exhibit relatively high levels of studious behavior, adolescents are less likely to exhibit problem behavior in school. Contrarily, when friends exhibit relatively high levels of problem behavior in school, adolescents will be more likely to exhibit problem behavior in school. Hence, we hypothesize that:

*H1) Adolescents will adjust their problem behavior in school to the problem behavior in school of their friends.*

In this chapter we want to investigate ego, alter, and dyadic factors that we expect to moderate the influence of friends on problem behavior in school. 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 problem behavior in school 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 condition the influence of friends in class on the problem behavior in school of adolescents.

### 6.2.1 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, Hymel, & Renshaw, 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 problem behavior in school more to the problem behavior in school of his/her friends, when fewer classmates consider ego as a friend.*

Not only the indegree of ego, but also the indegree of alter is expected to affect 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 Zarbatany (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 Zarbatany (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 problem behavior in school more to the problem behavior in school of his/her friends, when the average indegree of his/her friends is higher.*

## 6.2.2 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 problem behavior in school is affected by friendship reciprocity (Hallinan & 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, 1981; Hallinan & 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. 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 characterized 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:

*H<sub>4</sub>) Ego will adjust his/her problem behavior in school more to the problem behavior in school of his/her unreciprocated friends than to the problem behavior in school of his/her reciprocated friends.*

## 6.3 Data

To test our hypotheses we use data that contain 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 & Pomerantz, 2003; Knecht, 2006). Influence processes between friends may mainly

occur 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 at the start of the school year.

The written questionnaires took approximately 40 minutes 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. The response rate for students was 98% in wave 1, 93% in wave 2, 94% in wave 3, and 96% in wave 4. 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 data contain information on 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 (Brechwald & Prinstein, 2011).

## 6.4 Methods

In order to test our hypotheses we will make use of Simulation Investigation for Empirical Network Analysis (SIENA) (Snijders, 2011; Steglich 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 (Ripley, Snijders, & Preciado, 2011). Table 6.1 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., 2012). 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., 2012). 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.

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

Table 6.1 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)	45	43	12	55	25	20	55	28	17
	Homework inactivity								
	Inattentive in class	21	18	63	18	19	63	18	19
Excluded classes (Jaccard < 0.3, N classes = 12, N pupils = 302)	47	43	10	58	20	22	54	28	18
	Homework inactivity								
	Inattentive in class	22	16	62	17	21	66	17	17
Included classes (Jaccard > 0.3, N classes = 110, N pupils = 2766)	45	43	12	54	26	20	55	28	17
	Homework inactivity								
	Inattentive in class	21	18	64	18	18	63	18	19



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.

## 6.5 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 (problem behavior in school and friendship network), our moderators, our independent variables, behavioral evolution control variables and friendship formation effects.

### 6.5.1 Dependent variables

#### *Problem behavior in school*

The data contain four *problem behavior in school* items 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 problem behavior in school which are not

covered in this study.

We use two dependent variables that measure problem behavior in school to examine whether our results are robust.<sup>2</sup> We do not make a scale out of these two variables, since they refer to slightly different aspects of school behavior and, consequently, influence processes for these two variables might differ (Fredricks et al. 2004).

### *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.

## **6.5.2 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. In Siena this is referred to as the average similarity effect (*Av. Sim*). The precise definition of the average similarity effect is depicted in table 6.2.

---

2 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 problem behavior in school 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.

**Table 6.2** Effects included in the model expressed mathematically

	Mathematical Formula	Description
<b>Network: selection process</b>		
Homework / inattention homophily	$\sum_j x_{ij}(((R_i -  z_i - z_j )/R_i) - c)$	Tendency to choose a friend based on having a similar value on behavior $z$
Homework / inattention ego	$z_i \sum_j x_{ij}$	Effect of ego's behavior $z$ on ego's number of friends
Homework inactivity / inattention 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	$\sum_{j,h} x_{ij} x_{jh}$	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
<b>Behavior</b>		
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	$(z_i \sum_j x_{ij} x_{ji}) / (\sum_j x_{ij})$	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 $z$
Av.Sim	$(\sum_j x_{ij} (((R_i -  z_i - z_j )/R_i) - c)) / (\sum_j x_{ij})$	Effect of the average behavior of ego's friends on ego's behavior $z$
Av.Sim * ego indegree	$(\sum_j x_{ij} \sum_j x_{ij} (((R_i -  z_i - z_j )/R_i) - c)) / (\sum_j x_{ij})$	Average similarity between ego and his/her friends weighted according to the indegree of ego
Av.Sim * alter indegree	$(\sum_j x_{ij} x_{ji} (((R_i -  z_i - z_j )/R_i) - c)) / (\sum_j x_{ij})$	Similarity between ego and a friend weighted according to the indegree of this friend; averaged over all friends
Av.Sim * reciprocity	$(\sum_j x_{ij} x_{ji} (((R_i -  z_i - z_j )/R_i) - c)) / (\sum_j x_{ij})$	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 $z$

Note:  $i$  = 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;  $R_i$  = range of the behavioral variable  $z$ .  $C$  = mean of all similarity scores  $((R_i - |z_i - z_j|)/R_i)$ ;  $x_{*j}$  = indegree of alter  $\sum_i x_{ij}$ ;  $I\{v_{2i} = v_{2j}\} = 1$  when  $i$  and  $j$  have the same value on covariate  $v$ .

### 6.5.3 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 6.2.

### 6.5.4 Behavioral evolution controls

For the behavioral 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. The *quadratic shape* effect 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' problem behavior in school is self-correcting: the higher adolescents' problematic 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 problem behavior in school. 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 6.2.

### 6.5.5 Friendship formation effects

In order to correctly test for the influence of friends, we test for multiple aspects that affect friendship formation processes. First, we take into account the extent to which adolescents' homework inactivity and inattention behavior affect friendship

formation processes. Depending on the problem behavior in school under scrutiny, we incorporate the effect of ego's problem behavior in school on the number of friendship ties ego creates (i.e., *homework ego* and *inattentive ego*); the effect of alter's problem behavior in school on the number of friendship ties that alter receives (*homework alter*, *inattentive alter*), and the effect of the similarity between ego and alter with respect to their problem behavior in school 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.

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 estimate 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 6.3.

**Table 6.3** Descriptives of network and individual characteristics

Dependent variables	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
<b>Inattentive in class</b>									
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
<b>Homework inactivity</b>									
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
<b>Friendship variables</b>									
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 <sup>a</sup>									
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 <sup>b</sup>									
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 <sup>c</sup>									
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	
<b>Control variables</b>									
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

Note <sup>a</sup> Probability of two actors to be reciprocally connected given that there is a tie in at least one direction; <sup>b</sup> Proportion of ties that is present out of the potentially observed ties; <sup>c</sup> The fraction of triads in which a friend of a friend is a friend (out of those triads that could potentially be closed).

## 6.6 Results

Table 6.4 (on homework inactivity) and table 6.5 (on inattentiveness in class) show the results for the SIENA meta-analysis. 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 method of Snijders and Baerveldt (2003). 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 (2003) 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 the text.

We find support for our first hypothesis that friends influence adolescent problem behavior in school. For homework inactivity 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 adolescents adjust their homework inactivity to the average homework inactivity of their friends in class ( $OR = e^{1.09} = 2.97$ ; model 1 of table 6.4); and adolescents adjust their inattentiveness in class to the inattentiveness of their friends in class ( $OR = 7.17$ ). 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 to 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 problem behavior in school of their friends. While the Fisher type tests are

insignificant, we find significant and negative mean estimates. Model 2 in table 6.4 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 6.5 shows that the higher the indegree of ego is, the less his/her attention behavior will be influenced by the average inattention of his/her friends in class (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 problem behavior in school more (hypothesis 3; model 3 in table 6.4 and 6.5), neither do we find that unreciprocated friends influence the problem behavior in school of adolescents more than reciprocated friends (hypothesis 4; model 4 in table 6.4 and 6.5).

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 problem behavior in school. For example, people who do not do their homework tend to decrease their homework inactivity, whereas people who do a lot of homework tend to do increase their homework inactivity over time. This effect does not significantly vary across the school classes. Moreover, in all models we find a significant positive effect of the opinion of parents with respect to problem behavior in school and the problem behavior in school of adolescents. The less importance parents attach to the problem behavior in school of their child, the more likely adolescents are to increase their homework inactivity and inattention in class.

As visible from table 6.4 and table 6.5, we find evidence for several friendship selection effects. 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 background. Finally, as expected, adolescents tend to be friends with people in secondary school that they were already friends with in primary school. All these significant selection effects differ significantly across classes.

### **6.6.1 Robustness checks**

We conducted some additional analyses to see whether our results are robust (see Appendices chapter 6, table A6.1.1-A6.1.4). For both dependent variables



we estimated models that are similar to model 1, but each time we changed one aspect of the model. First, we analyze a model in which *parental opinions* is a changing covariate (robust 1 in table A6.1.1 and table A6.1.3). It could be argued that parents alter the importance they attach to school as a response to the (mis) behavior of their children in 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 chapter (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 (0.28; S.E. 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 (robust 2 in table A6.1.1 and table A6.1.3), and a model in which we used the balance effect instead of the transitive triplets effect (robust 3 in table A6.1.1 and table A6.1.3). Moreover, we estimated models in which we added a 3-cycle effect (robust 4 in table A6.1.2 and table A6.1.4). These different model specifications did not alter our conclusions.

Table 6.4 Meta-analysis results on homework inactivity with a standard error bound of 5

	Model 1			Model 2			Model 3			Model 4		
	Coef.	S.E.	N	Coef.	S.E.	N	Coef.	S.E.	N	Coef.	S.E.	N
<b>Network</b>												
Homophily homework	0.20*	0.08	82	0.17	0.09	78	0.19*	0.09	81	0.20*	0.09	77
Homework ego	-0.09* <sup>FL</sup>	0.02	84	-0.08* <sup>FL</sup>	0.02	79	-0.08* <sup>FL</sup>	0.02	82	-0.08* <sup>FL</sup>	0.02	77
Homework alter	-0.06* <sup>FL</sup>	0.02	83	-0.05* <sup>FL</sup>	0.02	79	-0.06* <sup>FL</sup>	0.02	82	-0.05* <sup>FL</sup>	0.02	77
Outdegree	-2.52* <sup>FL</sup>	0.05	82	-2.57* <sup>FL</sup>	0.05	78	-2.56* <sup>FL</sup>	0.05	80	-2.55* <sup>FL</sup>	0.05	76
Reciprocity	1.04* <sup>FR</sup>	0.04	83	1.03* <sup>FR</sup>	0.04	79	1.02* <sup>FR</sup>	0.04	82	1.03* <sup>FR</sup>	0.04	77
Transitive triplets	0.23* <sup>FR</sup>	0.01	84	0.23* <sup>FR</sup>	0.01	80	0.23* <sup>FR</sup>	0.01	82	0.22* <sup>FR</sup>	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* <sup>FR</sup>	0.04	83	0.03* <sup>FR</sup>	0.04	80	0.03* <sup>FR</sup>	0.04	82	0.04* <sup>FR</sup>	0.04	78
Gender similarity	0.95* <sup>FR</sup>	0.05	83	0.98* <sup>FR</sup>	0.05	79	0.97* <sup>FR</sup>	0.05	82	0.98* <sup>FR</sup>	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* <sup>FL</sup>	0.04	80	-0.14* <sup>FL</sup>	0.04	78	-0.14* <sup>FL</sup>	0.04	81	-0.14* <sup>FL</sup>	0.04	76
Ethnic similarity	0.13* <sup>FR</sup>	0.04	80	0.16* <sup>FR</sup>	0.03	78	0.17* <sup>FR</sup>	0.03	81	0.17* <sup>FR</sup>	0.03	75
Friends primary	1.00* <sup>FR</sup>	0.33	84	0.61* <sup>FR</sup>	0.03	79	0.61* <sup>FR</sup>	0.03	82	0.60* <sup>FR</sup>	0.03	78
<b>Behavior</b>												
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* <sup>FL</sup>	0.03	72	-0.38* <sup>FL</sup>	0.03	67	-0.35* <sup>FL</sup>	0.03	68	-0.35* <sup>FL</sup>	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
Av.Sim	+ 1.09*	0.28	35	1.09* <sup>FL</sup>	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	+											
Av.Sim * reciprocity	-											
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* <sup>FR</sup>	0.05	74	0.27* <sup>FR</sup>	0.05	69	0.31* <sup>FR</sup>	0.05	73	-0.30* <sup>FR</sup>	0.05	70

Note: 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 are 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. H indicates the hypothesized effect: - negative hypothesized effect, + positive hypothesized effect.

Table 6.5 Meta-analysis results on inattentiveness in class with a standard error bound of 5

H	Model 1			Model 2			Model 3			Model 4		
	Mean Coef.	S.E.	N	Mean Coef.	S.E.	N	Mean Coef.	S.E.	N	Coef.	S.E.	N
<b>Network</b>												
Homophily inattention	0.22 * <sub>FR</sub>	0.08	77	0.17* <sub>FR</sub>	.08	74	0.19* <sub>FR</sub>	0.08	72	0.21* <sub>FR</sub>	0.08	72
Inattentive ego	-0.04 <sub>FL</sub>	0.03	77	-0.05* <sub>FL</sub>	.02	74	-0.04* <sub>FL</sub>	0.02	72	-0.04 <sub>FL</sub>	0.03	73
Inattentive alter	-0.02	0.02	77	-0.02	.02	74	-0.02	0.02	72	-0.03 <sub>FL</sub>	0.02	73
Outdegree	-2.51* <sub>FL</sub>	0.05	76	-2.52* <sub>FL</sub>	.04	74	-2.49* <sub>FL</sub>	0.04	71	-2.54* <sub>FL</sub>	0.05	72
Reciprocity	1.04* <sub>FR</sub>	0.04	77	1.05* <sub>FR</sub>	.04	74	1.03* <sub>FR</sub>	0.04	72	1.03* <sub>FR</sub>	0.04	73
Transitive triplets	0.23* <sub>FR</sub>	0.01	77	0.23* <sub>FR</sub>	.01	74	0.22* <sub>FR</sub>	0.01	72	0.22* <sub>FR</sub>	0.01	73
Male ego	-0.03 <sub>FL</sub>	0.04	77	-0.04 <sub>FL</sub>	.04	74	-0.04 <sub>FL</sub>	0.04	72	-0.03 <sub>FL</sub>	0.03	73
Male alter	0.03 <sub>FR</sub>	0.04	77	0.04 <sub>FR</sub>	.04	74	0.05 <sub>FR</sub>	0.04	72	0.03 <sub>FR</sub>	0.04	73
Gender similarity	0.94* <sub>FR</sub>	0.05	77	0.92* <sub>FR</sub>	.05	74	0.90* <sub>FR</sub>	0.05	72	0.93* <sub>FR</sub>	0.05	73
Dutch ego	-0.01 <sub>FL</sub>	0.04	75	-0.02 <sub>FL</sub>	.04	73	-0.02 <sub>FL</sub>	0.04	71	-0.04 <sub>FL</sub>	0.04	72
Dutch alter	-0.10* <sub>FL</sub>	0.04	75	-0.13* <sub>FL</sub>	.04	73	-0.11* <sub>FL</sub>	0.04	71	-0.12* <sub>FL</sub>	0.04	72
Ethnic similarity	0.13* <sub>FR</sub>	0.04	75	0.17* <sub>FR</sub>	.03	73	0.16* <sub>FR</sub>	0.03	71	0.15* <sub>FR</sub>	0.03	72
Friends primary	0.78*	0.24	77	0.62* <sub>FR</sub>	.03	73	0.61* <sub>FR</sub>	0.03	71	0.62* <sub>FR</sub>	0.03	72
<b>Behavior</b>												
Linear shape	0.18	0.11	48	0.11	.13	42	0.09	0.12	41	0.15	0.13	46
Quadratic shape	-0.30* <sub>FL</sub>	0.05	67	-0.39* <sub>FL</sub>	.05	62	-0.36* <sub>FL</sub>	0.05	58	-0.34* <sub>FL</sub>	0.06	67
Ego indegree	0.00	0.03	71	-0.01	.03	60	0.01	0.03	64	-0.01	0.03	67
Alter indegree	-0.01	0.03	71	-0.01	.03	65	-0.02	0.03	63	-0.03	0.03	65
Reciprocated degree	-0.03	0.04	69	0.00	.04	61	-0.02	0.04	61	-0.01	0.04	66
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*	.07	61						
Av.Sim * alter indegree	+											
Av.Sim * reciprocity	-											
Male	-0.09	0.07	69	-0.07	.07	63	-0.08	0.07	61	-0.04	0.07	64
Parental opinions	0.38*	0.07	9	0.39*	.08	57	0.39*	0.08	57	0.43* <sub>FR</sub>	0.08	62

Notes: 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 are 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.  $H$  indicates the hypothesized effect: - negative hypothesized effect, + positive hypothesized effect.

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 (robust 5 in table A6.1.2 and table A6.1.4). 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 was lowered. For being inattentive in class we found a mean estimate of 1.66 (S.E. 0.36; N=49). For homework inactivity the mean estimate was 0.67 (S.E. 0.31; N=64). While the mean estimate for homework inactivity was significant, the correlation between the estimates and the standard errors also reached significance (Spearman's rank correlation  $\rho$  -0.40,  $p < 0.01$ ). The Fisher type tests were both insignificant.

## 6.7 Conclusion

We have investigated friends' influence on adolescents' problem behavior in school, 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 a social gradient to problem behavior in school. Adolescents are influenced by the problem behavior in school 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 problem behavior in school, 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 problem behavior in school. This might imply that students' school behavior will be maintained by their friends: the 'problematic' students will remain 'problematic', while the academically engaged students will keep on being the engaged students.

This study also investigated several ego, alter, and dyadic characteristics that might moderate influence on problem behavior in school among friends. Studying moderators is important, since it can deepen our understanding of who is most likely to be influenced by their friends' problem behavior in school and by which friends adolescents are most likely to be influenced. This may 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 problem behavior in school of their friends. However, we did not find evidence for the idea that friends with a higher indegree influence adolescents' problem behavior in school 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 inattention or not doing homework. 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 peer 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 in class, and not the influence of other classmates. Adolescents spend a lot of time in their class and the norms of other classmates, such as popular peers in class, might affect them over and above the norms of their friends.

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 parental socio-economic status affects student school outcomes (Dika & 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 accounting for the socio-economic status of ego's parents would alter our conclusions with respect to the influence of friends on changes in ego's behavior.

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

While the primary goal of this chapter was to deepen our understanding of the influence of friends on problem behavior in school, this chapter 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 & Prinstein, 2011; Veenstra & Dijkstra, 2011). The mechanisms that we describe in this chapter 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 chapter will lead to further research in this area.







## Appendices

Appendices chapter 2

Appendices chapter 3

Appendices chapter 4

Appendices chapter 5

Appendices chapter 6

## Appendices chapter 2

### A2.1 Measurement invariance between ethnic minority and ethnic majority students and across countries.

At least partial metric invariance is required in order to compare the paths of different groups to each other in a meaningful way (Cheung & Rensvold, 2002; Milfont & Fischer, 2010). Partial metric invariance can be established when a majority of the factor loadings is equal across groups (in our case 3 of the 4 loadings). Hence, we test for configural invariance (i.e., invariance of the factor structure) and metric invariance (i.e., invariance of the factor loadings).

We test for measurement invariance by conducting a Satorra-Bentler<sup>1</sup> adjusted  $\chi^2$  difference test (i.e., TRd) between a less restrictive and more restrictive model. However, the  $\chi^2$  difference test is sensitive to sample size, and tends to get significant in large samples even when the differences between models are trivial (Cheung & Rensvold, 2002; Meade, Johnson, & Braddy, 2008). Hence, we follow Cheung & Rensvold (2002) and Meade et al. (2008) and also check the  $\Delta$  CFI between a less restrictive and a more restrictive model. This test is less sensitive to sample size and more sensitive to measurement invariance than the  $\chi^2$  difference test (Meade, et al. 2008). When the  $\Delta$ CFI between the less restrictive and the more restrictive model is smaller or equal to 0.002, measurement invariance can be established (Meade, et al. 2008).

We test for measurement invariance between ethnic minority students and ethnic majority students at the individual level. Although, we realize that it would be better to test for *multilevel* measurement invariance<sup>2</sup>, research on testing for multilevel measurement invariance when groups are at the individual level is still in its elementary phase. Since our hypothesized relationships are all at the individual level, testing only for individual-level invariance might not be so problematic in our case.

We first test for configural invariance, in order to examine whether the same factor structure applies for both ethnic minority and ethnic majority students. We

---

1 Since our models are estimated with a robust maximum likelihood estimator (MLR), we have to use this adjusted Satorra-Bentler  $\chi^2$  difference test

2 There might be school-level measurement invariance between ethnic minorities and ethnic majorities, since ethnic minorities might select themselves into different schools than ethnic majority students.

estimate a confirmatory factor analysis with four items (i.e., coming late for class; getting punishment in school; arguing with the teacher; and skipping class) and a released covariance between the errors of two items (i.e., punishment in school and arguing with the teacher) separately for ethnic minority students and ethnic majority students. This model fits well for both groups (ethnic majority students: Satorra-Bentler  $\chi^2(1)=4.482$ ,  $p=0.034$ ;  $CFI=0.999$ ;  $TLI=0.996$ ;  $RMSEA=0.017$  and for ethnic minority students: Satorra-Bentler  $\chi^2(1)=9.094$ ,  $p=0.003$ ;  $CFI=0.997$ ;  $TLI=0.981$ ;  $RMSEA=0.041$ ). Consequently, we construct a multigroup CFA in which all factor loadings and factor intercepts are unconstrained in both groups. This model serves as our baseline model to test for metric invariance and has a good model fit: Satorra-Bentler  $\chi^2(2)=13,494$ ,  $p=0.001$ ;  $CFI=0.999$ ;  $TLI=0.992$ ;  $RMSEA=0.027$ .

To test for metric invariance we estimate a multi-group factor model in which the factor loadings are constrained to be equal across the two groups. This model fits the data well: Satorra-Bentler  $\chi^2(5)=38,746$ ,  $p<0.001$ ;  $CFI=0.996$ ;  $TLI=0.990$ ;  $RMSEA=0.029$ . The Satorra-Bentler scaled  $\chi^2$  difference test (i.e., TRd) is significant  $TRd(3)=25.040$ ,  $p<0.001$  and the  $\Delta CFI$  is slightly larger than 0.002 (i.e., 0.003). Hence, we test for partial measurement invariance by releasing the equality constraint on the loading of skipping class for immigrants and natives. The model fit of this model is better: Satorra-Bentler  $\chi^2(4)=17,098$ ,  $p=0.001$ ;  $CFI=0.998$ ;  $TLI=0.995$ ;  $RMSEA=0.020$ . The  $\Delta CFI$  is now 0.01 and the TRd is insignificant  $TRd(2)=3.960$ ,  $p=0.138^3$

We also test for measurement invariance across the four countries under scrutiny. We follow the procedure outlined by (Muthén, Khoo, & Gustafsson, 1997), however we only test for metric invariance. First we test for configural invariance by estimating a two-level CFA separately in each country. The model fit of a one factor model with four items at both the school and the individual-level is excellent in all four countries (England: Satorra-Bentler  $\chi^2(2)=0.483$ ,  $p=0.785$ ;  $CFI=1.000$ ;  $TLI=1.004$ ;  $RMSEA=0.000$ ; Germany: Satorra-Bentler  $\chi^2(3)=6.648$ ,  $p=0.084$ ;  $CFI=0.998$ ;  $TLI=0.993$ ;  $RMSEA=0.016$ ; The Netherlands: Satorra-Bentler  $\chi^2(2)=1.133$ ,  $p=0.568$ ;  $CFI=1.000$ ;  $TLI=1.002$ ;  $RMSEA=0.000$ ; and Sweden: Satorra-Bentler  $\chi^2(3)=3.305$ ,  $p=0.347$ ;  $CFI=1.000$ ;  $TLI=1.000$ ;  $RMSEA=0.005$ ). Consequently, we construct a multiple group factor model in which all factor loadings and factor

3 Because we almost find support for full metric invariance we tested our structural models assuming partial and full metric invariance. The parameter estimates and significance levels in both models are highly similar.

intercepts are unconstrained in all groups at both levels. This model serves as our baseline model to test for metric invariance and has a good model fit Satorra-Bentler  $\chi^2(10)=12.548, p=0.250; CFI=1.000; TLI=0.999; RMSEA=0.008$ .

We estimate a model in which metric invariance at the between level (i.e., school-level) is assumed. Hence, factor loadings at the between level are constrained to be equal across countries. The model fit is good Satorra-Bentler  $\chi^2(20)=43.560, p=0.002; CFI=0.998; TLI=0.994; RMSEA=0.017$ . While the Satorra-Bentler adjusted  $\Delta\chi^2$  test indicates that this restricted model fits the data worse than the unrestricted model (TRd(10)=32.988,  $p<0.001$ ), the  $\Delta$  CFI is 0.002. Hence, we conclude metric invariance at the between level.

