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## **Birds of a feather ... Selection and socialization processes in youths' social networks**

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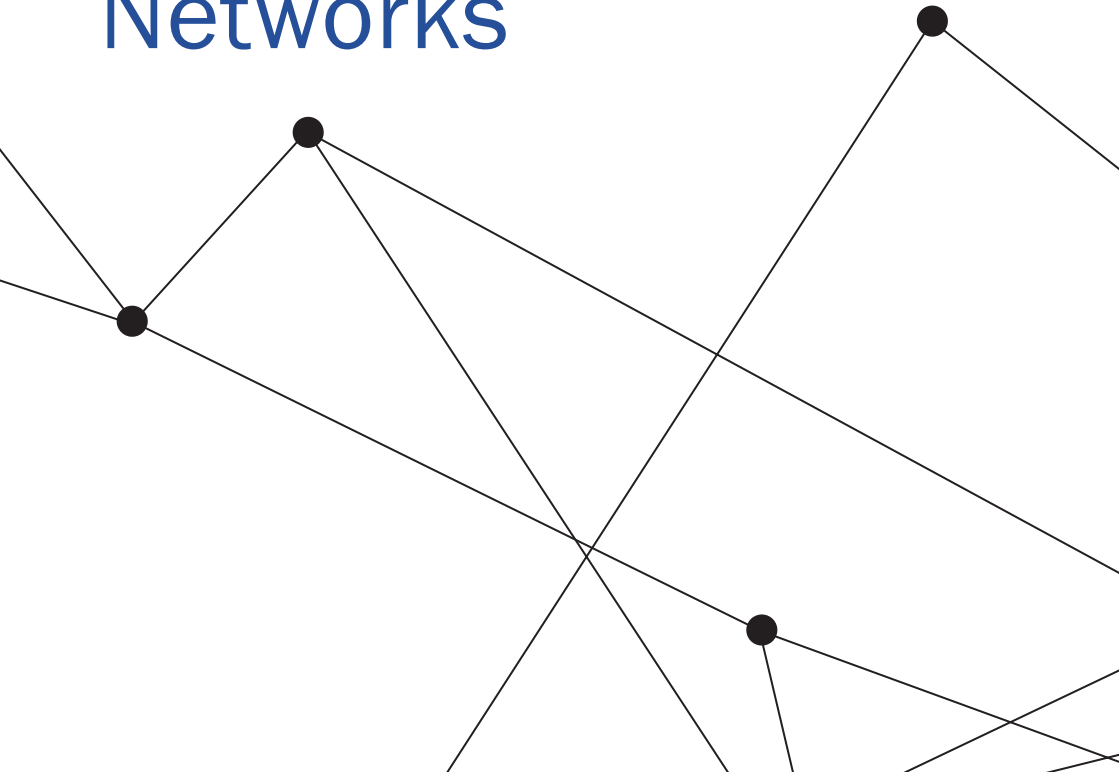
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Janna Fortuin

# Birds of a feather...

## Selection and Socialization Processes in Youths' Social Networks



Janna Fortuin

**Birds of a feather...**  
Selection and  
Socialization  
Processes in  
Youths' Social  
Networks

## **Colophon**

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# **Birds of a feather....?**

## **Selection and Socialization Processes in Youths' Social Networks**

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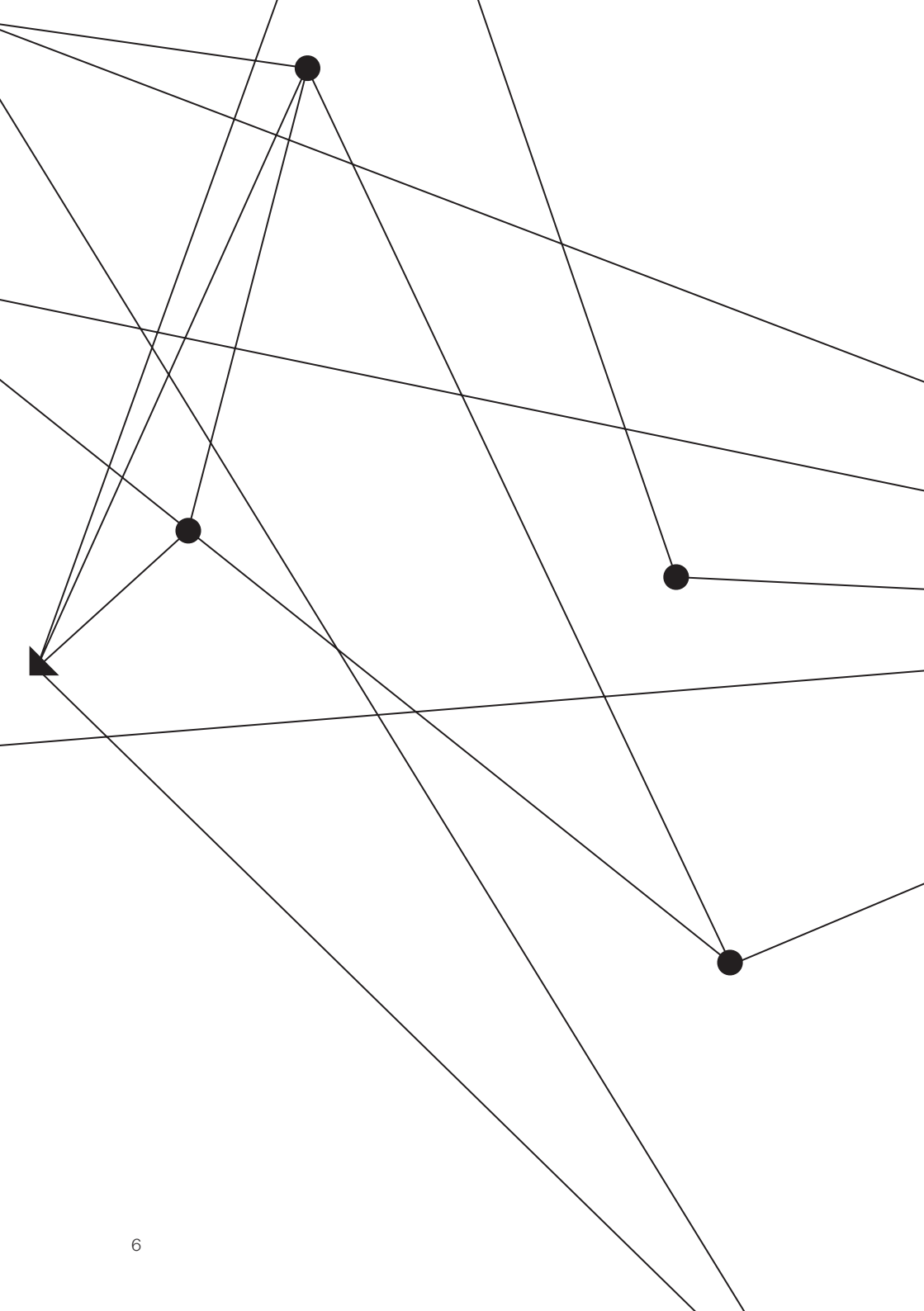
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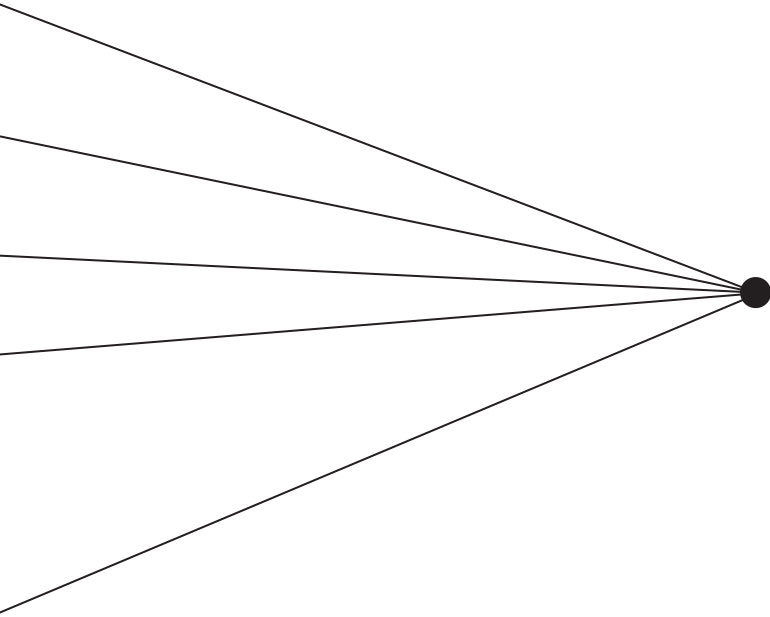
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# CHAPTER 1

# Introduction



The studies in this thesis focus on factors that both influence peer relationships and are influenced by peer relationships. Although we focus on the school context, it is possible that these factors are also important beyond school in students' future lives. Peer relationships are essential for children and adolescents: developing and maintaining peer relationships is a prime developmental task (Masten & Coatsworth, 1998). Through (peer) relationships, children and adolescents learn and practice age-appropriate social skills, experience group bonding, and develop a sense of identity by both identifying with and differentiating themselves from others (Vedder & Van Geel, in press). Peer contacts allow children and adolescents to experiment with a variety of alternative behaviors, and to experience the effects of such behaviors on others as well as on themselves (Kwon & Lease, 2014; Ladd, 2005). The focus of this thesis is on factors that determine with whom adolescents make contact (also known as selection factors), and on the effects of peer contacts (also known as socialization factors) on these factors.

## **1 Homophily, Selection and Socialization**

During adolescence, the importance of peer relations is often assumed to increase while the relative influence of parents and teachers decreases (Masten, Juvonen, & Spatzier, 2009). The peer group becomes more influential, at least with respect to specific functions like developing social competence and intimate relationships (Rice & Mulkeen, 1995). Given the importance of peer relationships, researchers have studied not just their role in the development of social competence, but also to what extent peer relationships impact other aspects of young people's lives, such as their cognitive and academic development and psychological wellbeing (Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006; Ryan, 2000). Likewise, researchers have wondered whether adolescents' choices to start, maintain or end relationships with peers are formed on the basis of particular manifestations of their development (specifically, certain behaviors or characteristics), or whether such choices depend on opportunity. If behaviors and characteristics do play a role in relationship choices, the question is which

behaviors and characteristics (Fortuin, Van Geel, & Vedder, 2015)? A quality that may influence adolescents' choices about starting, maintaining, or ending relationships is similarity between the adolescents and peers; a phenomenon also referred to as homophily (e.g., Mercer & DeRosier, 2010). Being or becoming similar with regard to characteristics (that matter to adolescents) contributes to mutual acceptance and popularity (Laursen, Hafen, Kerr, & Stattin, 2012). Friends tend to be alike on many characteristics such as ethnic background (Kupersmidt, DeRosier, & Patterson, 1995; Moody, 2001), age and sex (McPherson, Smith-Lovin, & Cook, 2001) academic achievement (Kiuru, Nurmi, Aunola, & Salmela-Aro, 2009, Wentzel, Barry, & Caldwell, 2004), academic focus (Barth, Dunlap, Dane, Lochman, & Wells, 2004), achievement motivation (Hafen, Laursen, Burk, Kerr, & Stattin, 2011; Ryan, 2000), deviant behavior (Berndt & Keefe, 1995; Jaccard, Blanton, & Dodge, 2005), delinquency (Burk, Kerr, & Stattin, 2008; Hafen et al., 2011), alcohol use (Knecht, Burk, Weesie, & Steglich, 2011), and depressive symptoms (Kiuru, Burk, Laursen, Nurmi, & Salmela-Aro, 2012; Van Zalk, Kerr, Branje, Stattin, & Meeus, 2010).

In this thesis, we focus on characteristics that have specific relevance for school success; that is, characteristics that might predict the selection of peers within school and those that might hinder or stimulate developments relevant for students' school careers. We begin by focusing on interethnic contact. This characteristic is deemed so important for student interaction and students' future that schools are being stipulated by law to take this characteristic carefully into consideration (e.g., Besluit vernieuwde kerndoelen Wet Primair Onderwijs, 2015; [http://wetten.overheid.nl/BWBR0018844/geldigheidsdatum\\_29-10-2015](http://wetten.overheid.nl/BWBR0018844/geldigheidsdatum_29-10-2015)). Students grow up in a multicultural society and thus need to learn about cultural diversity. Schools can contribute to social integration, social cohesion and respect for cultural diversity in society (Berlet et al., 2008). It has even been suggested that schools are the most important context for establishing social cohesion and for preparing students for participation in a multicultural society (Masson & Verkuyten, 1993).

An important characteristic of social cohesion and participation is the focus of chapter two, viz. positive interethnic contact between students in a classroom. Interethnic contact has been found to be effective in reducing intergroup prejudice (Beelmann & Heinemann, 2014; Pettigrew & Tropp, 2006). However, many studies have found that merely being in the same classroom is not enough to establish interethnic contact; oftentimes, students prefer to have contact with students of similar ethnic backgrounds (Kupersmidt et al., 1995; Moody, 2001). In the study in Chapter 2 we focus on a distinction between majority and minority students, firstly because there are often too few students of a particular immigrant background (e.g., Turkish, Moroccan, and Surinamese) in a classroom to allow for meaningful analyses of intra-ethnic contact in these groups. Secondly majority members' prejudice towards ethnic minorities emerges at a young age when they do not or hardly distinguish between specific ethnic groups, while ethnic minorities' prejudice towards the ethnic majority begins generally much later but referring to the same common majority group, when they are adolescents (Raabe & Beelmann, 2011). A possible explanation may be that for ethnic minority children, contact with ethnic majority children in and through school may provide valuable cultural learning opportunities, needed to participate successfully in the majority culture (Horenczyk & Tatar, 1998). Thus while we cannot analyze every form of intra-ethnic contact, we do address what is arguably the most important ethnic division in the classroom, and we analyze this for friendship and more casual contacts. It is important to note that we do not test the underlying mechanisms that could explain *why* children prefer or do not prefer same ethnic friendships. However, potential mechanisms that may explain ethnic homophily include hidden homophily (McPherson, Smith-Lovin, & Cook, 2001), which suggests that people who share an ethnicity also share other traits such as values, attitudes and tastes, making it easier for them to become friends. Another potential mechanism to explain ethnic homophily is *aversive racism* (Gaertner & Dovidion, 1986; Dovidio & Gaertner, 2004,) that is, that people today hold an egalitarian set of values, but still feel (unconscious) negative attitudes towards people of other ethnicities. Though the egalitarian values may prohibit blatant acts of discrimination, negative

attitudes may subtly influence behavior, and may make interethnic friendship less likely.

In our second study (chapter three), we focused on characteristics that are more specifically akin to students' school lives, viz., students' academic achievements. Although students in peer networks have previously been found to be similar in academic achievement (Chen, Chang, & He, 2003; Kiuru et al., 2009; Kurdek & Sinclair, 2000; Liu & Chen, 2003, Wentzel et al., 2004), academic focus (Barth et al., 2004), and the values they attach to academic standards (Rydell Altermatt & Pomerantz, 2003), little is known about why students are similar with regard to academic achievement. In this study, we address socialization and selection as two possible explanations. Again, we do not propose to study the underlying mechanisms, but it is known that adolescents social groups often have their own set of values, and some groups of friends may favor learning, good grades and a compliant attitude towards the teacher, whereas other social groups promote rule breaking behavior, deviancy against adult standards, and do not value school achievement. Such peer groups may use a variety of mechanisms, such as teasing or direct confrontation, to ensure that members adhere to the rules of the social group (England & Petro, 1998; Portes & Zhou, 1993). In our study, we determine whether similarity in academic achievement is the result of selection or socialization processes.

In our last study (chapter four) we focus on similarity between peers on internalizing and externalizing problem behavior. Problem behaviors frequently lead to expulsion or suspensions (Coskun, Van Geel, & Vedder, 2015); thus, it important in the light of educational attainment to describe the role of peers as regards these types of problem behaviors. Similarity of peers with regard to externalizing behaviors (e.g., Burk et al., 2008; Burk, Steglich, & Snijders, 2007; Steglich, Snijders, & West, 2006; Svensson, Burk, Stattin, & Kerr, 2012; Urberg, Degirmencioglu, & Tolson, 1998; Weerman, 2011) and internalizing behaviors (e.g., Kiuru et al., 2012; Reitz, Dekovic, Meijer, & Engels, 2006; Stevens & Prinstein, 2005) have previously been reported.

Similarities in externalizing behaviors may be explained using the differential association theory (Matsueda, 2001), which states that individuals in a group with a favorable attitude towards problematic behaviors, will have access to opportunities to learn and use such behaviors. Hirschi (1969) suggests that adolescents with weak ties to society and conventional institutions may engage in antisocial behaviors, and select like-minded friends. Dishion and Dodge (2005) suggest that adolescents' antisocial behavior will increase as a result of peer approval expressed when adolescents share, discuss or plan aggressive and antisocial behaviors. Similarities in internalizing behavior may be explained by co-rumination. Co-rumination refers to the excessive discussion of problems between peers. It may simultaneously strengthen friendships, and contribute to an increase in internalizing problems (Rose, 2002; Rose, Carlson, & Waller, 2007). Withdrawal and avoidance have been suggested as other explanations for the similarity of peer groups in terms of internalizing problems (Schaefer, Kornieko, & Fox, 2011). Avoidance here refers to a process wherein adolescents tend not to befriend peers with a certain characteristic (for example internalizing problems), whereas withdrawal here refers to a process wherein adolescents with a certain characteristic tend to withdraw themselves from a group of peers. Because adolescents with internalizing (or externalizing) problems may be avoided by, or withdraw themselves from groups of dissimilar peers, they may eventually be left with a group of peers that are similar in terms of problem behavior. In this study, we test selection, socialization, avoidance and withdrawal as possible explanations for similarity in both internalizing and externalizing problems.

The aim of the studies described in this thesis is to explore which of these characteristics function as *selection* factors for peer relations and which characteristics are *influenced* by the peer group. These two effects, known respectively as selection and socialization, have been the source of debate about the similarity of friends. If adolescents form a group sharing characteristics, how did this shared similarity between the adolescents come about? Adolescents who were already alike could select one another, and

by doing so a homogeneous peer group would be established (Kadushin, 2012). This effect is defined as selection. If peers influence one another to become more alike with respect to particular behaviors or characteristics, the end result is also a peer group which will become more homogeneous over time, as regards those behaviors and characteristics. This effect is known as socialization. Kandel (1978) was one of the first researchers to differentiate between selection and socialization. Both effects, and specifically the interplay between selection and socialization, are important in studying the peer context. Other researchers have conceptualized individuals as agents that actively create their own social context (e.g., Scarr & McCartney, 1983). In this way, students both define their context by selecting peers and in turn are influenced by said contexts. In our first study, on ethnic background, we studied solely selection effects, because ethnic background is a given characteristic not prone to socialization. In our second study, on academic achievement, we studied both selection and socialization. In our third study, on internalizing and externalizing problem behavior, we studied selection, socialization, avoidance and withdrawal. We found no studies reporting students being rejected by peers on the basis of academic achievement, or of students withdrawing based on their achievement. However, there is some evidence that problem behavior of students might lead to avoidance of these students and withdrawal of these students from 'regular' peer contact (Schaefer et al., 2011), which is why we chose to include all four effects in the last study.

