

Social Influence and Educational Decisions

Studies on Peer Influence in Secondary Education

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Abstract

This thesis examines the role of peers when students' educational decisions are formed. The thesis uses rich administrative data from Sweden, which provides opportunities to follow students over different transitions in their educational career and assess the role of peers in different educational situations. The thesis consists of one introductory chapter and four empirical studies. Study I examines how peers influence each other's applications to upper secondary education through two different influence functions, where students both conform to their peers' ambitious decisions and simultaneously can be discouraged from ambitious decisions by high-achieving peers. Study II builds on the findings from Study I and examines if students who conform to their peers' educational ambitions and enroll in ambitious and demanding educations are more prone to leave such educations since their applications potentially were too myopic when influenced by their peers. Study III examines how students' decisions to apply to gender typical and gender atypical upper secondary educations were affected by their peers. The study additionally examines if students enrolled in atypical educations are more likely to leave the education and if such decisions are mediated by the peer composition in their upper secondary education. Study IV examines how an admission reform to upper secondary education, which increased the sorting of students on achievements, affected application behavior to different tertiary education.

Keywords: *Peer influence, educational decisions, school leaving, application behavior, reference group.*

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To Whom It May
Concern

Sammanfattning

I avhandlingen undersöks hur elever i nionde klass och gymnasieelevers utbildningsval påverkas av deras skolkamrater. Skolkamrater kan påverka varandras utbildningsval på flera olika sätt, studierna i avhandlingen undersöker hur normativa och informativa kamrateffekter har en homogeniserande effekt på elevernas utbildningsval. Utöver homogeniserande kamrateffekter påverkas även eleverna av jämförande kamrateffekter där elever jämför sina betyg med sina skolkamraters betyg. Dessa jämförelser påverkar hur eleverna värderar sina egna skolresultat och i förlängningen deras ambitioner att uppnå en högre utbildningsnivå. Studierna i avhandlingen är baserade på registerdata som omfattar alla elever som avslutade grundskolan i Sverige under perioden 1999 till 2010. Avhandlingen består av ett introducerade kapitel samt 4 kapitel skrivna i artikel format.

Det introducerade kapitlet beskriver det teoretiska ramverket för hur kamrateffekter och referensgrupper påverkar elevernas utbildningsval, tidigare relevant forskning, det svenska utbildningssystemet, samt beskriver metodologiska utmaningar som uppstår när kamrateffekter ska estimeras. Det introducerande kapitlet avslutas med en sammanfattning av avhandlingens slutsatser samt relaterar slutsatserna till kunskapsluckor i forskningsfältet.

Studie I undersöker hur niondeklassares sannolikhet att söka sig till ett högskoleförberedande gymnasieprogram påverkas av deras skolkamraters utbildningsval och medelbetyg. Resultaten visar att sannolikheten att söka sig till en högskoleförberedande utbildning är högre om en hög andel av skolkamraterna söker sig till en högskoleförberedande utbildning. Resultaten visar även att det finns avskräckande effekter av högpresterande skolkamrater där sannolikheten att söka sig till en studieförberedande utbildning är lägre om skolkamraterna är högpresterande jämfört med ett scenario där skolkamraternas betyg är lägre.

Studie II utgår ifrån resultaten i Studie I som visar att skolkamrater har en homogeniserande effekt på varandras utbildningsval. Studie II undersöker om elever vars utbildningsval påverkats av sina skolkamrater senare ångrar sina utbildningsval, då eleven tagit för lite hänsyn till egna intressen och egen kompetens i sitt val av utbildning. Studien omfattar de elever som påbörjat en naturvetenskaplig gymnasieutbildning och undersöker hur sannolikheten att lämna utbildningen inom ett år påverkas av andelen skolkamrater i nionde klass som sökte sig

till en naturvetenskaplig utbildning. Resultaten påvisar ett positivt samband mellan andelen skolkamrater i nionde klass som sökte sig till ett naturvetenskapligt gymnasieprogram och sannolikheten att lämna gymnasieutbildningen inom ett år.

I studie III undersöks hur skolkamrater påverkar varandra att göra könstypiska och könsatypiska utbildningsval samt om elever som gjort könsatypiska utbildningsval är mer benägna att lämna utbildningen jämfört med deras syskon som inte gjort ett könsatypiskt utbildningsval. Studien finner att utbildningsvalen bland skolkamrater med samma kön har homogeniserande effekter på både typiska och atypiska utbildningsval. Studien finner även att flickor som gjort ett könsatypiskt utbildningsval är mer benägna att lämna sin utbildning jämfört med sina systrar som inte gjort ett könsatypiskt val men sådana skillnader finns inte bland bröder.

Studie IV undersöker hur elevers benägenhet att söka till högskoleutbildningar påverkas av en ökad betygssortering i gymnasiet. Studien använder sig av en antagningsreform som genomfördes 2000 i Stockholms kommun där antagningen ändrades från att vara baserad på avståndet mellan hem och skola till att vara baserad på betyg, där elever med de högsta betygen fick företräde till de populäraste skolorna. Studien finner asymmetriska effekter av antagningsreformen över betygsfördelningen, där sannolikheten att göra ambitiösa högskoleutbildningsval ökade mest bland de högst presentande eleverna, som fick en större möjlighet att välja gymnasieskola.

List of studies

Study I: Two Functions of Peer Influence on Upper-secondary Education Application Behavior

Rosenqvist, Erik. 2018. *Sociology of Education* 91:72-89.

Study II: My peers made me choose it: The probability of leaving a natural sciences track early when enrollment is based on conformity

Submitted

Study III: Gender atypical decisions and the role of peers

Submitted

Study IV: Elite schools, elite ambitions? The consequences of achievement sorting for the formation of educational ambitions

Together with Magnus Bygren

Submitted

Acknowledgments

As noted by others before me, writing a dissertation is a collective task in many aspects while sometimes also a lonesome and tiresome task. I owe gratitude to several individuals for making the years spent on this dissertation as pleasant as they can be. However, I would like to start by extending my gratitude to the Swedish tax payers, who provided me with the opportunity to pursue this project. I am also very grateful for an educational system that provided me with this opportunity despite mediocre educational achievements throughout primary and secondary education. In most other countries I wouldn't have gotten this opportunity.