Because we want to compare paths at the within level across countries, we also test for measurement invariance of the factor loadings at the within level. In this model measurement invariance at the between level is assumed. A model in which all loadings at the within (and the between level) are constrained to be equal has an unacceptable model fit (Satorra-Bentler  $\chi^2(29)=358.561, p<0.001; CFI=0.966; TLI=0.943; RMSEA=0.053$ ) and it fits the data worse than a model in which only equality between the loadings at the between level is assumed ( $\Delta$  CFI = 0.032 and TRd(9)=261.817,  $p<0.001$ ). We test for partial metric measurement invariance at the within level by releasing the error of the covariance between the skipping class item and the coming late to school item for Sweden<sup>4</sup>. After this adjustment, the model fit improved (Satorra-Bentler  $\chi^2(28)=193.697, p<0.001; CFI=0.983; TLI=0.970; RMSEA=0.038$ ). Although this measurement model fits the data well, the model still fits the data significantly worse than a model in which only metric invariance at the between level is assumed ( $\Delta$  CFI=0.016 and TRd(8)=117.303,  $p<0.001$ ).

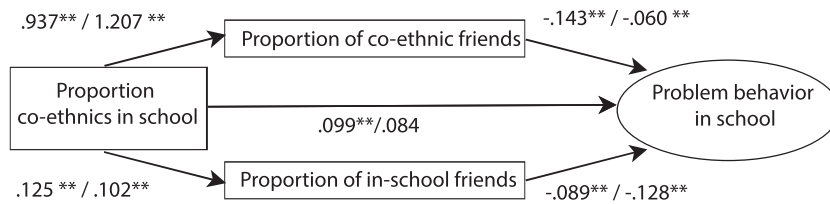
Metric measurement invariance is obtained for Germany, England, and The Netherlands at the within and the between level. For these countries the model fit of the unconstrained baseline model is very good ( $\chi^2(8)=10.436, p=0.236; CFI=1.000; TLI=0.998; RMSEA=0.009$ ). When constraining the loadings at the between level the model fit stays good: ( $\chi^2(14)=23.600, p=0.051; CFI=0.999; TLI=0.996; RMSEA=0.013$ ). Although the Satorra Bentler adjusted  $\chi^2$  difference test indicates that this latter model fits the data worse than the unconstrained model (TRd(6)=13.442,  $p=0.036$ ), the  $\Delta$  CFI indicates that the difference between the models is acceptable ( $\Delta$ CFI=0.001). The Satorra-Bentler adjusted  $\chi^2$  difference

---

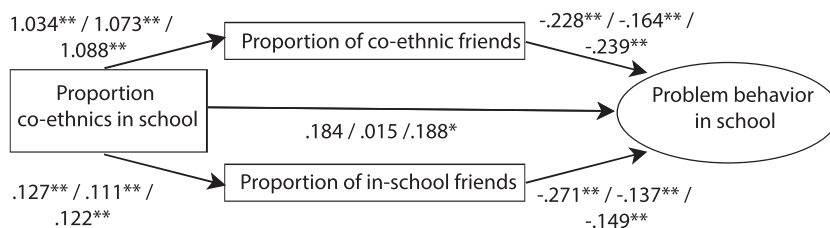
<sup>4</sup> The modification indices indicated that this adjustment to the model would improve our fit.

test indicates that a model in which factor loadings are also constrained at the within level fits the data worse than a model in which only the loadings at the between level are constrained ( $TRd(6)=15.663, p=0.016$ ). However, the  $\Delta CFI$  between these two models is acceptable (0.002). Because measurement invariance is obtained for England, Germany, and the Netherlands, we also conducted our pooled analyses without Sweden. Although the effect sizes are slightly smaller in these analyses (i.e., the total indirect effect is  $-0.091$  (S.E. 0.013),  $p < 0.001$ ), the conclusions of the study remain the same: all hypothesized effects are significant and in the expected direction. Similarly the multiple group analyses on ethnic minority students and ethnic majority students lead to highly similar conclusions when excluding Sweden.

### A2.2 Multiple group models (ethnic groups and countries)



**Figure A2.2.1** Multiple group model for ethnic majority students and ethnic minority students (unstandardized coefficients). The first coefficient is the coefficient for ethnic majority students and the second coefficient is the coefficients for ethnic majority students. The model shows paths at the individual-level. Control variables and paths at the between-level are estimated, but not presented for reasons of simplicity. Estimates are not weighted according to non-response and the sampling design of the study.



**Figure A2.2.2** Multiple group model for England, Germany, and the Netherlands (unstandardized coefficients). The first coefficient is the coefficient for England, the second coefficient is the coefficients for Germany and the third coefficient is the coefficient for the Netherlands. The model shows paths at the individual-level. Control variables and paths at the between-level are estimated, but not presented for reasons of simplicity. Estimates are not weighted according to non-response and the sampling design of the study.



### A2.3 Results for Sweden

**Table A2.3.1** Multi-level structural equation model with mediators, standardized estimates for Sweden. Model fit: Satorra-Bentler  $\chi^2(78) = 328.983$ ,  $p < 0.001$ ; CFI = 0.961; TLI = 0.931; RMSEA = 0.027

Individual-level (N= 16,197)	Problem behavior in school			Prop. co-ethnic friends (mediator)			Prop. in-school friends (mediator)		
	H	Coef. (S.E.)	p-value	H	Coef. (S.E.)	p-value	H	Coef. (S.E.)	p-value
Prop. co-ethnics in school		0.008 (0.056)	0.887	+	0.704** (0.036)	0.000	+	0.137** (0.038)	0.000
Prop. co-ethnic friends	-	-0.155** (0.023)	0.000						
Prop. in-school friends	-	-0.143** (0.019)	0.000						
Male		0.063** (0.017)	0.000		0.014 (0.015)	0.356		0.113** (0.018)	0.000
Parental education		0.010 (0.024)	0.664		0.008 (0.012)	0.528		0.028 (0.021)	0.181
<b>Region of origin (ref. native)</b>									
Anglo-countries		0.003 (0.017)	0.881		-0.005 (0.007)	0.433		0.008 (0.016)	0.637
North- and West- Europe		0.011 (0.034)	0.738		-0.008 (0.020)	0.705		0.066* (0.027)	0.014
South Europe		0.010 (0.019)	0.612		0.006 (0.013)	0.649		0.030 (0.017)	0.071
Eastern Europe		-0.024 (0.034)	0.487		-0.008 (0.022)	0.718		0.063* (0.025)	0.011
Latin America		0.005 (0.027)	0.862		-0.007 (0.008)	0.352		0.019 (0.015)	0.213
Asia		-0.040* (0.019)	0.033		-0.002 (0.012)	0.889		0.060** (0.017)	0.001
Islamic		-0.014 (0.037)	0.707		0.032 (0.027)	0.236		0.090** (0.025)	0.000
Africa		-0.002 (0.023)	0.923		-0.007 (0.012)	0.577		0.018 (0.022)	0.404
Number of siblings		0.057* (0.025)	0.023		-0.020 (0.015)	0.164		0.008 (0.021)	0.682
Parents divorced/separated		0.125** (0.017)	0.000		-0.036** (0.011)	0.001		-0.047** (0.017)	0.007
Problem behavior friends		0.377** (0.027)	0.000		0.095** (0.020)	0.000		0.030 (0.020)	0.133
<b>School-level (N=443)</b>									
Prop. co-ethnics school (i.e., ethnic homogeneity)		-0.563 (0.602)	0.350		0.914** (0.032)	0.000		0.284** (0.109)	0.009
Prop. co-ethnic friends		0.634 (0.505)	0.209						
Prop. in-school friends		0.051 (0.524)	0.922						
Mean parental education		-0.258 (0.137)	0.060		-0.021 (0.075)	0.776		-0.342** (0.102)	0.001

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , hypothesized effects are tested one-sided, other effects are tested two-sided. H indicates the hypothesized effect: - negative hypothesized effect, + positive hypothesized effect. The region Caribbean is left out of the model, because there were no respondents with this ethnic background. Estimates are not weighted according to non-response and the sampling design of the study.

## Appendices chapter 3

### A3.1 Measurement invariance

We test for measurement invariance of the problem behavior in school factor across the two measurement points at both the between-level and the within-level. Moreover, we test whether the item loadings at the between-level are the same as the item loadings at the within level. This latter constraint makes the interpretation of the contextual effects more straightforward (Marsh et al. 2009). The latent variable at the between level only truly represents the grade-level average when loadings are constrained to be equal across the between- and the within-level.

We compare the more constrained models to the less constrained models by the Satorra-Bentler adjusted  $\chi^2$  difference test (i.e., TRd) and by examining the  $\Delta$ CFI. As suggested by Cheung & Rensfold (2002), the CFI should not increase by more than 0.002 in the more constrained model. We use the  $\Delta$ CFI, as it is less sensitive to large sample sized.

In the first model item loadings, item intercepts, factor means and factor variances are allowed to vary across time points and across the between-level and the within-level. In the second model we constrain item loadings at the between-level to be the same as item loadings at the within-level. We notice that in some countries the model fit even improves when imposing these constraints. Hence, this becomes the baseline model to test for scalar invariance in the third model. In the third model, the item intercepts and item loadings are constrained to be equal across time points. In this way we test whether the relationships between the specific items and the latent factor are the same across time points and whether the intercept of the items are the same across time points. In case full scalar invariance is not obtained, we test for partial scalar invariance. When at least two items have the same loadings and the same intercepts across the time points, partial scalar invariance is obtained and we can appropriately analyze the differences in the latent factor means across different time points (Van de Schoot, Lugtig, & Hox, 2012).

Table A3.1.1 shows tests for measurement invariance for the Netherlands. The  $\Delta$ CFI between the first model and the second model is 0, and the Satorra-Bentler adjusted  $\chi^2$  difference test is insignificant ( $\text{TRd}(6) = 12.135, p = 0.055$ ). Hence, item loadings can be constrained to be equal across the levels. The fit of the third model is worse than that of the second model. The  $\Delta$ CFI is larger than 0.002,

and the Satorra-Bentler adjusted  $\chi^2$  difference test is highly significant. Based on the modification indices we release the model constraints step by step. We end up with a model in which the item loading for skipping class is not constrained to be equal across the time points at the within-level. Moreover, the item intercepts for skipping class and being punished in school are not constrained to be equal across the time points. This model does not fit the data worse than the first model ( $\Delta\text{CFI} = 0.001$ ;  $\text{TRd}(9) = 1.860$ ,  $p = 0.221$ ) or the second model ( $\Delta\text{CFI} = 0.000$ ,  $\text{TRd}(3) = 3.646$ ,  $p = 0.302$ ). To conclude, support for measurement invariance across the levels is found and partial scalar invariance across the time points is obtained. In this final model, all factor loadings are significant at both levels and standardized item loadings at the individual level are between 0.407 and 0.847.

**Table A3.1.1** *Model fit indices for tests of measurement invariance across time points and levels for the Netherlands.*

Model	TRd	df.	<i>P</i>	CFI	TLI	RMSEA
Model 1: No constraints	29.226	26	0.301	0.999	0.998	0.005
Model 2: Invariance across the item loadings at the between-level and the within-level	40.784	32	0.137	0.998	0.996	0.008
Model 3: Model 2 + Scalar invariance	112.115	38	<0.001	0.980	0.971	0.021
Model 4: Model 2+ partial scalar invariance	41.125	35	0.220	0.998	0.997	0.006

*Note: Analyses are weighted according to the sampling and non-response at the school and student-level.*

Table A3.1.2 shows tests for measurement invariance for Sweden. The second model, in which the item loadings are constrained across the level, seems to fit the data better than the unconstrained model. The third fits better than the first (unconstrained) model, but worse than the second model. The  $\Delta\text{CFI}$  between the second and the third model is much larger than 0.002, and the Satorra-Bentler adjusted  $\chi^2$  difference test is highly significant. Based on the modification indices we release the model constraints step by step. In the final model the item loading for receiving punishment class is not constrained to be equal across time points at the within-level. Moreover, the item intercepts for punishment in class and arguing with the teacher are not constrained to be equal across time points. The Satorra-Bentler adjusted  $\chi^2$  difference test is just significant ( $\text{TRd}(3) = 8.033$ ,  $p = 0.045$ ), but the  $\Delta\text{CFI}$  is 0. Moreover, the model fits better than the first unconstrained model. We conclude that we found support for partial measurement invariance across the time points and measurement invariance across the levels in Sweden. All



factor loadings are significant at both levels and standardized factor loadings at the individual level are between 0.548 and 0.728.

**Table A3.1.2** *Model fit indices for tests of measurement invariance across time points and levels for Sweden.*

Model	TRd	df.	<i>p</i>	CFI	TLI	RMSEA
Model 1: No constraints	153.463	26	<0.001	0.974	0.943	0.030
Model 2: Invariance across the item loadings at the between-level and the within-level	117.952	32	<0.001	0.982	0.969	0.022
Model 3: Model 2 + Scalar invariance	169.523	38	<0.001	0.973	0.960	0.025
Model 4: Model 2+ partial scalar invariance	125.262	35	<0.001	0.981	0.970	0.022

*Note: Analyses are weighted according to the sampling and non-response at the school and student-level.*

Table A3.1.3 shows tests for measurement invariance for England. The  $\Delta$ CFI between the first model, and the second model is 0 and the Satorra-Bentler adjusted  $\chi^2$  difference test is insignificant ( $\Delta\chi^2(6) = 6.238, p = 0.397$ ). Hence, item loadings can be constrained to be equal across the levels. The fit of the third model is worse than that of the second model. The  $\Delta$ CFI is larger than 0.002, and the Satorra-Bentler adjusted  $\chi^2$  difference test is significant. Based on the modification indices we release the model constraints step by step. We end up with a model in which the item loading for coming late to class is not constrained to be equal across the time points at the within-level. Also, the item intercepts for skipping class and coming late to class are not constrained to be equal across time points. This model does not fit the data worse than the first model ( $\Delta$ CFI = 0.000,  $\Delta\chi^2(9) = 11.535, p = 0.241$ ) or the second model ( $\Delta$ CFI = 0.000,  $\Delta\chi^2(3) = 5.035, p = 0.169$ ). To conclude, support for measurement invariance across the levels is found and partial scalar invariance across the time points is obtained. In this final model, all factor loadings are significant at both levels and standardized item loadings at the individual level are between 0.414 and 0.820.

All the main analyses presented in this paper were also performed assuming full measurement invariance. This did not change the conclusions of the paper.



**Table A3.1.3** *Model fit indices for tests of measurement invariance across time points and levels for England.*

<b>Model</b>	<b>TRd</b>	<b>df.</b>	<b><i>p</i></b>	<b>CFI</b>	<b>TLI</b>	<b>RMSEA</b>
Model 1: No constraints	54.268	26	<0.001	0.993	0.985	0.016
Model 2: Invariance across the item loadings at the between-level and the within-level	59.471	32	0.002	0.993	0.988	0.014
Model 3: Model 2 + Scalar invariance	99.738	38	<0.001	0.985	0.978	0.019
Model 4: Model 2+ partial scalar invariance	64.305	35	<0.001	0.993	0.989	0.014

*Note: Analyses are weighted according to the sampling and non-response at the school and student-level.*

## Appendices chapter 4

### A4.1 Full table 4.4

**Table A4.1.1** Multi-level cross-classified model of students' problem behavior in school.  $N$  student = 2783;  $N$  school = 90;  $N$  t0 class = 198;  $N$  t1class = 243

	Model 2		Model 3	
	Coef.	S.E.	Coef.	S.E.
Intercept	0.615**	0.073	0.627**	0.071
Problem behavior leavers	0.015	0.088	0.030	0.087
Problem behavior joiners	-0.100	0.120	-0.088	0.119
Problem behavior stayers	0.142*	0.075	0.148*	0.076
#Leaver friends	-0.012	0.009	-0.012	0.008
Leaver foes	-0.064*	0.033	-0.063*	0.033
#Joiner friends	0.026**	0.008	0.027**	0.008
Joiner foes	0.022	0.028	0.022	0.029
Problem behavior leaver friends	0.047**	0.016	0.041*	0.017
#Leaver friends * Problem behavior leaver friends			-0.017	0.014
<b>Control variables</b>				
<i>Problem behavior in school (t0)</i>	0.658**	0.018	0.660**	0.019
<i>Problem behavior in school (t0) squared</i>	-0.060**	0.017	-0.060**	0.017
Newness in class	0.083	0.100	0.071	0.099
Has a foe at t0	0.034	0.027	0.033	0.027
Boy	0.079**	0.022	0.080**	0.022
Native Dutch	0.024	0.018	0.025	0.018
Teacher support	-0.013	0.012	-0.013	0.012
Parental school support	-0.011	0.019	-0.011	0.019
Nr of months t0 school class	0.011	0.008	0.011	0.008
Nr of months t1 school class	0.009	0.007	0.008	0.007
<i>Specialization (ref. Technology)</i>				
<i>Health</i>	0.017	0.026	0.017	0.026
<i>Economy</i>	0.043	0.026	0.043	0.026
<i>Agriculture</i>	0.016	0.041	0.013	0.041
<i>Culture</i>	-0.021	0.036	-0.023	0.036
<i>Other (e.g., combination, unspecified)</i>	0.066	0.035	0.064	0.035
<i>Track (at school-level, ref. Vmbo-b)</i>				
<i>Vmbo-k</i>	-0.040	0.048	-0.040	0.048
<i>Vmbo-g</i>	-0.025	0.052	-0.022	0.052
<i>Vmbo-t</i>	0.000	0.051	0.001	0.051
<i>Havo</i>	-0.012	0.059	-0.011	0.059
<i>Vwo</i>	-0.015	0.055	-0.016	0.055

**Table A4.1.1** *Continued*

	Model 2		Model 3	
	Coef.	S.E.	Coef.	S.E.
<i>Changed track (ref. no track change)</i>				
<i>Changed to lower track</i>	0.047	0.041	0.048	0.041
<i>Changed to higher track</i>	-0.027	0.037	-0.025	0.038
<i>School variance</i>	4.527e-04		5.035e-04	
<i>Class t0 variance</i>	2.343e-03		2.128e-03	
<i>Class t1 variance</i>	2.921e-03		3.000e-03	
<i>Individual variance</i>	0.183		0.183	

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , hypothesized effects are tested one-sided, other effects are tested two-sided. All continuous independent variables are grand-mean centered. Estimates are not weighted according to the sampling design of the study and non-response.

## A4.2 Robustness checks

**Table A4.2.1** *Multi-level cross-classified model of problem behavior in school – Robustness checks*

	Robustness 1 ( $N$ student = 2779; school = 90; t0 class =198; t1 class=243)		Robustness 2 ( $N$ student = 2773; school = 90; t0 class =198; t1 class=243)	
	Coef.	S.E.	Coef.	S.E.
<i>Intercept</i>	0.616**	0.075	0.686**	0.069
Problem behavior leavers	0.010	0.086		
Problem behavior leavers same specialization			0.036	0.145
Problem behavior leavers different specialization			0.004	0.098
Problem behavior joiners	-0.089	0.117		
Problem behavior joiners same specialization			-0.003	0.135
Problem behavior joiners different specialization			0.159	0.153
Problem behavior stayers	0.144*	0.076		
Problem behavior stayers same specialization			0.032	0.084
Problem behavior stayers different specialization			0.197*	0.102
#Leaver friends			-0.011	0.008
# Leaver friends different specialization	-0.013	0.008		
Leaver foes	-0.064*	0.033	-0.065*	0.033
#Joiner friends	0.025**	0.008	0.027**	0.008
Joiner foes	0.023	0.028	0.021	0.028
Problem behavior leaver friends	0.046	0.016	0.043**	0.016
Control variables				
<i>Problem behavior in school (t0)</i>	0.658**	0.018	0.659**	0.018
<i>Problem behavior in school (t0) squared</i>	-0.060**	0.017	-0.060**	0.017

Table A4.2.1 *Continued*

	Robustness 1 ( <i>N student = 2779;</i> <i>school = 90; t0 class</i> <i>=198; t1 class=243</i> )		Robustness 2 ( <i>N student = 2773;</i> <i>school = 90; t0 class</i> <i>=198; t1 class=243</i> )	
	Coef.	S.E.	Coef.	S.E.
Newness in class	0.065	0.095	-0.037	0.085
Has a foe at t0	0.034	0.027	0.035	0.027
Boy	0.078	0.022	0.078**	0.022
Native Dutch	0.023	0.018	0.018	0.018
Teacher support	-0.013	0.012	-0.015	0.012
Parental school support	-0.011	0.019	-0.011	0.019
Nr of months t0 school class	0.011	0.008	0.014	0.008
Nr of months t1 school class	0.009	0.007	0.007	0.007
Specialization (ref. Technology)				
Health	0.015	0.026	0.025	0.028
Economy	0.040	0.026	0.059*	0.028
Agriculture	0.017	0.042	0.011	0.040
Culture	-0.024	0.036	-0.021	0.036
Other (e.g., combination, unspecified)	0.056	0.036	0.089*	0.040
Track (at school-level, ref. Vmbo-b)				
Vmbo-k	-0.042	0.049	-0.033	0.047
Vmbo-g	-0.023	0.052	-0.032	0.051
Vmbo-t	0.001	0.051	-0.031	0.053
Havo	-0.009	0.060	-0.028	0.064
Vwo	-0.011	0.056	-0.039	0.060
Changed track (ref. no track change)				
Changed to lower track	0.043	0.041	0.039	0.041
Changed to higher track	-0.028	0.038	-0.040	0.040
School variance	2.776e-04		8.344e-04	
Class t0 variance	2.366e-03		2.237e-03	
Class t1 variance	2.984e-03		2.250e-03	
Individual variance	0.183		0.184	

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , hypothesized effects are tested one-sided, other effects are tested two-sided. Continuous variables are grand-mean centered in the analyses. Estimates are not weighted according to the sampling design and non-response.

**Table A4.2.2** School fixed effect model of students' problem behavior in school.  $N$  student = 2783;  $N$  school = 90;  $N$  t0 class = 198;  $N$  t1class = 243

	Model 2		Model 3	
	Coef.	S.E.	Coef.	S.E.
<i>Intercept</i>	0.671**	0.075	0.683**	0.074
Problem behavior leavers	0.101	0.123	0.120	0.124
Problem behavior joiners	0.088	0.153	0.096	0.152
Problem behavior stayers	0.114	0.119	0.121	0.124
#Leaver friends	-0.013	0.009	-0.012	0.009
Leaver foes	-0.059*	0.034	-0.057*	0.033
#Joiner friends	0.028**	0.008	0.029**	0.008
Joiner foes	0.018	0.027	0.019	0.028
Problem behavior leaver friends	0.051**	0.016		
#Leaver friends * Problem behavior leaver friends			-0.020	0.014
<b>Control variables</b>				
<i>Problem behavior in school (t0)</i>	0.656**	0.019	0.658**	0.019
<i>Problem behavior in school (t0) squared</i>	-0.065**	0.018	-0.065**	0.019
Newness in class	-0.036	0.130	-0.042	0.129
Has a foe at t0	0.035	0.027	0.033	0.027
Boy	0.080**	0.022	0.082**	0.022
Native Dutch	0.011	0.022	0.011	0.022
Teacher support	-0.013	0.012	-0.014	0.013
Parental school support	-0.010	0.019	-0.010	0.019
Nr of months t0 school class	-0.023	0.027	-0.027	0.026
Nr of months t1 school class	0.038	0.027	0.039	0.028
Specialization (ref. Technology)	Coef.	S.E.	Coef.	S.E.
Health	0.019	0.028	0.019	0.028
Economy	0.037	0.029	0.037	0.029
Agriculture	0.024	0.043	0.021	0.044
Culture	-0.013	0.063	-0.015	0.064
Other (e.g., combination, unspecified)	0.065	0.036	0.063	0.036
Changed track (ref. no track change)				
<i>Changed to lower track</i>	0.043	0.042	0.042	0.051
<i>Changed to higher track</i>	-0.033	0.073	-0.031	0.046
<i>School variance</i>	0.019		0.020	
<i>Individual variance</i>	0.188		0.188	

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , hypothesized effects are tested one-sided, other effects are tested two-sided. Continuous variables are grand-mean centered in the analyses. School track is constant within a school and therefore not accounted for in the analyses. Robust standard errors are used. School-level variance is 0.037 and individual variance is 0.342 in the intercept-only model. Estimates are not weighted according to the sampling design of the study and non-response.

## Appendices chapter 5

### A5.1 Representativeness of the sample we use for our analyses

We use a Pearson's  $\chi^2$  test for independence to examine whether students that are included in the analyses of chapter 5 significantly differ from students that are excluded with respect to the items "arguments with teachers" and "lack of effort in school". Students in the analyses did not significantly differ from the students that were excluded from the analyses with respect to their lack of effort in school (wave 1: Pearson  $\chi^2(4) = 5.287$ ,  $p = 0.259$ ; wave 2: Pearson  $\chi^2(4) = 3.585$ ,  $p = 0.465$ ). However, in the first wave, they engaged in less arguments with their teachers than the students that were excluded from the analyses (wave 1: Pearson  $\chi^2(4) = 14.375$ ,  $p = 0.006$ ; wave 2: Pearson  $\chi^2(4) = 7.624$ ,  $p = 0.106$ ).

Little's MCAR tests (Li, 2013) show that students' lack of effort in school and the arguments they have with their teachers are not missing completely at random in the sample that we use for the main analyses of chapter 5 (lack of effort in school: Little  $\chi^2(2) = 17.346$ ,  $p < 0.001$ ; arguments with teachers: Little  $\chi^2(2) = 23.998$ ,  $p < 0.001$ ). Moreover, students are also not missing completely at random in the sample that we use in the fixed effect models presented in table A5.4.1 and A5.4.2 (lack of effort in school: Little  $\chi^2(2) = 47.638$ ,  $p < 0.001$  and arguments with teachers: Little  $\chi^2(2) = 60.751$ ,  $p < 0.001$ ). We have to be aware of this when drawing conclusions.