## **2 Types of Peer Relations and Networks**

The volume of literature on peer relations is huge, and not all results of different studies are instantly comparable, as different definitions of friendship, liking, positive contact and popularity (among others) are often used, and different forms of peer relations are the focus of different studies. Two important distinctions to be made in peer relation research are the *kind of peer relation* that the study focuses on and the type of network studied. As regards the kind of peer relations, researchers study a broad variety, ranging from casual



acquaintances to intimate friends, from peers who associate with each other to peers who collaboratively work on an assignment or project, and from a dyad to a larger social network or peer group. There are many differences between the different types of peer relationships, such as average size of the peer group or average number of friends, kind of activities undertaken together, and perhaps characteristics that function as selection criteria or that are influenced by said relationship (Zimmer-Gembeck & Kindermann, 2010). In this thesis, we describe two different forms of peer relationships. In the first study, we describe both friendship networks and networks of peers that interact frequently, without specifying what 'label' is applicable to this interaction. In studies 2 and 3, we focus solely on networks based on the 'liking' of students. We coin these 'friendship networks' as well although of course there is a conceptual difference between liking and friendship. Friendship is often defined as an intimate and enduring tie between peers (Kindermann & Skinner, 2012). Some researchers define 'friendship' as reciprocated ties between peers, because reciprocity rises when persons feel closer to each other (Buunk & Prins, 1998), and unilateral peer nominations function more as a personal preference than as a strong mutual bond (for a discussion and empirical evidence, see Kuhnt & Brust, 2014). When students name who their friends are, they in fact voice their opinion that a certain friendship exists, even though studies on the reciprocity of friendship show that not all friendship nominations are reciprocated. The question arises whether 'true' friendship only exists if both parties agree on the existence of the bond, and which 'friendship' is more influential, a friendship that is reciprocated, or a friendship that is unilaterally desired by one party. There is evidence for both of the latter possibilities, at least with regard to alcohol use and depression (Giletta et al., 2012). Some researchers have coined unilateral friendships as 'preferred' or 'desired friendships' (e.g., Sijtsema, Lindenberg, & Veenstra, 2010). Kindermann and Gest (2009) state that the definition partly depends on the researchers' field: "developmentalists see reciprocity as a requirement: A friendship exists when both individuals agree on the friendship: sociologists tend to view unreciprocated friendship as key reference-groups or as links that connect larger groups" (p. 103). When comparing results from different

studies, it is important to determine which definition of friendship is used in the studies. In fact, authors of studies into selection and socialization effects have used different measurements of 'friends'. These range from "who are your best friends in class" (Knecht et al., 2011), "nominate up to three same-grade peers with whom you most like to spend time" (Kiuru et al., 2012) to "participants identified up to three important peers, who were defined as someone you talk with, hang out with, and do things with."...Participants also indicated whether those nominated were friends, siblings, romantic partners, or others (Popp, Laursen, Kerr, Stattin, & Burk, 2008). In our second and third study, we chose to define 'friendship' networks based on unilateral liking nominations ("name which classmates you like best"). We will return to the distinction between reciprocated friendship and unilateral 'liking' in the general discussion of this thesis.

Larger networks or groups of friends can be identified by asking, for instance, each student in a class to name all of her or his friends. Typically, in studies focusing on larger friendship or peer groups, unilateral ties are used to describe the complex dynamics within these groups (see for example Dijkstra, Cillessen, & Borch, 2013; Sentse, Kiuru, Veenstra, & Salmivalli, 2014; Sijtsema, Ojanen et al., 2010). Using unilateral nominations allows us to study effects such as alter and ego effects. Alter effects describe whether students with certain characteristics are more sought out as friends, hence are more popular. Ego effects describe whether students with certain characteristics are students who are more active in seeking out friendships.

As mentioned earlier, the second important distinction in peer relations studies is the *type of network* studied. If unilateral nominations of individual students are used (nominations of friends, acquaintances, classmates that are liked), the resulting network of relationships is *directed*. This implies that the flow or direction of relations is visible, e.g., that student A might like student B, whereas student B does not reciprocate. This type of network is especially interesting when studying socialization, as influence in this example might flow from student B towards student A, but not from student A towards B, as

student B does not consider student A his friend. It is also possible to define *undirected* networks, where ties between two students do or do not exist, but if they exist the direction is unspecified (Scott, 2000; Wasserman & Faust, 1994). One way to define these networks is to use individual nominations and only include ties where both parties agree on the existence of the relation, i.e. reciprocated ties. Another, and in our eyes more interesting, way to define undirected networks, is to ask *all* students in a classroom, to name “who hangs out with whom”. In this approach, students function as informants on the social structure in a class. This method is called social-cognitive mapping. Social-cognitive mapping studies overlap with, but also differ from friendship studies (Kindermann & Skinner, 2012). The latter do not try to get hold of the social structure of a group of adolescents, but of a particular quality represented in a social network, viz., who is befriended with whom, what is the significance of the relationship, or what are particular developmental or educational outcomes or consequences of the characteristics, aspirations, and attitudes represented in the social network. Social interaction networks or social cognitive maps are non-directed networks. In these networks, the direction of the relation is not visible. However, the fact that these networks can be visualized based on the information of all classmates instead of personal nominations, makes them very interesting from our point of view. They represent the general opinion about the social structure of the class and as such are more ‘inter-subjective’ than networks based on personal nominations. These networks are more reliable in this sense, because they are based on multiple observations of the same peers (Kindermann, 2007). Indeed, Kindermann and Gest (2009) indicate that, although larger groups or networks could be identified via self-reports, students tend to exaggerate associations with popular peers, whereas basing networks on the multiple observations of classmates leads to a shared consensus about the social structure in a class. An added benefit of this technique is that the network can be adequately described even when some of the students are missing on the day(s) of data collection or do not partake in the study. An important distinction between peer networks based on social cognitive mapping and those based on self-report, is that social cognitive mapping give us information about the

(frequent) interactions in the classroom, whereas self-reports generally give us information about the friendship or liking networks, rather than interactions (Zimmer-Gembeck & Kindermann, 2010). The two represent different contexts that are both worthy of exploration. In the first study of this thesis, we use both types of approaches to class-related social networks: unilateral nominations, resulting in directed networks of friendship, and social cognitive mapping, resulting in undirected social interaction networks of interaction partners. In this study, one of the aims was to explore the role of certain selection characteristics, most importantly ethnic background, in different peer contexts and found similar findings for both approaches. This similarity and the wish to keep the designs used in the other studies sufficiently simple, allowing for a clear presentation of findings in one paper, made us decide to focus in the second and third study on directed networks based on unilateral liking nominations only.

### **3 Statistical Challenges**

Statistical analyses often assume independent observations, which are per definition problematic in a shared group environment. Furthermore, it has for long been a challenge to disentangle selection and socialization effects. However, advances in the last decade in statistical techniques allow analyses that do not assume independent observations, and can disentangle socialization and selection effects. Exponential Random Graph Modelling (ERGM) can be used to describe networks of students. Furthermore, stochastic actor-oriented analysis (SIENA) allows for distinguishing and simultaneously testing both selection and socialization effects, but also avoidance and withdrawal effects which allows to further our understanding of the interplay of these effects, and does not assume independence of observations. The many advantages and options of these analyses are described in numerous studies (e.g., Burk et al., 2007; Veenstra, Dijkstra, Steglich, & Van Zalk, 2013; Veenstra & Steglich, 2012). In this thesis, both ERGM and SIENA are used to study selection, and SIENA also was used to study socialization, avoidance and withdrawal within peer relationships.

## 4 The Structure of this Thesis

The first study in this thesis, in which we used a cross-sectional design, primarily deals with ethnicity and cultural diversity. In this first study we worked with children in their last year of primary schooling. We compared two forms of peer relations: friendships and social networks. Friendships were identified by asking all students to name classmates that were their friends. The children themselves determined the criteria for friendship. The social networks were identified by asking all children in a classroom, “Who hangs out with whom”. This study was cross-sectional and characterized by a single wave of data-collection, and as such it did not focus on developmental processes. Given the nature of ethnic background as a fixed characteristic this study is not intended to disentangle socialization and selection effects. What it did, however, is to control for children’s sociometric status as popular or rejected children. This is important, to make sure that choosing friends or identifying a casual contact is not attributed to similarity in ethnic background, while children’s choices actually are the result of their sociometric status.

For the second and third studies we used a longitudinal design. During one school year, we asked all students at three different time points, viz., at the start of the school year, in the winter and at the end of the school year, to complete questionnaires measuring a range of different variables. We also asked each student to name peers whom they liked. From these nominations, we constructed tables that signaled whether students selected others as peers whom they liked and whether they were selected as liked peers themselves. We collected our data in second year groups in secondary school. We visited 542 students in 24 classes in four different schools. Classes ranged from the lowest regular educational level in the Netherlands (VMBO) to the highest (VWO). This design allowed us to analyze and disentangle socialization and selection effects. During our analyses, it became clear that analyzing the data separately for each classroom hindered our aim to analyze multiple variables in the analyses. Crudely stated, trying to analyze 30 or so variables using data with 25 students in a class proved difficult. To enhance the possibility

to model more variables in a model, we merged the classroom data to school levels, creating data for five distinct schools; five, instead of four schools, because in one of the four schools, students from two different educational levels were analyzed separately.

The second study, reported in chapter 3, is entitled “Peers and academic achievement: a longitudinal study on selection and socialization effects of in-class friends.” Both common sense notions and many studies on cooperative learning (e.g., Gommans, Seger, Burk, & Scholte, 2015; Rohrbeck, Ginsburg-Block, Fantuzzo, & Miller, 2003)) and studies on class disruptive behavior (Salmivalli, 2009; Wilson & Lipsey, 2007) demonstrate that classmates can influence each other for better and for worse. We use these studies as the basis for our expectation that peers may socialize each other towards negative or positive changes in school achievements. Chapter four entitled “Peer influences on internalizing and externalizing problems among adolescents: a longitudinal social network analysis”, focused on challenging youth behaviors. This study is not just substantively different in that it focusses on problem behavior, but also because next to selection and socialization, avoidance and withdrawal were analyzed. As a result of withdrawal and avoidance, youth may end up with a peer group of similarly neglected or rejected youth (Schaefer et al., 2011).

The final chapter in this thesis is a general discussion. A summary of findings is followed by reflections on the theoretical implications, substantive issues that await further or even new studies, a discussion of methodological challenges and their link with substantive discussions, and, a short theoretical evaluation of the practical implications that were presented at the end of each of the chapters 2, 3 and 4.

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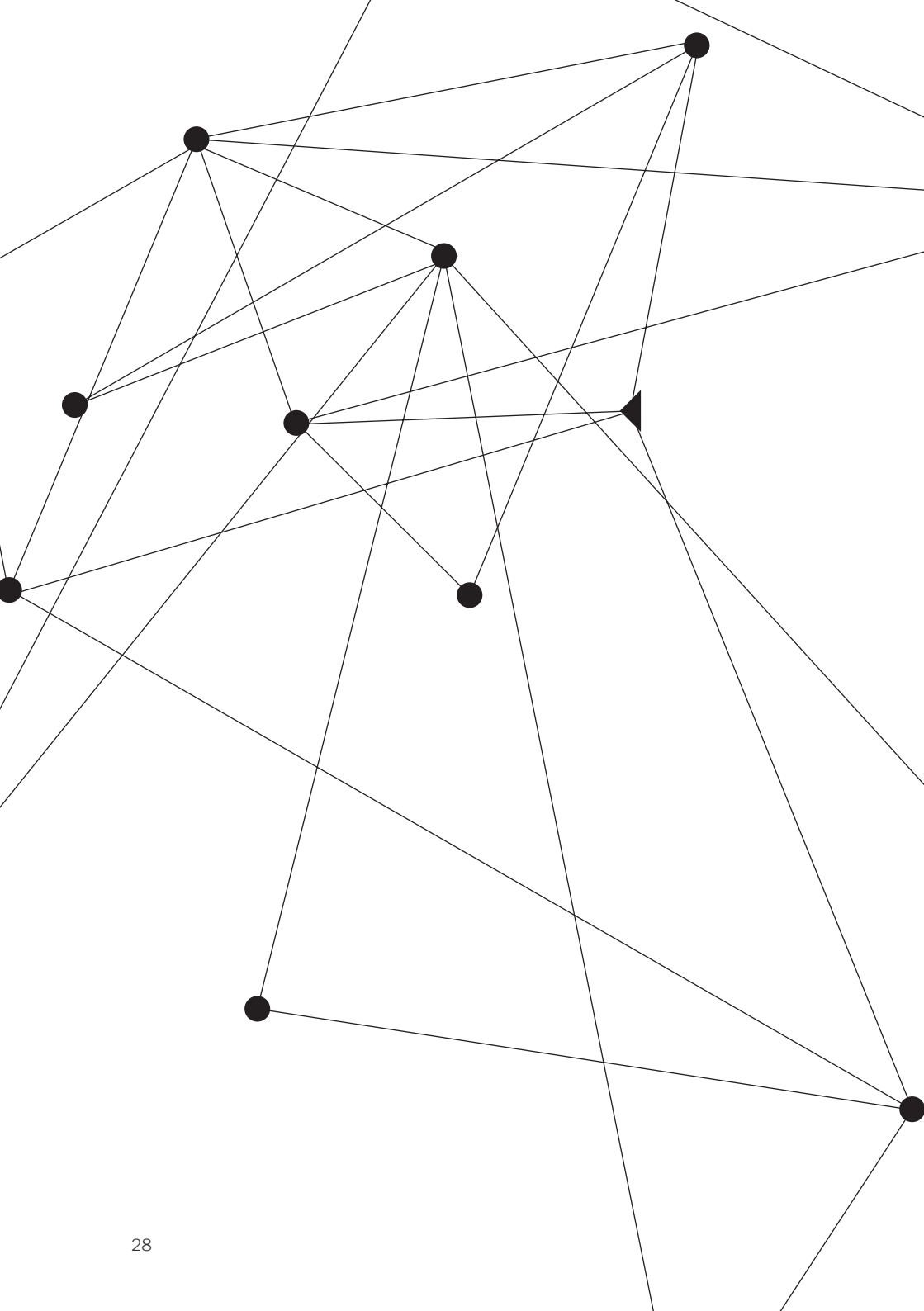
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## CHAPTER 2



# Ethnic preferences in friendships and casual contacts between majority and minority children in the Netherlands



## Abstract

Children bond with other children that are similar to them with regard to many aspects, one of which is ethnic background. In this study, we use network analysis to test whether this is equally true for two different qualities of relations; friendship and common social interaction. Participants were 296 6th grade elementary school children from 14 multi-ethnic schools in the Netherlands. In the Netherlands, like in many other countries, schools have the task to make sure that children develop positive social relationships with all children, irrespective their ethnic and cultural background. We found that children form both friendships and social interaction networks with others that have a similar ethnic background while controlling for structural network effects, sex effects and effects of sociometric status. For schools it is important that this was found for both types of interaction networks, because schools have more means to impact on casual relationships than on friendship relationships.

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## 1 Introduction

Children's peer relationships determine whether they are cared for, esteemed and valued by peers, and whether they are part of a network of communications and mutual obligations between peers. Peer relationships serve as a source of social and emotional support, and as a context for learning and practicing social, cognitive and language skills (De Abreu & Elbers, 2005; Goza & Ryabov, 2009; Ryan, 2000; Wentzel, 1999). In the Netherlands, where this study was conducted, as in many other western countries, schools explicitly have the task to stimulate students' development of positive relationships with other children and adults. Because the Netherlands is a culturally diverse community this also means that students are supposed to be prepared for collaboration with children and adults with cultural and ethnic backgrounds that may differ from their own; now and in the future. In this way schools contribute to social participation of all citizens and towards a socially cohesive society (Veugelers & Vedder, 2003). Because schools and other educational institutions are traditionally viewed as major arenas for intergroup contact and acculturation, they are perceived to be of great importance for attaining the desired goal of creating 'multicultural societies' (Vedder, Horenzyk, & Liebkind, 2006). Masson and Verkuyten (1993) even suggested that in the Netherlands the classroom is the primary and major medium, and perhaps an ideal one to bring students from different ethnic groups in continuous first hand as well as prolonged contact with each other. And indeed, in a recent study (Van Geel & Vedder, 2011) we found that in classrooms that harbor more cultural diversity, students are more likely to come into incidental contact with students who have a different ethnic background and have a more favorable attitude towards the cultural diversity they experience, than classes that provide less firsthand experience with cultural diversity.

In a review published at the end of the last century, Vedder and Veugelers (1999) concluded that schools in the Netherlands performed rather well in terms of achieving the goals in the social and multicultural domain. However, since the turn of the century much has changed in terms of the multicultural

climate in the Netherlands. Ethnic segregation between neighborhoods, and between and within schools has increased (Gijssberts & Dagevos, 2005). Voicing negative feelings about interethnic relationships has become more common and national policy has changed from one favoring cultural diversity and integration with attention for maintaining ethnic and cultural heterogeneity to one requiring immigrant assimilation to what is called a 'common core' of Judeo-Christian values and western/Dutch habits (Entzinger, 2006; Leeman, 2008; Maussen & Bogers, 2010). As a consequence interethnic friendships between students may have become more difficult and casual interethnic contacts more rare.

With regard to ethnicity many studies have shown that, in general, students choose friends that have a similar ethnic background or race (e.g. Kupersmidt, DeRosier, & Patterson, 1995; Moody, 2001). Some studies have shown that ethnic homogeneity in friendships is less prominent in minority group students when compared to majority (native Dutch or European-American) students' friendships (Hamm, 2000; Verkuyten & Martinovic, 2006). It has been argued, however, that this higher proportion of interethnic friendships is linked to the fewer opportunities that minority group students have to interact with students of their own ethnic background, because their numbers in society, schools and classes are relatively low. From the perspective of their ethnic background there are relatively more others, thus resulting in a relatively high proportion of interethnic friendships (Baerveldt, Zijlstra, De Wolf, Van Rossem, & Van Duijn, 2007). Indeed, when studies corrected for the opportunity to interact with students from various backgrounds, the proportion of interethnic friendships of minority group students became similar to the proportion of interethnic friendships of native students (Aboud, Mendelson, & Purdy, 2003; Baerveldt, Van Duijn, Vermeij, & Van Hemert, 2004). With or without this correction, it seems that both minority (immigrant) students (Kao & Vaquera, 2006; Titzmann, Silbereisen, & Schmitt-Rodermund, 2007) and majority (native) students (Kao & Joyner, 2004) show a preference for intra-ethnic friendships. These results seem to be generalizable to the Netherlands, as Baerveldt and colleagues (2007) found that both majority and minority

members in the Netherlands tended to prefer contacts within their own ethnic group. These findings particularly refer to friendships whereas contacts may also refer to more casual forms of contact. Casual contacts may be less intimate and less exclusive than friendships, but they may also be more frequent and may hold the potential of exploring new relationships; important qualities for stimulating and improving interethnic contacts.

Friendships are an important motive to stay involved in activities and in the setting or organizational context that provides the opportunities for being involved in these activities, e.g., a school. If students do not have an opportunity to build and maintain friendships, or even worse, if they experience being ridiculed, excluded or discriminated against, they may choose to quit school (Simpkins, Delgado, Price, Quach, & Starbuck, 2013). Schools have means to support positive relationship building and to avoid exclusionary practices, albeit limited. The means they have should be used and optimized. Two of these means are signaling experiences of isolation or exclusion, and changing the organizational and normative climate in schools allowing students the exploration of new relationships and establishing and maintaining friendships (Brown, 2013). As we shall argue, organizing structured opportunities for casual contacts is a way to go.

### **The Current Study**

This study will primarily address the signaling task by focusing on ethnic homophily of peer relationships. The tendency for ethnic homophily in the Netherlands has been demonstrated for friendship (Baerveldt et al., 2007) and more casual forms of contact (Vermeij, Van Duijn, & Baerveldt, 2009). In the current study we study both intercultural friendship and casual interethnic contacts between school children in the Netherlands and will try to replicate these earlier findings. The systematic replication of research is particularly important in the social sciences (Bakker, Van Dijk, & Wicherts, 2012; LeBel & Peters, 2011). In addition, however, the current study analyzes whether students' preferences for ethnic homophily are equally strong for friendships as for casual contacts. Friendships may withstand such social developments

as depicted in the preceding section, because they are to a large extent inspired or driven by a joint interest in engagement in particular activities (Brown, 2013), but casual contacts may not. Whereas intercultural friendship contacts primarily depend on a strong motivation to establish a rewarding contact with someone who is liked or even loved and who can join in activities that are of mutual interest, casual contacts crossing ethnic borders seem to depend more on non-personally controlled access or opportunities for avoidance. Schools, teachers and classmates, all can influence such contacts through measures that push students to collaborate, e.g., through implementing strategies for collaborative learning and mutual interdependence between students, or by facilitating opportunities for avoidance. The latter is realized by accommodating or even stimulating ethnic segregation in school, e.g., through group specific lessons (ethnic language lessons or separate religion lessons for Muslim and Christian children) and differentiation strategies along ethnic lines (Fredricks, Hackett, & Bregman, 2010; Moody, 2001). Moreover, age seems to have an influence. Aboud and colleagues (2003) reported that while primary school children had more same- than cross-race *companions* (casual contacts), only adolescents had more same- than cross-race *friends*.