Out of all individuals that have in one way or another contributed to this dissertation I will restrict myself to mention the most instrumental contributors. My main supervisor Magnus Bygren has been an excellent supervisor. His “hands off” style provided me with the freedom to pursue my own questions, while he always provided me with insightful comments and encouragements when I needed them. My second supervisor Martin Hällsten has been equally instrumental for this dissertation. Martin has always provided thoughtful comments and been very generous with his time and encouragements. I couldn't have asked for more from my supervisors. Frida Rudolphi and Jan O. Jonsson generously contributed their time and effort when commenting on the work presented at my halftime and final seminars. The LNU team at SOFI welcomed me into their community during the fall of 2017 for which I am very grateful. All the sociology PhD students in Stockholm have also provided an exciting and inspiring research environment but have also proven to be great companions at the office, when traveling and at the pub. Lauren Dean has also provided invaluable support by proof reading this dissertation. The administrative staff at the department provided me with support and helped me to keep my affairs in order, for which I am grateful.

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Introduction

One of sociology's core endeavors is to provide insights into how individual actions are shaped by their social surroundings through interpersonal influences. Besides the home environment, the school environment is considered one of the most important arenas for interpersonal influence that shapes adolescents' future life choices. This dissertation studies adolescents to show various effects of interpersonal influences through school peers. The studies herein examine how educational ambitions realized through different educational decisions are affected by the decisions and characteristics of peers in lower and upper secondary education.

This dissertation builds on the view that school peers can be seen as resources within schools that facilitate educational achievements and attainment, an idea that gained ground with the seminal Coleman Report (1966). The report suggested that the distribution of students within and between schools could be seen as a source of inequality in educational opportunities. On average, students' educational achievements could increase without substantial increases in public spending by altering student composition across schools. The report sparked public debate and has shaped both educational policy and educational research for half a century. One of the reasons for the interest in interpersonal influence in education is the fact that substantial inequalities in educational attainment and educational opportunities with respect to socioeconomic background still exist, despite expansions of educational systems in several countries which have provided more children opportunities to attain tertiary educations (Breen and Jonsson 2007).

A majority of the studies that examine the role of peers on educational outcomes study peer effects on grades. Research concerned with peer effects on educational attainment has been scarce in comparison. Potentially due to the temporal ordering between educational achievements and educational attainment, where educational achievements usually are seen as a determinant of educational attainment. However, sociologists examining structural differences in educational outcomes tend to separate inequalities in educational achievements and attainment by distinguish between structural factors that affect grade achievements and structural factors that affect educational attainment. Structural factors related to grades are traditionally called "primary effects", where students from more affluent homes tend to have higher grades. While structural factors related to educational attainment net of the primary effects are traditionally called

“secondary effects”, were students from more affluent homes tend to attain higher levels of education compared to students from less affluent homes with similar grades (Boudon 1974). Such secondary effects have been shown to vary with respect to a wide range of factors such as class and educational background (e.g. Erikson et al. 2005; Jackson et al. 2007) and immigration background (e.g. Jackson, Jonsson, and Rudolphi 2012; Jonsson and Rudolphi 2011). Explanations for such differences tend to focus on situations within families such as access to and production of cultural capital that facilitates educational attainment (Bourdieu and Passeron 1977; Bourdieu 1986). Coleman (1988) suggests that social capital within the family can explain differences in educational attainment where parental relations and access to information shape their children’s educational attainment.¹ There are also several explanations from rational choice perspectives where educational attainment is shaped by cost benefit calculations of education and the valuation of benefits and costs are molded by socioeconomic background (e.g. Boudon 1974; Breen and Goldthorpe 1997). By studying how peers influence each other’s educational decisions in different situations additional insights into such processes of educational inequalities can be gained. For instance, peers can be mediators of educational norms and provide information about different educational opportunities. Peers can also provide reference points for comparisons and evaluations of one’s own achievements, which can have implications for students’ educational ambitions and expectations. Peer influence can also affect how different educational options are valued in terms of costs and benefits. However, the studies within this dissertation aim to provide insights and perspectives that can be used in order to better explain and understand educational inequalities, not to directly describe or explain inequalities in educational opportunities.

This dissertation aims to increase the understanding of how peers influence each other’s educational decisions and how such influence may have implications for their educational careers. The dissertation contains four studies that examine different aspects of peer influence on educational decisions among Swedish students in upper secondary education, as well as at the end of lower secondary education. The studies draw on reference group theory and social identification theories. The studies use rich longitudinal Swedish administrative data which

¹ The studies on peer influence on educational decisions in this dissertation are interrelated with the social capital literature. However, the scope of the social capital literature is broader and emphasizes students’ parents’ relations and how those relationships facilitate educational achievements and attainment for the students’ peers as well as peer characteristics besides their educational decisions and average grades. The studies in this dissertation try to estimate effects of socialization between students and reference group behavior net of such social capital effects.

covers entire cohorts of students, allowing for controls of a wide variety of observed and unobserved factors.

In the following parts of this introductory chapter I will describe the reference group framework used in the studies, outline previous studies on peer influence on educational decisions, describe methodological challenges and discuss different approaches to address these challenges, present the Swedish educational system, briefly present the data used in the studies and the identification strategies facilitated by the data, shortly summarize the four studies within the dissertation, and, finally, discuss the contributions and implications of these studies and potential avenues for further research.

Reference group theory

The studies in this dissertation draw broadly on reference group theory when examining how students influence each other's educational decisions within lower secondary and upper secondary education. Reference groups were introduced as a concept by Hyman (1942) and substantive theories regarding how reference groups influence individual actions and orientations started to emerge shortly after. Reference groups consist of surrounding individuals' which students in some aspect identify with. The behavior and characteristics of these reference groups help students to define and evaluate their situations by providing frames of references which can alter the students' educational decisions. Kelley (1952) distinguished between two interrelated influence functions within the reference group framework, namely, normative influence and comparative influence. These two influence functions are analytically distinct from each other, while highly interrelated. The students constituting the reference group that pose normative influence on ego can also be a part of the reference group that pose comparative influence (Merton and Rossi 1968; Shibutani 1955).

Normative influence motivates students to gain or maintain acceptance from their reference group by aligning their attitudes and norms towards perceived consensus of the group, suggesting that their attitudes and norms are altered toward this perceived socially imposed norm (Hartup 1970). Such conformity in norms and orientation is argued to be stronger when students identify and compare themselves to each other (Festinger 1954; Newcomb 1961). The underlying rationale for such normative influence is argued to stem from the motivation of belongingness to the peer group (Baumeister and Leary 1995). Reference groups are cognitive in the sense that the

reference points are fluid and constantly redefined when the perspectives of the students change (Shibutani 1955). This implies that in order to distinguish such reference points one must also account for the salience and visibility of the students constituting a reference group (i.e., how exposed the students are to the reference group), and also, how meaningful the students that constitute the reference group are for the ego (Richer 1976).