### A5.2 Test of the assumptions

In multiple group analyses several networks (e.g., classes) are analyzed as one big network. Nevertheless, the analyses take into account that adolescents can only select and be influenced by students who attend their own classroom (i.e., the relationships between students of different classes are specified as structural zeroes). While this approach improves the power and convergence of the models, it implies that we assume that parameters<sup>5</sup> are the same in the different classes that we combine in one analysis. We take the second SIENA model to test this assumption for the hypothesized effects, the contagion effects of the behavior of peers and the *boy* effect. The assumption is met for these effects for 7 of the groups for students' lack of effort in school and for 14 of the groups for students'

<sup>5</sup> All parameters except for the rate parameters.

arguments with their teachers. In the groups for which the assumption is not met, we delete classes that violate the assumption and rerun the multiple group models and the meta-analyses. The results on these new models are highly in line with our main conclusions. Only the *lack of effort homophily* effect turns to insignificance, however this effect was already found to be not robust.

### A5.3 Models with convergence effect for the influence of the problem behavior of friends (i.e., Average similarity effect)

**Table A5.3.1** SIENA meta-analyses on 18 multiple group analyses on adolescents' friendships networks and their arguments with their teachers and lack of effort in school in Sweden.

	H D.V. = arguments with teachers (Based on 102 classes)			D.V. = lack of effort in school (Based on 107 classes)		
	Coef.	S.E.	Fisher test	Coef.	S.E.	Fisher test
<b>Network formation</b>						
Outdegree (density)	-2.342**	0.076	FL	-2.330**	0.067	FL
Reciprocity	1.655**	0.079	FR	1.642**	0.069	FR
Transitive triplets	0.625**	0.022	FR	0.624**	0.019	FR
3-cycle	-0.460**	0.050	FL	-0.448**	0.043	FL
Problem behavior alter	-0.020	0.041		-0.039	0.031	
Problem behavior ego	0.005 <sup>a</sup>	0.068		0.042 <sup>a</sup>	0.066	FR
Problem behavior homophily	+ 0.308 <sup>†</sup>	0.169		0.273	0.170	FR
National-Origin homophily	0.250** <sup>a</sup>	0.063	FR	0.268**	0.058	FR
Native alter	-0.210** <sup>a</sup>	0.068	FL	-0.195** <sup>a</sup>	0.060	FL
Native ego	0.102 <sup>a</sup>	0.073	FR	0.091 <sup>a</sup>	0.068	FR
Boy alter	0.006	0.040		0.010	0.037	
Boy ego	0.137 <sup>†</sup>	0.063	FR	0.101 <sup>a</sup>	0.065	FR
Sex homophily	+ 0.395**	0.039	FR	0.405**	0.035	FR
<b>Behavior</b>						
Linear shape	-0.845**	0.212	FL	-0.270 <sup>†</sup>	0.125	
Quadratic shape	0.178**	0.045		-0.105**	0.031	
Problem behavior friends (convergence)	+ 2.196**	0.409	FR	1.490**	0.392	FR
Boy	+ 0.321**	0.121	FR	0.290**	0.063	FR
Parental education	-0.056	0.041		-0.044	0.026	
Nr. Friends	-0.015	0.045		-0.016	0.038	

*Note: Estimates and standard errors are obtained according to the Snijders and Baerveldt (2003) method; \* p-value < 0.05, \*\* p-value < 0.01, one-sided t-test for hypothesized effects, other effects are tested two-sided; <sup>a</sup> The estimate significantly varies across the 18 groups; 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 and standard errors are printed bold, it means that the correlation between the estimate and standard error is significant. If this is the case, we have to rely on Fisher type tests. H indicates the hypothesized effect:*



- negative hypothesized effect, + positive hypothesized effect. Some of these hypothesized effects are not explicitly formulated in the text, but they are implied by an explicitly formulated hypothesis. Problem behavior friends refers to friends' arguments with teachers in the model on arguments with teachers and refers to friends' lack of effort in school in the model on lack of effort in school.

### A5.4 Fixed effect models on the full sample, weighted according to non-response in wave 1 and the sampling design of the study

**Table A5.4.1** Individual-level fixed effects models on adolescents' arguments with teachers in school on the larger Swedish sample. Estimates are weighted according to the design of the study and non-response at the school, class and student-level in wave 1.  $N$  (individuals) = 4060.  $N$  (observations) = 7815

	H	Model 1		Model 2		Model 3	
		Overall R <sup>2</sup> : 0.080		Overall R <sup>2</sup> : 0.079		Overall R <sup>2</sup> : 0.080	
		Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Time		-0.011	0.020	-0.011	0.020	-0.011	0.020
Boy*time	+	0.007	0.030	0.008	0.026	0.008	0.030
Argue friends	+	0.203**	0.032	0.203**	0.027	0.202**	0.032
Argue non-friends	+	0.090*	0.051	0.059	0.060		
Boy*Argue non-friends	+			0.058	0.099		
Argue same-sex non-friends	+					0.031	0.034
Argue opposite-sex non-friends						0.033	0.040
Prop. boys non-friends		0.379	0.342	0.385	0.342	0.380	0.342
Nr. Friends (ref = 0)							
1		-0.380**	0.080	-0.376**	0.079	-0.377**	0.080
2		-0.367**	0.079	-0.366**	0.079	-0.366**	0.079
3		-0.409**	0.081	-0.407**	0.081	-0.408**	0.081
4		-0.372**	0.080	-0.372**	0.080	-0.371**	0.080
5		-0.402**	0.082	-0.400**	0.082	-0.401**	0.083

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , one-sided tests for hypothesized effects, two-sided tests for non-hypothesized effects. H indicates the hypothesized effect: - a negative hypothesized effect, + a positive hypothesized effect. Some of these hypothesized effects are not explicitly formulated in the text, but they are implied by an explicitly formulated hypothesis.



**Table A5.4.2** Individual-level fixed effects models on adolescents' lack of lack effort in school on the larger Swedish sample. Estimates are weighted according to the design of the study and non-response at the school, class and student-level in wave 1.  $N$  (individuals) = 4033,  $N$  (observations) = 7652

	H	<u>Model 1</u>		<u>Model 2</u>		<u>Model 3</u>	
		Overall R <sup>2</sup> : 0.036		Overall R <sup>2</sup> : 0.036		Overall R <sup>2</sup> : 0.034	
		Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Time		-0.008	0.024	-0.009	0.024	-0.011	0.024
Boy*time	+	0.093**	0.035	0.095**	0.034	0.100**	0.035
Lack effort friends	+	0.062*	0.029	0.061*	0.029	0.059*	0.029
Lack effort non-friends	+	0.150**	0.056	0.053	0.079		
Boy*Lack effort non-friends	+			0.186*	0.112		
Lack effort same-sex non-friends	+					0.022	0.029
Lack effort opposite-sex non-friends						0.086*	0.041
Prop. boys non-friends		-0.314	0.262	-0.295	0.263	0.293	0.262
Nr. Friends (ref = 0)							
1		-0.319**	0.092	-0.314**	0.092	-0.312**	0.093
2		-0.234**	0.088	-0.230**	0.088	-0.227*	0.088
3		-0.245**	0.090	-0.242**	0.090	-0.238**	0.090
4		-0.217*	0.091	-0.213*	0.091	-0.208*	0.091
5		-0.260**	0.092	-0.254**	0.092	-0.252**	0.092

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , one-sided tests for hypothesized effects, two-sided tests for non-hypothesized effects.  $H$  indicates the hypothesized effect: - a negative hypothesized effect, + a positive hypothesized effect. Some of these hypothesized effects are not explicitly formulated in the text, but they are implied by an explicitly formulated hypothesis.

## Appendices chapter 6

### A6.1 Robustness checks

**Table A6.1.1** *Meta-analysis SIENA results on homework inactivity – robustness checks 1-3*

	H	Robust 1 (Parental opinions varying covariate)			Robust 2 (transitive ties effect)			Robust 3 (balance)		
		Coef.	S.E.	N	Coef.	S.E.	N	Coef.	S.E.	N
<b>Network</b>										
Homophily homework		0.17*	0.08	79	0.26*	0.08	76	0.23*	0.09	75
Homework ego		-0.09* <sup>FL</sup>	0.02	79	-0.09* <sup>FL</sup>	0.03	77	-0.15* <sup>FL</sup>	0.04	77
Homework alter		-0.06* <sup>FL</sup>	0.02	80	-0.02	0.02	77	-0.06* <sup>FL</sup>	0.02	77
Outdegree		-2.52* <sup>FL</sup>	0.05	76	-3.00* <sup>FL</sup>	0.06	76	-1.77* <sup>FL</sup>	0.05	75
Reciprocity		1.02* <sup>FR</sup>	0.04	79	1.14* <sup>FR</sup>	0.04	77	1.04* <sup>FR</sup>	0.03	77
Transitive triplets / ties / balance		0.23* <sup>FR</sup>	0.01	80	1.12* <sup>FR</sup>	0.04	77	0.17* <sup>FR</sup>	0.01	77
<b>3-cycle</b>										
Male ego		0.00	0.03	79	-0.01	0.03	77	0.01 <sup>FL FR</sup>	0.06	76
Male alter		0.05 <sup>FR</sup>	0.04	79	0.01	0.03	77	0.03	0.03	77
Gender similarity		0.95* <sup>FR</sup>	0.05	79	0.86* <sup>FR</sup>	0.04	77	0.77* <sup>FR</sup>	0.04	76
Dutch ego		0.02	0.04	76	0.06 <sup>FR</sup>	0.04	75	0.07 <sup>FR</sup>	0.07	74
Dutch alter		-0.11* <sup>FL</sup>	0.04	76	-0.10* <sup>FL</sup>	0.04	75	-0.10* <sup>FL</sup>	0.04	75
Ethnic similarity		0.13* <sup>FR</sup>	0.04	75	0.11* <sup>FR</sup>	0.04	75	0.14* <sup>FR</sup>	0.03	75
Friends primary		0.94* <sup>FR</sup>	0.30	80	0.83* <sup>FR</sup>	0.27	77	0.74* <sup>FR</sup>	0.27	77
<b>Behavior</b>										
Linear shape		0.06	0.10	60	0.21*	0.10	57	0.20	0.13	54
Quadratic shape		-0.38* <sup>FL</sup>	0.04	66	-0.38* <sup>FL</sup>	0.03	70	-0.38* <sup>FL</sup>	0.04	68
Ego indegree		0.02	0.02	73	0.03	0.03	71	0.03	0.02	70
Alter indegree		0.08*	0.03	71	0.02	0.03	72	0.02	0.03	71
Reciprocated degree		-0.11*	0.03	72	-0.05	0.03	68	-0.05	0.03	70
Av.Sim	+	0.28	0.29	31	0.90*	0.30	35	0.93*	0.28	37
Male		0.09	0.05	69	0.08	0.06	69	0.09*	0.06	68
Parental opinions		0.24* <sup>FR</sup>	0.04	73	0.29* <sup>FR</sup>	0.05	69	0.32* <sup>FR</sup>	0.05	69

Notes: 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.  $H$  indicates the hypothesized effect: - negative hypothesized effect, + positive hypothesized effect.



**Table A6.1.2** *Meta-analysis SIENA results on homework inactivity – robustness checks 4 and 5*

	<b>H</b>	<b>Robust 4 (3-cycle)</b>			<b>Robust 5 (standard error bound of 10)</b>		
		<b>Coef.</b>	<b>S.E.</b>	<b>N</b>	<b>Coef.</b>	<b>S.E.</b>	<b>N</b>
<b>Network</b>							
Homophily homework		0.25*	0.09	77	0.20*	0.08	82
Homework ego		-0.08* <sup>FL</sup>	0.02	77	-0.09* <sup>FL</sup>	0.02	84
Homework alter		-0.05* <sup>FL</sup>	0.02	77	-0.06* <sup>FL</sup>	0.02	84
Outdegree		-2.69* <sup>FL</sup>	0.05	77	-2.52* <sup>FL</sup>	0.05	82
Reciprocity		1.58* <sup>FR</sup>	0.04	77	1.04* <sup>FR</sup>	0.04	84
Transitive triplets		0.41* <sup>FR</sup>	0.01	77	0.23* <sup>FR</sup>	0.01	84
<b>3-cycle</b>							
Male ego		0.01	0.03	77	0.01	0.03	83
Male alter		0.02	0.04	77	0.02 <sup>FR</sup>	0.04	84
Gender similarity		0.97* <sup>FR</sup>	0.05	77	0.95* <sup>FR</sup>	0.05	83
Dutch ego		0.00	0.03	75	0.01	0.03	81
Dutch alter		-0.11* <sup>FL</sup>	0.04	75	-0.12* <sup>FL</sup>	0.04	81
Ethnic similarity		0.13* <sup>FR</sup>	0.04	75	0.13* <sup>FR</sup>	0.04	81
Friends primary		0.82* <sup>FR</sup>	0.17	77	1.00* <sup>FR</sup>	0.33	84
<b>Behavior</b>							
Linear shape		0.15	0.09	55	0.09	0.09	71
Quadratic shape		-0.37* <sup>FL</sup>	0.03	71	-0.38* <sup>FL</sup>	0.03	75
Ego indegree		0.03	0.02	73	0.01	0.02	77
Alter indegree		0.02	0.03	72	0.02	0.03	76
Reciprocated degree		-0.04	0.03	69	-0.02	0.03	77
Av.Sim	+	0.93*	0.27	39	0.67*	0.31	64
Male		0.11*	0.05	70	0.07	0.05	77
Parental opinions		0.28* <sup>FR</sup>	0.05	73	0.33* <sup>FR</sup>	0.05	78

*Notes: 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. H indicates the hypothesized effect: - negative hypothesized effect, + positive hypothesized effect.*

**Table A6.1.3** Meta-analysis SIENA results on inattentiveness in class – robustness checks 1-3

	<b>H</b>	<b>Robust 1</b> (Parental opinions varying covariate)			<b>Robust 2</b> (transitive ties effect)			<b>Robust 3</b> (balance)		
		<b>Coef.</b>	<b>S.E.</b>	<b>N</b>	<b>Coef.</b>	<b>S.E.</b>	<b>N</b>	<b>Coef.</b>	<b>S.E.</b>	<b>N</b>
<b>Network</b>										
Homophily inattention		0.20* <sup>FR</sup>	0.08	77	0.19*	0.07	76	0.21* <sup>FR</sup>	0.08	77
Inattentive ego		-0.04 <sup>FL</sup>	0.03	80	-0.03 <sup>FL</sup>	0.03	78	-0.02 <sup>FLFR</sup>	0.05	77
Inattentive alter		-0.02	0.02	80	-0.00	0.02	78	-0.02	0.02	77
Outdegree		-2.47* <sup>FL</sup>	0.04	76	-2.97* <sup>FL</sup>	0.06	75	-1.78* <sup>FL</sup>	0.05	76
Reciprocity		1.05* <sup>FR</sup>	0.04	80	1.13* <sup>FR</sup>	0.04	78	1.03* <sup>FR</sup>	0.04	77
Transitive triplets / ties / balance		0.23* <sup>FR</sup>	0.01	80	1.14* <sup>FR</sup>	0.04	78	0.17* <sup>FR</sup>	0.01	77
<b>3-cycle</b>								-0.42* <sup>FL</sup>	0.01	77
Male ego		-0.05 <sup>FL</sup>	0.04	80	-0.03 <sup>FL</sup>	0.03	78	-0.03 <sup>FLFR</sup>	0.05	77
Male alter		0.05 <sup>FR</sup>	0.04	80	0.01	0.04	78	0.03	0.03	77
Gender similarity		0.94* <sup>FR</sup>	0.05	80	0.82* <sup>FR</sup>	0.04	78	0.74* <sup>FR</sup>	0.05	77
Dutch ego		0.01	0.04	76	0.03 <sup>FR</sup>	0.05	74	0.02 <sup>FLFR</sup>	0.08	76
Dutch alter		-0.11* <sup>FL</sup>	0.04	76	-0.09* <sup>FR</sup>	0.04	74	-0.09* <sup>FL</sup>	0.04	76
Ethnic similarity		0.12* <sup>FR</sup>	0.04	76	0.11* <sup>FR</sup>	0.04	74	0.14* <sup>FR</sup>	0.03	76
Friends primary		0.69*	0.19	80	0.74* <sup>FR</sup>	0.19	77	0.63* <sup>FR</sup>	0.18	76
<b>Behavior</b>										
Linear shape		0.09	0.12	51	0.09	0.12	47	0.21	0.15	44
Quadratic shape		-0.33* <sup>FL</sup>	0.06	70	-0.31* <sup>FL</sup>	0.05	67	-0.28* <sup>FL</sup>	0.05	71
Ego indegree		-0.01	0.03	73	0.01	0.03	69	0.00	0.03	74
Alter indegree		-0.01	0.03	73	-0.02	0.03	71	-0.01	0.03	73
Reciprocated degree		-0.00	0.04	70	-0.03	0.04	68	-0.03	0.04	72
Av.Sim	+	1.29*	0.42	23	1.89*	0.55	19	1.83*	0.45	22
Male		-0.04	0.06	70	-0.09	0.07	68	-0.08	0.07	72
Parental opinions		0.24*	0.07	70	0.36*	0.07	68	0.36* <sup>FR</sup>	0.07	69

Notes: 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. H indicates the hypothesized effect: - negative hypothesized effect, + positive hypothesized effect.



**Table A6.1.4** Meta-analysis SIENA results on inattentiveness in class – robustness checks 4 and 5

	<b>H</b>	<b>Robust 4 (3-cycle)</b>			<b>Robust 5 (standard error bound of 10)</b>		
		<b>Coef.</b>	<b>S.E.</b>	<b>N</b>	<b>Coef.</b>	<b>S.E.</b>	<b>N</b>
<b>Network</b>							
Homophily inattention		0.22* <sup>FR</sup>	0.08	75	0.22* <sup>FR</sup>	0.08	77
Inattentive ego		-0.04 <sup>FL</sup>	0.02	76	-0.04 <sup>FL</sup>	0.03	77
Inattentive alter		-0.03	0.02	76	-0.02	0.02	77
Outdegree		-2.64* <sup>FL</sup>	0.05	74	-2.51* <sup>FL</sup>	0.05	76
Reciprocity		1.57* <sup>FR</sup>	0.04	77	1.04* <sup>FR</sup>	0.04	77
Transitive triplets		0.40* <sup>FR</sup>	0.01	77	0.23* <sup>FR</sup>	0.01	77
3-cycle		-0.42* <sup>FL</sup>	0.01	77			
Male ego		-0.02	0.03	76	-0.03 <sup>FL</sup>	0.04	77
Male alter		0.02	0.03	77	0.03	0.04	77
Gender similarity		0.92* <sup>FR</sup>	0.05	77	0.94* <sup>FR</sup>	0.05	77
Dutch ego		0.00	0.03	74	-0.00 <sup>FL</sup>	0.04	76
Dutch alter		-0.10* <sup>FL</sup>	0.04	75	-0.10* <sup>FL</sup>	0.04	76
Ethnic similarity		0.12* <sup>FR</sup>	0.04	75	0.13* <sup>FR</sup>	0.04	76
Friends primary		0.88* <sup>FR</sup>	0.23	75	0.78* <sup>FR/FL</sup>	0.02	77
<b>Behavior</b>							
Linear shape		0.06	0.12	45	0.16	0.11	62
Quadratic shape		-0.30* <sup>FL</sup>	0.06	62	-0.30* <sup>FL</sup>	0.05	72
Ego indegree		0.00	0.03	68	0.00	0.03	75
Alter indegree		-0.01	0.03	68	-0.01	0.03	76
Reciprocated degree		-0.02	0.04	67	-0.03	0.04	75
Av.Sim	+	1.84*	0.49	19	1.66*	0.36	49
Male		-0.09	0.07	66	-0.09	0.07	74
Parental opinions		0.39*	0.07	61	0.38*	0.07	71

Notes: 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. H indicates the hypothesized effect: - negative hypothesized effect, + positive hypothesized effect.







## Nederlandse samenvatting



## Nederlandse samenvatting

### Achtergrond van de studie

Een aanzienlijk deel van de jongeren houdt zich niet altijd aan de schoolregels of -normen. Cijfers uit 2010 tonen bijvoorbeeld aan dat 18 procent van de Nederlandse jongeren van 14 jaar wel eens spijbelt, 20 procent eens per maand of vaker ruzie heeft met leraren en 28 procent eens per maand of vaker te laat komt op school. Het overtreden van schoolregels of -normen, zowel door het vertonen van rebels gedrag (bijvoorbeeld, ruzie maken met leraren) als door onttrekking aan school (bijvoorbeeld, spijbelen), wordt ook wel probleemgedrag op school genoemd. Onderzoek wijst uit dat leerlingen die meer probleemgedrag vertonen op school lagere cijfers halen (Bryant, Schulenberg, Bachman, O'Malley, & Johnston, 2000; Fredricks, Blumenfeld, & Paris, 2004) en een grotere kans hebben op vroegtijdig schooluitval (Fredricks et al., 2004; Rumberger, 1995). Omdat probleemgedrag op school een voorspeller is voor het succes van iemands verdere schoolloopbaan, is het van belang om inzicht te krijgen in de determinanten van probleemgedrag op school.

Voorgaand onderzoek heeft probleemgedrag op school dikwijls gerelateerd aan de etniciteit of de sociaaleconomische achtergrond van leerlingen (McFarland, 2001). Onderzoekers verwachten dat, vergeleken met etnische meerderheden en leerlingen met een hogere sociaaleconomische achtergrond, etnische minderheden en leerlingen met een lagere sociaaleconomische achtergrond meer probleemgedrag vertonen op school (Ainsworth-Darnell & Downey, 1998; Bingham & Okagaki, 2012; Ogbu, 1987; Van Tubergen & van Gaans, 2013; Willis, 1977). Deze groepen zouden slechtere arbeidsperspectieven hebben en dit zou leiden tot een vervreemding van de samenleving en een devaluatie van school. Daarnaast wordt probleemgedrag op school – ook onder etnische minderheden en leerlingen met een lagere sociaaleconomische achtergrond – toegeschreven aan karakteristieken van ouders, zoals opvoedingsstijl en de ondersteuning op school van ouders (Blondal & Adalbjarnardottir, 2014; Davies, 1999; McNeal, 1999). Door de focus op de sociaal-etnische en de familie achtergrond van leerlingen, wordt echter de klascontext – de context waarin leerlingen de beslissing nemen om probleemgedrag te vertonen – grotendeels genegeerd (McFarland, 2001). McFarland (2001) definieert de klascontext als de interacties die leerlingen onderling hebben met elkaar en de interacties die leerlingen hebben met de leraar in de klas. De verklaringen van probleemgedrag op school in dit proefschrift richten zich voornamelijk op dit eerste aspect. Voorgaand onderzoek heeft meer gekeken naar de interacties tussen leraar

en leerling dan de interacties tussen leeftijdsgenoten in de klas (Fredricks et al., 2004; Ryan, 2000).

Vooraf tijdens het begin en het midden van de adolescentie zouden leeftijdsgenoten een belangrijke rol spelen in het gedrag van leerlingen op school. In deze levensfase worden relaties met leeftijdsgenoten steeds intiemer (Mahatmya, Lohman, Matjasko, & Feldman Farb, 2012). Daarnaast passen leerlingen zich in deze periode het meest aan aan het (deviante) gedrag van hun leeftijdsgenoten, terwijl ze zich steeds minder conformeren aan de wensen van ouders en leraren (Berndt, 1979; McCormick & Cappella, 2015). Daarom richt dit proefschrift zich op de invloed van leeftijdsgenoten op het probleemgedrag op school van jongeren tussen de 12 en 15 jaar oud. Leeftijdsgenoten worden in de literatuur en in dit proefschrift ook wel aangeduid als peers (Driessen, 2007).

Grof gezien zijn er in de wetenschappelijke literatuur twee type verklaringen voor probleemgedrag op school die zich richten op de rol van peers. De eerste groep verklaringen focust zich op de mate waarin een leerling positief en/of negatief verbonden is met zijn/haar peers op school of in de klas. Deze verklaringen vloeien voort uit de *sociale inbeddingstheorie* (belongingness theory). Volgens deze theorie zou de aanwezigheid van positieve relaties, en de afwezigheid van negatieve relaties met peers op school leiden tot een grotere betrokkenheid en verbondenheid met school, wat weer zou zorgen voor minder probleemgedrag op school (Baumeister & Leary, 1995; Juvonen et al. 2012). De tweede groep verklaringen van probleemgedrag op school kijkt naar de rol van de attributen van peers, zoals hun schoolgedrag en schoolprestaties. Volgens deze verklaringen zal de inbedding in een peergroep niet per definitie probleemgedrag op school verminderen, maar zal dit afhangen van de karakteristieken van de peer groep. Peers zouden fungeren als een *normatieve* en/of *comparatieve* referentiegroep voor jongeren (Merton, 1968; Richer, 1976). *Normatieve sociale beïnvloedingstheorie* stelt dat jongeren zich conformeren aan de gedragsnormen van hun peers (Brechwald & Prinstein, 2011; Sacerdote, 2011; Veenstra & Dijkstra, 2011). Leerlingen zullen eerder geneigd zijn om probleemgedrag te vertonen op school, wanneer anderen leeftijdsgenoten in hun omgeving dit ook doen. *Comparatieve referentiegroep theorie* stelt dat leerlingen hun prestaties op school evalueren aan de hand van de prestaties van hun peers (Richer, 1976). Wanneer leerlingen omringd worden door beter presterende leeftijdsgenoten, zullen ze hun eigen prestaties slechter beoordelen en dit kan negatieve gevolgen hebben op hun attitudes en gedrag op school.