Given the depicted social developments in Dutch society and the findings on the role of students' age (Aboud et al., 2003), we hypothesize to find in our primary school students a stronger ethnic homophily preference for casual contacts than for friendship relations.

Students' peer relationship choices depend on peers' ethnic background and opportunities for contacts with students who have a similar ethnic background, as pointed out earlier. However, children also have other qualities that make them more or less attractive candidates for establishing and maintaining contacts. In this respect children's sociometric status is of particular importance. Based on the work of Coie, Dodge, and Coppotelli (1982) we distinguish sociometrically popular (or 'accepted') from rejected children. Rejected children tend to be emotionally and cognitively at risk, whereas the sociometrically popular children are generally resourceful and well adapted

(c.f., Inderbitzen, Walters, & Bukowski, 1997; Newcomb, Bukowski, & Pattee, 1993). In addition, children's sociometric status appears to be related to their school adjustment and academic achievement (Tuma & Hallinan, 1979; Wentzel & Asher, 1995).

Apart from popular children being more attractive as friends and for casual contacts and having a rejected status being indicative of more problematic relationships, an additional reason for taking sociometric status into account is that earlier research (Kupersmidt et al., 1995) yielded the insight that children who are sociometrically similar have a greater chance of being friends. Moreover, children of minority ethnic background may have a greater chance of receiving lower sociometric scores (Coie et al., 1982; Rican, 1996). Hence, controlling for sociometric status is important to make sure that those friendship choices and casual contacts are not attributed to similarity in ethnic background, when children's social preferences actually are the result of their sociometric status. In our study we furthermore control for sex, and structural network effects.

## **2 Method**

### **Participants**

Data was collected in fourteen elementary schools in the western urbanized part of the Netherlands. In each school, one of the 6<sup>th</sup> grade classrooms was randomly selected for the study. In total 296 pupils took part in the study. These pupils were approximately 11.4 years of age ( $SD = 0.63$ ) and 52% were girls. The participants were asked in which country their parents were born. Ethnic background was determined by the country of birth of both parents: 32% of the children were of Dutch ethnic origin, 12% Turkish, 8% Moroccan, 8% Surinamese and 6% were of Antillean or Aruban (the Dutch Caribbean) origin, and 16% of the pupils had other ethnic backgrounds (e.g., Colombian, Russian, Lebanese, former Yugoslavians, etc.). Eighteen percent had a mixed ethnic background, e.g., Dutch-Moroccan. Due to the variegated group distribution and the relatively low numbers of students in each immigrant

group, we could not conduct analyses for each group. Alternatively we decided to contrast Dutch national students and all immigrant students. Of the 296 pupils, 30 had some missing values. Due to data-requirements of the models that were used these 30 children were disregarded.

We could not collect information about individual students' SES. Instead we collected information about the income and social security position of all families living in the neighborhoods in which the participating schools are located. In the Netherlands children commonly visit a primary school in their own neighborhood. Families on average had a yearly income of 25.375 euros ( $SD = 5.132$  euros) and 12.4% had social security as their sole source of income. This indicates that most children came from low SES backgrounds, which reflects the generally low SES backgrounds of families living in neighborhoods with high proportions of immigrants in the Netherlands.

## **Measures**

**Sociometric status.** Each child was given a list with all the names of his or her classmates, and was asked to indicate for each child how much they liked this child. This was done on a 7-point likert rating scale, which went from "least liked" via "neutral" to "most liked". These ratings were then processed with the program SSRAT (Maassen, Van der Linden, Goossens, & Bokhorst, 2000) to determine children's status as sociometrically popular and rejected.

**Friendship networks.** The children were asked to name up to three classmates that were their friends. The friendship nominations were entered into matrices that represent the friendship networks, whereby a 'zero' indicates no tie between children and a 'one' indicates a unilateral friendship nomination.

**Social interaction networks.** Each child had to describe which classmates frequently interact with one another. The children were asked "who hangs out with whom", given a sheet with circles drawn on it, and were encouraged to enter all the names of classmates in one circle, if they formed a 'group'. Also, it was emphasized that children could be member of several groups at the

same time, that boys and girls could interact, that the child should not forget to include its own groups and that not all circles had to be used. This resulted in a 'social map' of the classroom, based on frequency of interaction, drawn by each participating child. All of these social maps were then combined, using the program NETWORKS 4.0, into one combined social map. NETWORKS uses a method of testing conditional and unconditional chances of being named in a specific network, given the total amount of networks in the classroom and total amount of networks in which a particular child is named (Kindermann, 1996). The combined social map shows all the networks that are present in the classroom. This map reflects the general or average opinion about the social structure in the class and is referred to here as the social interaction network. Sadly, the social interaction networks (who hangs out with whom) of five schools could not be analyzed because too many students reported that all students hang out with all other students; they presented the class as one clique. Thus for the friendship data all schools were included in the analyses, and for the social network data nine schools were included in the analyses.

## **Procedure**

After their parents gave consent, the children were asked to complete a questionnaire. This questionnaire was administered by research assistants during a regular day in the classroom, while the teacher of the class (homeroom teacher) was present. Students were assured that their responses would be treated anonymously, and that participation was voluntary. The research assistants were students of Education and Child Studies who received a short training preparing them for the administration of the questionnaire. All questionnaires were completed within 30 to 45 minutes.

## **Method of Analysis**

We used a two-step analysis: first we analyzed all school(class)es using friendship and social interaction as dependent variables and with ethnic background as main explanatory variable. For sake of clarity, we further use the term 'schools' to refer to the analyses of the one class that we sampled in this school. This means that for each school, we conducted an analysis using



friendship data, resulting in 14 models for friendship data, and an analysis using social interaction data, resulting in nine models for social interaction networks. The analyses per school were done by running Exponential Random Graph Models (ERGM) using the program SIENA 3.11a (Snijders, Steglich, Schweinberger, & Huisman, 2007).

After conducting the analyses for each individual school the outcomes were used in a meta-analytic procedure that was first employed and described by Snijders and Baerveldt (2003) and is implemented in the program Siena08 (Snijders, 2007). We present the results of this analysis in this paper.<sup>1</sup> One meta-analysis was used to combine the outcomes for all fourteen analyses on friendship models, and one meta-analysis was used to combine the nine social interaction network models. Using this method, parameter estimates and variances obtained for the individual schools are tested to see whether there is a main effect across the schools and whether this effect is significantly different between schools. The analyses on friendship were controlled for reciprocity, which reflects the extent to which children reciprocate received friendship nominations; because children strongly tend to reciprocate friendship nominations, the reciprocity effect must almost always be included in ERGMs (Ripley, Snijders, & Preciado, 2011). Both the analyses on friendship and interaction networks were controlled for alternating k-stars, alternating k-triangles and alternating independent two-paths (all reflecting transitivity or tendencies to nominate friends of friends), and for the tendency to select same-sex peers. Furthermore, in the friendship analyses we controlled for the alter effects of the 'rejected' and 'popular' sociometric status of children: the degree to which rejected or popular children tend to be nominated by others.

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1 Reporting all individual models for each school would take up much space and is not very informative for most readers. However, anybody interested in the separate models can contact the first author to receive these models.

## 3 Results

### Descriptive Statistics

The basic characteristics of each school and network are described in Table 1. We can see that there is a large variation between the different schools as regards most of the variables; e.g., size of the classes ranges from 15 to 30, number of different ethnic backgrounds in the class ranges from four to eleven, and in seven classes, the largest ethnic group was a non-Dutch group.

### Friendship Networks

The results of the meta-analyses with friendship networks as dependent variable are presented in Table 2. All network analyses were controlled for reciprocity effects (children are more likely to form a friendship with another child if this friendship is reciprocated) and network transitivity (if your friend is friends with someone, you tend to also form a friendship with this person). Moreover, we controlled for the sex similarity effect and alter effects of a popular or rejected status (alter effects concern the number of nominations an individual receives). All control variables were significant, indicating that the control variables were indeed related to friendship selection. Controlling for these variables we found a significant ethnic similarity effect, which means we found support for the ethnic similarity hypothesis. This indicates that children tend to form friendships with other children that are similar to them with regard to ethnic background. To increase comparability with the analyses on social interaction networks, for which we could only use nine schools, the analyses for the friendship networks were also conducted with only nine schools that were included in the analyses for the social interaction networks; this did not change the statistical significance of any of the results. Most notably, ethnic similarity had a similar value with the nine schools ( $M = .37, SE = .11, p < .001$ ) as with the 14 schools ( $M = .30, SE = .09, p < .001$ ).

### Social Interaction Networks

In Table 3, we present the results of the meta-analyses of the nine schools for which the models using social interaction networks converged. Again,

all network analyses in this meta-analysis were controlled for transitivity effects, sex similarity and effects of a popular or rejected status. The different transitivity variables and sex similarity effects were significant, indicating preferences for interaction with same sex partners and indirect relations. Contrary to the friendship networks, in social interaction networks we did not find any evidence for the effect of sociometric status (either popular or rejected) on the ties. Nevertheless, as with the friendship networks, we found support for the similarity attraction hypothesis. Similar ethnic background is a selection criterion when choosing interaction partners. Even without testing it is clear that the strength of this effect is comparable for social interaction networks ( $M = .35$ ) and friendship networks ( $M = .37$ ).

**Table 1.** Descriptive information about analyzed schools

school	n	% missing values	Average degree friends <sup>a</sup>	Transitivity friends <sup>a</sup>	Average degree <sup>b</sup> SIN	Transitivity <sup>b</sup> SIN	Similarity in ethnic background <sup>c</sup>	# of ethnic groups <sup>d</sup>	Largest ethnic group <sup>d</sup>	% students of this group <sup>d</sup>
1*	21	4.76	2.350	0.284	3.800	0.745	0.379	10	Moroccan	40.0
2	17	23.53	2.308	0.436	4.462	0.769	0.590	5	Moroccan	53.8
3*	25	8.00	2.652	0.393	5.913	0.677	0.237	11	Turkish	26.1
4	15	13.33	2.769	0.694	3.077	0.688	0.256	7	Turkish	30.8
5	30	20.00	2.375	0.400	4.583	0.682	0.333	9	Antillean/Moroccan	29.2 (each)
6*	27	3.70	2.962	0.489	5.692	0.830	0.526	9	Dutch	50.0
7	21	4.76	2.750	0.379	5.300	0.690	1.268	4	Dutch	85.0
8	21	0.00	2.762	0.585	4.095	0.962	0.338	8	Dutch	28.6
9	23	0.00	2.696	0.478	3.913	0.860	0.466	6	Dutch	47.8
10*	15	13.33	2.769	0.527	2.615	0.750	0.513	6	Turkish	46.2
11	22	18.18	2.111	0.606	2.111	0.636	0.614	6	Turkish	50.0
12*	21	4.76	2.600	0.439	5.900	0.825	0.863	7	Dutch	60.0
13	22	22.73	1.765	0.543	2.118	0.875	0.831	5	Dutch	70.6
14	19	5.26	2.222	0.333	8.222	0.930	0.327	9	Dutch	27.8

<sup>a</sup> Friendship Network<sup>b</sup> Social Interaction Network<sup>c</sup> Ranging from 0 (no similarity) to 2 (total similarity)<sup>d</sup> Based on mother's ethnic background

\* schools excluded in analyses on social interaction networks

**Table 2.** Results of the meta-analysis of the friendship networks (N=9)

	Parameter test		Variance test		
	mean	Se	SD	$\chi^2$	df
Reciprocity	2.47 <sup>a</sup>	0.37	0.55	9.88	8
Alternating k-stars	-0.34	0.24	0.0	8.28	8
alternating k-triangles	0.72 <sup>a</sup>	0.08	0.22	14.57	8
Alternating independent two-paths	-0.32 <sup>b</sup>	0.12	0.0	3.82	8
same sex <sup>1</sup>	0.85 <sup>a</sup>	0.24	0.35	2.48	3
Sociometric Status 'Popular' alter effect	0.72 <sup>a</sup>	0.14	0.0	7.11	8
Sociometric Status 'Rejected' alter effect	-0.71 <sup>c</sup>	0.28	0.0	10.60	8
Similar ethnic background (centered)	0.37 <sup>a</sup>	0.11	0.0	5.47	8

The statistical significance for mean effect is approximated by calculating a *t*-ratio of the estimate divided by its standard error and then using the standard normal distribution.

<sup>a</sup>  $p < 0.001$ , <sup>b</sup>  $p < 0.01$ , <sup>c</sup>  $p \leq 0.05$ .

<sup>1</sup> These results are based on four schools. In the remaining five schools, the effect for sex similarity had to be fixed to a high positive value.

**Table 3.** Results of the meta-analysis of the social interaction networks (N=9)

	Parameter test		Variance test		
	mean	Se	SD	$\chi^2$	df
Alternating k-stars	-1.68 <sup>a</sup>	0.51	1.71	38.40 a	8
alternating k-triangles	2.05 <sup>a</sup>	0.27	0.59	17.05 a	8
same sex <sup>1</sup>	1.80	1.08	2.01	10.79 c	3
Sociometric Status 'Popular'	0.14	0.15	0.00	3.21	8
Sociometric Status 'Rejected'	0.03	0.20	0.00	3.92	8
Similar ethnic background (centered) <sup>2</sup>	0.35 <sup>a</sup>	0.10	0.09	7.87	8

The statistical significance for mean effect is approximated by calculating a t-ratio of the estimate divided by its standard error and then using the standard normal distribution.

<sup>a</sup>  $p < 0.001$ , <sup>b</sup>  $p < 0.01$ , <sup>c</sup>  $p < 0.05$ . The statistical significance of the  $\chi^2$  tests is calculated using the  $\chi^2$  distribution.

<sup>1</sup> All results are based on only four schools. In the remaining five schools the parameter was fixed to a high positive value due to no cross-sex ties.

<sup>2</sup> The results for the Snijders and Baerveldt's method do not include one school due to large standard error.

## **4 Discussion**

The current study was conducted to analyze whether children demonstrate more ethnic homophily in friendship selection than in more casual contacts. We controlled the analyses for sociometric status and structural network effects. We found a strong ethnic similarity effect in both friendship and social interaction networks, indicating that children form friendships and engage in social interactions with children that are similar to them with respect to ethnic background. These results show that the similarity-attraction hypothesis is valid for both friendships and social interactions of primary school children with regard to ethnic background. Our results are in line with previous studies on ethnic homophily in friendship networks (Baerveldt et al., 2007; Kupersmidt et al., 1995; Moody, 2001), and ethnic homophily in more casual interaction networks (Aboud & Snakar, 2007; Vermeij et al., 2009). However, we did not find support for the hypothesis that selection effects would be stronger for casual interaction networks than for friendship networks, as the parameter estimates were almost similar. This suggests that ethnicity is as important in choosing friends as it is in choosing interaction partners. This result indicates that ethnicity functions somewhat as a ‘dividing line’ as children are not only using it to select friends, but are also reluctant to interact with classmates with a different ethnic background.

Earlier we wrote that casual contacts are likely more susceptible to school and teacher regulation than friendship relations. From the perspective of schools’ responsibility to stimulate healthy social relationships and to contribute to social cohesion in communities and the society as a whole, the combination of the notion that casual relationships can be regulated and the finding that students are relatively heavy biased in favor of interactions with peers that are culturally similar, leads to a major educational challenge: create healthy and pleasant culturally diverse school communities. It should be noted that there were substantial differences between schools in terms of the strength of the ethnic homophily effect. Though overall children tend to interact with peers who are similar in terms of ethnicity, this tendency is stronger in some

schools than in others. The differences between schools entail additional research challenges: What causes the differences? Do school policies and their implementation play a role? And do schools' differentiation strategies and the use of particular instructional approaches, e.g., collaborative learning, make a difference? Perhaps school policies can be developed to reduce ethnocentrism among students.

## **Limitations**

In the method section we clarified that the social interaction network data of five schools were not included in the analyses, because too many students indicated that each and every student in the class hang out with each and every other student in the class. Statistics need variance and hence these data could not be analyzed. However, sometimes a lack of variance can have substantive relevance. It could be that all these children in those schools genuinely and enthusiastically interact with all classmates irrespective their ethnic background. It could also be that the lack of variance is linked to children's eagerness to provide social desirable answers, because their school and more particularly their teachers succeed in creating a strong normative climate when it comes to exclusion, prejudice and interethnic relations. We cannot discern these different reasons. Future research might address this by collecting information on schools' normative climate and how it is established and maintained.

Another limitation is that we could only compare national students to a group of immigrant students with a broad variety of cultural backgrounds. We found strong in-group preferences in both subsamples, but could not further specify our analyses exploring whether within the group of immigrant students there was even more specificity in in-group bias, for instance in the group of students with a Moroccan or Turkish background. The subsamples of these specific groups were simply too small. Future studies should address the specificity of in-group preferences. Last but not least, we worked with students living in low SES neighborhoods. We could, however, not collect data on individual students' SES background and hence could not control



for the role of SES. Future studies should control for differences in SES between students.

## **Conclusion**

To date, it is policy in the Netherlands and in many other western countries to try to have ethnically mixed classrooms, so that children can experience contact with many different cultures. It is hoped and supposed that this reduces ethnic stereotyping and racism. However, in many Western countries, including the USA and the Netherlands, it proves very difficult to ensure multi-ethnic classrooms (Vedder, Horenczyk, & Liebkind, 2006). Our study shows that even though we sampled culturally diverse schools with many different ethnic groups, children still prefer friendships and casual contacts with others of the same ethnic background. Our results suggest that if an educational goal is to make children experience interethnic contacts, just organizing mixed classrooms is not enough. Schools at least can try to better signal undesirable exclusionary practices in school. This paper shows that it is important to look both at friendship relationships and casual relationships. They are different but both characterized by an ethnic selection effect. Friendships are more centered on particular activities liked by co-participating peers. As stated by Brown (2013), friendships mostly serve positive, constructive goals, but they are exclusionary in that engagement with particular peers means that a youth is not involved at that same time with other peers. Casual contacts may be less focused, less committed, less centered around particular activities and interests. If they are characterized, however, by an ethnic preference or ethnic bias, while in a limited school bound space like a classroom or playground, this is likely to indicate active avoidance. When teachers signal this they should know that students need additional enticement and opportunities to establish and maintain intercultural contacts. Schools may help by providing such didactic instruments as the jigsaw method, in which students of different ethnicities are forced to work together on tasks. Such approaches have been found effective in reducing prejudice (Aronson & Patnoe, 1997; Stephan & Stephan, 2001). They may also try to change the normative climate (Brown, 2013), for instance, by avoiding the use of differentiation and selection

strategies that, although based on relevant criteria like academic performance, may result to be contaminated with ethnic bias in that cultural minority children get more excluded or separated than national children (Moody, 2001). They also can organize supervised curricular as well as extra-curricular activities and settings giving children space to explore new relationships, allowing children more initiative and autonomy than characteristic of most typical, formal learning settings (Fredricks & Simpkins, 2013), but with a watchful eye on exclusionary practices based on ethnic preferences. Children need to experience classmates with different ethnic backgrounds as pleasant company. They don't necessarily need to be friends, but they need a positive reason for mutual contact.