Deutsch and Gerard (1955) further distinguished informational social influence from normative influence where informational influences are related to exposure to information and willingness to accept the information from the reference group. These two influence functions tend to be found together and are usually conflated since they tend to affect educational decisions in a similar way; however, the rationale behind the two forms of influence are different. While the rationale behind normative influence is to gain and maintain belongingness and acceptance from the reference group, informational influence is related to exposure to information about different educational options (Deutsch and Gerard 1955). Both types of influence emerge through socialization. While normative influence places more emphasis on the subjective status of the influencer (i.e., meaningfulness), informational influence places more emphasis on seemingly objective information about the educational decisions ego conforms to (Abrams and Hogg 1990).²

According to the comparative influence function, students' educational decisions are not only influenced by norms and information that emerge within the school environment, students also evaluate their own performances and their ability to succeed in reference to other students within the school environment. This implies that students with the same performance levels who compare unfavorably to the achievements of their school mates can experience feelings of failure or discouragement while students who compare favorably can experience feelings of success or encouragement. Unfavorable comparisons to one's school mates are commonly called "relative deprivation" while favorable comparisons have been called "relative gratification" (Merton and Rossi 1968; Richer 1976). The effect of comparative influence is argued to be dependent on the difference between ego's performances and the reference group's achievements, where the comparison effects are smaller if there are large differences between the student's own

²Given the nature of the data used in the studies within this dissertation these two influence functions cannot be examined separately. The combined effect of informational influence and normative influence will be referred to as "conformity" when estimating influences on a student's educational decisions.

achievements and the reference group's average achievements (Festinger 1954). Put differently, there must be some similarities between the students in order for the comparisons to occur (Davis 1963; Merton and Rossi 1968).

As noted above, these influence functions are driven by different rationales (i.e., belongingness, information, and self-evaluation). This also suggests that students place different relevance on different segments of their reference group in different situations (Merton and Rossi 1968; Shibutani 1955) with students placing greater emphasis on individuals they identify with in the normative influence function, where identification and belongingness tend to be patterned by different social categories (e.g., gender, social status, and social background). Different emphasis on different individuals and groups in the normative influence functions can also be driven by anticipatory socialization where students conform to the behavior of individuals of other social categories or groups as a strategy to generate inclusion or stronger ties to these groups (Merton and Rossi 1968). Within the informational influence function, more emphasis could be placed on individuals that are perceived to be more reliable in providing information about different situations (Deutsch and Gerard 1955).

Comparative influence is assumed to be patterned by a different dimension of the social structure where individuals anchor their valuation of a situation to some social category to which they belong or characteristic they possess. When some expected outcome varies between social categories or characteristics it also implies that individuals in the same situation value their situations differently depending on their social category or characteristic (Davis 1959). Most of the early comparative influence research draws upon the large-scale study of American soldiers and their adjustment to life in the army conducted by Stouffer and colleagues (1949). The study provides several examples of how comparative influence is patterned by social categories and characteristics or attributes. For example, college educated soldiers were more discouraged by not getting a promotion within the army compared to non-college educated soldiers. Similar dynamics are also shown where black soldiers were more satisfied, in some aspects, compared to white soldiers since their new living situation was less deprived on average compared to white soldiers. Davis (1959) suggests that differences in comparisons depend on expectations or expected outcomes, where the level of deprivation or gratification is dependent on expectations of a situation conditional on one's own characteristics and the characteristics of reference

individuals. In an educational setting this can be applied to evaluation of one's own performances. The satisfaction of a performance for students with the characteristics of a high achiever is dependent both on the performances of other students with the characteristics of a high achiever and those of students with the characteristics of a low archiver. The evaluation of a given performance is lower if students with low-achieving attributes perform equally than if other students with high-achieving attributes perform equally.

Given this provisional account of reference group theory it is worth noting that the idea that individuals define their situations differently depending on their social surrounding was not novel, it was more of an approach to synthesize previous findings and ideas into a middle range social influence theory. For example, both Merton and Rossi (1968) and Shibutani (1955) drew their insight partly from Mead's concept of the generalized other where individuals approach their situations from the position of the culture in their groups (Mead 1925). Davis (1963) on the other hand drew some insights from Durkheim's idea of mechanical solidarity when arguing that normative influence is stronger when individuals are more alike (Durkheim 1984[1893]).

Research examining comparative peer influence effects on educational decisions

Previous studies have shown that peers affect student educational decisions by influencing aspirations and application and enrollment behaviors, but also decisions to leave an educational path. Such influence has emerged both through normative and informational influence (i.e., conformity) and comparative influence (i.e., discouraging or encouraging through relative comparisons). Several empirical studies were conducted in concert with the theoretical development of reference group theory in the middle of the twentieth century. One of the first studies that examined how students reference their aspirations towards their peers was by Chapman and Volkman (1939) who examined how their psychology students' self-evaluations varied when they were exposed to the achievements of their peers. One of the most famous studies on relative comparison effects from this period was by (Davis 1966) who concluded that "it's better to be a big frog in a small pond than a small frog in a small pond" (Davis 1966 p.31) based on the findings that the quality of a college was negatively related to ego's occupational aspirations given ego's achievements. Similar effects were also found by (Alwin and Otto 1977; Meyer 1970; Nelson 1972). Educational psychologists have conducted similar research on academic self-concept (i.e., perception of general intelligence and scholastic ability) and found

that students attending schools with high average grades valued their academic self-concept lower, net of their own actual achievements. Such effects usually are called Big Fish Little Pond Effects (BFLPE) (for a review see (Marsh et al. 2008).

During the last decade sociologists have shown that such comparative effects have real consequences for students' educational careers in terms of which schools and educations students apply to and enroll in. Lauen (2007) showed that students in Chicago with high-achieving peers were less likely to attend highly selective schools. Jonsson and Mood (2008) showed a negative relationship between peer average grades within lower secondary schools and applying to an academic track in upper secondary education and Skov (2016) showed that such comparison effects also exist in Denmark. Crosnoe (2009) showed that such comparisons effects also can work through socioeconomic status where students from less affluent families are more academically discouraged in educational contexts with a high proportion of students from more affluent homes, since their disadvantage becomes more salient in such contexts. Recently, Elsner and Isphording (2017) showed that the ordinal achievement ranks within high schools among American students are positively related to enrolling in college and to some extent completing a four-year college degree, net of their absolute achievements. These effects of ordinal school ranking have also been found in England where the school ranks in compulsory education are positively associated with completing upper secondary education subjects in science, technology, engineering, and mathematics (STEM) (Murphy and Weinhardt 2018).