Door ons te richten op al deze verschillende aspecten van de peer context in de klas of op school proberen we erachter te komen waarom sommige adolescenten meer probleemgedrag vertonen dan anderen en waarom probleemgedrag meer voorkomt in de ene klas dan in de andere klas. De volgende onderzoeksvraag staat centraal:

*In hoeverre heeft de peer context in de klas en op school invloed op probleemgedrag op school?*

Deze onderzoeksvraag wordt beantwoord aan de hand van longitudinale data van het ‘Children of Immigrants Longitudinal Survey in Four European Countries’ (CILS4EU) project verzameld onder leerlingen van ongeveer 14 jaar oud in Engeland, Duitsland, Nederland en Zweden. Tevens wordt gebruik gemaakt van longitudinale data verzameld onder Nederlandse leerlingen in de eerste klas van de middelbare school van het ‘Networks and actor attributes in early adolescence [2003/04]’ project.

## Bijdragen aan de literatuur

Dit proefschrift bestaat uit 5 empirische hoofdstukken die zijn onderverdeeld in twee delen. In het eerste deel (hoofdstuk 2-4) kijken we naar compositiekenmerken van scholen en klassen en het probleemgedrag van leerlingen. Onderzoekers hebben compositiekenmerken van de leerlingenpopulatie, zoals de etnische compositie (Benner & Crosnoe, 2011; Demanet & Van Houtte, 2011, 2014; Finn & Voelkl, 1993) en het onderwijsniveau van de school of de klas (Müller & Hofmann, 2016; Van Houtte & Stevens, 2008), gerelateerd aan probleemgedrag op school. Deze compositiekenmerken zouden de schoolnormen van de leerling-populatie reflecteren (Demanet & Van Houtte, 2011) of een indicatie zijn van de verbondenheid tussen leerlingen op school (Benner & Crosnoe, 2011; Finn & Voelkl, 1993). Hoewel onderzoekers dus veronderstellen dat peer processen (mede) ten grondslag liggen aan de relatie tussen compositiekenmerken van scholen of klassen en het probleemgedrag van leerlingen, zijn deze onderliggende mechanismen zelden empirisch onderzocht. Het eerste deel van de dissertatie draagt bij aan voorgaande studies door de veronderstelde peer mechanismen explicieter te toetsen. Daarnaast trachten wij in het eerste deel van het proefschrift op een nieuwe manier te onderzoeken in hoeverre het schoolgedrag van leerlingen afhangt van peer processen in de klas. Hiervoor maken wij gebruik van een quasi-experimenteel design: we bekijken of veranderingen in de klassamenstelling van leerlingen zijn gerelateerd aan veranderingen in het probleemgedrag van leerlingen.

In het tweede deel van het proefschrift (hoofdstuk 5 en 6) richten we ons specifiek op *normatieve sociale beïnvloedingsprocessen* in de klas op het gebied van probleemgedrag op school en onderzoeken we de condities die deze processen versterken of verzwakken. Aan de hand van normatieve sociale beïnvloedingstheorie wordt verwacht dat niet alle jongeren even vatbaar zijn om beïnvloed te worden door het probleemgedrag van hun medeleerlingen. Ook verwachten we dat sommige medeleerlingen meer invloed zullen uitoefenen dan anderen. Er is weinig onderzoek naar de condities die normatieve beïnvloedingsprocessen versterken of verzwakken en bestaande studies kampen vaak met methodologische problemen (Brechtwald & Prinstein, 2011; Veenstra & Dijkstra, 2011). In dit proefschrift wordt gebruik gemaakt van recent ontwikkelde statistische sociale netwerk methoden om deze condities te onderzoeken (namelijk SIENA). Door het bestuderen van deze condities hopen we niet alleen een betere grip te krijgen op beïnvloedingsprocessen, maar hopen we ook beter te begrijpen waarom sommige jongeren meer probleemgedrag vertonen dan anderen (zie hoofdstuk 5).

## Samenvatting per hoofdstuk

### Hoofdstuk 2: etnische compositie

In hoofdstuk 2 wordt de relatie tussen de etnische compositie van de school en probleemgedrag op school onderzocht. De meeste studies relateren het percentage etnische minderheden in school aan het (school-specifieke) probleemgedrag van leerlingen (Demanté & Van Houtte, 2011, 2014; Finn & Voelkl, 1993; Gieling, Vollebergh, & Van Dorsselaer, 2010). De empirische bevindingen van voorgaande studies met betrekking tot de aanwezigheid en de richting van deze relatie zijn ambigu en enkele onderzoekers hebben het percentage etnische minderheden op school bekritiseerd als een etnische compositie maat (Fleischmann, Phalet, Deboosere, & Neels, 2012). De maat zou onder andere 'blind' zijn voor de verschillende etnische minderheidsgroepen. Recente studies gebruiken in plaats van het percentage etnische minderheden op school, het percentage medeleerlingen met dezelfde etniciteit op school (Benner & Crosnoe, 2011; Georgiades, Boyle, & Fife, 2013; Johnson, Crosnoe, & Elder Jr, 2001). De empirische bevindingen van deze studies zijn consistent: leerlingen die worden omgeven door meer medeleerlingen met dezelfde etniciteit vertonen over het algemeen minder probleemgedrag. Deze onderzoeken zijn echter beperkt tot de Verenigde Staten. Wij breiden dit onderzoeksterrein uit naar West-Europa, waar etnische diversiteit gestaag is gegroeid sinds de jaren veertig.

We dragen bij aan voorgaande studies door ons te richten op de vriendschappen van leerlingen als een mogelijk onderliggend mechanisme van de relatie tussen het aandeel medeleerlingen met dezelfde etniciteit op school en probleemgedrag op school. Wanneer leerlingen worden omringd door minder medeleerlingen met dezelfde etniciteit is het moeilijker voor hen om hun vriendschapswensen te bevredigen. Leerlingen hebben de voorkeur voor co-etnische vriendschappen (McPherson, Smith-Lovin, & Cook, 2001; Smith, Maas, & van Tubergen, 2014). Bij een gebrek aan medeleerlingen met dezelfde etniciteit, zullen de beste vrienden van leerlingen daarom voornamelijk van buiten school komen. De leerlingen die hun vriendschappen tóch op school vormen zullen beperkt zijn tot interetnische vriendschappen. Onderzoek toont echter aan dat zowel buitenschoolse vriendschappen (Vaquera, 2009; Witkow, Gillen-O'Neel, & Fuligni, 2012) als interetnische vriendschappen op school (Ueno, 2009) minder bijdragen aan gevoelens van betrokkenheid bij school dan, respectievelijk, vriendschappen op school en co-etnische vriendschappen op school. Op basis van de *sociale inbeddingstheorie* verwachten we daarom dat leerlingen met meer buitenschoolse vrienden of interetnische vrienden op school meer probleemgedrag zullen vertonen op school.

Voor de analyses gebruiken we data van de eerste ronde van het CILS4EU project van Engeland, Duitsland, Nederland en Zweden. De resultaten laten zien dat wanneer leerlingen omringd worden door meer leeftijdsgenoten met dezelfde etniciteit op school, ze minder probleemgedrag vertonen. De relatie is echter niet erg sterk. Bevindingen suggereren tevens dat een mogelijk onderliggend mechanisme van de gevonden relatie inderdaad vriendschappen zijn. Leerlingen die omringd worden door meer medeleerlingen met dezelfde etniciteit hebben meer vrienden op school (in plaats van buiten school) en meer vrienden met dezelfde etniciteit (in plaats van interetnische vrienden) in de klas. Dit is vervolgens gerelateerd aan minder probleemgedrag op school.

### **Hoofdstuk 3: schoolprestaties van de klas**

Hoofdstuk 3 richt zich op de relatie tussen de schoolprestaties van de klas en het probleemgedrag van leerlingen op school. Voorgaand onderzoek heeft vooral gekeken naar verschillen in probleemgedrag op school tussen onderwijsniveaus waarin leerlingen worden geplaatst op basis van hun schoolprestaties. Cross-sectionele studies laten zien dat er sprake is van een anti-school cultuur op de lagere onderwijsniveaus en dat probleemgedrag op school hier meer voorkomt (Hargreaves, 1967; Van Houtte, 2006; Van Houtte & Stevens, 2008). Echter zijn

er longitudinale studies nodig om beter inzicht in de richting van deze relatie te krijgen. Oftewel, gedragen leerlingen zich problematischer op school *omdat* ze in een slechter presterende klas zitten? Dit type onderzoek is schaars. Een recente longitudinale studie laat echter zien dat op lagere schoolniveaus het probleemgedrag van leerlingen op school sterker toeneemt over de tijd (Müller & Hofmann, 2016). Deze bevinding wordt alleen niet ondersteund door een eerder longitudinaal onderzoek (Wiatrowski et al., 1982).

Wij stellen dat de onduidelijke resultaten van de longitudinale studies kunnen komen doordat twee completerende, maar in tegengestelde richting werkende mechanismen verantwoordelijk zijn voor de relatie tussen de schoolprestaties van de klas en het probleemgedrag op school van individuele leerlingen. Op basis van de *comparatieve referentiegroep theorie* verwachten wij dat leerlingen die worden omringd door leeftijdsgenoten wiens academische prestaties hoger zijn, een lager academisch zelfconcept zullen hebben (Marsh et al., 2008; Richer, 1976). Dit zal er vervolgens voor zorgen dat zij *meer* probleemgedrag vertonen op school (Finn, 1989). Op basis van *normatieve sociale beïnvloedingstheorie* verwachten we dat het probleemgedrag van leerlingen op school *minder* zal toenemen wanneer ze worden omringd door leeftijdsgenoten wiens academische prestaties beter zijn (Richer, 1976; Van Houtte & Stevens, 2009b). Leeftijdsgenoten die beter presteren op school zouden namelijk meer pro-schoolse normen overdragen. We gebruiken longitudinale data van drie Europese landen van de eerste twee rondes van het CILS4EU project om deze twee complementerende mechanismen te toetsen. In twee van deze landen worden leerlingen niet expliciet in verschillende klassen geplaatst aan de hand van hun schoolprestaties (namelijk, Engeland en Zweden) en in één land wel (namelijk, Nederland). We kunnen de relaties dus in verschillende contexten toetsen. Voor Nederland kunnen we tevens onderzoeken of met name het schoolniveau van de klas en/of de academische prestaties van de klas gerelateerd zijn aan het probleemgedrag van leerlingen.

Inconsistent met comparatieve referentiegroep theorie vinden we niet dat een student die in een klas zit die over het algemeen beter presteert een lager academisch zelfconcept heeft. Wel is het academische zelfconcept van studenten negatief gerelateerd aan hun probleemgedrag op school. In lijn met comparatieve referentiegroep theorie, zien we ook dat wanneer de *taal* prestaties van een klas hoger zijn, het *taal* zelfconcept van leerlingen lager is in Nederland en Zweden, maar niet in Engeland. Echter vinden we geen consistente negatieve relatie tussen het taal zelfconcept van leerlingen en hun probleemgedrag op school.



Comparatieve referentiegroep processen dragen dus niet bij aan de relatie tussen de schoolprestaties van de klas en het probleemgedrag van individuele leerlingen op school. In Nederland onderzoeken we ook de rol van het schoolniveau van de klas. We vinden een negatieve relatie tussen het schoolniveau van de klas en het academische en taal zelfconcept van de leerlingen in de klas. Het eerder gevonden negatieve verband tussen de taalprestaties van de klas en het taal zelfconcept van leerlingen lijkt gerelateerd aan het schoolniveau van de klas. In analyses waar we zowel de taalprestaties als het schoolniveau van de klas opnemen, vinden we geen negatief verband meer tussen de taalprestaties van de klas en het taal zelfconcept van leerlingen, maar wel een negatief verband tussen het schoolniveau van de klas en het taal zelfconcept van leerlingen.

In klassen met slechtere schoolprestaties is er een hogere mate van probleemgedrag op school. De resultaten suggereren dat met name de schoolprestaties van de leerlingen in de klas, en niet zozeer het niveau van de klas, negatief is gerelateerd aan probleemgedrag op school. In tegenstelling tot de verwachtingen op basis van normatieve sociale beïnvloedingstheorie vinden we niet dat het probleemgedrag van individuele leerlingen meer toeneemt wanneer het gemiddelde probleemgedrag in de klas hoger is.

## Hoofdstuk 4: veranderingen in klassamenstelling

Door leerlingen te volgen die van klas of school veranderen kunnen we meer inzicht krijgen in de mate waarin probleemgedrag op school afhangt van de peer context in de klas of op school. Wanneer leerlingen van klas of school veranderen, worden ze mogelijk blootgesteld aan de gedragsnormen van andere leeftijdsgenoten. Daarnaast worden ze misschien niet meer omringd door leeftijdsgenoten waar ze negatieve of positieve relaties mee hadden in hun oude klas of school.

Enkele voorgaande studies hebben gedragsveranderingen van studenten onderzocht die van school wisselen (Benner, 2011; Juvonen, 2007). Wanneer leerlingen van school wisselen verandert echter niet alleen hun peer context, maar ook andere aspecten van hun onderwijsomgeving, zoals de schoolregels, schoolgebruiken en schoolgrootte. Het is daarom onduidelijk in hoeverre gedragsveranderingen tijdens de transitie naar een nieuwe school écht te wijten zijn aan veranderingen in de peer context op school. In hoofdstuk 4 proberen we dit probleem van deze voorgaande studies te omzeilen door gedragsveranderingen van leerlingen te bestuderen die van klas veranderen. Deze leerlingen komen dus wél in een nieuwe peer context terecht, maar blijven in dezelfde schoolomgeving.

Analyses op de eerste twee rondes van de Nederlandse data van het CILS4EU project bieden geen ondersteuning voor de verwachtingen op basis van de *normatieve beïnvloedingstheorie*. Het probleemgedrag op school van individuele leerlingen wordt niet sterker beïnvloed door hun huidige klasgenoten dan door hun oud klasgenoten. Leerlingen lijken hun referentiegroep dus niet te veranderen wanneer ze van klas veranderen. In lijn met *sociale inbeddingstheorie*, laten de resultaten zien dat het probleemgedrag van leerlingen op school afneemt wanneer hun vijanden uit hun oude klas niet meer aanwezig zijn in hun nieuwe klas. Het aantal vrienden dat de klas verlaat is niet gerelateerd aan veranderingen in probleemgedrag op school. Het kan zijn dat het aantal vrienden dat de klas verlaat positief is gerelateerd aan het probleemgedrag van leerlingen op school, wanneer de vrienden die de klas verlaten weinig probleemgedrag op school vertonen; en dat het aantal vrienden dat de klas verlaat negatief is gerelateerd aan het probleemgedrag van leerlingen op school, wanneer de vrienden die de klas verlaten veel probleemgedrag vertonen. In de analyses vinden we hier echter geen bewijs voor. Ten slotte vinden we in tegenstelling tot de *sociale inbeddingstheorie* dat wanneer leerlingen van klas veranderen en meer vrienden hebben onder hun nieuwe klasgenoten, hun probleemgedrag op school toeneemt.

## Hoofdstuk 5: sekseverschillen

Voorgaand onderzoek heeft consistent gevonden dat jongens meer probleemgedrag vertonen op school dan meisjes (Buchmann, DiPrete, & McDaniel, 2008; Driessen & Van Langen, 2013). In hoofdstuk 5 onderzoeken we of sekse-specifieke beïnvloedingsprocessen bijdragen aan dit welomschreven sekseverschil in probleemgedrag op school. In de criminologische literatuur wordt gesteld dat sekseverschillen in delinquent gedrag (gedeeltelijk) te wijten zijn aan het feit dat jongens en meisjes: (1) worden blootgesteld, en daardoor worden beïnvloed, door het gedrag van anderen leeftijdsgenoten en (2) verschillend reageren op het gedrag van (anderen) leeftijdsgenoten (Haynie, Doogan, & Soller, 2014; Mears, Ploeger, & Warr, 1998). We passen deze verklaringen toe om het sekseverschil in probleemgedrag op school beter te begrijpen.

Ten eerste stellen we dat jongens (onbewust) voor vrienden kiezen die meer probleemgedrag op school vertonen dan meisjes. Jongens worden, vergeleken met meisjes, daardoor ook beïnvloed door vrienden die ‘problematischer’ zijn op school, en hun probleemgedrag op school zal dus eerder toenemen. Ten tweede verwachten we dat meisjes en jongens verschillend reageren op het probleemgedrag op school

van (andere) leeftijdsgenoten. Etnografisch onderzoek suggereert dat de sociale status van jongens meer afhangt van hun gedrag op school dan de sociale status van meisjes (Adler, Kless, & Adler, 1992; Warrington, Younger, & Williams, 2000). Vergeleken met meisjes zouden jongens meer druk ervaren om anti-schools gedrag te vertonen (Warrington et al., 2000). Daarom verwachten we dat het probleemgedrag van jongens op school eerder zal toenemen wanneer het probleemgedrag van hun bevriende óf niet bevriende klasgenoten hoger is. Ten slotte verwachten we dat jongeren zich vooral aanpassen aan het probleemgedrag op school van klasgenoten met hetzelfde geslacht. Hierdoor kan er een feedback proces ontstaan. Bij meisjes, wiens initiële probleemgedrag op school lager is dan dat van jongens, zal hun probleemgedrag op school minder snel toenemen dan bij jongens wanneer ze vooral worden beïnvloed door leeftijdsgenoten van hetzelfde geslacht.

We gebruiken data van de eerste twee rondes van het CILS4EU project in Zweden en richten ons op twee vormen van probleemgedrag op school: ruzie maken met leraren en niet je best doen op school. Analyses laten zien dat jongens meer blootgesteld worden aan dit probleemgedrag op school in hun vriendengroep. Daarbij worden leerlingen beïnvloed door dit probleemgedrag van hun vrienden. Echter lijken deze dynamische processen niet te verklaren waarom het probleemgedrag van jongens meer toeneemt dan dat van meisjes. We vinden geen sekseverschillen in de mate waarin jongeren beïnvloed worden door het probleemgedrag van hun bevriende klasgenoten. Wel zien we dat wanneer niet bevriende klasgenoten minder hun best doen op school, met name bij jongens hun inspanningen op school afnemen. Dit verklaart echter niet waarom de inspanningen van jongens op school meer afnemen dan dat van meisjes. Er is geen sekseverschil in de mate waarin jongeren beïnvloed worden door niet bevriende klasgenoten met betrekking tot ruzies met leraren. We vinden niet dat leerlingen meer beïnvloed worden door klasgenoten van hetzelfde geslacht dan door klasgenoten van het andere geslacht.

## Hoofdstuk 6: ego, alter en dyadische kenmerken

In hoofdstuk 6 onderzoeken we of beïnvloedingsprocessen tussen vrienden in de klas op het gebied van probleemgedrag op school afhankelijk zijn van (1) de sociale status van de adolescent (2) de sociale status van zijn/haar vriend en (3) of de vriendschap wederzijds is. Sociale status is gedefinieerd als het aantal ontvangen vriendschapsnominaties van klasgenoten. We veronderstellen dat adolescenten met een lagere sociale status meer behoefte hebben aan goedkeuring van hun vrienden, en daarom eerder beïnvloed zullen worden door het gedrag van hun vrienden. We

verwachten dat vrienden met een hogere status meer invloed zullen uitoefenen, omdat hun goedkeuring meer op prijs wordt gesteld. Ten slotte stellen we dat niet wederzijdse vriendschappen gekenmerkt worden door ongelijkheid. Een niet wederzijdse vriendschap kan gezien worden als een vriendschapswens of een nog niet 'gewonnen' vriendschap. We veronderstellen dat adolescenten om strategische redenen (namelijk het winnen van de vriendschap) zich dus eerder zullen aanpassen aan het gedrag van niet-wederzijdse vrienden dan aan het gedrag van wederzijdse vrienden.

We toetsen deze verwachtingen met paneldata waarin middelbare scholieren in Nederland gevolgd worden gedurende hun eerste schooljaar. De leerlingen worden gedurende het schooljaar vier keer ondervraagd. We vinden dat eersteklassers zich aanpassen aan de onoplettendheid en het huiswerkgedrag van vrienden in de klas, vooral wanneer zij een lagere sociale status hebben in de klas. De resultaten laten zien dat niet-wederzijdse vrienden of vrienden met een hoge status niet meer invloed uitoefenen dan, respectievelijk, wederzijdse vrienden of vrienden met een lagere status wat betreft onoplettendheid in de klas en huiswerkgedrag.

## Conclusie

In hoeverre is probleemgedrag op school nu afhankelijk van de peer context in klas of op school? We concluderen dat het hebben van positieve relaties met leeftijdsgenoten op school jongeren mogelijk van probleemgedrag kan weerhouden. Jongeren van wie de beste vrienden voornamelijk op school zitten vertonen minder probleemgedrag dan jongeren van wie de vrienden voornamelijk buiten school zitten. Dit is in lijn met de *sociale inbeddingstheorie*. De etnische compositie lijkt een rol te spelen in de mate waarin leerlingen positieve relaties vormen met hun medeleerlingen op school. Echter vinden we niet dat jongeren zich beter gedragen op school wanneer ze in dezelfde klas zitten als hun vrienden op school. Onze resultaten suggereren zelfs dat wanneer jongeren van klas veranderen en meer vrienden hebben onder hun *nieuwe* klasgenoten, hun probleemgedrag op school zal toenemen. Mogelijk proberen jongeren door het vertonen van probleemgedrag op school sociaal aanzien te krijgen onder deze nieuwe groep (potentiële) vrienden in de klas (zie bijvoorbeeld Allen, Weissberg, & Hawkins, 1989; Moffitt, 1993). De bevindingen van dit onderzoek laten wel zien dat het probleemgedrag van leerlingen op school afneemt wanneer ze worden gescheiden van hun vijanden in de klas. Vijanden in de klas zijn klasgenoten die gemeen tegen leerlingen zijn. Door

het wegnemen van deze vijanden voelen leerlingen zich mogelijk meer geaccepteerd en veiliger in de klas, wat hun betrokkenheid bij school bevordert en tevens hun probleemgedrag op school vermindert.

Wat betreft normatieve sociale beïnvloedingsprocessen vinden we geen bewijs voor de invloed van het probleemgedrag van de gehele klas op het probleemgedrag van individuele leerlingen op school. Wel vinden we dat vrienden in de klas het probleemgedrag van individuele leerlingen beïnvloeden. Onze resultaten zijn gedeeltelijk in strijd met voorgaand onderzoek dat wel een relatie vond tussen het probleemgedrag van de hele klas en het probleemgedrag van individuele leerlingen in de klas. De meeste van deze voorgaande studies onderzochten de invloed van klasgenoten op probleemgedrag op school onder leerlingen die nét naar een nieuwe school waren gegaan. In ons onderzoek zitten leerlingen die al een langere tijd op dezelfde school. Wanneer leerlingen net op een nieuwe school zitten proberen ze nieuwe vriendschappen te vormen en bij bepaalde groepen te horen. De sociale hiërarchie op school moet ook nog bepaald worden. Wanneer vriendengroepen gevormd zijn op school en de sociale hiërarchie is bepaald, kunnen beïnvloedingsprocessen mogelijk verslappen. Dit proefschrift laat inderdaad zien dat de vriendschapsgroepen van eersteklassers op de middelbare school in Nederland steeds stabielere worden over de tijd. Vervolgonderzoek zal moeten uitwijzen of beïnvloedingsprocessen op school verslappen naarmate leerlingen langer op dezelfde school zitten.

In deze studie vinden we wel bewijs voor beïnvloedingsprocessen tussen vrienden in de klas met betrekking tot hun gedrag op school, zowel in de eerste jaren als latere jaren van de middelbare school. Met name jongeren die minder vrienden hebben in de klas, passen zich aan aan het gedrag op school van hun bevriende klasgenoten. We vinden niet dat wederzijdse vrienden of vrienden met een hogere sociale status meer invloed uitoefenen. Ook vinden we geen sekseverschillen in de invloed die vrienden hebben op het gedrag van jongeren. Dit zou kunnen betekenen dat beïnvloedingsprocessen tussen vrienden vrij universeel zijn, en zich niet beperken tot specifieke individuen of vriendschapsrelaties (zie ook Pattiselanno (2016) met betrekking tot de invloed van vrienden op risicogedrag van jongeren). Echter zijn er ook andere verklaringen voor deze nul bevindingen. De bevinding dat vrienden met een hogere status geen grotere invloed hebben op het probleemgedrag op school van leerlingen kan komen door onze maat van sociale status. Klasgenoten die meer vriendschapsnominaties krijgen van andere klasgenoten worden misschien wel gewaardeerd in de klas, maar zijn niet per se invloedrijk (Cillessen & Van den Berg, 2012; Sandstrom, 2011). Onderzoekers stellen dat de mate waarin jongeren

invloedrijk zijn met name afhangt van de mate waarin zij als ‘populair’ worden beschouwd door leeftijdsgenoten. Een recente studie onder adolescenten in de Verenigde Staten laat zien dat wederzijdse vrienden spijbelgedrag meer beïnvloeden, wanneer deze vrienden ook als populairder worden gezien door medeleerlingen uit hetzelfde leerjaar (Rambaran et al., 2016).