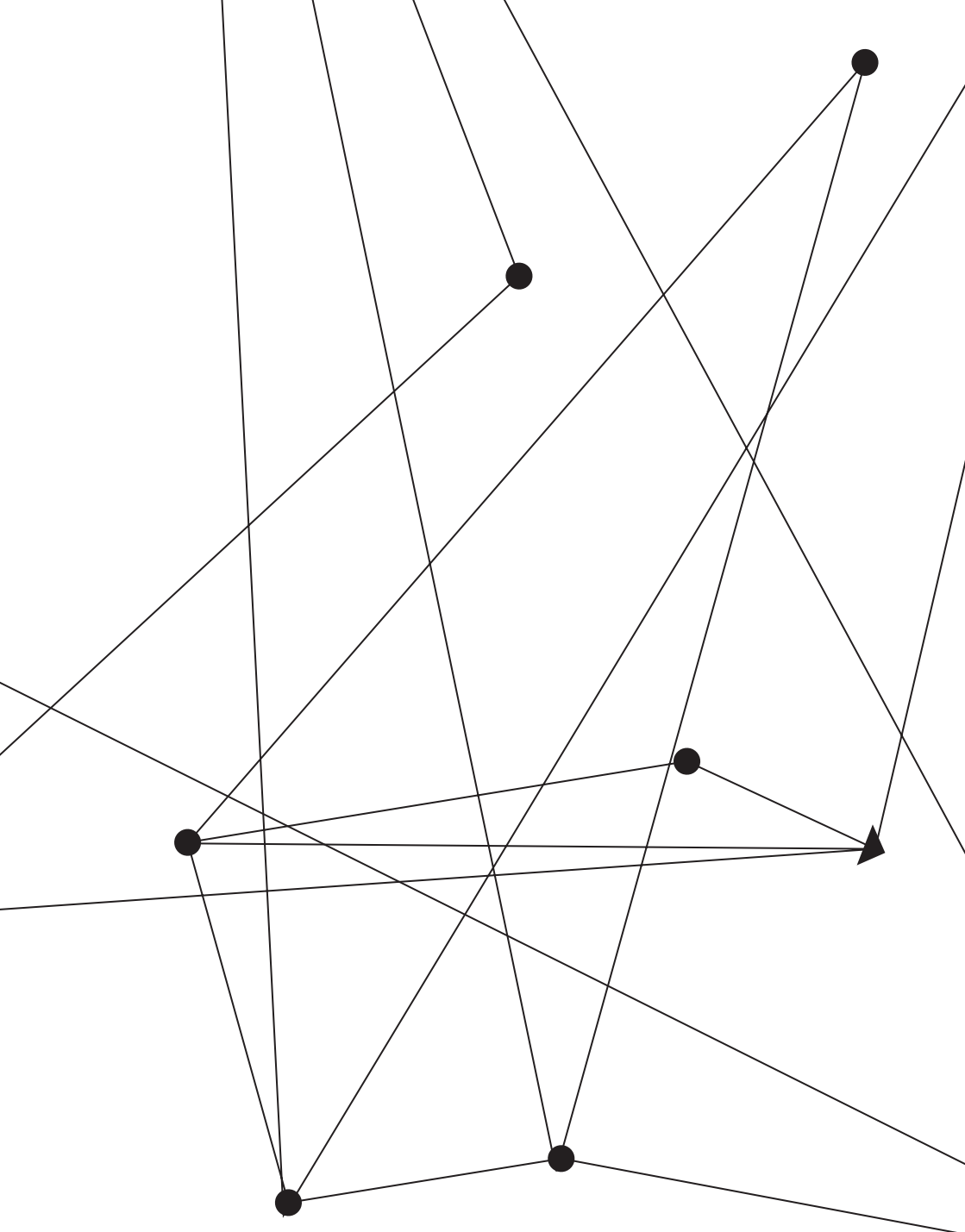
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## CHAPTER 3

# Peers and academic achievement:

A longitudinal  
study on selection  
and socialization  
effects of in-class  
friends



## Abstract

The current study was conducted to analyze whether in-class friends influence each other's grades, and whether adolescents tend to select friends that are similar to them in terms of academic achievement. During one academic year, 542 eighth grade students (mean age 13.3) reported on three different occasions on their in-class friendship networks. At these occasions their report card grades for three subjects were copied from their files. We tested whether academic achievement functions as a selection criterion for friendship, and/or whether academic achievement is influenced by in-class friends, using social network analytic techniques. Socialization effects for Dutch and English language grades, but not for math grades, were found. We found no support for selection effects of grades.

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## 1 Introduction

Many parents worry that their children's school performance suffers under the company their children keep. They would like their children to seek the company of well performing and well-adjusted peers, peers that do not distract from learning and, ideally, make good models for high performance. Do friends influence each other's school grades? Arnett (2000) pointed out that in modern societies adolescents need a prolonged period for orienting on their future. Education plays an important role in adolescents' future orientations, because of its instrumental value to achieve future career goals. Generally, the intensity of this orientation to the future has proven to have a positive association with mental health and social adjustment (McCabe & Barnett, 2000). These positive consequences also have their down side in that lower academic achievement and academic underachievement have been linked to several negative outcomes such as delinquency (Bergin & Bergin, 2009), school drop-out (Garnier, Stein, & Jacobs, 1997), lower self-esteem (Crocker, Karpinski, Quinn, & Chase, 2003), lower occupational outcomes (lower status jobs and lower paying jobs), and even higher divorce rates (McCall, Evahn, & Kratzer, 1992). Report card grades are particularly important, because they are decisive for grade repetition, and in the long term they have a profound effect on students' educational and social attainment (Goza & Ryabov, 2009).

In the study of predictors of students' academic performance and engagement, the peer context is a major source of interest (Ide, Parkerson, Haertel, & Wahlberg, 1981; Kindermann, 2007; Kurdek & Sinclair, 2000). During adolescence peers are assumed to become increasingly more important for youths' social and emotional development (Masten, Juvoonen, & Spatzier, 2009). Irrespective the consequences for school adjustment students generally enjoy the informal and authentic learning opportunities provided by peers, particularly when compared with opportunities for formal learning in school. The activities they embark upon and the social structure of the informal settings is such that they feel motivated to get and stay engaged (Rogoff, Paradise, Arauz, Chorrea-Chavez, & Angelillo, 2003). During such

informal activities participants may get engaged in serious learning which may either distract from, or be strongly supportive of intended and formal learning in schools (Dodge, Dishion, & Lansford, 2006). Although the importance of the peer network for adolescent (social and cognitive) development has long been recognized (Rubin, Bukowski, & Parker, 1998), and the importance of the peer network specifically for educational outcomes has also been acknowledged (Coleman, 1961; Ide et al., 1981), relatively few studies have focused on the role of peer networks in academic achievement. Although some researchers have shown that students in peer networks are similar with regard to academic achievement (Chen, Chang, & He, 2003; Kiuru, Nurmi, Aunola, & Salmela-Aro, 2009; Kurdek & Sinclair, 2000; Liu & Chen, 2003; Wentzel, Barry, & Caldwell, 2004), academic focus (Barth, Dunlap, Dane, Lochman, & Wells, 2004), and the value they attach to academic standards (Rydell Altermatt & Pomerantz, 2003), for all these studies the question remains: How come that the peers are similar? Were they similar in the first place (a selection effect) or did they become similar after they met (a socialization effect or peer influence)? Most studies argue for either or both of these effects, or offer some evidence of socialization effects without concurrently estimating selection effects (Epstein, 1983; Ryan, 2001). In the current study, we aim to advance the knowledge on socialization and selection effects in academic achievement by analyzing these effects with a stochastic actor based model for network dynamics; such a model corrects for the interdependence of children in a classroom and can simultaneously estimate socialization and selection effects (Kenny, Kashy, & Cook, 2006; Laursen, Popp, Burk, Kerr, & Stattin, 2008; Ripley, Snijders, & Preciado, 2011; Steglich, Sinclair, Holliday, & Moore, 2012).

## **Current Study**

Both common sense notions and many studies on cooperative learning (e.g., Rohrbeck, Ginsburg-Block, Fantuzzo, & Miller, 2003), on the impact of bullying (Salmivalli, 2009) and on class disruptive behavior (Wilson & Lipsey, 2007) demonstrate that peers influence each other for better and for worse. This influence is reflected in students' well-being as well as in their school achievements. We use these studies as the basis for our first hypothesis:

peers socialize each other towards stable achievements or either negative or positive changes in achievements. In short, peers matter for achievements and changes in achievement over time.

For selection effects the picture is less clear. Peers may select each other's company based on salient characteristics, but what these characteristics are is not always clear, given that similarities are always accompanied by many differences (Hamm, 2000). Moreover, salience of characteristics depends on particular settings or contexts. Wearing a bathing suit during a gala dinner would be highly salient, whereas during swimming lessons it would nicely fit the occasion. And in case a characteristic is sufficiently salient it is unclear whether a drive towards similarity or towards distinction is at stake. For instance, studies referring to situations in which a status hierarchy is particularly important, e.g., the rat race for best grades and best universities, point out that similarity in social status is not what drives peers to connect, but differences in status: high performers versus low performers. Connecting with a high status student may improve your own status (cf., Hallinan, 1978). Other scholars (e.g., Wehrens, Kuyper, Dijkstra, Buunk, & Van Der Werf, 2010) suggest that association with a non-similar peer accentuates the peers 'otherness'. This accentuation based on social comparison may have positive consequences for students characterized by appreciated characteristics (e.g., learning easy and being a good student) for which the comparison results in or is accompanied by positive feelings and a boost in self-esteem. If, however, the comparison results in negative self-reflections about one's capacities and jeopardizes self-esteem, this may have serious negative consequences for learning and development. These latter students would be better off selecting similar peers. Results from sociometric studies show support for both possibilities (Gorman, Kim, & Schimmelbusch, 2002). In short, with respect to selection effects studies are largely inconclusive. Hence, we cannot formulate a clear hypothesis as regards the selection of peers with similar average achievements.

## 2 Method

### Participants

In the Netherlands, secondary education is track-based, and track levels range from lower (VMBO, junior vocational high school), intermediate (HAVO, general academic junior high school) to higher (VWO, pre-university) level. Students start their secondary education in seventh grade classes that are either of one track-level or combine two or three levels. Classes in our sample consisted of students of the same track in all schools except one. In this school, students from the intermediate and higher track were taught in classes together. In total, two schools with 10 classes of the lower track ( $n = 166$ ), one school with mixed intermediate/higher track (six classes,  $n = 161$ ) and one school with five intermediate track classes and three higher track classes ( $n = 215$ ) participated. Because the two tracks in the latter school were distinct and separate, the networks of this school were analyzed separately, and treated as two 'schools'.

The sample used for this study consists of 542 students (51% female) from 24 eighth grade classes in four schools in the western part of the Netherlands. Sample size per school ranged from 40 to 215, class size from 12 to 31. Students ranged in age from 12 to 16, with a mean age of 13.3 ( $SD = 0.5$ ), and 98% of the students were early adolescents (aged 14 or less) at the first measurement. In terms of ethnic background, the sample was mixed, 62% of the students had a Dutch background, 11% were Turkish, 2% Moroccan, 1% Surinamese, 1% Dutch Antillean and 16% had some other ethnic background, many with a mixed ethnic background, e.g. Dutch-Moroccan. Of 8% percent of the pupils the ethnic background was not known. The highest level of education that either parent finished determined SES. Of the parents 4.1% did not complete school or finished only primary school, 15.3% finished junior vocational high school, 11.4% general academic junior high school, 9.2% pre-university level school, 6.5% senior vocational high school, and 16.6% held a university degree. Of the children 33.9% did not know their parents' education or did not answer the question regarding their parents' education.

## Measures

**Friendship networks.** Students could nominate up to seven students that they liked within their classroom. The friendship network was represented in a matrix of all students in a classroom, where a '1' indicated the presence of a tie or nomination of this student, and a '0' the lack of a tie. Ethnic background was determined by asking the students to indicate in which country their parents were born. For the analyses, ethnic background was transformed into a dichotomous variable, indicating whether the student was a native Dutch student or an immigrant student. In accordance with Dutch national policy students with mixed native-immigrant backgrounds were classified as immigrant students.

**Academic achievement.** Report card grades were collected from school records. At T1 –the start of the school year– we used the grades that were given at the end of the 7th grade, at T2, the grades that were given for the Christmas report card and at T3 the grades of the Easter report card. Report card grades were noted for three subjects: English, Dutch and Mathematics. Grades in the Netherlands theoretically range from 1-10. Very few students actually receive a 1, 2, 3 or 10. We therefore transformed grades 1, 2, or 3 into a 4 and a score of 10 into a 9. The proportion of missing data per achievement indicator was as follows: Dutch achievement: 5.9%, English achievement: 5.8%, math achievement: 6.2%.

## Procedure

A researcher administered questionnaires, with teachers present. During one school year, each school was visited three times, once during autumn, once in winter and once in spring. Questionnaires took approximately 40 minutes to complete. The data-collection moments were three months apart. At each occasion, an identical questionnaire was administered. All students in each classroom were invited to participate in the study. Parents received information prior to the study, and could indicate whether or not their child could participate.

## Analyses

We used the social network analytical package SIENA (Snijders, Steglich, Schweinberger, & Huisman, 2008). SIENA can be used to test socialization and selection effects in a longitudinal network using stochastic actor based models. Within a stochastic actor based model the evolution of a network is viewed as a stochastic process driven by the actors. Probabilities of tie changes may be influenced by the network structure, by characteristics of actors, or by characteristics of pairs of actors (Snijders, Van de Bunt, & Steglich, 2010). First we ran network analyses per school. Then we performed a meta-analysis using SIENA08 (Snijders, 2008; Snijders, & Baerveldt, 2003) on the outcomes of the first analyses, to generalize the findings from the individual schools. Because some school samples were small and would not allow the estimation of the many parameters, we ran a single model for each achievement model (math, English, Dutch), as opposed to estimating all effects for the achievement measures simultaneously.

To test our hypotheses, we included selection effects (choosing friends that are similar in terms of grades) and socialization effects (becoming similar to friends in terms of grades over time) in the models for math, English and Dutch. Furthermore, all models were controlled for the structural network effects Outdegree<sup>2</sup> (the extent to which actors tend to nominate others) reciprocity<sup>3</sup> (the tendency to return a friend's nomination), and Geodesic distance of two<sup>4</sup> (a negative parameter suggests the tendency for network closure: becoming friends with friends of friends). Controlling for these structural network effects is advised in the SIENA manual (Ripley et al., 2011).

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<sup>2</sup> mathematical definition:  $S_{i1}^{net}(x) S_{i1}^{net} = x_{i+} = \sum_j x_{ij}$ ,  $x_{ij}=1$  is the presence of a tie,  $x_{ij}=0$  is the absence of a tie.

<sup>3</sup> mathematical definition:  $S_{i2}^{net}(x) S_{i2}^{net} = \sum_j x_{ij} x_{ji}$

<sup>4</sup> mathematical definition:  $S_{i12}^{net}(x) S_{i12}^{net} = \neq \{j | x_{ij}=0, \max_h(x_{ih}x_{hj}) > 0\}$

Because, in the Netherlands as well as in other western countries, girls tend to perform better academically than boys (Fulgini, Eccles, Barber, & Clements, 2001; Kiuru et al., 2009; Van Houtte, 2004), and immigrant students tend to have a poorer academic performance than native students (Centraal Bureau voor de Statistiek, 2012), and simultaneously both gender and ethnicity have been found to be related to friendship selection (e.g., Baerveldt, Zijlstra, De Wolf, Van Rossem, & Van Duijn, 2007; Burk, Steglich, Snijders, 2007), we control the analyses for gender and ethnicity selection effects.

The networks were collected within classrooms, but later on were merged to school-level networks to prevent small sample sizes that may cause instable parameter estimates (Snijders et al., 2008). To achieve school-based networks, structural zeros were used for ties between classes. This means that a tie between students from different classes was made impossible. During T1, 1.4% of the ties were missing on average per network. During T2, 3.1% percent of the ties were missing on average per network, and during T3, 1.7% of the ties were missing. Missing ties mostly occurred because students were absent on the day of the data collection, and thus on that day could not nominate peers as friends. If the number of missing ties is lower than 10% it is unlikely that missing data will cause difficulties or distortions in the estimation procedure (Ripley, Snijders, Boda, Vörös, & Preciado, 2013). Only non-missing data is used in the estimation of the parameters (Ripley et al., 2013).

### 3 Results

The mean grades and standard deviations for Dutch, English and Math are presented in Table 2. The grades for Dutch and English were stable in the first two waves, but dropped in the third wave. The grades for Math declined each wave, but also showed the sharpest decline in the third wave. A repeated measures ANOVA demonstrated a multivariate significant effect (Wilks' lambda  $F(6, 1864) = 17.723, p < .001, \chi^2 = .054$ ). Follow-up univariate ANOVAs revealed significant declines of Dutch grades ( $F(2, 934) = 6.597,$



**Table 1.** Means (and standard deviations) of original grades

	Dutch	English	Math
T1	7.01 (.83)	7.11 (.97)	6.72 (.93)
T2	7.05 (1.08)	7.11 (1.30)	6.61 (1.47)
T3	6.91 (1.10)	6.74 (1.11)	6.43 (1.30)

$p = .001$ ,  $\chi^2 = .01$ ), English grades ( $F(2, 934) = 35.189$ ,  $p < .001$ ,  $\chi^2 = .07$ ), and math grades ( $F(2, 934) = 17.528$ ,  $p < .001$ ,  $\chi^2 = .04$ ).

The friendship networks are characterized by reciprocated friendships (see the significant reciprocity parameter), which suggests that actors tend to reciprocate friendship nominations. Significant selection effects for gender and ethnicity suggest that children tend to become friends with peers with similar ethnicity and gender. A negative and statistically significant outdegree suggests that children tend to not establish friendships with unspecific others, or in other words, establishing a tie is 'costly' and will only happen when this tie offsets the initial 'cost' of establishing a tie by positive rewards in the form of positive parameters for other factors, such as for instance a similarity in gender, in the case of a positive gender effect. A non-significant result for geodesic distances of two reflects that actors in the included networks are not prone to network closure; that is, they do not tend to become friends with friends of friends. For none of the subjects did we find statistically significant selection effects. We found significant socialization effects though, indicating that students' Dutch and English achievement is influenced by their friends' achievement. The socialization effect for math was not significant. The results are summarized in Table 2.

**Table 2.** Meta-analysis of models describing interdependence of friendship networks and Dutch-language, English language and math.

	Mean	SE
<b>Network dynamics</b>		
Outdegree	-2.89***	0.19
Reciprocity	1.75***	0.28
geodesic distance	-1.00	.30
Gender similarity	2.10***	.29
Ethnic similarity	.27*	.11
Math similarity	.08	.58
Dutch Similarity	-.35	.73
English Similarity	.10	.47
<b>Behavioral dynamics</b>		
Math average similarity	.72	.54
Dutch average similarity	2.67***	.62
English average similarity	1.56**	.57

\*= $p < .05$ ; \*\*= $p < .01$ ; \*\*\*= $p < .001$

## 4 Discussion

In this study, we set out to determine the role that academic achievement plays for adolescents in selecting peers to interact with, and to determine whether peers influence adolescents' academic achievement. The results indicate that there are no selection effects, but that there are socialization effects on English and Dutch language achievement.

### Selection and Socialization Effects on Academic Achievement

Adolescents' achievement is influenced by their friends' achievement. This effect was found in separate models for English and Dutch, whilst controlling for structural network effects and gender and ethnicity selection effects. It is a finding that indicates that friends are an important factor in academic achievement development. This is not to say that friends do have a positive effect. The fact that we also found that over a year grades go down for all subjects could mean that they negatively impact on each other's achievements. Matter of factually, the results suggest that peers may positively or negatively affect academic achievement, and that over time friends tend to become more similar in terms of grades. Dodge and colleagues (2006) indeed suggested that socialization means that peers can both support and detract from learning, depending on the particular attitude of the peers. That there was no socialization effect for math may perhaps be explained by the rather special status of math in the curriculum (Maassen & Landsheer, 2000). Math scores are also relatively strongly related to intelligence (Blackwell, Trzesniewski, & Dweck, 2007; Douglas, Burton, & Reese-Durham, 2008) and math anxiety (Ashcraft, 2002), and perhaps these personal influences prevent a strong influence from peers.