Research examining normative and informative peer influence on educational decisions

Haller and Butterworth (1960) conducted one of the first studies addressing normative influence or conformity on educational aspirations by measuring intraclass correlation between occupational and educational aspirations of pairs of best friends, where the friends were classified according to their respective class backgrounds, ability, and the educational aspirations their parents had for them. The findings were inconclusive but generally found that the intraclass correlation was higher for occupational aspirations than educational aspirations. The authors however note that the correlation might arise due to selection of friendships based on educational aspirations. Duncan, Haller, and Portes (1968) expanded and reinterpreted Haller and Butterworth's (1960) study with more complex models, using the same data, and merged educational and occupational aspirations for an outcome they called "ambition". The results

suggested that friends' ambitions were positively associated with ego's ambitions in addition to homophily in friendships, under the assumption that friendship formation is not driven by ambitions. A similar result was also found by Alexander and Campbell (1964) who showed that the influence of friends was larger when friendship ties were reciprocated. A more recent study by Hallinan and Williams (1990) found similar results. They examined how best friends influenced each other's educational aspirations and attainment and found positive relationships between ego's and friends' educational aspirations and attainment, with larger effects when friendships were reciprocated and when friends shared similar sociodemographic characteristics.

Influenced by the methodological advancements in Blau and Duncan's (1967) study on the American occupational structure, Sewell, Haller, and Portes (1969) developed an influential model for occupational and status attainment commonly referred to as the Wisconsin Model. The model was one of the first to incorporate and examine the role of social influence from significant others on social mobility. The model used rich survey data covering high school students in Wisconsin, with information on socioeconomic background, educational achievements and aspirations, as well as occupational and educational attainment at later stages in life (Sewell and Hauser 1972). It uses a path model examining how different determinants of educational and occupational aspirations and attainment are associated. The model introduces influence of significant others as a key determinant, which includes parental encouragement, teacher encouragement, and close friends' college plans, which were argued to influence students' aspirations through the normative influence function. The model suggests that socioeconomic status and academic performance have direct effects on the influence of significant others, which in turn is positively associated with educational and occupational aspirations, affecting social mobility. Similar findings regarding significant others were also found in the replication study conducted over several subsamples based on types of community of residence (Sewell, Haller, and Ohlendorf 1970). The study also contributed to the understanding of the relationship between social influence and social mobility by separating parental socioeconomic status from parental aspirations where the former usually had been used as a proxy for the latter.

During the 1980's and 1990's the interest in interpersonal influences on educational attainment mediated through conformity declined and the work during the last two decades is rather scarce, especially in comparison to the vast amount of research on peer effects on grades.

One potential reason for this decline was a shift in focus towards studies that emphasized contextual aspects of the school, such as peer composition. Such studies tend to highlight access to different sorts of resources that come with the composition of students within the school, while the research on the effects of conformity (i.e., normative and informative influence) on educational decisions and attainment within schools focuses on reference group behavior net of these school composition effects.

There are however some studies conducted during the last two decades examining interpersonal influence through conformity on educational attainment and educational expectations. Buchmann and Dalton (2002) conducted a study on peer influence with country comparisons and found that expectations to attend university depend on if the students perceived that they were encouraged to do well in school by their friends in lower secondary education. Such influence was shown to be dependent on the country's educational system, where students only experienced positive influence in comprehensive educational systems where the students were not yet sorted, while students in educational systems with curriculum tracking at early stages of the education did not experience any effects from their peers' educational attitudes. In contrast, Roth (2017) found that educational expectations to attend ambitious tracks (abitur) are influenced by the perceived expectations of their peers in Germany's highly stratified educational system.

Fletcher (2012) showed that high school students in Texas are more likely to enroll in their preferred college if more students within their high school also have preferences for that specific college. In an additional study Fletcher (2015) examines how students' college enrollment decisions are affected by their school peers' college enrollment behavior and concludes that peer enrollment behavior has large effects on student college enrollment behaviors. Sokatch (2006) found similar effects where peers' college plans were positively correlated with ego's college enrollment decisions. Additionally, an interview-based study by Holland (2011) found that students' peers and friends influenced and guided their college decisions both through local norms emerging within their peer culture and also through information about access to college.

Frank et al. (2008) examined how high school students' decisions to take advanced math courses is affected by the average level of math courses taken by different compositions of peers

within the high school context. No significant socialization effects were found on boys' decisions to take advanced math courses. Girls were unaffected by their friends and same-sex course mates but positively affected by the average level of math courses taken by other girls within the school and within their local cluster (i.e., other girls that the girls had taken several other courses with). Such conformity effects were smaller if girls initially had taken several math courses suggesting that the conformity effects had a homogenizing effect, where girls become more similar in terms of math courses taken. Similar to Frank et al. (2008), Crabonaro and Workman (2016) show that more distant peers affect a student's educational decisions, where educational expectations of high school students are positively affected by college expectations of both friends and friends of friends. Besides heterogeneous effects in peer influences by gender, studies find that both White and Latino high school students are more likely to apply to postsecondary education when they report that they have friends that are college bound. Latinos, though, are less affected by their friends' college intentions compared to white students (Alvarado and López Turley 2012). Influence of peers has also been found to affect peers' curricular choices among high school students in Israel, where both girls and boys are more likely to enroll in STEM fields if their best friends also enroll in such fields (Gabay-Egozi, Shavit, and Yaish 2014).