De bevinding dat niet-wederzijdse vrienden niet invloedrijker zijn dan wederzijdse vrienden kan komen door het feit dat vriendschapswedekerigheid beïnvloedingsprocessen zowel kan versterken als verzwakken. Aan de ene kant kan het gedrag van wederzijdse vrienden minder van invloed zijn dan het gedrag van niet-wederzijdse vrienden, omdat hun vriendschap al gewonnen is. Aan de andere kant kan het gedrag van wederzijdse vrienden juist meer van invloed zijn dan het gedrag van niet-wederzijdse vrienden, omdat jongeren emotioneel meer betrokken zijn bij hun wederzijdse vrienden. De bevinding dat jongens zich niet meer aanpassen aan het schoolgedrag van hun vrienden dan meisjes kan mogelijk ook komen doordat sekseverschillen in beïnvloedingsprocessen complexer zijn dan verwacht. De sociale status van jongens hangt misschien meer af van hun gedrag op school dan dat van meisjes. Hierdoor is de sociale druk wat betreft schoolgedrag relatief hoog voor jongens. Daar tegenover staat dat de vriendschapsgroepen van meisjes vaak hechter zijn dan die van jongens en zullen meisjes zich mogelijk in het algemeen eerder conformeren aan het gedrag van hun vrienden (Haynie et al., 2014). Met betrekking tot probleemgedrag op school zullen meisjes en jongens dus mogelijk even vatbaar voor de invloed van vrienden zijn.

Op basis van de *comparatieve referentiegroep theorie* stelden wij dat jongeren een lager academisch zelfconcept zullen hebben wanneer ze omringd worden door beter presterende klasgenoten. Dit zou zorgen voor een hogere mate van probleemgedrag op school. Dit proefschrift vindt geen bewijs voor deze indirecte relatie. Studenten die worden omringd door klasgenoten met hogere algehele schoolprestaties hebben niet een lager academisch zelfconcept. Sommige bevindingen laten wel zien dat studenten die worden omringd door klasgenoten met betere taalprestaties, een lager taal zelfconcept hebben. Er is echter alleen een consistente negatieve relatie tussen het algemene academische zelfconcept van leerlingen en hun probleemgedrag op school, en niet tussen hun taal zelfconcept en hun probleemgedrag op school. Eerder onderzoek gaf ook aan dat er een sterkere relatie is tussen de prestaties van schoolgenoten in specifieke vakken en het zelfconcept van individuele leerlingen in deze specifieke vakken dan tussen de algehele schoolprestaties van schoolgenoten en het algehele academische zelfconcept van individuele leerlingen (Salchegger,

2016). We denken dat leerlingen meer bewust zijn van hun prestaties in specifieke schoolvakken dan van hun algehele schoolprestaties. Zelfs de slechts presterende leerlingen in de klas zijn mogelijk niet de slechtste van de klas in alle schoolvakken. Een deprivatie van de academische zelfwaarde van een leerling door slechte prestaties in het ene vak, kan mogelijk gecompenseerd worden door betere prestaties in een ander vak. Leerlingen met een lager zelfconcept in een specifiek schoolvak zullen zich dus ook niet tegen school in het *algemeen* keren. Desalniettemin kan het zo zijn dat deze leerlingen meer probleemgedrag vertonen tijdens deze specifieke vakken. Verder onderzoek zal dit moeten uitwijzen.

## Beperkingen van de studie

Deze studie kent enkele beperkingen. Ten eerste hebben onze data enkele restricties. In hoofdstuk 2 maken we gebruik van cross-sectionele data, waardoor we geen uitspraken kunnen doen over de richting van de relatie tussen de etnische compositie van scholen, vriendschappen van studenten en hun probleemgedrag op school. Hoewel we in alle andere hoofdstukken wel longitudinale data gebruiken, hebben we vaak maar twee metingen tot onze beschikking. Hierdoor bekijken we slechts één verandering in het probleemgedrag van leerlingen en zijn de statistische mogelijkheden om significante voorspellers van veranderingen in het probleemgedrag van leerlingen te vinden beperkt. Daaraan gerelateerd zullen leerlingen enkel sporadisch probleemgedrag vertonen op school en zullen beïnvloedingsprocessen ook sporadisch voorkomen (Davies, 1999). De twee longitudinale metingen die we in de meeste studies van dit proefschrift gebruiken liggen een jaar uiteen. We hadden leerlingen misschien frequenter naar hun probleemgedrag op school moeten vragen om meer grip te krijgen op deze sporadische processen. Daarnaast gaven onze data met name inzicht in sociale netwerkprocessen in de klas, en minder in deze processen op school in zijn algemeen of zelfs buiten school. Tussen de 34 (Duitsland) en 29 procent (Engeland) van de beste vrienden van leerlingen zijn vrienden van buiten school. Tussen de 59 (Engeland) en 23 procent (Duitsland) van de vrienden op school zijn vrienden buiten de klas.

Ten tweede kent onze studie beperkingen met betrekking tot de assumpties die we hebben moeten maken over referentiegroep processen. In deze samenvatting zullen we enkele van deze assumpties bespreken. Veel studies, waaronder deze, veronderstellen dat klasgenoten (of schoolgenoten) en/of vrienden de referentiegroep vormen van jongeren. Achteraf gezien is deze veronderstelling misschien niet precies genoeg. De

groep klasgenoten is misschien te divers om als een referentiegroep te fungeren. Hoewel deze groep misschien leerlingen bevat die 'cool' zijn of waar jongeren graag vrienden mee zouden willen worden, bevat deze groep mogelijk ook leerlingen die geminacht worden. Vriendengroepen in de klas zijn misschien ook niet de meest belangrijke referentiegroep voor jongeren op school, omdat jongeren op deze leerlingen misschien niet meer zoveel indruk hoeven te maken (zie ook Frank et al. (2008)). Toekomstig onderzoek zal vast moeten stellen wie de meest belangrijke referentiegroepen zijn van jongeren door de invloed van het gedrag van verschillende referentiegroepen met elkaar te vergelijken, zoals populaire leerlingen met vrienden in de klas.

Zelfs wanneer we weten wie de referentiegroep is, is onderzoek naar referentiegroepprocessen lastig, omdat het netwerkprocessen zijn. Jongeren worden niet slechts aan één andere referentiepersoon blootgesteld, maar worden omgeven door meerdere referentiepersonen (bijvoorbeeld meerdere vrienden, meerdere klasgenoten). De attributen van deze personen kunnen verschillen van elkaar en ook nog eens veranderen over de tijd (Friedkin, 1998). De vraag is of we wel van een 'gedragsnorm' of 'academische standaard' kunnen spreken wanneer deze personen erg van elkaar verschillen. In de meeste onderzoeken, waaronder deze, worden de consequenties van de heterogeniteit van de attributen van de referentiegroep niet meegenomen. Er wordt verondersteld dat er genoeg homogeniteit is in de attributen van de referentiegroep om te spreken van een norm of standaard. Het kan echter zijn dat het gemiddelde gedrag of de gemiddelde prestaties van leeftijdsgenoten minder van invloed zijn op het gedrag van jongeren wanneer het gedrag of de prestaties van leeftijdsgenoten heterogener is. Helaas is het lastig om dit te empirisch te toetsen.

Een tweede netwerk factor die de studie naar referentiegroepprocessen lastig maakt is dat niet alle referentiegroepen even groot zijn. De mate waarin een specifieke peer het gedrag van een adolescent kan beïnvloeden kan afhangen van het aantal andere peers waaraan de adolescent wordt blootgesteld. Zo kan een adolescent minder beïnvloed worden door een peer, wanneer de adolescent omgeven wordt door meer andere peers. Daarbij kan een peer ook minder kracht uitoefenen op de adolescent wanneer hij/zij meerdere andere adolescenten probeert te beïnvloeden. In de praktijk veronderstellen de meeste studies, waaronder deze studie, dat de attributen van een peer een minder grote invloed uitoefenen op het gedrag van adolescenten wanneer adolescenten zijn blootgesteld aan meer peers. Echter is er weinig onderzoek die deze veronderstelling daadwerkelijk test.



Concluderend kunnen we dus stellen dat we misschien referentiegroepsprocessen nog beter moeten begrijpen om er achter te komen of ze onderliggend zijn aan andere relaties, zoals de relatie tussen de schoolprestaties van de klas en het probleemgedrag op school van individuele leerlingen.



## References



## References

- Aboud, F., Mendelson, M., & Purdy, K. (2003). Cross-race peer relations and friendship quality. *International Journal of Behavioral Development, 27*(2), 165-173.
- Abraham, J. (1989). Testing Hargreaves' and Lacey's differentiation-polarisation theory in a setted comprehensive. *British Journal of Sociology, 40*(1), 46-81.
- Abrams, D., Wetherell, M., Cochrane, S., Hogg, M. A., & Turner, J. C. (1990). Knowing what to think by knowing who you are: Self-categorization and the nature of norm formation, conformity and group polarization\*. *British Journal of Social Psychology, 29*(2), 97-119.
- Adler, P. A., Kless, S. J., & Adler, P. (1992). Socialization to gender roles: Popularity among elementary school boys and girls. *Sociology of Education, 65*(3), 169-187.
- Agirdag, O., Van Houtte, M., & Van Avermaet, P. (2012). Ethnic school segregation and self-esteem: The role of Teacher-Pupil relationships. *Urban Education, 47*(6), 1135-1159.
- Agnew, R. (1985). A revised strain theory of delinquency. *Social Forces, 64*(1), 151-167.
- Aikins, J. W., Bierman, K. L., & Parker, J. G. (2005). Navigating the transition to junior high school: The influence of pre-transition friendship and self-system characteristics. *Social Development, 14*(1), 42-60.
- Ainsworth-Darnell, J. W., & Downey, D. B. (1998). Assessing the oppositional culture explanation for racial/ethnic differences in school performance. *American Sociological Review, 63*(4), 536-553.
- Allen, J. P., Weissberg, R. P., & Hawkins, J. A. (1989). The relation between values and social competence in early adolescence. *Developmental Psychology, 25*(3), 458-464.
- Allison, P. D. (1978). Measures of inequality. *American Sociological Review, 43* (6), 865-880.
- Allison, P. D. (2009). *Fixed effects regression models*. Los Angeles: Sage.
- Altermatt, E. R., & Pomerantz, E. M. (2003). The development of competence-related and motivational beliefs: An investigation of similarity and influence among friends. *Journal of Educational Psychology, 95*(1), 111-123.
- Asher, S. R., Hymel, S., & Renshaw, P. D. (1984). Loneliness in children. *Child Development, 55*(4), 1456-1464.
- Aunola, K., Stattin, H., & Nurmi, J. (2000). Adolescents' achievement strategies, school adjustment, and externalizing and internalizing problem behaviors. *Journal of Youth and Adolescence, 29*(3), 289-306.
- Baetschmann, G., Staub, K. E., & Winkelmann, R. (2015). Consistent estimation of the fixed effects ordered logit model. *Journal of the Royal Statistical Society: Series A (Statistics in Society), 178*(3), 685-703.
- Bagwell, C. L., & Schmidt, M. E. (2013). *Friendships in childhood and adolescence*. New York: Guilford Press.
- Bankston, C., & Caldas, S. J. (1996). Majority African American schools and social injustice: The influence of de facto segregation on academic achievement. *Social Forces, 75*(2), 535-555.
- Barth, J. M., Dunlap, S. T., Dane, H., Lochman, J. E., & Wells, K. C. (2004). Classroom environment influences on aggression, peer relations, and academic focus. *Journal of School Psychology, 42*(2), 115-133.
- Battistich, V., & Hom, A. (1997). The relationship between students' sense of their school as a community and their involvement in problem behaviors. *American Journal of Public Health, 87*(12), 1997-2001.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497-529.

- Belfi, B., Goos, M., De Fraine, B., & Van Damme, J. (2012). The effect of class composition by gender and ability on secondary school students' school well-being and academic self-concept: A literature review. *Educational Research Review*, 7(1), 62-74.
- Benner, A. D. (2011). The transition to high school: Current knowledge, future directions. *Educational Psychology Review*, 23(3), 299-328.
- Benner, A. D., & Crosnoe, R. (2011). The Racial/Ethnic composition of elementary schools and young Children's academic and socioemotional functioning. *American Educational Research Journal*, 48(3), 621-646.
- Benner, A. D., & Graham, S. (2007). Navigating the transition to Multi-Ethnic urban high schools: Changing ethnic congruence and adolescents' School-Related affect. *Journal of Research on Adolescence*, 17(1), 207-220.
- Benner, A. D., & Graham, S. (2009). The transition to high school as a developmental process among multiethnic urban youth. *Child Development*, 80(2), 356-376.
- Benner, A. D., Graham, S., & Mistry, R. S. (2008). Discerning direct and mediated effects of ecological structures and processes on adolescents' educational outcomes. *Developmental Psychology*, 44(3), 840-854.
- Berndt, T. J. (1979). Developmental changes in conformity to peers and parents. *Developmental Psychology*, 15(6), 608-616.
- Berndt, T. J. (1989). Obtaining support from friends during childhood and adolescence. In D. Belle (Ed.), *Children's social networks and social supports* (pp. 308-331). New York: Wiley.
- Berndt, T. J. (1999). Friends' influence on students' adjustment to school. *Educational Psychologist*, 34(1), 15-28.
- Berndt, T. J., Hawkins, J. A., & Jiao, Z. (1999). Influences of friends and friendships on adjustment to junior high school. *Merrill-Palmer Quarterly*, 45(1), 13-41.
- Berndt, T. J., & Keefe, K. (1995). Friends' influence on adolescents' adjustment to school. *Child Development*, 66(5), 1312-1329.
- Bingham, G. E., & Okagaki, L. (2012). Ethnicity and student engagement. In S. L. Christenson, A. L. Reschly & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 65-95). New York: Springer US.
- Blau, P. M. (1977). A macrosociological theory of social structure. *American Journal of Sociology*, 83(1), 26-54.
- Blondal, K. S., & Adalbjarnardottir, S. (2014). Parenting in relation to school dropout through student engagement: A longitudinal study. *Journal of Marriage and Family*, 76(4), 778-795.
- Bol, T., & Van de Werfhorst, H. G. (2013). Educational systems and the trade-off between labor market allocation and equality of educational opportunity. *Comparative Education Review*, 57(2), 285-308.
- Bol, T., Witschge, J., Van de Werfhorst, H. G., & Dronkers, J. (2014). Curricular tracking and central examinations: Counterbalancing the impact of social background on student achievement in 36 countries. *Social Forces*, 92(4), 1545-1572.
- Bot, S. M., Engels, R. C. M. E., Knibbe, R. A., & Meeus, W. H. J. (2005). Friend's drinking behaviour and adolescent alcohol consumption: The moderating role of friendship characteristics. *Addictive Behaviors*, 30(5), 929-947.
- Bowes, L., Maughan, B., Ball, H., Shakoor, S., Ouellet-Morin, I., Caspi, A., . . . Arseneault, L. (2013). Chronic bullying victimization across school transitions: The role of genetic and environmental influences. *Development and Psychopathology*, 25(02), 333-346.
- Brandt, P. A., & Weinert, C. (1981). The PRQ-a social support measure. *Nursing Research*, 30(5), 277-280.
- Brechwald, W. A., & Prinstein, M. J. (2011). Beyond homophily: A decade of advances in understanding peer influence processes. *Journal of Research on Adolescence*, 21(1), 166-179.

- Bryant, A. L., Schulenberg, J., Bachman, J. G., O'Malley, P. M., & Johnston, L. D. (2000). Understanding the links among school misbehavior, academic achievement, and cigarette use: A national panel study of adolescents. *Prevention Science, 1*(2), 71-87.
- Buchmann, C., DiPrete, T. A., & McDaniel, A. (2008). Gender inequalities in education. *Annual Review of Sociology, 34*, 319-337.
- Carrell, S. E., & Hoekstra, M. L. (2010). Externalities in the classroom: How children exposed to domestic violence affect everyone's kids. *American Economic Journal: Applied Economics, 2*(1), 211-228.
- Cartwright, D., & Harary, F. (1956). Structural balance: A generalization of Heider's theory. *Psychological Review, 63*(5), 277-293.
- Castles, S., & Miller, M. (2009). *The age of migration. International population movements in the modern world*. (4th ed.). London: Palgrave Macmillan.
- Chang, L. (2004). The role of classroom norms in contextualizing the relations of children's social behaviors to peer acceptance. *Developmental Psychology, 40*(5), 691.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233-255.
- Chmielewski, A. K., Dumont, H., & Trautwein, U. (2013). Tracking effects depend on tracking type an international comparison of students' mathematics self-concept. *American Educational Research Journal, 50*(5), 925-957.
- Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology, 55*, 591-621.
- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology, 58*(6), 1015-1026.
- Cillessen, A. H. N., Schwartz, D., & Mayeux, L. (2011). *Popularity in the peer system*. New York: Guilford Press.
- Cillessen, A. H. N., & Van den Berg, Y. H. (2012). Popularity and school adjustment. In A. M. Ryan, & G. W. Ladd (Eds.), *Peer relationships and adjustment at school* (pp. 135-164). Charlotte, NC: Information Age Publishing.
- CILS4EU. (2016). Children of Immigrants Longitudinal Survey in Four European Countries. Technical Report. Wave 1 – 2010/2011, v1.2.0. Mannheim: Mannheim University.
- Cohen, A. K. (1955). *Delinquent boys: The culture of the gang*. Glencoe, Illinois: Free Press.
- Cohen, J. (1983). Peer influence on college aspirations with initial aspirations controlled. *American Sociological Review, 48*(5), 728-734.
- Coleman, J. S. (1961). *The adolescent society: The social life of the teenager and its impact on education*. Glencoe, Illinois: Free press.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94*, S95-S120.
- Corville-Smith J., Ryan, B.A., Adams, G.R., Dalicandro, T. (1998) Distinguishing Absentee Students from Regular Attenders: The Combined Influence of Personal, Family, and School Factors. *Journal of Youth and Adolescence, 27*(5), 629-640.
- Crosnoe, R., Cavanagh, S., & Elder Jr, G. H. (2003). Adolescent friendships as academic resources: The intersection of friendship, race, and school disadvantage. *Sociological Perspectives, 46*(3), 331-352.
- Davies, S. (1999). Subcultural explanations and interpretations of school deviance. *Aggression and Violent Behavior, 4*(2), 191-202.
- Demant, J., & Van Houtte, M. (2011). Social-ethnic school composition and school misconduct: Does sense of futility clarify the picture? *Sociological Spectrum, 31*(2), 224-256.
- Demant, J., & Van Houtte, M. (2012). School belonging and school misconduct: The differing role of teacher and peer attachment. *Journal of Youth and Adolescence, 41*(4), 499-514.

- Demagnet, J., & Van Houtte, M. (2014). Social–ethnic school composition and disengagement: An inquiry into the perceived control explanation. *The Social Science Journal*, 51(4), 659-675.
- Demagnet, J., Vanderwegen, P., Vermeersch, H., & Van Houtte, M. (2013). Unravelling gender composition effects on rule-breaking at school: A focus on study attitudes. *Gender and Education*, 25(4), 466-485.
- Deutsch, M., & Gerard, H. B. (1955). A study of normative and informational social influences upon individual judgment. *The Journal of Abnormal and Social Psychology*, 51(3), 629-636.
- Dika, S. L., & Singh, K. (2002). Applications of social capital in educational literature: A critical synthesis. *Review of Educational Research*, 72(1), 31-60.
- Driessen, G. (2002). School composition and achievement in primary education: A large-scale multilevel approach. *Studies in Educational Evaluation*, 28(4), 347-368.
- Driessen, G. (2006). De totstandkoming van de adviezen voortgezet onderwijs: Invloeden van thuis en school. *Pedagogiek*, 25(4), 279-298.
- Driessen, G. (2007). *Peer group effecten op onderwijsprestaties. Een internationaal review van effecten, verklaringen en theoretische en methodologische aspecten*. Nijmegen: ITS, Radboud Universiteit Nijmegen. Retrieved from <http://its.ruhosting.nl/publicaties/pdf/r1730.pdf>
- Driessen, G., & Van Langen, A. (2013). Gender differences in primary and secondary education: Are girls really outperforming boys? *International Review of Education*, 59(1), 67-86.
- Eitle, T. M., & Eitle, D. J. (2004). Inequality, segregation, and the overrepresentation of African Americans in school suspensions. *Sociological Perspectives*, 47(3), 269-287.
- Ellis, W. E., & Zarbatany, L. (2007). Peer group status as a moderator of group influence on children's deviant, aggressive, and prosocial behavior. *Child Development*, 78(4), 1240-1254.
- Enders, C. K. (2001). A primer on maximum likelihood algorithms available for use with missing data. *Structural Equation Modeling*, 8(1), 128-141.
- Eurydice. (2005). *The education system in the Netherlands 2005*. The Hague: Dutch Eurydice Unit, Ministry of Education, Culture and Science of the Netherlands.
- Falci, C., & McNeely, C. (2009). Too many friends: Social integration, network cohesion and adolescent depressive symptoms. *Social Forces*, 87(4), 2031-2061.
- Fekkes, M., Pijpers, F. I., & Verloove-Vanhorick, S. P. (2005). Bullying: Who does what, when and where? Involvement of children, teachers and parents in bullying behavior. *Health Education Research*, 20(1), 81-91.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7(2), 117-140.
- Figlio, D. N. (2007). Boys named sue: Disruptive children and their peers. *Education Finance and Policy*, 2(4), 376-394.
- Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research*, 59(2), 117-142.
- Finn, J. D., & Voelkl, K. E. (1993). School characteristics related to student engagement. *Journal of Negro Education*, 62(3), 249-268.
- Finn, J. D., & Zimmer, K. S. (2012). Student engagement: What is it? Why does it matter? In S. L. Christenson, A. L. Reschly & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 97-131). New York: Springer US.
- Flashman, J. (2012). Academic achievement and its impact on friend dynamics. *Sociology of Education*, 85(1), 61-80.
- Fleischmann, F., Phalet, K., Deboosere, P., & Neels, K. (2012). Comparing concepts of ethnicity in ethnic composition measures: Local community contexts and the educational attainment of the second generation in Belgium. *Journal of Ethnic and Migration Studies*, 38(10), 1513-1531.
- Fordham, S., & Ogbu, J. U. (1986). Black students' school success: Coping with the "burden of 'acting white'". *The Urban Review*, 18(3), 176-206.



- Fortuin, J., Van Geel, M., & Vedder, P. (2015). Peer influences on internalizing and externalizing problems among adolescents: A longitudinal social network analysis. *Journal of Youth and Adolescence*, *44*(4), 887-897.
- Francis, B. (1999). Lads, lasses and (new) labour: 14-16-year-old students' responses to the 'laddish behaviour and boys' underachievement' debate. *British Journal of Sociology of Education*, *20*(3), 355-371.
- Francis, B. (2002). *Boys, girls and achievement: Addressing the classroom issues*. London: RoutledgeFalmer.
- Frank, K. A., Muller, C., Schiller, K. S., Riegle-Crumb, C., Mueller, A. S., Crosnoe, R., & Pearson, J. (2008). The social dynamics of mathematics coursetaking in high school. *American Journal of Sociology*, *113*(6), 1645-1696.
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*(1), 59-109.
- Friedkin, N. E. (1998). *A structural theory of social influence*. Cambridge: Cambridge University Press.
- Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology*, *95*(1), 148-162.
- Georgiades, K., Boyle, M. H., & Fife, K. A. (2013). Emotional and behavioral problems among adolescent students: The role of immigrant, racial/ethnic congruence and belongingness in schools. *Journal of Youth and Adolescence*, *42*(9), 1473-1492.
- Geven, S., Weesie, J., & Van Tubergen, F. (2013). The influence of friends on adolescents' behavior problems at school: The role of ego, alter and dyadic characteristics. *Social Networks*, *35*(4), 583-592.
- Gibb, S. J., Fergusson, D. M., & Horwood, L. J. (2008). Gender differences in educational achievement to age 25. *Australian Journal of Education*, *52*(1), 63-80.
- Gieling, M., Vollebergh, W., & Van Dorsselaer, S. (2010). Ethnic density in school classes and adolescent mental health. *Social Psychiatry and Psychiatric Epidemiology*, *45*(6), 639-646.
- Granovetter, M. (1978). Threshold models of collective behavior. *American Journal of Sociology*, *83*(6), 1420-1443.
- Green, J., Liem, G. A. D., Martin, A. J., Colmar, S., Marsh, H. W., & McInerney, D. (2012). Academic motivation, self-concept, engagement, and performance in high school: Key processes from a longitudinal perspective. *Journal of Adolescence*, *35*(5), 1111-1122.
- Haas, S. A., & Schaefer, D. R. (2014). With a little help from my friends? Asymmetrical social influence on adolescent smoking initiation and cessation. *Journal of Health and Social Behavior*, *55*(2), 126-143.
- Hallinan, M. T. (1981). The peer influence process. *Studies in Educational Evaluation*, *7*(3), 285-306.
- Hallinan, M. T. (1998). Diversity effects on student outcomes: Social science evidence. *Ohio State Law Journal*, *59*(3), 733-754.
- Hallinan, M. T., & Williams, R. A. (1990). Students' characteristics and the peer-influence process. *Sociology of Education*, *63*(2), 122-132.
- Halpern, D. (1993). Minorities and mental health. *Social Science & Medicine*, *36*(5), 597-607.
- Hamm, J. V., & Faircloth, B. S. (2005). The role of friendship in adolescents' sense of school belonging. *New Directions for Child and Adolescent Development*, *2005*(107), 61-78.
- Hamm, J. V., Schmid, L., Farmer, T. W., & Locke, B. (2011). Injunctive and descriptive peer group norms and the academic adjustment of rural early adolescents. *The Journal of Early Adolescence*, *31*(1), 41-73.
- Hanushek, E. A., Kain, J. F., Markman, J. M., & Rivkin, S. G. (2003). Does peer ability affect student achievement? *Journal of Applied Econometrics*, *18*(5), 527-544.
- Hargreaves, D. H. (1967). *Social relations in a secondary school*. London: Routledge & Kegan Paul.