For the selection of friends the young adolescents participating in our study generally used other criteria than school achievements. Although school and school activities may absorb substantial proportions of young persons' time most days of the week, week in week out, year in year out, most of these

youngsters do not see formal learning as cool and fun, at least not in western countries (Hendry, Shucksmith, Love, & Glendinning, 2005; Verma & Larson, 2003). At the same time studies (e.g., Hendry et al., 2005; Mansfield & Wosnitza, 2010) show that being together with peers and helping each other is important for young adolescents. The combination of these two tendencies may explain why we did find less support for selection than for socialization effects. De Klepper, Sleebos, Van de Bunt, and Agneessens (2010) have a simpler explanation: selection occurs more frequently with regard to visible behavior and attitudes, which are visible before students become friends, whereas socialization occurs more frequently for non-visible attributes (e.g., school achievements). For non-visible attributes, similarity between friends more often is the result of socialization. Although this argument is by no means definitive, we do classify report card grades as an attribute that is not highly visible – they are actually private and confident– and therefore is more likely to be socialized than that it is used as a selection criterion.

Although this makes sense, it does not explain why we do not find socialization effects for math. It is not likely that math achievements are more visible than language achievements. Earlier we suggested that personal resources like intelligence, are more important for math achievements. For language competence in English and Dutch it is more likely that social resources (TV, internet, and opportunities to communicate) are more important.

### **Limitations and Prospects**

A point of discussion with regard to the networks in our study is that we collected network nominations within classrooms, and then combined these classroom networks into school networks. It was impossible for students in our study to indicate relations that they had with other students in the same school or same year-group, even though these relations may have been present. A central issue in all peer context research is how to define the borders of the peer context, or in this case network. There are many practical advantages of limiting the network to the class, as well as substantive reasons. One main reason for us to limit ourselves to classrooms was that adolescents of this age

take all their classes with the same students. Hence, we ensured that they chose peers that they spent a lot of time with.

We also would like to address one shortcoming in both the literature of peer socialization and in our study. By separating selection and socialization effects, we have taken a first step towards describing the processes that result in peer group homogeneity. But we need real process studies to tell us exactly how selection and socialization occurs. If, for instance, socialization occurs because frequent contact allows behaviors to be copied ('contagion effect'), we would expect socialization to occur more often in high frequency contact relationships. If socialization occurs through the means of thought sharing and discussion we would expect socialization to mainly occur within peer groups that are defined by intimate relations motivated or characterized by a willingness to share thoughts and discussions. We would also expect socialization to occur more in girls' networks, as there is some evidence that girls' friendships are more defined by thought sharing than boys' friendships (Van Houtte, 2004), and girls talk more about what they have learned in school (Bishop et al., 2004). Girls also repeatedly view their friendships as more positive than boys and know more about their friends than boys do (Berndt & Keefe, 1995). Yet we found no evidence of increased socialization for girls, suggesting that discussion and thought sharing is not the (most important) process through which socialization occurs, at least for academic achievement. We know of no micro-developmental studies that closely and intensively followed children characterized by particular peer relationships to find out what interaction processes are at stake in selection and socialization processes, and feel this area of research would benefit greatly from such a study.

### **Educational Implications**

Our finding that students influence each other's achievement entails a challenge to find out whether and how this can be used for developing an educational tool. Although we hope that with time peer interaction might start serving particular learning goals, it is perhaps presumptuous to expect

teachers or parents to influence preferences for friends or peer networks in the classroom. Teachers, however, can place students in cooperative dyads or groups. Hence, teachers can influence the interaction students have with each other. It would be interesting to test whether the socialization effects also occur within teacher-formed cooperative groups. Positive teacher-steered interaction experiences might influence future (free) choice of cooperation partners. Obviously, not just finding a way to give peers a more prominent role in students' formal learning is at stake here, but also the question how to make sure that peers have a positive impact, leading to gains in competence.

To conclude, we have shown in this study that the peer context is relevant for the academic achievement development of adolescents. Adolescents do not select peers on the basis of their achievements, but they are influenced by the language achievement of their peers.

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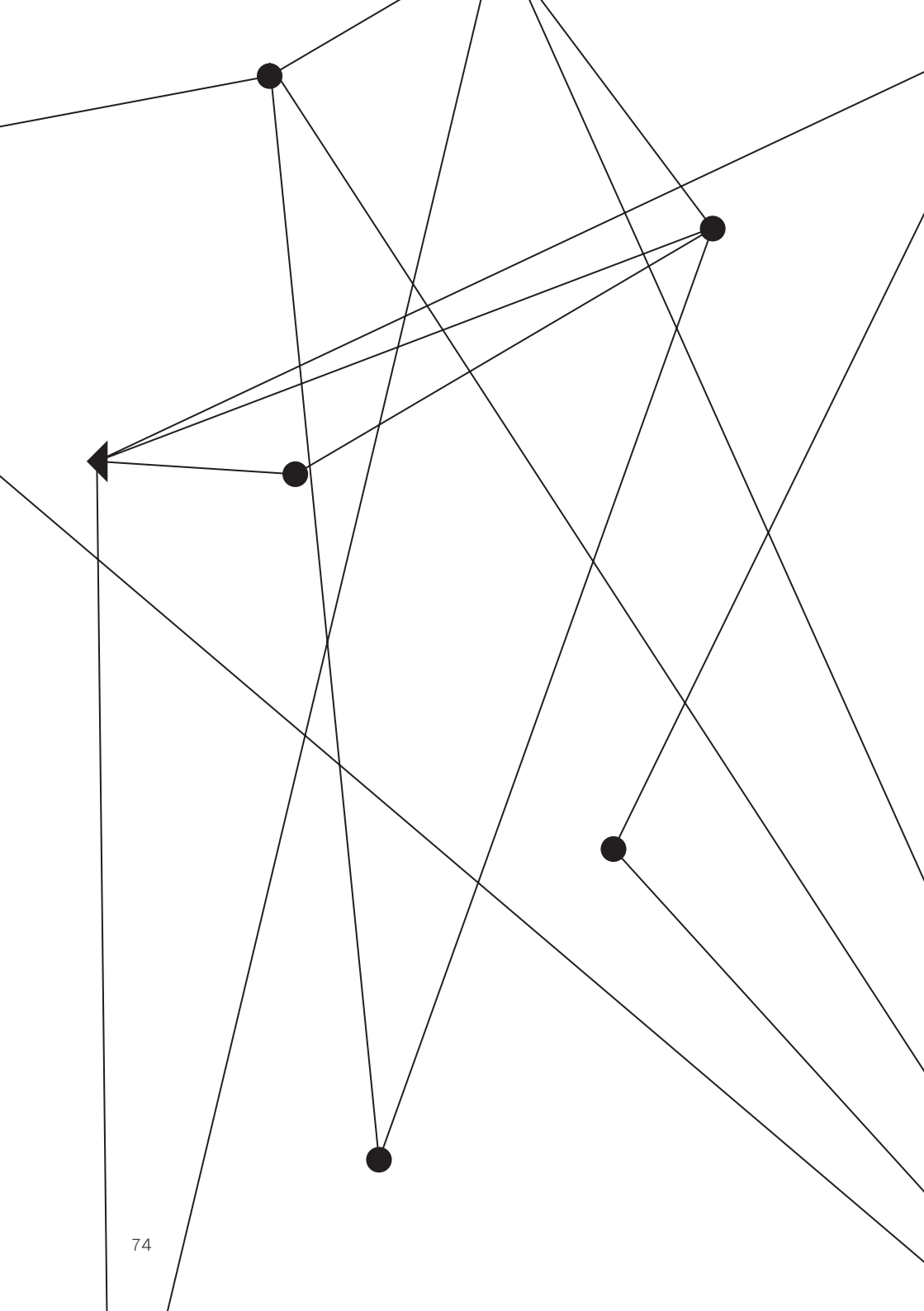


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## CHAPTER 4

# Peer Influences on Internalizing and Externalizing Problems among Adolescents: A Longitudinal Social Network Analysis

## Abstract

Adolescents who like each other may become more similar to each other with regard to internalizing and externalizing problems, though it is not yet clear which social mechanisms explain these similarities. In this longitudinal study, we analyzed four mechanisms that may explain similarity in adolescent peer networks with regard to externalizing and internalizing problems: selection, socialization, avoidance and withdrawal. At three moments during one school-year, we asked 542 adolescents (8<sup>th</sup> grade, M-age = 13.3 years, 51% female) to report who they liked in their classroom, and their own internalizing and externalizing problems. Adolescents tend to prefer peers who have similar externalizing problem scores, but no significant selection effect was found for internalizing problems. Adolescents who share the same group of friends socialize each other and then become more similar with respect to externalizing problems, but not with respect to internalizing problems. We found no significant effects for avoidance or withdrawal. Adolescents may choose to belong to a peer group that is similar to them in terms of externalizing problem behaviors, and through peer group socialization (e.g., enticing, modelling, mimicking, and peer pressure) become more similar to that group over time.

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# 1 Introduction

In the Netherlands, as in other countries, classrooms in middle schools are a social unit in which adolescents follow classes and socialize together. Though they may have different teachers for different courses, all children in the class remain together, at least throughout a year. Though this stable and mostly secure social environment offers advantages, peers may also affect each other's externalizing problem behavior (Burk, Kerr, & Stattin, 2008) and internalizing problem behavior (Haselager, Hartup, Van Lieshout, & Riksen-Walraven, 1998). Similarity between friends is often described as friendship homophily (e.g., Mercer & DeRosier, 2010). Being or becoming similar as regards salient characteristics and characteristics that matter to adolescents contributes to mutual acceptance and popularity (Laursen, Hafen, Kerr, & Stattin, 2012). Similarities between adolescent friends may be explained by friends becoming more similar over time, processes in which peers that are similar befriend one-another, or by processes in which adolescents that are dissimilar from the peer group either remove themselves or avoid a group.

Adolescents becoming more similar to one another over time has been referred to as socialization (cf., Mercer & DeRosier, 2010). Towards adolescence, children tend to become more challenging for themselves as well as for their environment. The prevalence as well as the intensity of both externalizing and internalizing problem behavior rise (Eccles, 1999; Martel, 2013). Adolescents' social network of peers is partly responsible for this increase. Through processes like peer pressure, modeling, mimicking and instruction or through a combination of these, they socialize each other and eventually become more similar (cf., Mercer & DeRosier, 2010). When dealing with a type of externalizing problems that is commonly referred to as delinquency or anti-social behavior, this socializing is actually deviancy training (Dishion & Dodge, 2005). With regard to internalizing problem behavior, this socialization may be explained in terms of co-rumination; the excessive discussing of problems between peers (Rose, 2002). Not all similarity in peer relationships and friendships is due to socialization; adolescents are likely to choose or



select friends that are similar to them as regards important characteristics, including problem behavior (Burk, Steglich, & Snijders, 2007). Other mechanisms have been suggested to account for peer similarity, namely withdrawal and avoidance. Withdrawal means that depressed children stop their engagement with dissimilar peers, whereas avoidance means that peers try not to interact or communicate with dissimilar peers. As a result of withdrawal and avoidance, depressed children may end up with a peer group of similarly depressed children (Schaefer, Kornieko, & Fox, 2011).

In the current study, we focus on social network influences on adolescents' internalizing and externalizing behaviors. The current article expands upon the existing literature in three ways. First, though both selection and socialization effects have been reported for internalizing and externalizing behaviors, most studies focus on either internalizing or externalizing behaviors, whereas internalizing and externalizing problems frequently are experienced concurrently (Dubois & Silverthorn, 2004; Sameroff, 2000). This is referred to as co-morbidity. Studying these problems separately easily leads to misattributions or incomplete explanations. By concurrently studying internalizing and externalizing problems, this caveat is avoided. Second, relatively few studies have analyzed withdrawal and avoidance effects, especially for externalizing problems. Third, most studies on peer influences on externalizing problem behaviors focus on more severe forms of externalizing problems, in the current study we shall focus on less severe but more frequent forms of externalizing problem behaviors.

### **Peer Influences on Externalizing Problems**

There is a large body of literature concerning socialization and selection effects of adolescents' delinquency, and these studies have often reported support for both selection and socialization (Burk et al., 2008; Burk et al., 2007; Svensson, Burk, Stattin, & Kerr, 2012). Peer similarity in terms of delinquency can be explained using the differential association theory (Matsueda, 2001), which states that individuals in a group that has a favorable attitude towards crime will have access to learning and opportunities that will make them more

likely to commit a criminal act themselves, or the deviancy training theory (Dishion & Dodge, 2005). The latter suggests that adolescents' antisocial behavior will increase as a result of peer approval provided when adolescents share, discuss or plan aggressive and antisocial behaviors. Social control theory (Hirschi, 1969) may help to explain the selection of adolescent peers, because it suggests that adolescents with weak ties to society and conventional institutions may engage in delinquency, and select like-minded friends. It has even been suggested that socialization and selection do not happen independently, but that during adolescence the opportunities to select delinquent friends increases because parental supervision diminishes, and that this wider available network of delinquent friends then provides new learning opportunities (socialization) with regard to delinquent behavior (Snyder et al., 2005). However, Weerman (2011) suggested that peer influence is not a decisive factor in adolescent delinquency, as in his study he found no support for selection and only weak support for socialization with delinquency as a dependent variable. Weerman (2011) suggested that adolescents' friendship choices are more the result of general mechanisms, such as proximity and reciprocity, than of delinquency.

Hitherto, milder externalizing behaviors have received less attention in the peer similarity literature than delinquency (Burk et al., 2008; Burk et al., 2007; Svensson et al., 2012; Weerman, 2011) or substance use (Knecht, Burk, Weesie, & Steglich, 2011; Steglich, Snijders, & West, 2006; Urberg, Degirmencioglu, & Tolson, 1998). This attention for graver types of adolescents' externalizing problem behaviors seems unbalanced in light of the fact that most adolescents share a considerable part of their time in school classes. The majority of infractions in classrooms are of a non-grave, nonviolent nature. They are more akin to disobedience (Raffaele Mendez & Knoff, 2003), or classroom disruptions (Raffaele Mendez & Knoff, 2003; Skiba & Rausch, 2006). Though compared to delinquency and substance use these may seem small problems, such 'small' but frequent disruptions are a significant source of stress for teachers (Clunies-Ross, Little, & Kienhuis, 2008), and an important reason for student expulsions or suspensions.

These are likely to increase future student misbehavior (Skiba & Rausch, 2006). Though we know less of peer influences on milder forms of behavior problems, Baerveldt, Völker and Van Rossem (2008) suggested that peer influences will be more pronounced for lighter forms of delinquency than for more severe delinquency, because adolescents who demonstrate severe problem behaviors are likely to have problems that make it difficult to create and maintain friendships.

It has been suggested that rejection plays a central role in the development of externalizing problems among adolescents. Adolescents who demonstrate problem behaviors may be rejected by their peers, and thus end up making friends with similar behavior problems. This group of friends can then serve to further socialize problem behaviors within the group (Vitaro, Pedersen, & Brendgren, 2007). However, several scholars also point out that engaging in externalizing problem behaviors is often appreciated by adolescents, and may serve to enhance popularity among peers (Ellis et al., 2012; Govender, 2011; Salmivalli, 2010). This potentially makes it an important characteristic in friendship selection (Snyder et al., 2005). Baerveldt and colleagues (2008) explain that peer similarity among the most delinquent peers may happen because delinquent adolescents withdraw or are rejected from normative peer groups and 'end up' with delinquent peers, but also suggest that for lighter forms of problem behavior such rejection is less likely to happen. Overall, most existing studies suggest that peer influences shape adolescents' problem behaviors, but which peer mechanisms are most influential remains unclear.

### **Peer Influences on Internalizing Problems**

Similar to externalizing problems, many studies now suggest peer influences on internalizing problems. Studies investigating the characteristics of friends of children with internalizing problem behavior have provided evidence for friends who are similar with regards to depressive complaints (Haselager et al., 1998), anxiety (Mariano & Harton, 2005), suicide ideation and attempts (Yoder, 1999), and general internalizing problems (Henrich, Kuperminc, Sack, Blatt, & Leadbeater, 2000). Pachucki, Ozer, Barrat, and Cattuto (2015) found

no support for socialization, but Mercer and colleagues (2010), and Prinstein and Stevens (Prinstein, 2007; Stevens & Prinstein, 2005) did. Giletta and colleagues found support for socialization, but only in best friendship dyads and with female adolescents (Giletta et al., 2012). Others found support for selection (Hogue & Steinberg, 1995), and for a combination of selection and socialization (Kiuru, Burk, Laursen, Nurmi, & Salmela-Aro, 2012; Reitz, Dekovic, Meijer, & Engels, 2006; Stevens & Prinstein, 2005). Co-rumination may explain similarities in adolescent's internalizing problem behaviors. Co-rumination refers to the excessive discussing of problems between peers, and may simultaneously strengthen friendships, but also contributes to an increase in internalizing problems (Rose, 2002; Rose, Carlson, & Waller, 2007). With regard to selection processes, it has been suggested that there is an interplay between selection and de-selection processes (Van Zalk, Kerr, Branje, Stattin, & Meeus, 2010), wherein similarly depressed peers are selected as friends and non-similar peers are deselected as friends. The selection of depressed peers as friends suggests that there is a preference among adolescents to befriend similarly depressed peers. Depressed people may start to prefer the company of similarly depressed people, who may be more apt at providing comfort (Rook, Pietromonaco, & Lewis, 1994). Moreover, depressed friends may provide a social comparison which may make one feel better about one's own depression (Gibbons, 1984). However, Coyne (1976) suggests that an initial reaction to a depressed interaction partner may be one of pity and sympathy, but persisting complaints and pleas for help are likely to lead to rejection and the indirect expression of resentment. In line with this reasoning, Schaefer and colleagues (2011) suggest an explanation of similarities in depression between adolescent friends that does not focus on selection but on withdrawal (similar to de-selection) and avoidance (similar to rejection). They state that depressed adolescents make unattractive friends even to similarly depressed peers, but because they are rejected by everyone else, they will have to 'lower their standards' and accept friendship with similarly depressed peers. Furthermore, because of negative reactions depressed adolescents may receive from friends and peers, they may invest less in their existing friendships and eventually withdraw from them. Much

like externalizing problems, studies point to peer influences on internalizing problems, but again it remains unclear which mechanisms are most important in explaining peer similarity in internalizing problems.

## **Current Study**

The current study is meant to advance our knowledge about youth peer influences on both internalizing and externalizing problem behavior. Because we wanted to focus this study on problems that were prevalent among adolescents, we focus on relatively less severe but more frequently manifested externalizing problem behaviors. Previous studies on peer influences on externalizing problem behavior strongly focused on major or minor delinquent acts (Burk et al., 2008; Burk et al., 2007; Svensson et al., 2012). Other additions over existing literature include the simultaneous inclusion of internalizing and externalizing problems, and the simultaneous inclusion of selection, socialization, withdrawal and avoidance effects, which to the best of our knowledge have not been combined in a single analysis for externalizing or internalizing problem behavior. The simultaneous inclusion of internalizing and externalizing problems hitherto has only been provided by Van Zalk et al. (2010).

In the Netherlands, students in the eighth grade receive almost all of their lessons in the same class and stay together as a class. This class is the social and educational unit, and pupils do not move between classes as is common in school systems in other countries. Therefore, we chose to analyze the in-class networks of these adolescents. For this study, we collected data for entire classrooms, where each student reported on their own behavior, thereby eliminating inflated similarities caused by projection effects (Baerveldt et al., 2008; Prinstein & Wang, 2005).