In summary previous studies of high school students usually base the influence effects on friends, where friends are either observed within the study or the influence is derived from ego's perception of the friends (i.e., ego reports their friend's behavior or expectations). These studies generally struggle with isolating peer influences from peer selection while studies that expand the influence sphere to include other students besides nominated friends find influence effects from non-friends as well. An alternative approach used to circumvent endogeneity related to friendship selection is to rely on some kind of randomization of students into peer groups. Using data on students attending military school randomly distributed into peer groups, Lyle (2007) found that peers' decisions to stay in the military longer than required, as well as the choice of college major, have a positive effect on the student's respective choices while there are no achievement effects related to the peers. Additionally, previous studies focusing on peer influences in upper secondary education generally use a broader notion of "peer", beyond friendship nominations, usually a cohort approach. These studies tend to place emphasis on endogeneity and identification of causal effects. However, the data used are often local and highly selective, which raises questions about the applicability of the results beyond the specific context. For example,

De Giorgi, Pellizzari, and Redaelli (2010) study students' specialization in either business and administration or economics in a prestigious Italian university. The study uses overlapping peer groups and randomization into classes to address problems related to non-random selection into peer groups and circular influence between ego and peers. The findings suggest that students conform to each other's choice of major. Arcidiacono and Nicholson (2005) studied how medical school students in the U.S. affect each other's choice of specialization and found no socialization effects, which they suggest to be a result of a selection of highly motivated and determined students into medical school.

Research examining peer effects on educational achievements

A related research field examining the effects of peers on educational outcomes studies peer effects on educational achievements such as test scores and grades. Such studies have used an array of theoretical models examining how peers affect each other's achievements within the school context. The linear-in-means model examines how peers' average outcomes or characteristics affect the student's achievements and usually find modest peer effects on achievements (Sacerdote 2011). Key-player models examine how specific students either harm other students through disruptive behavior or how exceptionally talented or gifted students can improve the results of their peers. The support for these different models is inconclusive and suggests that peers matter for students in several different ways and thus has different policy implications (Sacerdote 2011). Much of the literature regarding peer effects on grades is policy oriented and focuses on effects of sorting students into different educational groups. This sorting literature hinges on the proposition that peers matter for different educational outcomes. The literature usually focuses on either optimizing the allocation of students into different peer groups in order to maximize educational achievements or the equity implications of allocating students into different educational groups. Ability tracking is argued to increase average achievements when instructional groups are more homogenous. Several studies find support for this argument while the effects vary over the ability distribution, where high achievers tend to gain more from ability tracking, suggesting a cumulative advantage (Sacerdote 2011).

Research examining peer effects on early school leaving and delinquent behavior

There are also several studies that examine the role of peers when students leave an education early or dropout. Studies have, for example, examined how peers affect each other's decisions to

leave the education through normative influence where students are more likely to leave the education if their peers leave the education (e.g. Ream and Rumberger 2008). Other studies have focused on the student's social integration within the school, where collective affiliation can protect students from leaving the school (e.g. Carbonaro and Workman 2013). Some studies have also focused on comparison effects on dropping out where negative comparisons to peers can have positive effects on the probability of leaving the education. For example, changes in students' relative achievements resulting from educational transitions can discourage students and increase their likelihood of dropping out (Stinebrickner and Stinebrickner 2012). School peers have also been shown to be important determinants of other outcomes besides educational achievements and educational attainment such as smoking, drinking and drug use, or criminal behavior (e.g. for a review see Brechwald and Prinstein 2011). Such peer effects are usually found to have stronger influence on students than peer effects on achievements (Sacerdote 2011).

Defining peer context

One of the major challenges with studying peer influence is to specify the scope of the peer group. The range of the peer group is a theoretical question where the scholar needs to consider both the outcome studied and the mechanism affecting the outcome. Several definitions of peer groups have been studied, each with their own benefits and caveats. Most of the early work on reference group theory emphasized that reference groups vary with different situations (Davis 1959; Merton and Rossi 1968; Turner 1956). For instance, Turner (1955) suggested that the relevance of different segments of the reference group varies with different values or situations where friends function as points of references for moral and ethical values while judging success based on individuals around them with similar aspiration.

The most common approach to defining peer influences is through friendship ties where peers are defined either as reciprocated friendships (both ego and alter nominate each other as friends) or unidirectional friendships. Another approach to measuring influence from friends is to measure ego's perception of friend behaviors or attitudes (e.g. Buchmann and Dalton 2002). Hallinan (1983) and Hallinan and Williams (1990) argued that friendship pairs are the most meaningful unit when studying interpersonal influence in school contexts. The argument is based on the application of Parson's theory of influence (1963) where students are influenced primarily when they seek information about a particular situation (i.e., educational options and forming

educational aspirations). Students are more willing to accept information from individuals that are perceived as trustworthy, and students are also more willing to accept information to which they have a stronger solidarity. Given these propositions, close friends can influence each other more compared to distant peers, under the assumption that trust and solidarity is higher among friends. In addition, using a “close friends approach” to peer influence isolates peers that interact on a regular basis from more distant peers, providing more precision in terms of addressing the source of influence. This approach to interpersonal influence has however been criticized for excluding influence from more distant peers (Carrell, Fullerton, and West 2009). Previous literature has also showed that students are influenced by other students outside their friend group such as friends of friends (Carbonaro and Workman 2016) or clusters of students exposed to each other in several different courses (Frank et al. 2008). Estimated peer influence models based on friendship are also potentially biased because friendship selection is most likely based on unobserved characteristics that drive both friends’ and ego’s educational decisions (Shalizi and Thomas 2011).

At the other end of the spectrum are studies that use a wider definition of peers, such as students within the same school cohort (Bifulco, Fletcher, and Ross 2011; Carrell, Malmstrom, and West 2008; Fletcher and Tienda 2009; Fletcher 2012; Rosenqvist 2018). This definition captures a broader range of peers that are likely to affect egos through diffusion of norms and information or comparisons. However, such a definition cannot distinguish between the relative importance of different peers. One alternative to the cohort approach is to differentiate the peers within the cohort based on salient social characteristics that influence patterns of interaction, such as gender and socioeconomic background, where such characteristics can serve as proxies for points of reference. Studies that apply a cohort approach to estimate peer influence effects on educational decisions usually find larger peer effects and capture influence that is not conditioned on friendship nominations (Carrell, Fullerton, and West 2009). Such studies have however been criticized for ignoring analytically and sociologically relevant aspect of friendship selection (Lomi et al. 2011). In my view, the friendship approach and broader peer definitions can provide valuable insight into different aspects of how students’ educational decisions are affected by their social surroundings and serve as complements to each other. To be fair, the definition of the peer groups in most cases is probably a question of data availability, which is reflected by the modest amount of studies that evaluate several different measures of peers simultaneously.

Identification problems and methodological issues

Despite the scope of peers used, researchers are interested in estimating how peers influence each other's need to overcome several obstacles in order to convincingly claim that the estimated effects are causal (Angrist 2014; Manski 1993; Manski 2000). To credibly address causality using observational data is challenging and most researchers fail to credibly show causal effects from independent variables on dependent variables. However, in my view one can argue that effects are more or less causal depending on the identifying assumption the estimation relies on. Below are some of the most pressing threats to causality and identification strategies aimed at addressing those threats when studying peer influences on educational decisions.