- Hartjen, C. A., & Priyadarsini, S. (2003). Gender, peers, and delinquency: A study of boys and girls in rural France. *Youth & Society, 34*(4), 387-414.
- Hartup, W. W. (1996). The company they keep: Friendships and their developmental significance. *Child Development, 67*(1), 1-13.
- Haynie, D. L., Doogan, N. J., & Soller, B. (2014). Gender, friendship networks, and delinquency: A dynamic network approach. *Criminology, 52*(4), 688-722.
- Heath, A. F., Rothon, C., & Kilpi, E. (2008). The second generation in Western Europe: Education, unemployment, and occupational attainment. *Annual Review of Sociology, 34*, 211-235.
- Heider, F. (1946). Attitudes and cognitive organization. *The Journal of Psychology, 21*(1), 107-112.
- Hirschi, T. (1969). *Causes of delinquency*. Berkeley: University of California Press.
- Holmes, D. S. (1978). Projection as a defense mechanism. *Psychological Bulletin, 85*(4), 677-688.
- Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York: Routledge.
- Irwin, K., & Horne, C. (2013). A normative explanation of antisocial punishment. *Social Science Research, 42*(2), 562-570.
- Jackson, C. (2003). Motives for 'laddishness' at school: Fear of failure and fear of the 'feminine'. *British Educational Research Journal, 29*(4), 583-598.
- Jenkins, P. H. (1995). School delinquency and school commitment. *Sociology of Education, 68*(3), 221-239.
- Jimerson, S. R., Campos, E., & Greif, J. L. (2003). Toward an understanding of definitions and measures of school engagement and related terms. *The California School Psychologist, 8*(1), 7-27.
- Johnson, M. K., Crosnoe, R., & Elder Jr, G. H. (2001). Students' attachment and academic engagement: The role of race and ethnicity. *Sociology of Education, 74*(4), 318-340.
- Jonsson, J. O. (1999). Explaining sex differences in educational choice an empirical assessment of a rational choice model. *European Sociological Review, 15*(4), 391-404.
- Jonsson, J. O., & Mood, C. (2008). Choice by contrast in Swedish schools: How peers' achievement affects educational choice. *Social Forces, 87*(2), 741-765.
- Joyner, K., & Kao, G. (2000). School racial composition and adolescent racial homophily. *Social Science Quarterly, 81*(3), 810-825.
- Juvonen, J. (2007). Reforming middle schools: Focus on continuity, social connectedness, and engagement. *Educational Psychologist, 42*(4), 197-208.
- Juvonen, J., Espinoza, G., & Knifsend, C. (2012). The role of peer relationships in student academic and extracurricular engagement. In S. L. Christenson, A. L. Reschly & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 387-401). New York: Springer US.
- Juvonen, J., & Graham, S. (2014). Bullying in schools: The power of bullies and the plight of victims. *Annual Review of Psychology, 65*, 159-185.
- Juvonen, J., & Gross, E. F. (2005). The rejected and the bullied. Lessons about social misfits from developmental psychology. In K. D. Williams, J. P. Forgas & W. Von Hippel (Eds.), *The social outcast: Ostracism, social exclusion, rejection, and bullying* (pp. 155-170). New York: Psychology Press.
- Juvonen, J., Nishina, A., & Graham, S. (2000). Peer harassment, psychological adjustment, and school functioning in early adolescence. *Journal of Educational Psychology, 92*(2), 349-359.
- Juvonen, J., Wang, Y., & Espinoza, G. (2010). Bullying experiences and compromised academic performance across middle school grades. *The Journal of Early Adolescence, 31*(1), 152-173.
- Kalter, F., Heath, A. F., Hewstone, M., Jonsson, J. O., Kalmijn, M., Kogan, I., & Van Tubergen, F. (2013). Children of Immigrants Longitudinal Survey in four European countries (Cils4eu). *GESIS Data Archive, Cologne, ZA5353 Data File Version, 1*(0)
- Kandel, D. B. (1978). Homophily, selection, and socialization in adolescent friendships. *American Journal of Sociology, 84*(2), 427-436.

- Kao, G., & Joyner, K. (2004). Do race and ethnicity matter among friends? *The Sociological Quarterly*, *45*(3), 557-573.
- Kellam, S. G., Ling, X., Merisca, R., Brown, C. H., & Ialongo, N. (1998). The effect of the level of aggression in the first grade classroom on the course and malleability of aggressive behavior into middle school. *Development and Psychopathology*, *10*(2), 165-185.
- Kelly, D. H. (1976). Track position, school misconduct and youth deviance. A test of the interpretive effect of school commitment. *Urban Education*, *10*(4), 379-388.
- Kindermann, T. A. (2007). Effects of naturally existing peer groups on changes in academic engagement in a cohort of sixth graders. *Child Development*, *78*(4), 1186-1203.
- Kingery, J. N., & Erdley, C. A. (2007). Peer experience as predictors of adjustment across the middle school transition. *Education and Treatment of Children*, *30*(2), 73-88.
- Kiuru, N., Burk, W. J., Laursen, B., Nurmi, J., & Salmela-Aro, K. (2012). Is depression contagious? A test of alternative peer socialization mechanisms of depressive symptoms in adolescent peer networks. *Journal of Adolescent Health*, *50*(3), 250-255.
- Kline, R. B. (2011). *Principles and practice of structural equation modeling*. New York: Guilford press.
- Knecht, A. B. (2006). Networks and actor attributes in early adolescence. *ICS Codebook*, 61
- Knecht, A. B. (2008). *Friendship selection and friends' influence: Dynamics of networks and actor attributes in early adolescence*. Utrecht University.
- Knecht, A. B., Burk, W. J., Weesie, J., & Steglich, C. E. G. (2011). Friendship and alcohol use in early adolescence: A multilevel social network approach. *Journal of Research on Adolescence*, *21*(2), 475-487.
- Knecht, A. B., Snijders, T. A. B., Baerveldt, C., Steglich, C. E. G., & Raub, W. (2010). Friendship and delinquency: Selection and influence processes in early adolescence. *Social Development*, *19*(3), 494-514.
- Kubitschek, W. N., & Hallinan, M. T. (1998). Tracking and students' friendships. *Social Psychology Quarterly*, *61*(1), 1-15.
- Ladd, G. W., Kochenderfer-Ladd, B., & Sechler, C. M. (2012). Classroom peer relations and children's social and scholastic development: Risk factors and resources. In A. M. Ryan, & G. W. Ladd (Eds.), *Peer relationships and adjustment at school* (pp. 11-49). Charlotte, NC: Information Age Publishing.
- Lam, S., Jimerson, S., Kikas, E., Cefai, C., Veiga, F. H., Nelson, B., . . . Duck, R. (2012). Do girls and boys perceive themselves as equally engaged in school? The results of an international study from 12 countries. *Journal of School Psychology*, *50*(1), 77-94.
- Langenkamp, A. G. (2010). Academic vulnerability and resilience during the transition to high school the role of social relationships and district context. *Sociology of Education*, *83*(1), 1-19.
- Lapinski, M. K., & Rimal, R. N. (2005). An explication of social norms. *Communication Theory*, *15*(2), 127-147.
- Leenders, R. T. A. (2002). Modeling social influence through network autocorrelation: Constructing the weight matrix. *Social Networks*, *24*(1), 21-47.
- Legewie, J., & DiPrete, T. A. (2012). School context and the gender gap in educational achievement. *American Sociological Review*, *77*(3), 463-485.
- Leung, K., & Lau, S. (1988). Effects of self-concept and perceived disapproval of delinquent behavior in school children. *Journal of Youth and Adolescence*, *18*(4), 345-359.
- Li, C. (2013). Little's test of missing completely at random. *The Stata Journal*, *13*(4), 795-809.
- Liljeberg, J. F., Eklund, J. M., Fritz, M. V., & of Klinteberg, B. (2011). Poor school bonding and delinquency over time: Bidirectional effects and sex differences. *Journal of Adolescence*, *34*(1), 1-9.
- Lin, X. (2010). Identifying peer effects in student academic achievement by spatial autoregressive models with group unobservables. *Journal of Labor Economics*, *28*(4), 825-860.

- Lindenberg, S. (2013). Social rationality, self-regulation and well-being: The regulatory significance of needs, goals, and the self. In R. Wittek, T. A. B. Snijders & V. Nee (Eds.), *Handbook of rational choice social research* (pp. 72-112). Stanford: Stanford University Press.
- Lubbers, M. J., Snijders, T. A. B., & Van der Werf, M. P. C. (2011). Dynamics of peer relationships across the first two years of junior high as a function of gender and changes in classroom composition. *Journal of Research on Adolescence, 21*(2), 488-504.
- Luciak, M. (2004). Minority status and schooling—John U. Ogbu's theory and the schooling of ethnic minorities in Europe. *Intercultural Education, 15*(4), 359-368.
- Mahatmya, D., Lohman, B. J., Matjasko, J. L., & Feldman Farb, A. (2012). Engagement across developmental periods. In S. L. Christenson, A. L. Reschly & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 45-63). New York: Springer US.
- Marsh, H. W. (1987). The big-fish-little-pond effect on academic self-concept. *Journal of Educational Psychology, 79*(3), 280-295.
- Marsh, H. W., & Hau, K. (2003). Big-fish–little-pond effect on academic self-concept: A cross-cultural (26-country) test of the negative effects of academically selective schools. *American Psychologist, 58*(5), 364-376.
- Marsh, H. W., Kong, C., & Hau, K. (2000). Longitudinal multilevel models of the big-fish-little-pond effect on academic self-concept: Counterbalancing contrast and reflected-glory effects in Hong Kong schools. *Journal of Personality and Social Psychology, 78*(2), 337-349.
- Marsh, H. W., Lüdtke, O., Nagengast, B., Trautwein, U., Morin, A. J., Abduljabbar, A. S., & Köller, O. (2012). Classroom climate and contextual effects: Conceptual and methodological issues in the evaluation of group-level effects. *Educational Psychologist, 47*(2), 106-124.
- Marsh, H. W., Lüdtke, O., Robitzsch, A., Trautwein, U., Asparouhov, T., Muthén, B., & Nagengast, B. (2009). Doubly-latent models of school contextual effects: Integrating multilevel and structural equation approaches to control measurement and sampling error. *Multivariate Behavioral Research, 44*(6), 764-802.
- Marsh, H. W., Seaton, M., Trautwein, U., Lüdtke, O., Hau, K., O'Mara, A. J., & Craven, R. G. (2008). The big-fish–little-pond-effect stands up to critical scrutiny: Implications for theory, methodology, and future research. *Educational Psychology Review, 20*(3), 319-350.
- Mäs, M., & Flache, A. (2013). Differentiation without distancing. Explaining bi-polarization of opinions without negative influence. *PLoS ONE, 8*(11), 1-17.
- Mason, W. A., Conrey, F. R., & Smith, E. R. (2007). Situating social influence processes: Dynamic, multidirectional flows of influence within social networks. *Personality and Social Psychology Review, 11*(3), 279-300.
- McCormick, M. P., & Cappella, E. (2015). Conceptualizing academic norms in middle school A social network perspective. *The Journal of Early Adolescence, 35*(4), 441-466.
- McFarland, D. A. (2001). Student resistance: How the formal and informal organization of classrooms facilitate everyday forms of student defiance. *American Journal of Sociology, 107*(3), 612-678.
- McFarland, D. A., Diehl, D., & Rawlings, C. (2011). Methodological transactionalism and the sociology of education. In M. T. Hallinan (Ed.), *Frontiers in sociology of education* (pp. 87-109). Dordrecht, the Netherlands: Springer.
- McNeal, R. B. (1999). Parental involvement as social capital: Differential effectiveness on science achievement, truancy, and dropping out. *Social Forces, 78*(1), 117-144.
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology, 27*, 415-444.
- Meade, A. W., Johnson, E. C., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. *Journal of Applied Psychology, 93*(3), 568-592.
- Mears, D. P., Ploeger, M., & Warr, M. (1998). Explaining the gender gap in delinquency: Peer influence and moral evaluations of behavior. *Journal of Research in Crime and Delinquency, 35*(3), 251-266.

- Mercken, L., Snijders, T. A. B., Steglich, C. E. G., Vartiainen, E., & De Vries, H. (2010). Dynamics of adolescent friendship networks and smoking behavior. *Social Networks, 32*(1), 72-81.
- Mercken, L., Steglich, C. E. G., Sinclair, P., Holliday, J., & Moore, L. (2012). A longitudinal social network analysis of peer influence, peer selection, and smoking behavior among adolescents in British schools. *Health Psychology, 31*(4), 450-459.
- Merry, M. S. (2005). Advocacy and involvement: The role of parents in western Islamic schools. *Religious Education, 100*(4), 374-385.
- Merton, R. (1968). *Social theory and social structure* (3rd ed.). New York: Free Press.
- Mikami, A. Y., Lerner, M. D., & Lun, J. (2010). Social context influences on children's rejection by their peers. *Child Development Perspectives, 4*(2), 123-130.
- Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research, 3*(1), 111-130.
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100*(4), 674-701.
- Molloy, L. E., Gest, S. D., & Rulison, K. L. (2011). Peer influences on academic motivation: Exploring multiple methods of assessing youths' most "Influential" peer relationships. *The Journal of Early Adolescence, 31*(1), 13-40.
- Moody, J. (2001). Race, school integration, and friendship segregation in America. *American Journal of Sociology, 107*(3), 679-716.
- Morris, E. W. (2008). "Rednecks," "Rutters," and "Rithmetic social class, masculinity, and schooling in a rural context. *Gender & Society, 22*(6), 728-751.
- Müller, C. M., & Hofmann, V. (2016). Does being assigned to a low school track negatively affect psychological adjustment? A longitudinal study in the first year of secondary school. *School Effectiveness and School Improvement, 27*(2), 95-115.
- Müller, C. M., Hofmann, V., Fleischli, J., & Studer, F. (2015). „Sag 'mir, was deine Klassenkameraden tun und ich sage dir, was du tun wirst“? Zum Einfluss der Klassenzusammensetzung auf die Entwicklung von schulischem Problemverhalten. *Zeitschrift Für Erziehungswissenschaft, 18*(3), 1-21.
- Müller, C. M., Hofmann, V., Fleischli, J., & Studer, F. (2016a). Effects of classroom composition on the development of antisocial behavior in lower secondary school. *Journal of Research on Adolescence, 26*(2), 345-359.
- Müller, C. M., Hofmann, V., Fleischli, J., & Studer, F. (2016b). Classroom peer influence from the entire class, dominant students, and friends. *Journal of Cognitive Education and Psychology, 15*(1), 122-145.
- Muthén, B. O., Khoo, S., & Gustafsson, J. (1997). Multilevel latent variable modeling in multiple populations. *Unpublished Manuscript*,
- Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus User's guide*. (Seventh Edition. ed.) Los Angeles, CA: Muthén & Muthén.
- Nagengast, B., & Marsh, H. W. (2012). Big fish in little ponds aspire more: Mediation and cross-cultural generalizability of school-average ability effects on self-concept and career aspirations in science. *Journal of Educational Psychology, 104*(4), 1033-1053.
- Neckerman, H. J. (1996). The stability of social groups in childhood and adolescence: The role of the classroom social environment. *Social Development, 5*(2), 131-145.
- Neidell, M., & Waldfogel, J. (2010). Cognitive and noncognitive peer effects in early education. *The Review of Economics and Statistics, 92*(3), 562-576.
- Nishina, A., Juvonen, J., & Witkow, M. R. (2005). Sticks and stones may break my bones, but names will make me feel sick: The psychosocial, somatic, and scholastic consequences of peer harassment. *Journal of Clinical Child and Adolescent Psychology, 34*(1), 37-48.
- Office for National Statistics (ONS). (2012). Ethnicity and national identity in England and Wales 2011. Retrieved from [http://www.ons.gov.uk/ons/dcp171776\\_290558.pdf](http://www.ons.gov.uk/ons/dcp171776_290558.pdf)

- Ogbu, J. U. (1987). Variability in minority school performance: A problem in search of an explanation. *Anthropology & Education Quarterly*, 18(4), 312-334.
- Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research*, 70(3), 323-367.
- Parker, J. G., & Asher, S. R. (1993). Friendship and friendship quality in middle childhood: Links with peer group acceptance and feelings of loneliness and social dissatisfaction. *Developmental Psychology*, 29(4), 611-621.
- Pattiselanno, K. L. (2016). *At your own risk: The importance of group dynamics and peer processes in adolescent peer groups for adolescents' involvement in risk behaviors*. (Ph.d. dissertation.). (University of Groningen, Interuniversity Center for Social Science Theory and Methodology).
- Piquero, N. L., Gover, A. R., MacDonald, J. M., & Piquero, A. R. (2005). The influence of delinquent peers on delinquency does gender matter? *Youth & Society*, 36(3), 251-275.
- Preacher, K. J., Zhang, Z., & Zyphur, M. J. (2011). Alternative methods for assessing mediation in multilevel data: The advantages of multilevel SEM. *Structural Equation Modeling*, 18(2), 161-182.
- Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods*, 15(3), 209-233.
- Rambaran, J. A., Dijkstra, J. K., & Stark, T. H. (2013). Status-Based influence processes: The role of norm salience in contagion of adolescent risk attitudes. *Journal of Research on Adolescence*, 23(3), 574-585.
- Rambaran, J. A., Hopmeyer, A., Schwartz, D., Steglich, C. E. G., Badaly, D., & Veenstra, R. (2016). Academic functioning and peer influences: A short-term longitudinal study of network-behavior dynamics in middle adolescence. *Child Development*, (forthcoming)
- Reid, K. (2005). The causes, views and traits of school absenteeism and truancy: An analytical review. *Research in Education*, 74(1), 59-82
- Richer, S. (1976). Reference-group theory and ability grouping: A convergence of sociological theory and educational research. *Sociology of Education*, 49(1), 65-71.
- Ripley, R. M., Snijders, T. A. B., & Preciado, P. (2011). *Manual for RSiena*. Oxford: University of Oxford: Department of Statistics; Nuffield College.
- Ripley, R. M., Snijders, T. A. B., & Preciado, P. (2013). *Manual for SIENA version 4.0*. Oxford: University of Oxford, Department of Statistics; Nuffield College.
- Rosenberg, M., Schooler, C., & Schoenbach, C. (1989). Self-esteem and adolescent problems: Modeling reciprocal effects. *American Sociological Review*, 54(6), 1004-1018.
- Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global self-esteem and specific self-esteem: Different concepts, different outcomes. *American Sociological Review*, 60(1), 141-156.
- Ross, L., Greene, D., & House, P. (1977). The "false consensus effect": An egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology*, 13(3), 279-301.
- Rumberger, R. W. (1995). Dropping out of middle school: A multilevel analysis of students and schools. *American Educational Research Journal*, 32(3), 583-625.
- Ryan, A. M. (2000). Peer groups as a context for the socialization of adolescents' motivation, engagement, and achievement in school. *Educational Psychologist*, 35(2), 101-111.
- Ryan, A. M., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal*, 38(2), 437-460.
- Sacerdote, B. (2011). Peer effects in education: How might they work, how big are they and how much do we know thus far? *Handbook of the Economics of Education*, 3, 249-277.
- Salchegger, S. (2016). Selective school systems and academic self-concept: How explicit and implicit school-level tracking relate to the big-Fish-Little-pond effect across cultures. *Journal of Educational Psychology*, 108(3), 405-423.



- Sandstrom, M. J. (2011). The power of popularity: Influence processes in childhood and adolescence. In A. H. N. Cillessen, D. Schwartz & L. Mayeux (Eds.), *Popularity in the peer system* (pp. 219-244). New York: Guilford Press.
- Schneider, B. H., Dixon, K., & Udvari, S. (2007). Closeness and competition in the inter-ethnic and co-ethnic friendships of early adolescents in Toronto and Montreal. *The Journal of Early Adolescence*, 27(1), 115-138.
- Scholte, R. H., Engels, R. C., Overbeek, G., De Kemp, R. A., & Haselager, G. J. (2007). Stability in bullying and victimization and its association with social adjustment in childhood and adolescence. *Journal of Abnormal Child Psychology*, 35(2), 217-228.
- Sen, A. (1973). *On economic inequality*. Oxford: Oxford University Press.
- Shin, H., & Ryan, A. M. (2014). Early adolescent friendships and academic adjustment: Examining selection and influence processes with longitudinal social network analysis. *Developmental Psychology*, 50(11), 2462-2472.
- Shrum, W., Cheek Jr, N. H., & Hunter, S. (1988). Friendship in school: Gender and racial homophily. *Sociology of Education*, 61(4), 227-239.
- Smith, S. (2015). *Ethnic segregation in friendship networks. studies of its determinants in English, German, Dutch, and Swedish school classes* (Ph.d. dissertation). (Utrecht University, Interuniversity Center for Social Science Theory and Methodology).
- Smith, S., Maas, I., & Van Tubergen, F. (2014). Ethnic ingroup friendships in schools: Testing the by-product hypothesis in England, Germany, the Netherlands and Sweden. *Social Networks*, 39, 33-45.
- Snijders, T. A. B. (2011). Network dynamics, chapter 33. In J. Scott, & P. J. Carrington (Eds.), *The SAGE handbook of social network analysis* (pp. 501-513) London: Sage, 2011.
- Snijders, T. A. B., & Baerveldt, C. (2003). A multilevel network study of the effects of delinquent behavior on friendship evolution. *Journal of Mathematical Sociology*, 27(2-3), 123-151.
- Snijders, T. A. B., Van de Bunt, G. G., & Steglich, C. E. G. (2010). Introduction to stochastic actor-based models for network dynamics. *Social Networks*, 32(1), 44-60.
- Sørensen, A. B. (1970). Organizational differentiation of students and educational opportunity. *Sociology of Education*, 43(4), 355-376.
- Spruyt, B., Van Droogenbroeck, F., & Kavadias, D. (2015). Educational tracking and sense of futility: A matter of stigma consciousness? *Oxford Review of Education*, 41(6), 747-765.
- Statistics Netherlands. (2014). Population; sex, age, origin and generation, 1 January. Retrieved from <http://statline.cbs.nl/Statweb/publication/?DM=SLLEN&PA=37325ENG&D1=a&D2=0&D3=0&D4=0&D5=0&D6=13-18&LA=EN&VW=T>
- Statistics Sweden. (2014). Number of persons by foreign/Swedish background and year. Retrieved from [http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START\\_\\_BE\\_\\_BE0101\\_\\_BE0101Q/UtlSvBakgTotNK/?rxid=de941a85-ad62-4562-a99e-a4743dbc07c7](http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__BE__BE0101__BE0101Q/UtlSvBakgTotNK/?rxid=de941a85-ad62-4562-a99e-a4743dbc07c7)
- Steglich, C. E. G., Snijders, T. A. B., & Pearson, M. (2010). Dynamic networks and behavior: Separating selection from influence. *Sociological Methodology*, 40(1), 329-393.
- Steinberg, L., Dornbusch, S. M., & Brown, B. B. (1992). Ethnic differences in adolescent achievement: An ecological perspective. *American Psychologist*, 47(6), 723-729.
- Stevens, P. A., & Vermeersch, H. (2010). Streaming in Flemish secondary schools: Exploring teachers' perceptions of and adaptations to students in different streams. *Oxford Review of Education*, 36(3), 267-284.
- Szulkin, R., & Jonsson, J. O. (2007). *Ethnic segregation and educational outcomes in Swedish comprehensive schools*. Stockholm University Linnaeus Center for Integration Studies (SULCIS).
- The Federal Statistical Office Germany. (2013). Population, 2013, by migrant status and age groups. Retrieved from <https://www.destatis.de/EN/FactsFigures/SocietyState/Population/MigrationIntegration/PersonsMigrationBackground/PersonsMigrationBackground.html>

- Thijs, J., & Verkuyten, M. (2014). School ethnic diversity and students' interethnic relations. *British Journal of Educational Psychology, 84*(1), 1-21.
- Thomas, D. E., Bierman, K. L., & Powers, C. (2011). The influence of classroom aggression and classroom climate on aggressive-disruptive behavior. *Child Development, 82*(3), 751-757.
- Tietjen, A. M. (1982). The social networks of preadolescent children in Sweden. *International Journal of Behavioral Development, 5*(1), 111-130.
- Trautwein, U., Lüdtke, O., Marsh, H. W., Köller, O., & Baumert, J. (2006). Tracking, grading, and student motivation: Using group composition and status to predict self-concept and interest in ninth-grade mathematics. *Journal of Educational Psychology, 98*(4), 788-806.
- Tygart, C. E. (1988). Strain theory and public school vandalism: Academic tracking, school social status, and students' academic achievement. *Youth and Society, 20*(1), 106-118.
- Ueno, K. (2005). The effects of friendship networks on adolescent depressive symptoms. *Social Science Research, 34*(3), 484-510.
- Ueno, K. (2009). Same-Race friendships and school attachment: Demonstrating the interaction between personal network and school composition. *Sociological Forum, 24*(3), 515-537.
- Van de Gaer, E., Pustjens, H., Van Damme, J., & De Munter, A. (2007). Impact of attitudes of peers on language achievement: Gender differences. *The Journal of Educational Research, 101*(2), 78-90.
- Van de Schoot, R., Lugtig, P., & Hox, J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology, 9*(4), 486-492.
- Van de Werfhorst, H. G., Bergstra, M., & Veenstra, R. (2012). School disciplinary climate, behavioral problems, and academic achievement in the Netherlands. In R. Arum, & M. Velez (Eds.), *Improving learning environments* (pp. 196-221). Stanford, CA: Stanford University Press.
- Van Houtte, M. (2004a). Gender context of the school and study culture, or how the presence of girls affects the achievement of boys. *Educational Studies, 30*(4), 409-423.
- Van Houtte, M. (2004b). Why boys achieve less at school than girls: The difference between boys' and girls' academic culture. *Educational Studies, 30*(2), 159-173.
- Van Houtte, M. (2006). School type and academic culture: Evidence for the differentiation-polarization theory. *Journal of Curriculum Studies, 38*(3), 273-292.
- Van Houtte, M., Demanet, J., & Stevens, P. A. J. (2012). Self-esteem of academic and vocational students: Does within-school tracking sharpen the difference? *Acta Sociologica, 55*(1), 73-89.
- Van Houtte, M., & Stevens, P. A. J. (2008). Sense of futility: The missing link between track position and self-reported school misconduct. *Youth & Society, 40*(2), 245-264.
- Van Houtte, M., & Stevens, P. A. J. (2009a). School ethnic composition and students' integration outside and inside schools in Belgium. *Sociology of Education, 82*(3), 217-239.
- Van Houtte, M., & Stevens, P. A. J. (2009b). Study involvement of academic and vocational students: Does between-school tracking sharpen the difference? *American Educational Research Journal, 46*(4), 943-973.
- Van Tubergen, F., & Van Gaans, M. (2016). Is there an oppositional culture among immigrant adolescents in the Netherlands? *Youth & Society, 48*(2), 202-219.
- Vantieghem, W., Vermeersch, H., & Van Houtte, M. (2014). Why "Gender" disappeared from the gender gap: (re-) introducing gender identity theory to educational gender gap research. *Social Psychology of Education, 17*(3), 1-25.
- Vaquera, E. (2009). Friendship, educational engagement, and school belonging: Comparing Hispanic and white adolescents. *Hispanic Journal of Behavioral Sciences, 31*(4), 492-514.
- Vaquera, E., & Kao, G. (2008). Do you like me as much as I like you? friendship reciprocity and its effects on school outcomes among adolescents. *Social Science Research, 37*(1), 55-72.
- Veenstra, R., & Dijkstra, J. K. (2011). Transformations in adolescent peer networks. In B. Laursen, & W. A. Collins (Eds.), *Relationship pathways: From adolescence to young adulthood*. (pp. 135-154). Los Angeles: Sage.