Earlier research reports socialization and selection effects for externalizing problem behaviors (Burk et al., 2008; Burk et al., 2007), and the existence of avoidance and withdrawal effects have been suggested (Baerveldt et al., 2008; Snyder et al., 2005), though not actually studied. Literature is

somewhat contradictory, especially regarding the existence of avoidance effects for externalizing problem behavior. Based on Baerveldt et al. (2008), we expect that for relatively lighter externalizing problem behaviors there will be selection and socialization effects, but no avoidance or withdrawal effects. Earlier research regarding peer influences on internalizing problem behaviors suggests the existence of socialization, selection, withdrawal and avoidance. Based on the results regarding co-rumination (Rose, 2002; Rose et al. 2007) and the results of Van Zalk et al. (2010), we hypothesize socialization effects for internalizing problems. The theory and results regarding the existence of selection, withdrawal and avoidance effects is more contradictory, but based on the work by Coyne (1976) and Schaefer et al. (2011), we expect avoidance and withdrawal but no selection effects for internalizing problems.

Because both ethnicity (e.g., Van Geel & Vedder, 2010) and gender (e.g., Leadbeater, Kuperminc, Blatt, & Hertzog, 1999) have been found related to internalizing and externalizing problems, and simultaneously both gender and ethnicity have been found to be related to friendship selection (e.g., Baerveldt, Zijlstra, De Wolf, Van Rossem, & Van Duijn, 2007; Burk et al., 2007), we control the analyses for gender and ethnicity selection effects.

## 2 Method

### Participants

The sample used for this study consisted of 542 students (51% female) from 24 eighth grade classes in four schools in the western part of the Netherlands. Students ranged in age from 12 to 16 years ( $M$ -age = 13.3 years;  $SD$  = 0.5), and 98% of the students were early adolescents (aged 14 or less) during the first round of data collection. The sample was ethnically mixed: 62% of the students had a Dutch background, 11% were Turkish, 2% Moroccan, 1% Surinamese, 1% Dutch-Antillean and 16% had some other ethnic background, many with a mixed ethnic background, e.g., Dutch-Moroccan. For 8% percent of the pupils the ethnic background was not known. The highest level of education that either parent finished determined SES: 4.1% did not complete

school or finished only primary school, 15.3% finished junior vocational high school, 11.4% general academic junior high school, 9.2 % pre-university level school, 6.5% senior vocational high school, and 16.6% held a university degree. Many students did not know their parents' education or did not answer the question about their parents' education, viz, 33.9%.

## Measurements

**Peer nominations.** Students could nominate up to seven students that they liked within their classroom, although some nominated more than seven. We chose to include all the nominations the students made. We then created a matrix for each classroom wherein a one indicated a nomination of a classmate (*like*), also referred to as a tie, and wherein a zero indicated the absence of a nomination, also referred to as the absence of a tie. Note that ties in the matrix, were not necessarily reciprocated, so that each nomination was reflected as a tie in the matrix, regardless of reciprocity. Using reciprocated nominations as opposed to unilateral nominations will lead to a loss of information because when using unilateral nominations missing actors cannot nominate other children, but can receive incoming ties, which is not possible when using reciprocated nominations. The Siena program accounts for reciprocity through inclusion of a reciprocity parameter (for a similar analysis procedure see Sentse, Kiuru, Veenstra, & Salmivalli, 2014). Classrooms tended to be rather small, so for each school the nominations of the students of all participating classrooms were combined into one school matrix, to preserve power in the statistical analyses. Because students could not nominate out-of-class friends, potential ties between students from different classrooms were coded as structural zeroes, representing the impossibility of ties between these students in our model.

**Background variables.** Gender, ethnic background, and SES were used as background variables. Ethnic background was measured by asking the students to mention in which country their parents were born. SES was measured by asking the students to report the highest level of education reached by their parents.

**Externalizing problem behavior.** For our measure of externalizing problem behavior, we used eight items that measured maladaptive behavior. Each started with “How often did you ...”. The items were: 1) tell a lie; 2) have a serious fight with a teacher; 3) exhibit bad behavior for which you were sent out of class; 4) lose your patience because you had to wait very long; 5) tease another student; 6) swear at a teacher; 7) have to go to the principal because of something you did; 8) bully another student. This newly formed self-report scale was inspired by other scales (Bendixen & Olweus, 1999; Koerhuis, 2007) and proved to be reliable (Cronbach’s  $\alpha = 0.84$ ). A five-point response scale was used ranging from *Never* to *Often* in the course of the last year. Because most students scored low on behavior problems, rounding the original continuous scores off to integers would have resulted in a very limited variation in the data. To solve this problem scale scores were multiplied by 3 and then rounded before entering them into the analyses (see Burk et al. (2007) for the application of a similar procedure).

**Internalizing problem behavior.** Our measure for internalizing behavior is a self-report scale first used in the ICSEY study (Berry, Phinney, Sam, & Vedder, 2006). We choose to use this scale because classrooms in the Netherlands tend to be ethnically diverse, and the ICSEY scale for internalizing problems was found unidimensional and reliable across various ethnic groups (Berry et al., 2006). It consists of 15 items designed to measure depression, anxiety, and psychosomatic symptoms. Sample items are: “I feel tired.” and “My thoughts are confused.” Students could indicate their answer on a five-point response scale, ranging from *Never* to *Often*. In the current study the scale has a Cronbach’s alpha of 0.86. Because our analytic technique, SIENA, only accepts integer numbers as values for outcome variables, the scores were rounded ( $\geq .05 = 1$ ) before entering them into the analyses, thus providing a possible range of scores from 1 to 5.

## Procedure

A researcher administered questionnaires, with teachers present. During one school year, each school was visited three times, once during autumn,



once in winter and once in spring. The data-collection moments were approximately three months apart. During each round of data collection an identical questionnaire was administered. All students in each classroom were invited to participate in the study. They were informed that they could refrain from participating and that the information they provided would be treated confidentially and would only be seen by the research team. Parents received information prior to the study, and were invited to inform the school if they did not want their child to participate. The participation rate for the schools was lower than 30 percent, but for the consenting schools no parents withdrew their children from the study and all students decided to participate.

### **Plan of Analysis**

For the analyses we used a social network analytic approach: the Simulation Investigation for Empirical Network Analysis (SIENA; Snijders, Steglich, Schweinberger, & Huisman, 2010). An important reason for using this approach is that it takes into account the so-called structural effects within social groups when studying the interplay of selection and socialization effects of adolescents. Another important benefit of SIENA is that selection and socialization effects can be disentangled. SIENA was designed to analyze social network models with repeated measures using dynamic actor-oriented models. A dynamic network consists of ties between actors that can change over time. Actors, in the current study the adolescents, in a network may 'choose' to start new ties, terminate old ties, or do nothing. This reflects social situations wherein people can, develop new sympathies for people in a network, lose their sympathy for someone, or wherein status quo can be preserved. The probabilities for a choice depend on the objective function, which expresses how likely it is that an actor changes his or her network in a particular way. Effects can be included in this objective function to test hypotheses or to control for covariates and structural network effects (Snijders et al., 2010; Snijders, Van de Bunt, & Steglich, 2010).

In our analyses we controlled for several structural network effects. We controlled for reciprocity (the tendency to return a friend's nomination)

because in general people tend to reciprocate ties, and Geodesic distance of two (a negative parameter suggests the tendency for network closure: becoming friends with friends of friends), because people tend to become friends with friends of friends. Such effects are very common in most social networks, thus it is advised in the Siena manual to always control for structural network effects (Snijders, Steglich et al., 2010). Because Haynie (2001, 2002) has shown that the density within a network is a powerful predictor of anti-social behavior, we also control for density, which reflects whether people tend to have many or few ties with others. As outlined in the current study section, we also control for gender and ethnicity selection effects, because adolescents tend to select friends that are similar in terms of gender and ethnicity, and these characteristics are tied to internalizing and externalizing problem behavior.

Several effects were included in the objective function to test our hypotheses. Selection effects were included to test whether adolescents tend to select peers that are similar to them in terms of internalizing and externalizing problem behaviors. A positive and significant selection parameter for internalizing and externalizing problem behaviors would suggest the existence of a selection effect on these variables. Socialization effects were included to test whether adolescents tend to become similar to preferred peers in terms of internalizing and externalizing problem behaviors. A positive and significant socialization parameter for internalizing and externalizing problem behaviors would suggest the existence of a socialization effect on these variables. Withdrawal and Avoidance effects are studied by modeling the ego and alter effects of internalizing and externalizing problem behavior (Schaefer et al., 2011). A negative parameter on an ego internalizing or externalizing parameter (withdrawal) would suggest that adolescents who score high on this behavior tend to nominate fewer peers as friends, whereas a negative alter internalizing or externalizing parameter (avoidance) would indicate that adolescents who score high on this parameter are nominated less often by peers as friend.

In the current study we used a two-step approach for the analyses. First we ran network analyses per school. Then we performed a meta-analysis on the outcomes of the first analyses, to combine the findings from the individual schools (Snijders, Steglich et al., 2010).

### 3 Results

The means, standard deviations and correlations for internalizing and externalizing problems are provided in Table 1. A repeated measures ANOVA indicated no mean changes for either internalizing [ $F(2, 838) = 2.839, p=.059$ ] or externalizing [ $F(2, 838) = .561, p=.571$ ] problems over time in the entire sample. There were 122 children with missing data on externalizing and/or internalizing problems and were therefore excluded from the repeated measures ANOVA. These children could not provide outgoing ties, but could be nominated as friends, and were therefore not excluded from the SIENA analyses (see Huisman & Steglich, 2008 for an extended discussion on the handling of missing data in SIENA). Correlations between internalizing problems across the three measurements were high and statistically significant, as were correlations between externalizing problems across the three waves.

**Table 1.** Means, standard deviations and correlations for internalizing (Int.) and externalizing (Ext.) problems at the three measurements.

	<i>M(SD)</i>	Int.(T1)	Ext.(T1)	Int.(T2)	Ext.(T2)	Int.(T3)	Ext.(T3)
Int.(T1)	2.13 (.56)	-					
Ext.(T1)	1.52 (.45)	.11*	-				
Int.(T2)	2.14 (.63)	.66***	.15**	-			
Ext.(T2)	1.53 (.51)	.09	.67***	.34***	-		
Int.(T3)	2.07 (.62)	.61***	.15**	.74***	.18**	-	
Ext.(T3)	1.52 (.46)	.16**	.70***	.23***	.68***	.29***	-

\*= $p < .05$ ; \*\*= $p < .01$ ; \*\*\*= $p < .001$

As outlined in the method section, we first ran separate analyses for each school and then combined the outcomes of these analyses using a meta-analysis. The separate analyses for each school converged well, as indicated by low t-ratios and no standard errors for parameter estimates that exceeded three (Snijders, Steglich et al., 2010). After analyses for separate schools were run, results for the separate schools were combined in a meta-analysis to test our hypotheses. The results of the meta-analysis are summarized in Table 2. The 'network rate functions' are not related to the objective function. This reflects how often children change their network or their behaviors. The 'tendency' reflects whether respondents tended towards high or low scores on the scale. The non-significant and near zero parameter in our case reflects that children tended to score towards the middle of the scales. The 'quadratic tendencies' reflects the effect of the behavior upon itself. The structural network effects 'reciprocity' and 'geodesic distances of two' were significant, which indicates that adolescents tended to reciprocate friendship nominations and tended to become friends over time with friends of friends. The density parameter was negative and significant, which indicates that adolescents tend to have few ties with others. The sex similarity and ethnic similarity effects had positive values and were significant, which indicates that adolescents tended to select friends with similar gender and ethnic background.

Our hypotheses regarding externalizing problem behaviors were supported. We found a positive and significant socialization parameter for externalizing problem behavior, and a positive and significant selection parameter, which indicates support for our hypotheses regarding socialization and selection of externalizing problem behaviors.

**Table 2.** Outcomes of the SIENA analyses on selection and socialization problem behavior.

	Mean parameter		SD		$\chi^2$
	Est.	S.E.	Est.		
<b>Network dynamics</b>					
Network rate 1	1.98***	0.19	0.25		10.43*
Network rate 2	1.69***	0.13	0.00		7.17
Density	-2.71***	0.15	0.00		2.71
Reciprocity	1.86***	0.22	.37		9.96*
Geodesic distances 2	-0.97*	0.30	0.45		4.50
sex similarity	1.96***	0.25	0.00		1.93
Ethnic background similarity	0.24**	0.10	0.00		3.22
Internalizing alter (avoidance)	-0.01	0.04	0.00		2.82
Internalizing ego (withdrawal)	-0.02	0.04	0.00		3.02
Externalizing alter (avoidance)	-0.02	0.04	0.00		0.92
Externalizing ego (withdrawal)	0.06	.03	0.00		1.03
Internalizing similarity (selection)	0.14	0.51	0.00		1.94
Externalizing similarity (selection)	1.25*	0.56	0.00		0.85
<b>Behavioral dynamics</b>					
Internalizing rate 1	3.69***	0.35	0.00		2.28
Internalizing rate 2	3.14***	0.58	1.06		8.86
Externalizing rate 1	3.47***	0.64	1.12		9.56*
Externalizing rate 2	2.58***	0.23	0.00		1.09
Tendency internalizing	-0.07*	0.03	0.00		3.85
Quadratic tendency internalizing	-0.03*	0.01	.00		4.42
Tendency externalizing	-0.04	0.03	0.00		0.71
Quadratic tendency externalizing	-0.02	0.01	0.00		4.76
Internalizing average similarity (socialization)	1.91†	1.04	1.51		6.95
Externalizing average similarity (socialization)	3.50***	1.01	0.00		3.05

†  $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

These results suggest that adolescents tend to like peers that are similar to them in terms of externalizing problem behavior and become more similar to liked peers in terms of externalizing problem behavior. Furthermore, in line with our hypotheses, we found non-significant effects for the ego externalizing problems effect (withdrawal) [ $p > .10$ ] and the alter externalizing problems effect (avoidance) [ $p > .20$ ], which suggests that peers with high problem behaviors do not nominate fewer peers, which would indicate withdrawal, nor do they receive fewer nominations from peers, which would indicate avoidance.

Our hypotheses regarding internalizing problem behaviors were only partially supported. As expected we found a non-significant selection effect for internalizing problems [ $p > .20$ ], which suggests that peers do not nominate peers that are similar to them in terms of internalizing problem behaviors as liked. However, contrary to our hypotheses we also found no withdrawal or avoidance effects for internalizing problem behaviors, as indicated by non-significant internalizing ego and internalizing alter effects. This suggests that children who report many internalizing problems do not nominate fewer peers as liked, nor are they nominated less often as liked by their classmates than children with fewer internalizing problems. We found a marginally significant effect for socialization ( $p < .10$ ), which we interpreted as small support for our hypothesis regarding the socialization of internalizing problems.

## **4 Discussion**

In this longitudinal study, we set out to test peer influences with regard to two types of problem behavior: internalizing problem behavior and externalizing problem behavior, while controlling for structural network effects and gender and ethnicity selection effects. Many previous studies on peer mechanisms focus on either internalizing or externalizing behaviors, whereas internalizing and externalizing problems frequently are experienced concurrently (Dubois & Silverthorn, 2004; Sameroff, 2000). In the current study, we entered internalizing and externalizing problems simultaneously to avoid misattribution. Furthermore, we analyzed avoidance and withdrawal effects for both internalizing and externalizing problems.

With regard to externalizing problem behaviors, all our hypotheses were supported. In line with previous studies we found significant effects for socialization and selection (Burk et al., 2008; Burk et al., 2007; Svensson et al., 2012), but we did not find significant effects for avoidance or withdrawal. It has been suggested that adolescents with externalizing problems may have problems maintaining friendships and are often rejected by peers (Baerveldt et al., 2008; Vitaro et al., 2007), but Baerveldt et al. (2008) stated that this is probably mostly true for severely delinquent adolescents, who may have personality problems that impede their capacity to form social bonds. Lighter forms of externalizing problems, which were the focus of the current study, may even be a valued trait among adolescents as it may signal evolutionary fitness, deviance of adult norms and the capacity to gain control of resources (Ellis et al., 2012; Govender, 2011; Salmivalli, 2010).

Overall, we did not find any mean change in level of externalizing behavior problems: that adolescents become more similar to liked peers does not necessarily indicate that their problems increase, the mean level of problem behaviors may also decrease to become more similar to that of liked peers. It has been suggested that there are different peer groups, for example nerds and jocks, with their own norms regarding externalizing behaviors (England &

Petro, 1998). With regard to externalizing problems, adolescents may choose to belong to a peer group that resembles their initial levels of externalizing problem behaviors, and through mimicking, peer pressure and, perhaps for some groups, deviancy training (Dishion & Dodge, 2005) become more attuned to the group norm over time.

Our hypotheses for internalizing problems were only partially confirmed. As expected, and in line with Schaefer et al. (2011), we found no significant effects for selection, but contrary to our expectations we also found no support for avoidance or withdrawal. We found a marginally significant socialization effect for internalizing problems, which may have happened because of co-rumination (Rose et al., 2007). However, the effect size was small, and perhaps, as Weerman (2011) concluded for delinquency, peer influences on internalizing problems are small at best and maybe other factors are more important in the emergence of internalizing problems among adolescents. It has already been reported that selection and socialization effects for internalizing problems in the classroom are weak (Van Zalk et al., 2010) or absent (Pachucki et al., 2015). However, Van Zalk et al. (2010) concluded that peer influences on depression are most pronounced for peer relations outside the classroom, and Giletta and colleagues (2012) showed that peer socialization of depressive symptoms only occurred in very best friends dyads. Because people may react hostile or dismissive towards people who speak of their depressed mood (Coyne, 1974; Rook et al., 1994), it may be that adolescents are very selective with whom they share their depressed thoughts. Classmates who are merely liked may not be trusted enough as a discussion partner for internalizing problems, which may explain why we found absent (selection, avoidance, withdrawal), or weak (socialization) peer influences for internalizing problems. Outside of the classroom it may be easier to arrange a personal conversation in which adolescents feel comfortable enough to talk of internalizing problems: even when a classmate is trusted enough to share internalizing problems, other classmates might overhear, and, at least during school time, it might be difficult to privately talk to classmates.



The dismissive attitudes towards internalizing problems (Coyne, 1974; Schaefer et al. 2011) and the sometimes positive attitudes of adolescents towards externalizing problems (England & Petro, 1998) may help to explain why we found peer influences for externalizing problems but not for internalizing problems. However, we should also keep in mind that in contrast to internalizing problems, externalizing problems are easily visible to most students and are frequently made even more salient by teachers who correct or punish students for this behavior (Bryan, Day-Vines, Griffin, & Moore-Thomas, 2012). Internalizing problems may not be readily visible in a classroom setting, hence it would be more difficult to select friends with internalizing problems or mimic their behavior (see Van Workum, Scholte, Cillessen, Lodder, & Giletta, 2013, for a similar reasoning in reference to happiness). To the best of our knowledge, this is the second study to examine peer influences on externalizing and internalizing problems simultaneously, we only know the study by Van Zalk et al. (2010) to also include both measures simultaneously. Given that internalizing problems and externalizing problems tend to be highly correlated, and may even be affected by the same underlying causes (Reitz, Deković, & Meijer, 2005), it may be that previous studies found peer influences on internalizing problems because externalizing problems were not controlled for in the analyses. We cannot but emphasize that based on our study it would be too soon to conclude that previous results regarding peer influences on internalizing problems are fully explained by not controlling for externalizing problems. We do suggest however, that future studies on peer influences on problem behavior should include both internalizing and externalizing problem behaviors in the analyses.

Our results on externalizing problems are in line with earlier studies reporting both selection and socialization effects on adolescents' delinquency. We used unilateral friendship nominations as the starting point of our analyses. Though this method establishes more contacts between adolescents, it may not adequately identify the best friendships. Stone and colleagues (Stone et al., 2013) found that only in reciprocal friendships children were likely to be similar with respect to internalizing problems, not in unilateral

peer relationships. And Giletta and colleagues (2012) showed that peer socialization of depressive symptoms only occurred in very best friends dyads. In the current study we may not have found selection and socialization effects for internalizing problems, because we focused on unilateral friendships only.