One of the most discussed threats to causality which researchers have tried to address for several decades is selection into peer groups based on unobservable factors correlated with both peer behavior or influence and ego's outcome. Such problems arise when students befriend other students similar to themselves (i.e., homophily), which makes it hard to distinguish their similarities from their influence on each other. For example, it is hard to rule out that students do not befriend each other because they have similar educational ambitions. Haller and Butterworth noted this problem (1960) and tried to circumvent it by examining intraclass correlation in educational aspirations among friends, conditional on similar socioeconomic background. Duncan, Haller, and Portes (1968) also concluded in their reinterpretation of Haller and Butterworth's model (1960) that their results were irrelevant if friendship selection is based on aspirations. More novel models of friendship selection and friendship influence have tried to model friendship selection where selection and influence are separated by applying stochastic actor-based models on longitudinal network data (e.g. Lomi et al. 2011; Snijders, Van de Bunt, Gerhard G, and Steglich 2010).

Studies that allow for a broader definition of peers such as classrooms or school cohorts typically address such selection effects by using fixed effects approaches (Mouw 2006). A common approach is to rely on school fixed effects where the model controls for time constant differences between schools, and estimate influence using variation within the schools (e.g. Jonsson and Mood 2008; Skov 2016). These models rely on the identifying assumption that school effects such as social selection are constant over time and affect all students within the school in a similar way, given additional controls for observable variables. Such fixed effects

models can also be used on entities smaller than schools, given that the independent and dependent variables are observed more than once, within the entity. For example, Study I and Study III in this dissertation use siblings as a fixed effects entity. Sibling fixed effects control for all differences between siblings while using observed variation between the siblings to estimate peer influences on educational decisions. Such models rely on the identifying assumption that parents and family-specific factors affect the students in the same way when they make educational decisions and are influenced by their peers. Another approach to raise the internal validity and circumvent problems related to selection into peer groups based on unobservable characteristics is to rely on some form of randomization into peer groups where students' have been randomly selected into different groups (e.g. instructional groups or college roommates) (Mouw 2006; Sacerdote 2011). However, such studies have mostly been conducted in selective upper secondary settings, such as prestigious colleges or military schools (De Giorgi, Pellizzari, and Redaelli 2010; Lyle 2007; Sacerdote 2001). This suggests that such studies are less externally valid compared to studies conducted with nationally representative random samples from a population or an entire population.

There are some additional threats to the validity of the estimations of peer influence. One problem concerns what Manski (1993) called the reflection problem, also known as simultaneous effects. This problem arises when peers' educational decisions are assumed to affect ego's educational decision while ego may simultaneously affect peer educational decisions, causing an upward bias of the estimated influence effect. Another problem is correlated time-varying unobservable factors, where both ego's and peers' educational decisions could be driven by some time-varying unobserved external factor. This would make their educational decisions more similar and bias the estimate of social influence through conformity upward. Another problem related to identifying socialization effects is conflating peer behavior with peers' exogenous characteristics (i.e., contextual effects). This problem suggests that the researcher is unable to isolate the effect of peer educational decisions from peer characteristics on ego's educational decisions. This is problematic when policy implications are drawn from the findings, since policies related to socialization are usually different from policies directed toward school composition (Manski 2000).

One approach to circumvent reflection could be to rely on an instrumental variable (IV) approach. With this approach, the endogenous independent variable is predicted with an instrumental variable. A valid instrument should be a predictor of the peers' educational decisions while assumed to only be indirectly related to ego's educational decisions through its effect on the peers' educational decisions. De Giorgi, Pellizzari, and Redaelli (2010) used an identification strategy relying on overlapping peer groups, where ego's peers' educational decisions were instrumented with the characteristics and educational decisions of ego's peers' peers, who were not part of ego's peer group to predict the educational decisions of ego's peers.

Similarly, in order to address endogeneity threats from correlated unobservable time-varying factors affecting ego and peers in a similar way (i.e., exogenous shock) an instrumental variable approach can be used. In order for the instrument to be valid it should be correlated with peers' educational decisions and uncorrelated with the unobserved factor that potentially drives both ego's and peers' educational decisions, as well as ego's educational decision. This implies that the validity of such instrument cannot be evaluated using data, instead it must be motivated theoretically. Fletcher (2015) used peers' parental expectations for their children's educational attainment as an instrument for peers' educational aspirations. In order to circumvent the threat of correlated unobservable factors, such instrument requires the identifying assumption that peers' parents' educational expectations do not directly influence their children's peers' educational decisions and there are no unobserved effects that drive both parents' educational expectations for their children and their children's peers' educational decisions.

Swedish school system and context

The educational system in Sweden is considered to be egalitarian since compulsory education, upper secondary education, and most tertiary educations are free.³ In addition, students are provided with free school lunches and teaching materials in compulsory and upper secondary education. Most tertiary educations entitle students to study grants and student loans to cover their living expenses when studying. Students are entitled to study grants and loans for 12 academic semesters of full-time studies, where each year contains two semesters.

³ The description of the educational system refers to the period 1998 to 2010. Study IV includes data from 1997 which used a different grade system in lower secondary education.

Schooling is compulsory from the age of seven until the end of 9th grade and the curriculum is nationally standardized. Formal tracking by ability is prohibited and instructional grouping discouraged (Jonsson and Mood 2008). The grades are teacher assigned based on standardized criteria where skills are matched to standardized requirements. Students can be assigned four different grades, corresponding to a numerical value: fail=0, pass=10, pass with distinction=15, and pass with special distinction=20. The grade sum is based on the 16 highest grades suggesting a maximum of 320. In order to be eligible for upper secondary education the students are required to attain at least a pass in math, English, and Swedish or Swedish as a second language.⁴