- Veenstra, R., Dijkstra, J. K., & Kreager, D. A. (2017). Pathways, networks, and norms. A sociological perspective on peer research. In W. M. Bukowski, B. Laursen & K. H. Rubin (Eds.), *Handbook of peer interactions, relationships, and groups*. New York, NY: Guilford.
- Veenstra, R., Dijkstra, J. K., Steglich, C. E. G., & Van Zalk, M. H. W. (2013). Network-behavior dynamics. *Journal of Research on Adolescence*, *23*(3), 399-412.
- Veenstra, R., Lindenberg, S., Tinga, F., & Ormel, J. (2010). Truancy in late elementary and early secondary education: The influence of social bonds and self-control—the TRAILS study. *International Journal of Behavioral Development*, *34*(4), 302-310.
- Voelkl, K. E. (2012). School identification. In S. L. Christenson, A. L. Reschly & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 193-218). New York: Springer US.
- Wang, M., & Eccles, J. S. (2012). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. *Child Development*, *83*(3), 877-895.
- Warrington, M., Younger, M., & Williams, J. (2000). Student attitudes, image and the gender gap. *British Educational Research Journal*, *26*(3), 393-407.
- Weerman, F. M. (2011). Delinquent peers in context: A longitudinal network analysis of selection and influence effects\*. *Criminology*, *49*(1), 253-286.
- Weiss, C. C., & Bearman, P. S. (2007). Fresh starts: Reinvestigating the effects of the transition to high school on student outcomes. *American Journal of Education*, *113*(3), 395-421.
- Westerhuis, A., Neuvcl, J., Huijgen, T., & Meng, C. (2012). *Doorstroomatlas vmbo. de onderwijsloopbanen van vmbo'ers in kaart gebracht*. Den Haag: Ministerie van Onderwijs, Cultuur en Wetenschap.
- White, I. R., Royston, P., & Wood, A. M. (2011). Multiple imputation using chained equations: Issues and guidance for practice. *Statistics in Medicine*, *30*(4), 377-399.
- Wiatrowski, M. D., Hansell, S., Massey, C. R., & Wilson, D. L. (1982). Curriculum tracking and delinquency. *American Sociological Review*, *47*(1), 151-160.
- Willis, P. E. (1977). *Learning to labor: How working class kids get working class jobs*. New York: Columbia University Press.
- Witkow, M. R., & Fuligni, A. J. (2010). In-School versus Out-of-School friendships and academic achievement among an ethnically diverse sample of adolescents. *Journal of Research on Adolescence*, *20*(3), 631-650.
- Witkow, M. R., Gillen-O'Neel, C., & Fuligni, A. J. (2012). College social engagement and school identification: Differences by college type and ethnicity. *Journal of Applied Developmental Psychology*, *33*(5), 243-251.
- Wong, T. M., Slotboom, A., & Bijleveld, C. C. (2010). Risk factors for delinquency in adolescent and young adult females: A European review. *European Journal of Criminology*, *7*(4), 266-284.
- Wood, W. (2000). Attitude change: Persuasion and social influence. *Annual Review of Psychology*, *51*(1), 539-570.
- Wright, J. C., Giammarino, M., & Parad, H. W. (1986). Social status in small groups: Individual-group similarity and the social "misfit". *Journal of Personality and Social Psychology*, *50*(3), 523.
- Zimmer, R. W. (2003). A new twist in the educational tracking debate. *Economics of Education Review*, *22*(3), 307-315.
- Zimmer, R. W., & Toma, E. F. (2000). Peer effects in private and public schools across countries. *Journal of Policy Analysis and Management*, *19*(1), 75-92.



# Acknowledgements



## Acknowledgements

Writing this dissertation was a journey I would not have wanted to miss out on. While difficult at times, I enjoyed delving into a topic and it was an interesting experience to eventually almost get absorbed by it. Frank, I am very grateful that you gave me this opportunity. Throughout the process I could always count on you. I have learned a lot from your very precise comments with respect to both the general aspects of my work, as well as the tiniest details. Thank you for your trust in me as a researcher, and as a teacher. Finally, you have been very helpful and supportive in my career decisions, and truly wished the best for me.

Jeroen, you stimulate thought. The side paths that your brain takes can make things shaky at times, but are also highly refreshing. During the process you helped me consider aspects of my work that I may have neglected otherwise. I enjoyed our meetings and I thank you for letting me discuss the things I struggled with, even when I got lost in a detail.

While people say that doing a Ph.D. is a solitary experience, I rarely experienced it this way. This was largely due to my national and international teammates of the CILS4EU project. Eva, you were always there to discuss CILS issues and you were a great troubleshooter when things went wrong. I really appreciated your regular visits to my room to check how things were going, both with the project and with me. Merel and Sander, thank you for coordinating the first waves of the study and setting up the infrastructure. I very much enjoyed working with you. Pascale and Sanne, I was lucky to coordinate the Dutch CILS data collection together with you. I felt that we all cared a lot about the project and that this made sharing responsibilities easy. Pascale, your organizational talent and precision are precious. I am happy you are back on the team. Sanne, you were my roommate during most of my Ph.D. and I could not have wished for a better one. We used the same data, were interested in similar topics, and conducted similar type of analyses. When you left I lost a precious sounding board for my ideas. Thank you for cheering me up when things were not going as planned - I will never forget the digital owl - and for all the fun times. Lowlands was one of the highlights. Manja, Bas, Maaike, and Müge, thank you for being our successors! Also outside of work we have proven to be a good team. I still think back sometimes to our trip to Sweden and I hope more memorable conferences, dinners, and/or nights out will follow. Manja, I am happy you are my paranimf. You have been very attentive and I thank you for always lending a listening ear. I hope visiting the “vierdaagse feesten” together will become

Ack

a tradition. Outside of my CILS collaborators in Utrecht, special thanks go to Matthijs and Janne. Matthijs, I enjoyed working with you on chapter 2. You helped me focus my text more on the real “problem” and your interpretation of the results was very insightful. Janne, thank you for your helpful feedback on chapter 5 and your hospitality in Oxford. You introduced me to the Oxford way of working! The informal discussions of work over tea were a delight. Besides the CILS4EU team, I am grateful to the schools, students, and teachers who participated in the study.

I consider the working environment and atmosphere in Utrecht to be special. I want to thank all my dear (ex-)colleagues for the (MaSS-) seminars, practical help with respect to teaching or research, choirs/band, game evenings, dinners, drinks, and lunches. I want to specifically mention Vincenz and Antonie for regularly making me smile at work. I will miss your company in Amsterdam. Jesper, I am happy you will be there in Amsterdam. Special thanks also to the support staff. Bärbel, Ellen, Pim, Marjet, and Babs, you made life easier at work. The large CILS project must have been a pain for some of you at times, but you always helped find ways to make the project run smoothly. Finally, I want to mention Mariëlle. There are few Ph.D. students who have a mentor, and while it may be considered as a luxury, for me it has been invaluable. Mariëlle, thank you for being understanding and for your advice.

I would like to acknowledge the support of the larger ICS community. I was happy to be part of this club and the ICS events are important common goods. I especially received helpful comments from my reviewers at the forum days: Zoli Lippényi, Jan Kornelis Dijkstra, Jelle Sijtsema, René Veenstra, and Loes van Rijsewijk. Tom Snijders, I enjoyed attending the informal network seminars in Oxford. You answered various of my SIENA related questions. I find it impressive how you always find the time to help.

I am grateful to my reading committee, Catrin Finkenauer, Mieke van Houtte, Arnout van de Rijt, René Veenstra, and Herman van de Werfhorst, for taking the time to assess my dissertation.

Aside from the scientific evidence, personal experience also confirms that friends can have a *positive* influence on educational outcomes. Aranka and Sanne, you have been there since year 0. This research made me realize even more how special your unconditional acceptance and support is. I never had to prove myself, you were just there. It is comforting to share such a long history together. Aranka, you are able

to confront me with my peculiarities and to accept them and laugh about them at the same time. I think I have learned a lot about myself through you. Sanne, the trips to and back to school were always a moment of evaluation. Still, I know I can count on you. Else, we go a long way back as well. You have always been similarly loyal, and attentive, and are very caring. Eva, we do not see each other that much anymore, but I always enjoy our times together. Karlijn, thank you for putting things in perspective. You are a great friend. Anouk, Cath, Annick, and Marjolein, you have offered true respite from work. I want to mention the ladies from the “Tuesday” for great dinners, trips, nights out, and more. Thank you, Sanne D, Anne, Sanne K, Oddy, and Anne Floor. Finally, I am grateful to my tennis and wine buddies.

Peter, Jenny, and Ben I always look forward to coming to France. Thank you for all the relaxing moments that helped me to escape from my work. Daan, broer, your observations and advice are often spot on, but most of all you are able to ease my worries with a simple joke. I am happy that you will be standing next to me during my defense. I also want to thank you for making the cover of this book. Mel, you are always up for family time and that makes me very happy. It is nice to be able to share Ph.D. experiences with you. Papa and mama, for as long as I can remember you have helped me to clear my head and during the process of writing this dissertation that was often necessary. You’ve lightened the burden of the failures, but also brightened the joy of the successes. Thank you for your love and cheer up messages, for knowing when I need them most, and for being my support hotline for all sorts of queries.

Nick, you combine characteristics that I probably used to think of as being mutually exclusive. You gave me a lot of space to write this dissertation, while being at the same time so attentive and caring about it. You provide me room to express myself without letting me lose myself in it. Thank you for this. I think it is unique.

Ack





# Curriculum Vitae



## Curriculum Vitae

Sara Geven was born in Nijmegen, the Netherlands, on October 26th, 1987. In 2009 she obtained her Bachelor's degree cum laude in the Social Sciences from University College Maastricht (honors college). As part of her Bachelor's degree, she spent a semester at the University of California Berkeley, where she followed courses in Sociology, including courses on social networks and social inequality. In 2011 she completed her Research Master's degree in Sociology and Social Research at Utrecht University, cum laude. In that year she started her Ph.D. at the Interuniversity Center for Social Science Theory and Methodology (ICS) at the Department of Sociology at Utrecht University where she conducted the present study under the supervision of Frank van Tubergen and Jeroen Weesie. As part of her Ph.D. research she collaborated with Janne Jonsson (Nuffield College at the University of Oxford / SOFI Stockholm University) during a two month research visit to Nuffield College at the University of Oxford. During her Ph.D., Sara taught Introduction to Sociology and classes on survey methods. Moreover, she helped coordinate the third, fourth, and fifth waves of the Dutch part of the CILS4EU project. As of July 2016, she works as a postdoctoral researcher at the Sociology Department of the University of Amsterdam.



ICS dissertation series



## ICS dissertation series

The ICS series presents dissertations of the Interuniversity Center for Social Science Theory and Methodology. Each of these studies aims at integrating explicit theory formation with state of the art empirical research or at the development of advanced methods for empirical research. The ICS was founded in 1986 as a cooperative effort of the universities of Groningen and Utrecht. Since 1992, the ICS expanded to the University of Nijmegen. Most of the projects are financed by the participating universities or by the Netherlands Organization for Scientific Research (NWO). The international composition of the ICS graduate students is mirrored in the increasing international orientation of the projects and thus of the ICS series itself.

1. Cornelis van Liere (1990). *Lastige leerlingen. Een empirisch onderzoek naar sociale oorzaken van probleemgedrag op basisscholen*. Amsterdam: Thesis Publishers.
2. Marco H.D. van Leeuwen (1990). *Bijstand in Amsterdam, ca. 1800-1850. Armenzorg als beheersings- en overlevingsstrategie*. ICS-dissertation, Utrecht.
3. Ineke Maas (1990). *Deelname aan podiumkunsten via de podia, de media en actieve beoefening. Substitutie of leereffecten?* Amsterdam: Thesis Publishers.
4. Marjolein I. Broese van Groenou (1991). *Gescheiden netwerken. De relaties met vrienden en verwanten na echtscheiding*. Amsterdam: Thesis Publishers.
5. Jan M.M. van den Bos (1991). *Dutch EC policy making. A model guided approach to coordination and negotiation*. Amsterdam: Thesis Publishers.
6. Karin Sanders (1991). *Vrouwelijke pioniers. Vrouwen en mannen met een 'mannelijke' hogere beroepsopleiding aan het begin van hun loopbaan*. Amsterdam: Thesis Publishers.
7. Sjerp de Vries (1991). *Egoism, altruism, and social justice. Theory and experiments on cooperation in social dilemmas*. Amsterdam: Thesis Publishers.
8. Ronald S. Batenburg (1991). *Automatisering in bedrijf*. Amsterdam: Thesis Publishers.
9. Rudi Wielers (1991). *Selectie en allocatie op de arbeidsmarkt. Een uitwerking voor de informele en geïnstitutionaliseerde kinderopvang*. Amsterdam: Thesis Publishers.
10. Gert P. Westert (1991). *Verschillen in ziekenhuisgebruik*. ICS-dissertation, Groningen.
11. Hanneke Hermesen (1992). *Votes and policy preferences. Equilibria in party systems*. Amsterdam: Thesis Publishers.
12. Cora J.M. Maas (1992). *Probleemleerlingen in het basisonderwijs*. Amsterdam: Thesis Publishers.
13. Ed A.W. Boxman (1992). *Contacten en carrière. Een empirisch theoretisch onderzoek naar de relatie tussen sociale netwerken en arbeidsmarktposities*. Amsterdam: Thesis Publishers.
14. Conny G.J. Taes (1992). *Kijken naar banen. Een onderzoek naar de inschatting van arbeidsmarktkansen bij schoolverlaters uit het middelbaar beroeps onderwijs*. Amsterdam: Thesis Publishers.
15. Peter van Roozendaal (1992). *Cabinets in multi party democracies. The effect of dominant and central parties on cabinet composition and durability*. Amsterdam: Thesis Publishers.
16. Marcel van Dam (1992). *Regio zonder regie. Verschillen in en effectiviteit van gemeentelijk arbeidsmarktbeleid*. Amsterdam: Thesis Publishers.
17. Tanja van der Lippe (1993). *Arbeidsverdeling tussen mannen en vrouwen*. Amsterdam: Thesis Publishers.

18. Marc A. Jacobs (1993). *Software: Kopen of kopiëren? Een sociaal wetenschappelijk onderzoek onder PC gebruikers*. Amsterdam: Thesis Publishers.
19. Peter van der Meer (1993). *Verdringing op de Nederlandse arbeidsmarkt. Sector- en sekseverschillen*. Amsterdam: Thesis Publishers.
20. Gerbert Kraaykamp (1993). *Over lezen gesproken. Een studie naar sociale differentiatie in leesgedrag*. Amsterdam: Thesis Publishers.
21. Evelien Zeggelink (1993). *Strangers into friends. The evolution of friendship networks using an individual oriented modeling approach*. Amsterdam: Thesis Publishers.
22. Jaco Berveling (1994). *Het stempel op de besluitvorming. Macht, invloed en besluitvorming op twee Amsterdamse beleidsterreinen*. Amsterdam: Thesis Publishers.
23. Wim Bernasco (1994). *Coupled careers. The effects of spouse's resources on success at work*. Amsterdam: Thesis Publishers.
24. Liset van Dijk (1994). *Choices in child care. The distribution of child care among mothers, fathers and non parental care providers*. Amsterdam: Thesis Publishers.
25. Jos de Haan (1994). *Research groups in Dutch sociology*. Amsterdam: Thesis Publishers.
26. Kwasi Boahene (1995). *Innovation adoption as a socio economic process. The case of the Ghanaian cocoa industry*. Amsterdam: Thesis Publishers.
27. Paul E.M. Ligthart (1995). *Solidarity in economic transactions. An experimental study of framing effects in bargaining and contracting*. Amsterdam: Thesis Publishers.
28. Roger Th. A.J. Leenders (1995). *Structure and influence. Statistical models for the dynamics of actor attributes, network structure, and their interdependence*. Amsterdam: Thesis Publishers.
29. Beate Völker (1995). *Should auld acquaintance be forgot...? Institutions of communism, the transition to capitalism and personal networks: the case of East Germany*. Amsterdam: Thesis Publishers.
30. Anna M. Cancrinus Matthijsse (1995). *Tussen hulpverlening en ondernemerschap. Beroepsuitoefening en taakopvattingen van openbare apothekers in een aantal West Europese landen*. Amsterdam: Thesis Publishers.
31. Nardi Steverink (1996). *Zo lang mogelijk zelfstandig. Naar een verklaring van verschillen in oriëntatie ten aanzien van opname in een verzorgingstehuis onder fysiek kwetsbare ouderen*. Amsterdam: Thesis Publishers.
32. Ellen Lindeman (1996). *Participatie in vrijwilligerswerk*. Amsterdam: Thesis Publishers.
33. Chris Snijders (1996). *Trust and commitments*. Amsterdam: Thesis Publishers.
34. Koos Postma (1996). *Changing prejudice in Hungary. A study on the collapse of state socialism and its impact on prejudice against gypsies and Jews*. Amsterdam: Thesis Publishers.
35. Joeske T. van Busschbach (1996). *Uit het oog, uit het hart? Stabiliteit en verandering in persoonlijke relaties*. Amsterdam: Thesis Publishers.
36. René Torenvlied (1996). *Besluiten in uitvoering. Theorieën over beleidsuitvoering modelmatig getoetst op sociale vernieuwing in drie gemeenten*. Amsterdam: Thesis Publishers.
37. Andreas Flache (1996). *The double edge of networks. An analysis of the effect of informal networks on cooperation in social dilemmas*. Amsterdam: Thesis Publishers.
38. Kees van Veen (1997). *Inside an internal labor market: Formal rules, flexibility and career lines in a Dutch manufacturing company*. Amsterdam: Thesis Publishers.
39. Lucienne van Eijk (1997). *Activity and well being in the elderly*. Amsterdam: Thesis Publishers.
40. Róbert Gál (1997). *Unreliability. Contract discipline and contract governance under economic transition*. Amsterdam: Thesis Publishers.
41. Anne Geerte van de Goor (1997). *Effects of regulation on disability duration*. ICS-dissertation, Utrecht.
42. Boris Blumberg (1997). *Das Management von Technologiekooperationen. Partnersuche und Verhandlungen mit dem Partner aus empirisch theoretischer Perspektive*. ICS-dissertation, Utrecht.
43. Marijke von Bergh (1997). *Loopbanen van oudere werknemers*. Amsterdam: Thesis Publishers.



44. Anna Petra Nieboer (1997). *Life events and well being: A prospective study on changes in well being of elderly people due to a serious illness event or death of the spouse*. Amsterdam: Thesis Publishers.
45. Jacques Niehof (1997). *Resources and social reproduction: The effects of cultural and material resources on educational and occupational careers in industrial nations at the end of the twentieth century*. ICS-dissertation, Nijmegen.
46. Ariana Need (1997). *The kindred vote. Individual and family effects of social class and religion on electoral change in the Netherlands, 1956-1994*. ICS-dissertation, Nijmegen.
47. Jim Allen (1997). *Sector composition and the effect of education on wages: an international Comparison*. Amsterdam: Thesis Publishers.
48. Jack B.F. Hutten (1998). *Workload and provision of care in general practice. An empirical study of the relation between workload of Dutch general practitioners and the content and quality of their Care*. ICS-dissertation, Utrecht.
49. Per B. Kropp (1998). *Berufserfolg im Transformationsprozeß. Eine theoretisch empirische Studie über die Gewinner und Verlierer der Wende in Ostdeutschland*. ICS-dissertation, Utrecht.
50. Maarten H.J. Wolbers (1998). *Diploma inflatie en verdringing op de arbeidsmarkt. Een studie naar ontwikkelingen in de opbrengsten van diploma's in Nederland*. ICS-dissertation, Nijmegen.
51. Wilma Smeenk (1998). *Opportunity and marriage. The impact of individual resources and marriage market structure on first marriage timing and partner choice in the Netherlands*. ICS-dissertation, Nijmegen.
52. Marinus Spreen (1999). *Sampling personal network structures: Statistical inference in ego-graphs*. ICS-dissertation, Groningen.
53. Vincent Buskens (1999). *Social networks and trust*. ICS-dissertation, Utrecht.
54. Susanne Rijken (1999). *Educational expansion and status attainment. A cross-national and over-time comparison*. ICS-dissertation, Utrecht.
55. Mérove Gijsberts (1999). *The legitimization of inequality in state-socialist and market societies, 1987-1996*. ICS-dissertation, Utrecht.
56. Gerhard G. Van de Bunt (1999). *Friends by choice. An actor-oriented statistical network model for friendship networks through time*. ICS-dissertation, Groningen.
57. Robert Thomson (1999). *The party mandate: Election pledges and government actions in the Netherlands, 1986-1998*. Amsterdam: Thela Thesis.
58. Corine Baarda (1999). *Politieke besluiten en boeren beslissingen. Het draagvlak van het mestbeleid tot 2000*. ICS-dissertation, Groningen.
59. Rafael Wittek (1999). *Interdependence and informal control in organizations*. ICS-dissertation, Groningen.
60. Diane Payne (1999). *Policy making in the European Union: An analysis of the impact of the reform of the structural funds in Ireland*. ICS-dissertation, Groningen.
61. René Veenstra (1999). *Leerlingen-klassen-scholen. Prestaties en vorderingen van leerlingen in het voortgezet onderwijs*. Amsterdam, Thela Thesis.
62. Marjolein Achterkamp (1999). *Influence strategies in collective decision making. A comparison of two models*. ICS-dissertation, Groningen.
63. Peter Mühlau (2000). *The governance of the employment relation. A relational signaling perspective*. ICS-dissertation, Groningen.
64. Agnes Akkerman (2000). *Verdeelde vakbeweging en stakingen. Concurrentie om leden*. ICS-dissertation, Groningen.
65. Sandra van Thiel (2000). *Quangocratization: Trends, causes and consequences*. ICS-dissertation, Utrecht.
66. Rudi Turksema (2000). *Supply of day care*. ICS-dissertation, Utrecht.
67. Sylvia E. Korupp (2000). *Mothers and the process of social stratification*. ICS-dissertation, Utrecht.
68. Bernard A. Nijstad (2000). *How the group affects the mind: Effects of communication in idea generating groups*. ICS-dissertation, Utrecht.