Our focus on within class social networks is an important limitation. Although students of about 13 years living in the Netherlands spend most of their time during weekdays in class with their classmates, classmates are by no means the only peers or persons to meet and to influence or to be influenced by. It is likely that students are influenced also by their out-of-school peers (Kiesner, Kerr, & Stattin, 2004; Van Zalk et al., 2010), by their parents and by other adults (Vedder, Berry, Sabatier, & Sam, 2009). Also, we had three moments of measurement with approximately three months in between each moment of measurement, while our measurement instruments instructed students to give an account concerning their problem behaviors over the last year. Given that our scale anchors started at *never*, and our questionnaires contained eight (externalizing) and fifteen (internalizing) items that reflected highly prevalent behaviors among adolescents, we believe that the scales were sensitive enough to 'capture' changes in the measured constructs. Furthermore, our general focus on internalizing problems differs from the focus on particularly depression in other articles on peer influence (Schaefer et al., 2011; Van Zalk et al., 2010). Future studies should establish to what extent the results in the current study can be generalized to other populations, and can be replicated (Bakker, Van Dijk, & Wicherts, 2012; LeBel & Peters, 2011).

The current findings make clear that the prevention of minor norm-breaking behavior in young adolescence should focus on a combination of both peer socialization (how to engage peers in more or less norm-breaking behavior) and peer selection (what makes norm breaking peers interesting?). This may seem a bigger challenge than it actually is. A good class climate, open discussions between teachers and students about norms and rules and how to interpret and maintain them, may improve the situation that is rather common, albeit disruptive (Olweus, 1997; Rigby, 2008; Troop-Gordon & Ladd, 2013).

## **Conclusion**

In the current study, we found peer influences for 'light' externalizing problem behaviors but not for internalizing problem behaviors. In line with other studies and theories (Baerveldt et al., 2008; Snyder et al., 2005), it appears that at least mild externalizing problems are an important characteristic for deciding whom is liked or not among adolescents, and adolescents seem to adjust their externalizing behaviors to that of their peer group. We did not find peer influences on internalizing problems, and suspect that these are more likely to be affected by intimate relations, for example best friends, than by a preferred group of peers in the classroom (Giletta et al., 2012; Van Zalk et al., 2010). In conclusion, adolescents' externalizing problems especially may be affected by classmates; for this to happen, adolescents need not even be best friends. A mere preference for one another is enough to socialize externalizing problem behaviors.



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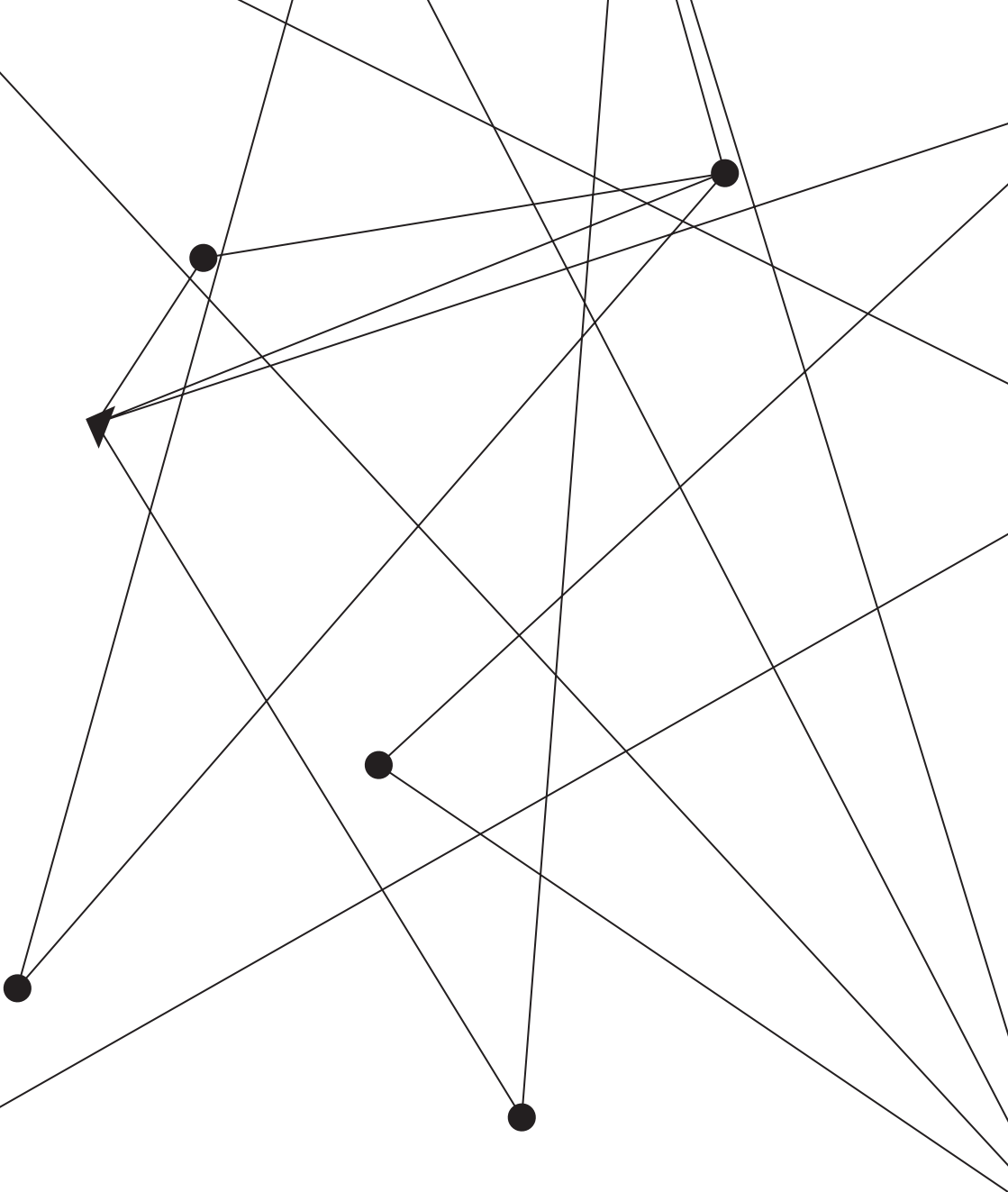
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## CHAPTER 5

# General Discussion

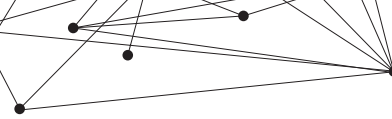


In this thesis, we studied peer relations in early adolescence. Peer contact is essential for adolescents, serving as a source of support, a context for learning and social and emotional development (De Abreu & Elbers, 2005; Masten, Juuvonen, & Spatzier, 2009). A known phenomenon in peer relations is homophily, i.e., the fact that most friends, casual contacts, or peers in a peer group are alike on a broad variety of characteristics or attributes. However, it is often unclear whether this homophily is the result of selection, where students select peers that are like themselves, or whether this is the result of socialization, where the individual student is influenced by his or her peers to become more alike over time. The focus in this thesis was on factors that have an important impact on students' educational attainment and well-being. The aim of this thesis was to explore which characteristics function as selection factors for peer relations and which characteristics are influenced by the peer group. We conducted three different studies, all dealing with young adolescents' social networks.

Our aim to analyze socialization and selection effects is strongly tied to our use of SIENA in chapters three and four: Using SIENA, selection and socialization effects can be disentangled and concurrently estimated; it can be analyzed whether a behavioral variable functions as a selection criterion for friendship and whether behavior changes as a result of the behavior of friends. Furthermore SIENA allows for the correct analysis of dependent data and takes structural effects within social groups into account. Such structural effects include the tendency for reciprocity (nominating somebody who nominates you as friend) and the tendency to become friends with friends of friends. In short, SIENA allows for the correct statistical analysis of social networks, whilst controlling for structural network effects and disentangling socialization and selection effects (Snijders, Steglich, Schweinberger, & Huisman, 2010).

In chapter two we studied two different types of peer relations of sixth graders (last year of primary school): social interaction networks and friendship networks. In this study, we focused on the role of ethnic background in

peer selection, while controlling for network effects such as reciprocity and transitivity, and for sociometric status. Based on the existing literature, we expected to find a stronger ethnic homophily preference for casual contacts than for friendship relations. However, we found that students exhibited a similar preference for ethnic homophily in both forms of peer relations. This suggests that ethnicity is as important in choosing friends as it is in choosing interaction partners. Not only does this reaffirm the similarity-attraction hypothesis, it also suggests that when it comes to ethnicity, similarity-attraction applies as much to casual contacts as it does to friendships. For teachers, this poses an important challenge because even at a casual level intercultural contact may not happen 'automatically'. Although the contact hypothesis, stating that intergroup contact leads to less prejudice and positive intergroup relations, is one of the best supported theories in social psychology (Beelman & Heinemann, 2014), simply placing children of different ethnic backgrounds in a room together does not lead to an increased inter-ethnic contact preference. Perhaps, even for casual contacts the similarity between students as regards characteristics that we did not focus on, i.e., the so-called hidden homophily (McPherson, Smith-Lovin, & Cook, 2001), influences preferences of children. However, because we did not test this explanation, we cannot validly contend what caused this preference. In our study we suggested that particularly casual contacts are important in schools, because it is these contacts, in contrast to more intimate friendship contacts, that schools or teachers are likely to be able to promote through pedagogical measures. However, we showed that even for casual contacts, students prefer to interact with others of a similar background. As stated before, one conclusion is that administrations of schools that value diversity in peer contact have to work harder to stimulate interethnic relations through active didactic approaches, such as ethnically heterogeneous cooperative learning groups. In light of these findings, we suggest that specific interventions, such as the jigsaw classroom (Aronson & Patnoe, 1997; Roseth, Johnson & Johnson, 2008), may be needed to establish intercultural contacts in the classroom. A recent meta-analysis by Beelman and Heinemann (2014) of studies on the effects of programs in preventing and reducing prejudice, and improving intergroup



attitudes, suggests that such programs implementing the contact hypothesis model are even more successful if they combine direct contact with training in empathy and perspective taking. However, simply suggesting that schools should all start using cooperative learning groups and make sure to implement programs for training students' empathy and perspective taking, is probably too simple. As commented in the second chapter, we found substantial differences between schools in terms of the strength of the ethnic homophily effect. Schools differ in the extent to which students are actually interacting with peers who differ in ethnic background. It could well be that this reflects that schools or school staff differ in attitudes and policies with respect to intercultural relationships and intercultural education. Perhaps schools should first be invited to develop and implement policies that are friendly to intercultural issues.

In chapter three, we broadened our attention to both selection and socialization processes in grade eight (second year of secondary education) friendship networks. We focused on the role of academic achievement, while controlling for the ethnicity similarity effect that we found was so important in our earlier study. Because report card grades are decisive for grade repetition and have a long term effect on students' educational attainment and social participation (Goza & Ryabov, 2009), we wanted to know whether students selected and socialized each other with regard to report card grades. Students may be supportive of formal learning in schools or may distract each other from this learning (Dodge, Dishion, & Lansford, 2006). Our expectation was that peers would socialize each other as regards academic performance. Indeed, we found that students socialize their peers' Dutch and English language achievements, and thus become more alike with regard to these achievements, but not their math achievement. This indicates that friends are important for language achievements. We found no selection effects for academic achievements, indicating that academic achievement does not function as a selection criterion for adolescents. In line with Dodge and colleagues (2006), our study suggests that friendship choices may indeed affect grades. This could be for better or worse; adolescents may entice one

another to do other things than study, but they may also help one another achieve better grades. Because grades declined over the course of our study the first process may be more prevalent than the second. The challenge for teachers and schools is to turn this socialization into a positive influence. As stated in chapter three, it is unrealistic to expect teachers, or perhaps even parents, to dictate which students become friends with one another. However, teachers *can* influence which students interact with one another through placement in the classrooms, assigned seating, cooperative work groups or dyads. It would be interesting to expand studies on peer socialization to find out whether teachers can implement certain social structures in the classroom as an aid to support students' mutual learning aimed at raising students' achievements. Of course, this is exactly what many cooperative working methods based on social-constructivism theory and the work of Vygotsky aim to achieve (Webb et al., 2008; Zakaria, Chin, & Daud, 2010). The fact that language achievement is influenced by peers, whereas math achievement is not, poses yet another interesting question. Explanations that we offer are that math has a high status in the Dutch curriculum (Maassen & Landsheer, 2000), that math scores are relatively strongly related to intelligence (and that math is a domain where intelligence is considered to be more important than in other curricular domains, Douglas, Burton, & Reese-Durham, 2008), and that math anxiety plays an important role in math achievement (Ashcraft, 2002). Hence, personal characteristics may be more important in math than they are for students' language competence and achievements, for which social contexts seem to be more important.

In our fourth chapter, we broadened both the type of peer effects that we focused on and the criteria that we studied. We studied four possible peer processes: selection, socialization, avoidance and withdrawal. While avoidance and withdrawal are not noted as likely effects that shape the peer group that students interact with, as regards academic achievement, these effects have been suggested as explanations for the selection and de-selection of *depressed* peers (Schaefer, Kronieko, & Fox, 2011). Avoidance refers to the process that students with certain attributes are less often



nominated as friends; they are avoided by their peers. Withdrawal refers to the process that students with particular attributes themselves nominate fewer peers, withdrawing themselves from social interactions. While these effects do not necessarily lead to increased similarity in problem behavior, they might influence the peer selection process, and through this selection process, influence the 'availability' of students for interaction. We studied these processes with regard to internalizing and externalizing problem behavior concurrently, to avoid misattribution, and focused specifically on lighter forms of externalizing problem behaviors. For externalizing problem behavior, as expected, we found evidence of both selection and socialization effects, and no evidence of avoidance or withdrawal effects. The selection and socialization effects are in line with earlier research (Burk, Kerr, & Stattin, 2008; Svensson, Burk, Stattin, & Kerr, 2012). Although other studies (e.g., Vitaro, Pedersen, & Brendgen, 2007) have stated that adolescents with externalizing problem behavior are often rejected by peers, we found no such avoidance effect. These earlier studies, however, described this effect for students with (severe) delinquent behavior. Perhaps we should be careful to compare our study to those studies, since we focused on relatively 'light' externalizing problem behavior. Previously it has been suggested that adolescents may avoid those peers who engage in severe forms of externalizing problem behaviors, such as delinquency (Baerveldt, Völker, & Van Rossem, 2008), but may actually value lighter forms of externalizing problems as they may signal evolutionary fitness, deviance of adult norms and the capacity to gain control of resources (Ellis et al., 2012; Govender, 2011; Salmivalli, 2010). For instance, adolescents who exhibit bullying behavior, are also in control of resources (Reijntjes et al., 2013). Our results fit this line of thought well, and suggest that practitioners should be mindful of the potential rewards elicited by (lighter) externalizing behaviors amongst adolescents.

Also in line with our hypotheses, we found no selection effect for internalizing problem behavior. However, contrary to our expectations, we neither found avoidance nor withdrawal effects. The lack of avoidance and withdrawal effects indicates that the proposed de-selection and rejection processes do

not explain the peer interactions for adolescents with internalizing problem behavior. Rather, the only effect found with regard to internalizing problem behavior was a trend towards socialization. This trend might indicate co-rumination between friends (Rose, Carlson, & Waller, 2007), but more research is needed to explicitly test whether and under which circumstances internalizing problem behavior is socialized by peers.

### **Limitations and Directions for Further Research**

In our first study, we tested whether the selection of friends and casual contacts was influenced by the ethnic background of the children. However, because our sample was very diverse, we ended up testing whether immigrant children had a preference for immigrant children, and native children a preference for native children. Of course, ‘lumping’ children with up to 11 different ethnic backgrounds together in one immigrant group, is rather blunt and a limitation to our study and its results. It would be interesting to see whether our results hold in classes where there are two or three specific ethnic groups, large enough to draw conclusions. In our second and third study, we asked students to indicate which classmates they liked. It is entirely possible that these students had out-of-class or out-of school friends who also socialized these students. However, due to our research design, we could not estimate the influence of these peers. The consequence of our choice of a design focusing on in school or in class social networks is that certain results may depend for their explanation on the design characteristics or limitations. For instance, in our study on internalizing and externalizing problem behavior, we found only a trend for socialization of internalizing problem behavior. Previous research has reported both support for socialization (Haselager, Hartup, Van Lieshout, & Riksen-Walraven, 1998; Henrich, Kuperminc, Sack, Blatt, & Leadbeater, 2000; Mariano & Harton, 2005) and no evidence of such support (Pachucki, Ozer, Barrat, & Cattuto, 2015) or only for female best friend dyads (Giletta et al., 2011; Giletta et al., 2012). The measure of friends that we used, was rather general, with adolescents naming up to seven peers that they liked. It could be that the socialization of internalizing problem behavior is stronger in best friend dyads or in friendship groups where intimate thought

sharing is more frequent. Such friendships allow for co-rumination that could lead to an increase in internalizing problem behavior (Rose et al, 2007). In social cognitive theory (Bandura, 1986), socialization is hypothesized to occur through communication. Peers give information about what is expected or what is valued, either directly to a specified peer or through gossip (also called *normative regulation*, see Eder, Evans & Parker, 1995). If socialization occurs through thought sharing, we would expect socialization to occur more frequently in groups where discussion and thought sharing are abundant. Here, a gender effect might be in play, as female friendships are more defined by thought and emotional sharing (Aukett, Ritchie, & Mill, 1988) However, Rancourt, Conway, Burk, & Prinstein (2013) found an opposite effect in all-male friendship groups. They found socialization effects with respect to dieting behavior. Such effects were not found in all-female friendship groups.

As stated in the introduction, some researchers operationalize ‘friendship’ as reciprocated ties between peers. Earlier we have been explicit in stating that in our analyses we used unilateral peer nominations based on liking. It is easy to understand that a focus on reciprocated ties would have resulted in fewer cases in our analyses, likely to result in statistical problems when using such complex designs as we did. This being said, it is important to realize that there are substantive issues, like co-rumination and disclosure, in peer socialization and selection that perhaps are likely better ‘captured’ when studying reciprocated peer relations. However, reciprocated ties are not necessarily a reflection of intimacy. A recent study by Kuhnt and Brust (2014) showed that networks of adult students based on a specific question namely “with whom would you talk about personal problems”, did not increase in reciprocity over time whereas networks based on more basic questions (“with whom do you spend time” or “of whom do you know whether they are in a stable relationship or not”) lead to an increase in reciprocity. To complicate matters, there is also some evidence that selection and reciprocity interact. For instance, Hafen and colleagues (Hafen, Laursen, Burk, Kerr, & Statin, 2011) report that 7<sup>th</sup> and 10<sup>th</sup> grade students who were not friends, but were more similar to each other with regard to (among others) self-esteem

and delinquency, more often evolved into a stable, reciprocated friendship, than students who differed more on these variables. As difference scores increased, the likelihood that a friendship was stable decreased. The usage of non-reciprocated ties for the study of internalizing problem behavior thus has both advantages and disadvantages. With regard to form of peer contact, there is evidence that there are many different peer contexts, such as classmates, friends, intimate or best friends, in or out of school, that, depending on the characteristic being studied, exert comparable or quite distinct socialization (Kiesner, Poulin, & Nicotra, 2003; McGloin, Sullivan, & Thomas, 2014; Urberg, Degirmencioglu, & Pilgrim, 1997; Zimmer-Gembeck & Kindermann, 2010). We chose to study in-class friends and determined friendship networks based on the nomination of classmates that students liked. Although Kindermann and Gest, for instance, state that “friendship groups are defined by feelings of liking between individuals” (p. 103, 2009), an important limitation of this choice is that we do not know for certain whether these networks differed in any way from networks based on specific questions such as “name three friends”. Nevertheless, we do compare the results of our studies with results from studies using networks based on specific (limited) friend nominations. The similarity in outcomes makes us feel confident about the validity of these comparisons. However, with regard to certain specific factors, such as internalizing and externalizing problem behavior, it would be interesting to contrast specific peer contexts, such as those between unilateral friendships and reciprocated friendships or between casual and intimate friendships.