When students apply to the curriculum-tracked upper secondary education during 9th grade, they have a wide range of educational tracks to which they can apply. There are two main branches in the upper secondary education: the academic and the vocational. The main purpose of the academic branch is to prepare students for postsecondary education in either the social sciences and humanities (social science track) or in science, technology, engineering, and mathematics (STEM) in the natural sciences track. In addition, there are a few schools that offer an International Baccalaureate with an international standardization of the curriculum, preparing students for postsecondary education. The vocational tracks prepare students for employment within different manual occupations. The curriculum in the vocational tracks is not designed to prepare students for postsecondary educations and gives limited access to these. Consequentially, the share proceeding to a postsecondary education is substantially lower compared to students that attended an academic track (Breen and Jonsson 2000; Rudolphi 2013). There are also preparatory tracks for students not eligible for other upper secondary tracks and semi-academic tracks such as the aesthetical programs with emphasis on arts-related subjects. Students apply for secondary education twice during 9th grade. The first application is submitted early in their last semester and based on their current grade sum. This application serves as a trial application and is not formally binding; the aim is to provide the students with an indication of their chances of being admitted to their preferred track given their current grade sum. The second round of applications is submitted at the end of their last semester where they apply to their preferred educational track and the admissions are based on their final grades. The students are also encouraged to visit upper secondary schools and have discussions with students and study

⁴ Swedish as a second language is offered to students who do not have Swedish as their mother tongue.

counselors in order to make informed decisions. Students are allowed to change programs between years, if there are available places, and such changes are usually associated with a prolongation of their education by at least one year because curricula in different tracks vary and enrollment is limited to the fall semester (starting in August). Students have the right to enroll in upper secondary programs up until the year they turn 20, thereafter they are referred to adult education. In order to be eligible for tertiary education the students need at least to pass courses that correspond to 90 percent of their upper secondary education. In addition, most tertiary educations require several courses in Swedish, English, and Math, depending on the field of study. Students can enroll in tertiary education twice a year either in the fall semester (August) or in the spring semester (January). The places in tertiary educations are limited and admissions to popular educations are based on either the students' grades in upper secondary education or their results on a national university aptitude test.⁵

Data

The studies in the dissertation are based on a collection of administrative registers supplied by statistics Sweden. The registers are longitudinal and cover entire populations of students that are traced between different registers using unique personal identification numbers. Five different educational registers are used in this dissertation. The 9th grade register is used in all studies and contains yearly information on all students in Sweden that attended 9th grade (usually at the age of 16). The register contains information on which school the students attend and their achievements in 9th grade. The upper secondary application register is used in Study I, II, and III and contains the students' applications to upper secondary educations. The upper secondary enrollment register is used in study II, III, and IV and contains information on which track and in which school and cohort the students enrolled. The upper secondary graduation register data is used in study IV and contains information on students graduating from upper secondary education with information on school, track, and year, in addition to their grades from upper secondary education. Study IV also uses the tertiary education applications register with information about applications to tertiary educations. Several additional registers are also used. The most crucial of these is the multigenerational register, which connects the students to their parents by birth records and also allows students to be matched to their siblings. Students'

⁵ Some educations have an additional quota where eligible students can be admitted based on relevant work experiences. Aesthetical tertiary educations also admit eligible students based on auditions or work samples.

socioeconomic background is gathered by retrieving information such as parental education, employment status, and income from the longitudinal integration database for health insurance and labor market studies (LISA by Swedish acronym).

Methods

These compilations of longitudinal administrative data have allowed me to use models that control for a large number of unobserved as well as observed factors while following the students through several educational crossroads when facing different educational decisions. Such rich data also allow me to examine various sources of heterogeneity in interpersonal influence. Studies I and III rely on school and sibling fixed effects controlling for a large number of unobserved factors that could affect both ego's and peers' educational decisions. The studies do not control for biases emerging from reflection, suggesting that the estimates suffer from an upward bias. The size of this bias is probably small given the size of the peer groups used. The studies cannot exclude the possibility that the estimated effects of conformity are biased upward by time-varying exogenous shocks that affect ego's and peers' educational decisions in the same direction. However, given the gender specific influence effects in the studies, such effects must be driven by gender specific exogenous shocks. Study II relies on a larger fixed effects entity (i.e., school track) instead of sibling fixed effects, but the design is less sensitive to potential biases caused by reflection and exogenous shocks. It focuses on the temporal aspects of peer influence where the outcome is dependent on peer behavior in earlier stages of the students' educational career. These studies also include controls for different time-varying peer compositional characteristics in order to separate effects arising from peer behavior from contextual effects.

Study IV uses a different approach when examining the selection into tertiary educations as a consequence of an admission reform that increased the achievement sorting of students across schools. The study uses a difference in difference approach with a matched control group where the schools exposed to the reform are matched with schools of similar characteristics before the implementation of the reform (sociodemographic composition, achievement composition, and applications to tertiary educations). The difference in difference approach controls for initial differences between the schools and rests on the assumption that the only

remaining difference in student application behavior between schools can be attributed to the admission reform.

Summary of studies

Study I - Two Functions of Peer Influence on Upper-secondary Education Application Behavior

In this study, peer influences on applications to upper secondary educations are studied through two different influence functions identified within the reference group literature: namely, normative and comparative influence. Normative influence suggests that students alter each other's educational applications toward an emerging local norm within the school cohort, making the students' applications more similar. Comparative influence suggests that students evaluate their own educational achievements with their peers' average achievements, which affects their evaluation of their own utility of enrolling in an academic track. The study uses Swedish administrative data covering all students that attended 9th grade and applied to upper secondary education from 1998 to 2010. The data also include information about sociodemographic characteristics of the students and their school peers, as well as family identifiers that allowed me to match siblings. The study relies on linear probability models with an extensive amount of time varying covariates in addition to school and sibling fixed effects. The approach allows me to control for several observed and unobserved factors that affect a student's application behavior as well as their peers' average achievements and their application behavior.

The study finds that students are more likely to apply to an upper secondary track that prepares them for tertiary educations when they are exposed to peers that apply to an academic track. Moreover, students' decisions to apply to an academic track are dependent on their relative achievement position within their school where they are less likely to apply to an academic track if their peers are high achievers, net of their grades. These two effects are interrelated and when examined separately the effects are substantially lower, suggesting a downward bias of respective influence functions.