69. Inge F. de Wolf (2000). *Opleidingspecialisatie en arbeidsmarktsucces van sociale wetenschappers*. ICS-dissertation, Utrecht.
70. Jan Kratzer (2001). *Communication and performance: An empirical study in innovation teams*. ICS-dissertation, Groningen.
71. Madelon Kroneman (2001). *Healthcare systems and hospital bed use*. ICS/NIVEL-dissertation, Utrecht.
72. Herman van de Werfhorst (2001). *Field of study and social inequality. Four types of educational resources in the process of stratification in the Netherlands*. ICS-dissertation, Nijmegen.
73. Tamás Bartus (2001). *Social capital and earnings inequalities. The role of informal job search in Hungary*. ICS-dissertation Groningen.
74. Hester Moerbeek (2001). *Friends and foes in the occupational career. The influence of sweet and sour social capital on the labour market*. ICS-dissertation, Nijmegen.
75. Marcel van Assen (2001). *Essays on actor perspectives in exchange networks and social dilemmas*. ICS-dissertation, Groningen.
76. Inge Sieben (2001). *Sibling similarities and social stratification. The impact of family background across countries and cohorts*. ICS-dissertation, Nijmegen.
77. Alinda van Bruggen (2001). *Individual production of social well being. An exploratory study*. ICS-dissertation, Groningen.
78. Marcel Coenders (2001). *Nationalistic attitudes and ethnic exclusionism in a comparative perspective: An empirical study of attitudes toward the country and ethnic immigrants in 22 countries*. ICS-dissertation, Nijmegen.
79. Marcel Lubbers (2001). *Exclusionistic electorates. Extreme right wing voting in Western Europe*. ICS-dissertation, Nijmegen.
80. Uwe Matzat (2001). *Social networks and cooperation in electronic communities. A theoretical-empirical analysis of academic communication and internet discussion groups*. ICS-dissertation, Groningen.
81. Jacques P.G. Janssen (2002). *Do opposites attract divorce? Dimensions of mixed marriage and the risk of divorce in the Netherlands*. ICS-dissertation, Nijmegen.
82. Miranda Jansen (2002). *Waardenoriëntaties en partnerrelaties. Een panelstudie naar wederzijdse invloeden*. ICS-dissertation, Utrecht.
83. Anne Rigt Poortman (2002). *Socioeconomic causes and consequences of divorce*. ICS-dissertation, Utrecht.
84. Alexander Gattig (2002). *Intertemporal decision making*. ICS-dissertation, Groningen.
85. Gerrit Rooks (2002). *Contract en conflict: Strategisch Management van Inkooptransacties*. ICS-dissertation, Utrecht.
86. Károly Takács (2002). *Social networks and intergroup conflict*. ICS-dissertation, Groningen.
87. Thomas Gautschi (2002). *Trust and exchange, effects of temporal embeddedness and network embeddedness on providing and dividing a surplus*. ICS-dissertation, Utrecht.
88. Hilde Bras (2002). *Zeeuwse meiden. Dienen in de levensloop van vrouwen, ca. 1850-1950*. Aksant Academic Publishers, Amsterdam.
89. Merijn Rengers (2002). *Economic lives of artists. Studies into careers and the labour market in the cultural sector*. ICS-dissertation, Utrecht.
90. Annelies Kassenberg (2002). *Wat scholieren bindt. Sociale gemeenschap in scholen*. ICS-dissertation, Groningen.
91. Marc Verboord (2003). *Moet de meester dalen of de leerling klimmen? De invloed van literatuuronderwijs en ouders op het lezen van boeken tussen 1975 en 2000*. ICS-dissertation, Utrecht.
92. Marcel van Egmond (2003). *Rain falls on all of us (but some manage to get more wet than others): Political context and electoral participation*. ICS-dissertation, Nijmegen.
93. Justine Horgan (2003). *High performance human resource management in Ireland and the Netherlands: Adoption and effectiveness*. ICS-dissertation, Groningen.

94. Corine Hoeben (2003). *LETS' be a community. Community in Local Exchange Trading Systems*. ICS-dissertation, Groningen.
95. Christian Steglich (2003). *The framing of decision situations. Automatic goal selection and rational goal pursuit*. ICS-dissertation, Groningen.
96. Johan van Wilsem (2003). *Crime and context. The impact of individual, neighborhood, city and country characteristics on victimization*. ICS-dissertation, Nijmegen.
97. Christiaan Monden (2003). *Education, inequality and health. The impact of partners and life course*. ICS-dissertation, Nijmegen.
98. Evelyn Hello (2003). *Educational attainment and ethnic attitudes. How to explain their relationship*. ICS-dissertation, Nijmegen.
99. Marnix Croes en Peter Tammes (2004). *Gif laten wij niet voortbestaan. Een onderzoek naar de overlevingskansen van joden in de Nederlandse gemeenten, 1940-1945*. Aksant Academic Publishers, Amsterdam.
100. Ineke Nagel (2004). *Cultuurdeelname in de levensloop*. ICS-dissertation, Utrecht.
101. Marieke van der Wal (2004). *Competencies to participate in life. Measurement and the impact of school*. ICS-dissertation, Groningen.
102. Vivian Meertens (2004). *Depressive symptoms in the general population: a multifactorial social approach*. ICS-dissertation, Nijmegen.
103. Hanneke Schuurmans (2004). *Promoting well-being in frail elderly people. Theory and intervention*. ICS-dissertation, Groningen.
104. Javier Arregui (2004). *Negotiation in legislative decision-making in the European Union*. ICS-dissertation, Groningen.
105. Tamar Fischer (2004). *Parental divorce, conflict and resources. The effects on children's behaviour problems, socioeconomic attainment, and transitions in the demographic career*. ICS-dissertation, Nijmegen.
106. René Bekkers (2004). *Giving and volunteering in the Netherlands: Sociological and psychological perspectives*. ICS-dissertation, Utrecht.
107. Renée van der Hulst (2004). *Gender differences in workplace authority: An empirical study on social networks*. ICS-dissertation, Groningen.
108. Rita Smaniotto (2004). *'You scratch my back and I scratch yours' versus 'Love Thy neighbour'. Two proximate mechanisms of reciprocal altruism*. ICS-dissertation, Groningen.
109. Maurice Gesthuizen (2004). *The life-course of the low-educated in the Netherlands: Social and economic risks*. ICS-dissertation, Nijmegen.
110. Carljine Philips (2005). *Vakantiegemeenschappen. Kwalitatief en kwantitatief onderzoek naar gelegenheid en refreshergemeenschap tijdens de vakantie*. ICS-dissertation, Groningen.
111. Esther de Ruijter (2005). *Household outsourcing*. ICS-dissertation, Utrecht.
112. Frank van Tubergen (2005). *The integration of immigrants in cross-national perspective: Origin, destination, and community effects*. ICS-dissertation, Utrecht.
113. Ferry Koster (2005). *For the time being. Accounting for inconclusive findings concerning the effects of temporary employment relationships on solidary behavior of employees*. ICS-dissertation, Groningen.
114. Carolien Klein Haarhuis (2005). *Promoting anti-corruption reforms. Evaluating the implementation of a World Bank anti-corruption program in seven African countries (1999-2001)*. ICS-dissertation, Utrecht.
115. Martin van der Gaag (2005). *Measurement of individual social capital*. ICS-dissertation, Groningen.
116. Johan Hansen (2005). *Shaping careers of men and women in organizational contexts*. ICS-dissertation, Utrecht.
117. Davide Barrera (2005). *Trust in embedded settings*. ICS-dissertation, Utrecht.
118. Mattijs Lambooi (2005). *Promoting cooperation. Studies into the effects of long-term and short-term rewards on cooperation of employees*. ICS-dissertation, Utrecht.

119. Lotte Vermeij (2006). *What's cooking? Cultural boundaries among Dutch teenagers of different ethnic origins in the context of school*. ICS-dissertation, Utrecht.
120. Mathilde Strating (2006). *Facing the challenge of rheumatoid arthritis. A 13-year prospective study among patients and a cross-sectional study among their partners*. ICS-dissertation, Groningen.
121. Jannes de Vries (2006). *Measurement error in family background variables: The bias in the intergenerational transmission of status, cultural consumption, party preference, and religiosity*. ICS-dissertation, Nijmegen.
122. Stefan Thau (2006). *Workplace deviance: Four studies on employee motives and self-regulation*. ICS-dissertation, Groningen.
123. Mirjam Plantinga (2006). *Employee motivation and employee performance in child care. The effects of the introduction of market forces on employees in the Dutch child-care sector*. ICS-dissertation, Groningen.
124. Helga de Valk (2006). *Pathways into adulthood. A comparative study on family life transitions among migrant and Dutch Youth*. ICS-dissertation, Utrecht.
125. Henrike Elzen (2006). *Self-management for chronically ill older people*. ICS-Dissertation, Groningen.
126. Ayse Güveli (2007). *New social classes within the service class in the Netherlands and Britain. Adjusting the EGP class schema for the technocrats and the social and cultural specialists*. ICS-dissertation, Nijmegen.
127. Willem-Jan Verhoeven (2007). *Income attainment in post-communist societies*. ICS-dissertation, Utrecht.
128. Marieke Voorpostel (2007). *Sibling support: The exchange of help among brothers and sisters in the Netherlands*. ICS-dissertation, Utrecht.
129. Jacob Dijkstra (2007). *The effects of externalities on partner choice and payoffs in exchange networks*. ICS-dissertation, Groningen.
130. Patricia van Echtelt (2007). *Time-greedy employment relationships: Four studies on the time claims of post-Fordist work*. ICS-dissertation, Groningen.
131. Sonja Vogt (2007). *Heterogeneity in social dilemmas: The case of social support*. ICS-dissertation, Utrecht.
132. Michael Schweinberger (2007). *Statistical methods for studying the evolution of networks and behavior*. ICS-dissertation, Groningen.
133. István Back (2007). *Commitment and evolution: Connecting emotion and reason in long-term relationships*. ICS-dissertation, Groningen.
134. Ruben van Gaalen (2007). *Solidarity and ambivalence in parent-child relationships*. ICS-dissertation, Utrecht.
135. Jan Reitsma (2007). *Religiosity and solidarity – Dimensions and relationships disentangled and tested*. ICS-dissertation, Nijmegen.
136. Jan Kornelis Dijkstra (2007). *Status and affection among (pre)adolescents and their relation with antisocial and prosocial behavior*. ICS-dissertation, Groningen.
137. Wouter van Gils (2007). *Full-time working couples in the Netherlands. Causes and consequences*. ICS-dissertation, Nijmegen.
138. Djamila Schans (2007). *Ethnic diversity in intergenerational solidarity*. ICS-dissertation, Utrecht.
139. Ruud van der Meulen (2007). *Brug over woelig water: Lidmaatschap van sportverenigingen, vriendschappen, kennissenkringen en veralgemeend vertrouwen*. ICS-dissertation, Nijmegen.
140. Andrea Knecht (2008). *Friendship selection and friends' influence. Dynamics of networks and actor attributes in early adolescence*. ICS-dissertation, Utrecht.
141. Ingrid Doorten (2008). *The division of unpaid work in the household: A stubborn pattern?* ICS-dissertation, Utrecht.
142. Stijn Ruiter (2008). *Association in context and association as context: Causes and consequences of voluntary association involvement*. ICS-dissertation, Nijmegen.
143. Janneke Joly (2008). *People on our minds: When humanized contexts activate social norms*. ICS-dissertation, Groningen.

144. Margreet Frieling (2008). *'Joint production' als motor voor actief burgerschap in de buurt*. ICS-dissertation, Groningen.
145. Ellen Verbakel (2008). *The partner as resource or restriction? Labour market careers of husbands and wives and the consequences for inequality between couples*. ICS-dissertation, Nijmegen.
146. Gijs van Houten (2008). *Beleidsuitvoering in gelaagde stelsels. De doorwerking van aanbevelingen van de Stichting van de Arbeid in het CAO-overleg*. ICS-dissertation, Utrecht.
147. Eva Jaspers (2008). *Intolerance over time. Macro and micro level questions on attitudes towards euthanasia, homosexuality and ethnic minorities*. ICS-dissertation, Nijmegen.
148. Gijs Weijters (2008). *Youth delinquency in Dutch cities and schools: A multilevel approach*. ICS-dissertation, Nijmegen.
149. Jessica Pass (2009). *The self in social rejection*. ICS-dissertation, Groningen.
150. Gerald Mollenhorst (2009). *Networks in contexts. How meeting opportunities affect personal relationships*. ICS-dissertation, Utrecht.
151. Tom van der Meer (2009). *States of freely associating citizens: Comparative studies into the impact of state institutions on social, civic and political participation*. ICS-dissertation, Nijmegen.
152. Manuela Vieth (2009). *Commitments and reciprocity in trust situations. Experimental studies on obligation, indignation, and self-consistency*. ICS-dissertation, Utrecht.
153. Rense Corten (2009). *Co-evolution of social networks and behavior in social dilemmas: Theoretical and empirical perspectives*. ICS-dissertation, Utrecht.
154. Arieke J. Rijken (2009). *Happy families, high fertility? Childbearing choices in the context of family and partner relationships*. ICS-dissertation, Utrecht.
155. Jochem Tolsma (2009). *Ethnic hostility among ethnic majority and minority groups in the Netherlands. An investigation into the impact of social mobility experiences, the local living environment and educational attainment on ethnic hostility*. ICS-dissertation, Nijmegen.
156. Freek Bux (2009). *Linked lives: Young adults' life course and relations with parents*. ICS-dissertation, Utrecht.
157. Philip Wotschack (2009). *Household governance and time allocation. Four studies on the combination of work and care*. ICS-dissertation, Groningen.
158. Nienke Moor (2009). *Explaining worldwide religious diversity. The relationship between subsistence technologies and ideas about the unknown in pre-industrial and (post-) industrial societies*. ICS-dissertation, Nijmegen.
159. Lieke ten Brummelhuis (2009). *Family matters at work. Depleting and enriching effects of employees' family lives on work outcomes*. ICS-dissertation, Utrecht.
160. Renske Keizer (2010). *Remaining childless. Causes and consequences from a life Course Perspective*. ICS-dissertation, Utrecht.
161. Miranda Sentse (2010). *Bridging contexts: The interplay between family, child, and peers in explaining problem behavior in early adolescence*. ICS-dissertation, Groningen.
162. Nicole Tieben (2010). *Transitions, tracks and transformations. Social inequality in transitions into, through and out of secondary education in the Netherlands for cohorts born between 1914 and 1985*. ICS-dissertation, Nijmegen.
163. Birgit Pauksztat (2010). *Speaking up in organizations: Four studies on employee voice*. ICS-dissertation, Groningen.
164. Richard Zijdeman (2010). *Status attainment in the Netherlands, 1811-1941. Spatial and temporal variation before and during industrialization*. ICS-dissertation, Utrecht.
165. Rianne Kloosterman (2010). *Social background and children's educational careers. The and secondary effects of social background over transitions and over time in the Netherlands*. ICS-dissertation, Nijmegen.
166. Olav Aarts (2010). *Religious diversity and religious involvement. A study of religious markets in Western societies at the end of the twentieth century*. ICS-dissertation, Nijmegen.
167. Stephanie Wiesmann (2010). *24/7 Negotiation in couples transition to parenthood*. ICS-dissertation, Utrecht.

168. Borja Martinovic (2010). *Interethnic contacts: A dynamic analysis of interaction between immigrants and natives in Western countries*. ICS-dissertation, Utrecht.
169. Anne Roeters (2010). *Family life under pressure? Parents' paid work and the quantity and quality of parent-child and family time*. ICS-dissertation, Utrecht.
170. Jelle Sijtsema (2010). *Adolescent aggressive behavior: Status and stimulation goals in relation to the peer context*. ICS-dissertation, Groningen.
171. Kees Keizer (2010). *The spreading of disorder*. ICS-dissertation, Groningen.
172. Michael Mäs (2010). *The diversity puzzle. Explaining clustering and polarization of opinions*. ICS-dissertation, Groningen.
173. Marie-Louise Damen (2010). *Cultuurdeelname en CKV. Studies naar effecten van kunsteducatie op de cultuurdeelname van leerlingen tijdens en na het voortgezet onderwijs*. ICS-dissertation, Utrecht.
174. Marieke van de Rakt (2011). *Two generations of crime: The intergenerational transmission of convictions over the life course*. ICS-dissertation, Nijmegen.
175. Willem Huijnk (2011). *Family life and ethnic attitudes. The role of the family for attitudes towards intermarriage and acculturation among minority and majority groups*. ICS-dissertation, Utrecht.
176. Tim Huijts (2011). *Social ties and health in Europe. Individual associations, cross-national variations, and contextual explanations*. ICS-dissertation, Nijmegen.
177. Wouter Steenbeek (2011). *Social and physical Disorder. How community, business presence and entrepreneurs influence disorder in Dutch neighborhoods*. ICS-dissertation, Utrecht.
178. Miranda Vervoort (2011). *Living together apart? Ethnic concentration in the neighborhood and ethnic minorities' social contacts and language practices*. ICS-dissertation, Utrecht.
179. Agnieszka Kanas (2011). *The economic performance of immigrants. The role of human and social capital*. ICS-dissertation, Utrecht.
180. Lea Ellwardt (2011). *Gossip in organizations. A social network study*. ICS-dissertation, Groningen.
181. Annemarije Oosterwaal (2011). *The gap between decision and implementation. Decision making, delegation and compliance in governmental and organizational settings*. ICS-dissertation, Utrecht.
182. Natascha Notten (2011). *Parents and the media. Causes and consequences of parental media socialization*. ICS-dissertation, Nijmegen.
183. Tobias Stark (2011). *Integration in schools. A process perspective on students' interethnic attitudes and interpersonal relationships*. ICS-dissertation, Groningen.
184. Giedo Jansen (2011). *Social cleavages and political choices. Large-scale comparisons of social class, religion and voting behavior in Western democracies*. ICS-dissertation, Nijmegen.
185. Ruud van der Horst (2011). *Network effects on treatment results in a closed forensic psychiatric setting*. ICS-dissertation, Groningen.
186. Mark Levels (2011). *Abortion laws in European countries between 1960 and 2010. Legislative developments and their consequences for women's reproductive decision-making*. ICS-dissertation, Nijmegen.
187. Marieke van Londen (2012). *Exclusion of ethnic minorities in the Netherlands. The effects of individual and situational characteristics on opposition to ethnic policy and ethnically mixed neighbourhoods*. ICS-dissertation, Nijmegen.
188. Sigrid M. Mohnen (2012). *Neighborhood context and health: How neighborhood social capital affects individual health*. ICS-dissertation, Utrecht.
189. Asya Zhelyazkova (2012). *Compliance under controversy: analysis of the transposition of European directives and their provisions*. ICS-dissertation, Utrecht.
190. Valeska Korff (2012). *Between cause and control: Management in a humanitarian organization*. ICS-dissertation, Groningen.
191. Maike Gieling (2012). *Dealing with diversity: Adolescents' support for civil liberties and immigrant rights*. ICS-dissertation, Utrecht.
192. Katya Ivanova (2012). *From parents to partners: The impact of family on romantic relationships in adolescence and emerging adulthood*. ICS-dissertation, Groningen.



193. Jelmer Schalk (2012). *The performance of public corporate actors: Essays on effects of institutional and network embeddedness in supranational, national, and local collaborative contexts*. ICS-dissertation, Utrecht.
194. Alona Labun (2012). *Social networks and informal power in organizations*. ICS-dissertation, Groningen.
195. Michal Bojanowski (2012). *Essays on social network formation in heterogeneous populations: Models, methods, and empirical analyses*. ICS-dissertation, Utrecht.
196. Anca Minescu (2012). *Relative group position and intergroup attitudes in Russia*. ICS-dissertation, Utrecht.
197. Marieke van Schellen (2012). *Marriage and crime over the life course. The criminal careers of convicts and their spouses*. ICS-dissertation, Utrecht.
198. Mieke Maliepaard (2012). *Religious trends and social integration: Muslim minorities in the Netherlands*. ICS-dissertation, Utrecht.
199. Fransje Smits (2012). *Turks and Moroccans in the Low Countries around the year 2000: Determinants of religiosity, trend in religiosity and determinants of the trend*. ICS-dissertation, Nijmegen.
200. Roderick Sluiter (2012). *The diffusion of morality policies among Western European countries between 1960 and 2010. A comparison of temporal and spatial diffusion patterns of six morality and eleven non-morality policies*. ICS-dissertation, Nijmegen.
201. Nicoletta Balbo (2012). *Family, friends and fertility*. ICS-dissertation, Groningen.
202. Anke Munniksma (2013). *Crossing ethnic boundaries: Parental resistance to and consequences of adolescents' cross-ethnic peer relations*. ICS-dissertation, Groningen.
203. Anja Abendroth (2013). *Working women in Europe. How the country, workplace, and family context matter*. ICS-dissertation, Utrecht.
204. Katia Begall (2013). *Occupational hazard? The relationship between working conditions and fertility*. ICS-dissertation, Groningen.
205. Hidde Bekhuis (2013). *The popularity of domestic cultural products: Cross-national differences and the relation to globalization*. ICS-dissertation, Utrecht.
206. Lieselotte Blommaert (2013). *Are Joris and Renske more employable than Rashid and Samira? A study on the prevalence and sources of ethnic discrimination in recruitment in the Netherlands using experimental and survey data*. ICS-dissertation, Utrecht.
207. Wiebke Schulz (2013). *Careers of men and women in the 19th and 20th centuries*. ICS-dissertation, Utrecht.
208. Ozan Aksoy (2013). *Essays on social preferences and beliefs in non-embedded social dilemmas*. ICS-dissertation, Utrecht.
209. Dominik Morbitzer (2013). *Limited farsightedness in network formation*. ICS-dissertation, Utrecht.
210. Thomas de Vroome (2013). *Earning your place: The relation between immigrants' economic and psychological integration in the Netherlands*. ICS-dissertation, Utrecht.
211. Marloes de Lange (2013). *Causes and consequences of employment flexibility among young people. Recent developments in the Netherlands and Europe*. ICS-dissertation, Nijmegen.
212. Roza Meuleman (2014). *Consuming the nation. Domestic cultural consumption: its stratification and relation with nationalist attitudes*. ICS-dissertation, Utrecht.
213. Esther Havekes (2014). *Putting interethnic attitudes in context. The relationship between neighbourhood characteristics, interethnic attitudes and residential behaviour*. ICS-dissertation, Utrecht.
214. Zoltán Lippényi (2014). *Transitions toward an open society? Intergenerational occupational mobility in Hungary in the 19th and 20th centuries*. ICS-dissertation, Utrecht.
215. Anouk Smeekes (2014). *The presence of the past: Historical rooting of national identity and current group dynamics*. ICS-dissertation, Utrecht.
216. Michael Savelkoul (2014). *Ethnic diversity and social capital. Testing underlying explanations derived from conflict and contact theories in Europe and the United States*. ICS-dissertation, Nijmegen.

217. Martijn Hogerbrugge (2014). *Misfortune and family: How negative events, family ties, and lives are linked*. ICS-dissertation, Utrecht.
218. Gina Potarca (2014). *Modern love. Comparative insights in online dating preferences and assortative mating*. ICS-dissertation, Groningen.
219. Mariska van der Horst (2014). *Gender, aspirations, and achievements: Relating work and family aspirations to occupational outcomes*. ICS-dissertation, Utrecht.
220. Gijs Huitsing (2014). *A social network perspective on bullying*. ICS dissertation, Groningen.
221. Thomas Kowalewski (2015). *Personal growth in organizational contexts*. ICS-dissertation, Groningen.
222. Manu Muñoz-Herrera (2015). *The impact of individual differences on network relations: Social exclusion and inequality in productive exchange and coordination games*. ICS-dissertation, Groningen.
223. Tim Immerzeel (2015). *Voting for a change. The democratic lure of populist radical right parties in voting behavior*. ICS-dissertation, Utrecht.
224. Fernando Nieto Morales (2015). *The control imperative: Studies on reorganization in the public and private sectors*. ICS-dissertation, Groningen.
225. Jellie Sierksma (2015). *Bounded helping: How morality and intergroup relations shape children's reasoning about helping*. ICS-dissertation, Utrecht.
226. Tinka Veldhuis (2015). *Captivated by fear. An evaluation of terrorism detention policy*. ICS-dissertation, Groningen.
227. Miranda Visser (2015). *Loyalty in humanity. Turnover among expatriate humanitarian aid workers*. ICS-dissertation, Groningen.
228. Sarah Westphal (2015). *Are the kids alright? Essays on postdivorce residence arrangements and children's well-being*. ICS-dissertation, Utrecht.
229. Britta Rüschoff (2015). *Peers in careers: Peer relationships in the transition from school to work*. ICS-dissertation, Groningen.
230. Nynke van Miltenburg. (2015). *Cooperation under peer sanctioning institutions: Collective decisions, noise, and endogenous implementation*. ICS-dissertation, Utrecht.
231. Antonie Knigge (2015). *Sources of sibling similarity. Status attainment in the Netherlands during modernization*. ICS-dissertation, Utrecht.
232. Sanne Smith (2015). *Ethnic segregation in friendship networks. Studies of its determinants in English, German, Dutch, and Swedish school classes*. ICS-dissertation, Utrecht.
233. Patrick Präg (2015). *Social stratification and health. Four essays on social determinants of health and wellbeing*. ICS-dissertation, Groningen.
234. Wike Been (2015). *European top managers' support for work-life arrangements*. ICS- dissertation, Utrecht.
235. André Grow (2016). *Status differentiation: New insights from agent-based modeling and social network analysis*. ICS-dissertation, Groningen.
236. Jesper Rözer (2016). *Family and personal networks. How a partner and children affect social relationships*. ICS-dissertation, Utrecht.
237. Kim Pattiselanno (2016). *At your own risk: The importance of group dynamics and peer processes in adolescent peer groups for adolescents' involvement in risk behaviors*. ICS- dissertation, Groningen.
238. Vincenz Frey (2016). *Network formation and trust*. ICS-dissertation, Utrecht.
239. Rozemarijn van der Ploeg (2016). *Be a buddy, not a bully? Four studies on social and emotional processes related to bullying, defending, and victimization*. ICS-dissertation, Groningen.
240. Tali Spiegel (2016). *Identity, career trajectories and wellbeing: A closer look at individuals with degenerative eye conditions*. ICS- dissertation, Groningen.
241. Felix Tropf (2016). *Social Science Genetics and Fertility*. ICS-dissertation, Groningen.
242. Sara Geven (2016). *Adolescent problem behavior in school: the role of peer networks*. ICS dissertation, Utrecht.