We chose to work with network analysis in this thesis to model selection, socialization, avoidance and withdrawal in well-defined groups. Indeed, we chose a research design that allowed us to draw conclusions about these effects with regard to several factors. However, we did not directly study answers to the question *how* socialization is realized. Without research into this key question, there is a real danger that network studies simply offer more information about which specific criterion is or is not a factor in friendship selection or socialization, without any information that pertains to the practical application of this data: how can we stimulate positive development

within peer networks, and how can we offer insulation or promote resistance to negative peer effects? Specifically applied to our studies: how can we stimulate positive socialization with regard to academic achievement and problem behavior, resulting in higher achievements and abstaining from or decreasing problem behavior?

To conclude, this thesis broadened our understanding of peer selection and socialization effects. We found that ethnic background functions as a selection criterion for both early adolescents' friendships and casual contacts. Friends are also selected on the basis of minor externalizing problem behavior, but not on the basis of internalizing problem behavior or academic achievement. Language achievement and minor externalizing problem behavior are both socialized by friends, whereas math achievement is not. Overall, these studies indicate that both positive and negative peer influences are possible in schools. The studies offer insights into opportunities and challenges for schools and teachers to support the positive development of students, by promoting intercultural contact and positive scaffolding or socialization of language achievement. With regard to internalizing and externalizing problem behavior, the challenge lies perhaps in setting a normative school climate where lighter norm-breaking behavior does not signal social dominance, or leads to experiencing a feeling of reward.



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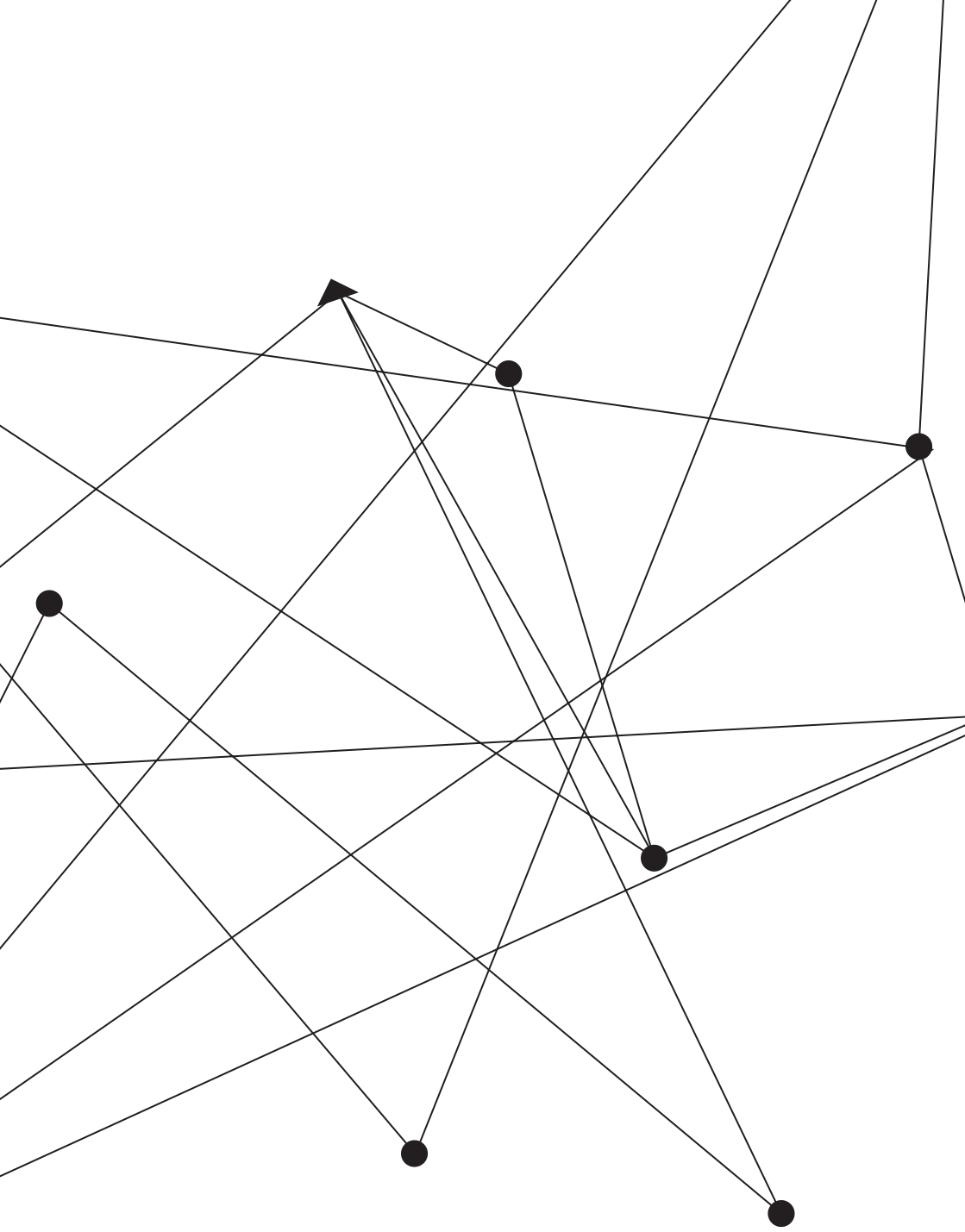
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# Samenvatting

## (Dutch Summary)



In dit proefschrift zijn verschillende studies beschreven naar de socialisatie en selectie van leeftijdsgenoten. Socialisatie verwijst hierbij naar het concept dat kinderen en adolescenten elkaar beïnvloeden door met elkaar om te gaan, terwijl selectie verwijst naar de factoren die kinderen en adolescenten gebruiken om leeftijdsgenoten te kiezen om mee om te gaan. Kinderen en adolescenten ontwikkelen zich mede door sociaal contact met leeftijdsgenoten. In de adolescentie intensiveert dit contact met leeftijdsgenoten zich rond bepaalde interesses en activiteiten en worden pubers (deels) meer gevoelig voor de invloed van leeftijdsgenoten. Deze dissertatie gaat over verschillende studies waarin is onderzocht op basis van welke kenmerken kinderen elkaar selecteren als vrienden of groepsgenoten, en op welke kenmerken ze elkaar socialiseren. Voor het onderzoek hebben we speciale technieken gebruikt voor de analyse van sociale netwerken. Deze technieken stelden ons in staat om tegelijkertijd selectie en socialisatie te testen, terwijl rekening kon worden gehouden met verschillende structurele kenmerken van het netwerk. Bij die structurele kenmerken gaat het om bijvoorbeeld reciprociteit oftewel wederkerigheid van relaties, en transitiviteit, het verschijnsel dat vrienden van vrienden, indirecte vrienden, vaak ook directe vrienden worden.

Na de introductie wordt in het tweede hoofdstuk de selectie van leeftijdsgenoten in de laatste groep van het basisonderwijs beschreven. Deze kinderen waren gemiddeld 11 jaar oud. In dit onderzoek hebben wij bekeken welke rol de etnische achtergrond van leerlingen speelt bij zowel selectie van vrienden als selectie van 'sociale interactie partners' die niet per sé tot de vrienden horen. We hebben ervoor gekozen om ons in de eerste studie hier op te richten, omdat etnische achtergrond, vergelijkbaar met leeftijd en sekse, een vaststaande achtergrondfactor is die niet alleen een persoonskenmerk is, maar ook mogelijk doorwerkt op, of samenhangt met, vele aspecten van het verdere leven van de jeugdige. Voorbeelden zijn bijvoorbeeld woonsituatie, mogelijkheden op school, en mogelijkheden op de arbeidsmarkt. In dit onderzoek werd voor sekse en sociometrische status gecontroleerd om te voorkomen dat abusievelijk selectie-effecten aan etnisch achtergrond zouden worden toegeschreven. Uit eerder onderzoek is bekend dat leerlingen een

voorkeur kunnen hebben voor relaties met leerlingen van hetzelfde geslacht en dezelfde sociometrische status (bijvoorbeeld populaire kinderen). Uit de resultaten bleek dat kinderen een voorkeur hebben voor zowel vrienden als sociale interactie partners met een vergelijkbare etnische achtergrond.

In hoofdstuk drie wordt zowel de vriendschapsselectie als de wederzijdse socialisatie van gemiddeld 13 jarige leerlingen in de tweede klas van het voortgezet onderwijs beschreven (vmbo-vwo). In dit onderzoek hebben we ons geconcentreerd op de factor schoolprestaties, uitgesplitst naar de prestaties op drie gebieden: Nederlands, Engels en wiskunde. Deze keuze werd ingegeven door de notie dat socialisatie door leeftijdsgenoten op school uiteindelijk invloed kan hebben op leerprestaties. Sommige schoolsystemen en leertheorieën gaan hier expliciet vanuit. Voor zowel ouders als docenten is het daarom nuttig om te weten of deze socialisatie daadwerkelijk plaats vindt bij drie kernvakken in het Nederlands onderwijs, en in hoeverre leerlingen gelijk presterende leerlingen uitkiezen als vrienden. Leerlingen blijken elkaar niet te selecteren als vrienden op basis van schoolprestaties. Ze blijken elkaar daarentegen wél te beïnvloeden, specifiek als het gaat om prestaties op de vakken Engels en Nederlands. Het is opvallend dat deze beïnvloeding niet plaats vindt op het gebied van wiskunde prestaties. Leerlingen haalden overigens in de loop van het jaar gemiddeld (iets) lagere cijfers in Nederlands en Engels. Dit suggereert dat beïnvloeding niet alleen richting hogere cijfers plaats vindt, maar dat leerlingen elkaars prestaties ook op negatieve wijze kunnen beïnvloeden.

In hoofdstuk vier werd nogmaals de vriendschapsselectie en socialisatie bij tweede klassers op middelbare scholen (vmbo-vwo) bekeken, maar ditmaal met de focus op probleemgedrag. Ouders en leerkrachten zijn vaak bang dat leerlingen elkaar 'aansteken' met probleemgedrag. De kernvraag hier is: in hoeverre wordt gemeenschappelijk probleemgedrag verklaard door selectie van vrienden met hetzelfde gedrag, en in hoeverre door socialisatie? We hebben gekeken naar internaliserend probleemgedrag (teruggetrokken, verlegen en depressief gedrag) en naar externaliserend probleemgedrag

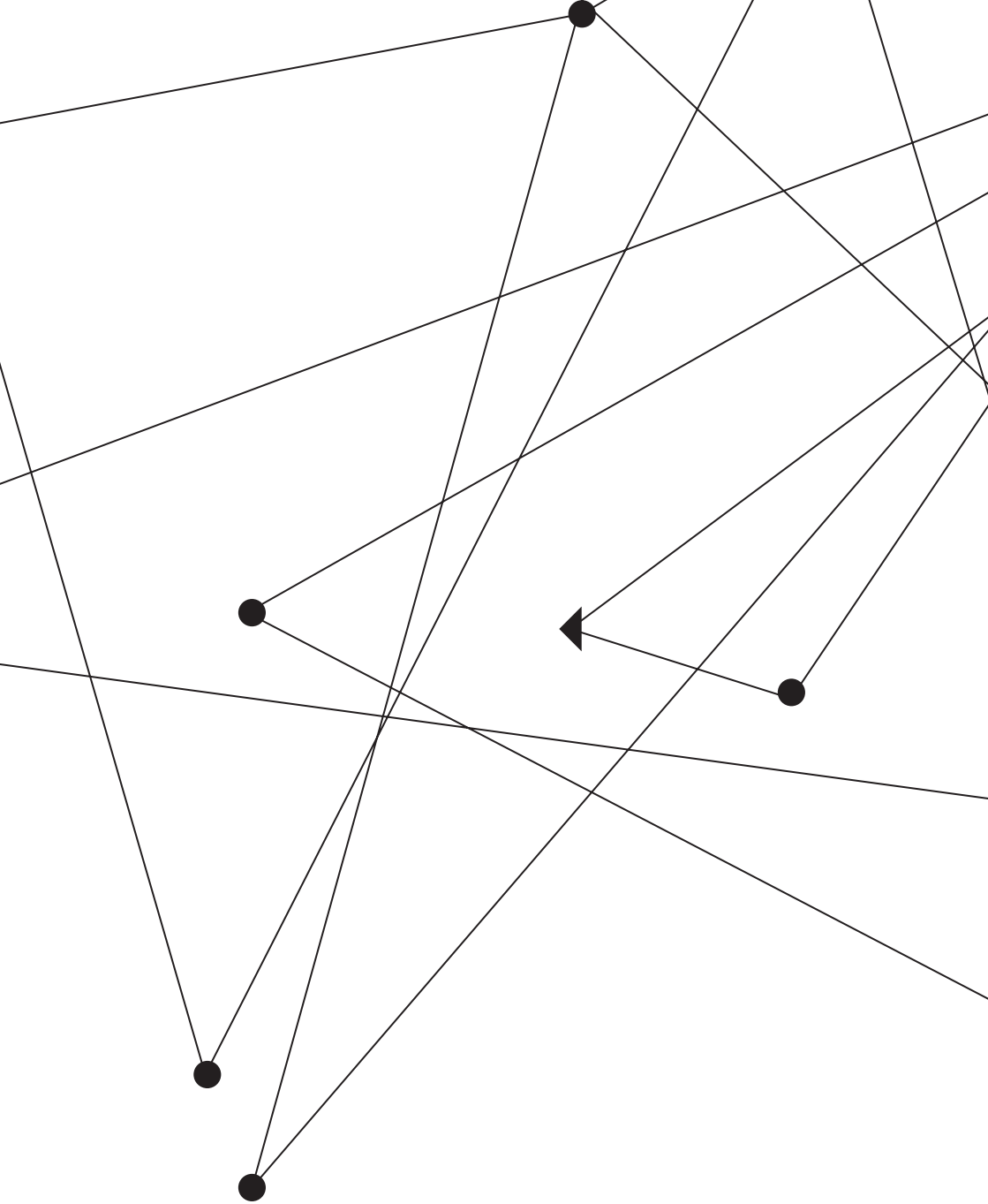


(liegen, ruzie maken met een leraar en pesten). Daarnaast hebben we in deze studie ook onderzocht in hoeverre leerlingen zich terugtrekken uit sociale contacten (op basis van hun probleemgedrag) en in hoeverre ze worden vermeden vanwege dit probleemgedrag. Vermijding en terugtrekking zouden naast selectie en socialisatie ook overeenkomsten in probleemgedrag tussen leeftijdsgenoten kunnen verklaren. Uit de resultaten bleek echter dat vermijding en terugtrekking niet van invloed waren op vriendschapsrelaties. Vrienden werden niet geselecteerd op basis van internaliserend probleemgedrag, maar wel op basis van externaliserend probleemgedrag: leerlingen met vergelijkbaar probleemgedrag zochten elkaar op als vrienden. Ook bleken vrienden elkaar te socialiseren in termen van externaliserend probleemgedrag. Op het gebied van internaliserend probleemgedrag werd enkel een trend gevonden richting socialisatie.

Samenvattend kan gesteld worden dat de onderzoeken in dit proefschrift meer zicht hebben gegeven op de ingewikkelde dynamiek van selectie en socialisatie bij adolescenten. Er blijven echter ook nog vragen over. Zo is het belangrijk om verder te onderzoeken *hoe*, door middel van welke processen, socialisatie plaats vindt.









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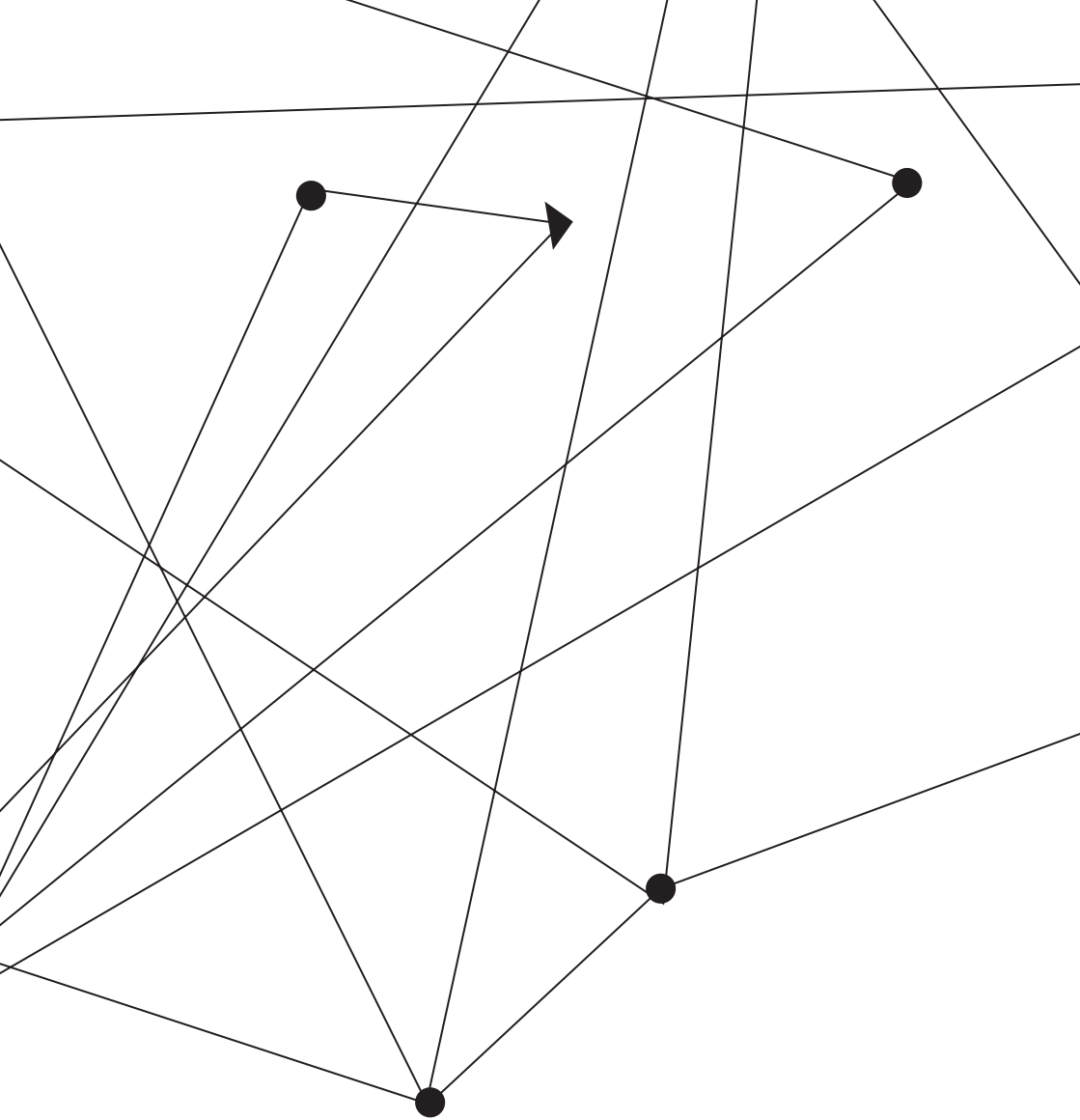


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# Curriculum Vitae





Janna Fortuin was born on the 5<sup>th</sup> of May 1977 in Groningen. She completed secondary schooling at the Montessori Lyceum Amsterdam, and studied Clinical Psychology at the University of Amsterdam, which she completed Cum Laude in 2002. During this study she also took classes in physics, astronomy and English and sat on the board of the study society of the psychology department, VSPA. She started to teach bachelor students of Psychology at the University of Amsterdam in 2001. After her graduation, she continued working in the department of Psychology as coordinator of the first year seminars. She also worked for the interdisciplinary Beta-Gamma bachelor program (UvA). In 2004, she started her PhD study at Leiden University studying selection and socializing processes in adolescents. Since 2009, she is a lecturer in the Teacher Training master program of the Graduate School of Child Development and Education, University of Amsterdam.