Drawing on social identity theory and findings from stratification research, the study examines if these peer effects vary by a student's own achievement level and demographic characteristics as well as their peers' demographic characteristics. The study finds that both conformity and comparison effects (i.e., social contrast) depend on the student's own

achievement level, where the effects are stronger among students in the middle of the achievement distribution. It is proposed that such differences are explained by the strong relationship between one's own achievements and the likelihood of enrolling in an academic track, where high achievers are more likely to attend an academic track while lower achieving students are more likely to attend a vocational education, and the educational path among middle achievers is less clear. The study additionally finds that students are affected differently depending on their own gender and history of immigration as well as their peers' gender and immigration history. Girls tend to be more affected by the decisions of other girls while boys tend to be more affected by the decisions of other boys. Additionally, native-born students with native-born parents tends to be more affected by other native-born students compared to peers with an immigrant background. Yet, the applications of students with an immigrant background tend to be more affected by the applications of students with a native background. When examining the effects of social contrast through the average grades of different peer groups a different pattern emerges. The average grades of students with an immigrant background, especially boys, tend to have stronger discouraging effects especially for girls with a native background. A plausible explanation for such heterogeneous effects could be sought in expectations about relative achievements where groups that on average tend to be high achievers are more discouraged by their peers achievements and the achievement groups that on average tend to achieve relatively low have stronger discouraging effects. These two different influence patterns suggest that the reference group the students use varies with the type of influence the reference group exerts.

Study II - My peers made me choose it: The probability of leaving a natural sciences track early when enrollment is based on conformity

This study builds on the finding from Study I that students conform to each other's educational decisions. This suggests that students educational decisions are altered by socially imposed norms about educational ambitions. Such influence could potentially push the students towards educational tracks that are either too hard or do not fit their interests. Consequentially, I examine the effects of 9th grade peers' application behavior on the probability of leaving a natural science track within a year from enrollment, which is argued to be the most demanding upper secondary track. Additionally, the effects of peer composition within the new track are examined as

potential mediators of the effects. The study uses administrative data covering all students that finished 9th grade from 1999 to 2010. The analytical population is restricted to all students who enrolled in a natural science track. The estimations include variables with information about several individual characteristics along with peer characteristics in both the natural science track and 9th grade school cohort. The estimations are based on linear probability models including upper secondary school and 9th grade school fixed effect.

The results show that there is a relatively small but positive relationship between leaving the natural science track and the share of 9th grade peers who applied to such track. The results also show that the composition of peers within the new track affects the student's decision to leave the track. Drawing on previous research suggesting that collective affiliation and feelings of belonging are important for school adjustment, I show that having students from your 9th grade peer group in the new peer group reduces the risk of leaving the track before graduating. The findings also show that discouraging effects through comparisons are in play in upper secondary education where the risk of leaving the track increases with the average achievements of the students' grades, net of their own achievements. Since it is shown in Study I, and elsewhere, that gender is a salient characteristic when choosing reference groups, this study demonstrates that conforming to decisions the students later regret is almost exclusively driven by conformity to same sex peers. The gender composition of track peers that were also peers in 9th grade is shown to be important where same-sex peers, to a larger extent, shelter students from leaving the track early.

Study III - Gender atypical decisions and the role of peers

The aim of this study is to examine the role of school peers' educational decisions when students apply to the educations that are most gender segregated within upper secondary education. More specifically, the study examines how normative influence (i.e., conformity) affects boys and girls when applying to educations traditionally considered typical or atypical given their gender. In addition to studying the role of peers when students select into gender atypical educations, whether those who select into gender atypical educations are more likely to leave the education early compared to their same-sex siblings enrolled in a non-atypical education is examined. The study uses administrative register data for students that attended 9th grade and enrolled in an upper secondary education from 1999 to 2010. The multigenerational register allows students to

be matched with their siblings, which facilitates the use of same-sex sibling fixed effects restricted to the students that attended the same 9th grade school. This implies studying differences between sisters and brothers exposed to different peers or different educational tracks, while controlling for all the observed and unobserved factors that affect them in a similar fashion such as parental influence and different sorts of family-related resources.

The study finds that gender norms about appropriate educations are formed locally among the peers where students applying to gender atypical tracks influence other students to apply to such tracks to the same extent as peers applying to gender typical tracks. The results also suggest that neither one's own grades nor comparative effects through peer grades determines students applications to gender atypical educations, although when examining the probability of applying to a gender typical education there is a negative relationship between one's own grades and a positive relationship between average peer grades. The results also suggest that token girls (i.e., girls enrolling in an atypical education) are more likely to leave the track compared to their non-token sisters while token boys are equally likely to leave the track compared to their non-token brothers. It is suggested that the findings are driven by different types of school climate faced by token girls and boys, where girls are less likely to be included in their new peer group and more likely to face a chilly climate by their peers compared to boys. The number of peers within the new track that attended the same 9th grade school as token girls, however, had a protective effect from leaving the track early, while no such protective features were found for token boys.

Study IV- Elite schools, elite ambitions? The consequences of achievement sorting for the formation of educational ambitions

The study examines more implicitly peer influences through normative and comparative influence by analyzing the effect on tertiary education application behavior of an admission reform that increased student sorting by achievements in upper secondary education. In this study we exploit a reform that changed admission to upper secondary education in the municipality of Stockholm from being based on distance between home and school to be based on achievements. The reform result was that high achieving students were sorted into the most popular schools, while low achievers were sorted into less popular schools. Such changes in school composition are suggested to have implications on students' future educational plans through normative and comparative influences. According to the normative influence function, a culture of high

ambitions can emerge in schools with a concentration of high achievers while cultures of low ambitions might occur in schools with a concentration of low achievers. However, according to the comparative influence function, students sorted into schools with high achievers can be discouraged by their high-achieving peers while being sorted into a low-achieving context can have encouraging effects on the students' future ambition, since they achieve relatively higher. This suggests that the reform can affect students' future educational plans in different directions mediated by the two influence functions. Two outcomes are examined in the study: applying to a prestigious tertiary education after graduation from upper secondary education and applying to a tertiary education that is not defined as prestigious.

The study relies on administrative data for students that enrolled in upper secondary education from 1997 to 2002. The upper secondary schools in Stockholm are matched with schools unaffected by the reform outside of Stockholm based on school composition characteristics before the reform (1997-1999). The study applies a difference in difference estimation technique where initial differences between the Stockholm schools and the matched control schools are differenced out and the remaining differences between the schools during 2000-2002 can be attributed to the admission reform (i.e., treatment effect). The results suggest that the reform has on average no effects on the probability of applying to tertiary educations defined as non-prestigious. However, there is a positive effect of the admission reform on the probability of applying to a prestigious education, but the effect goes towards zero when the student's peers' applications are considered, suggesting that the effect is mediated through conformity. There is however substantial heterogeneity in the reform effect where girls and students with tertiary educated parents experience stronger effects of the reform. The positive effects are also found among the highest achieving students while lower achieving students are unaffected.

Conclusions, contributions and further research

The studies in this dissertation have used Swedish administrative registers covering several full cohorts, which have provided me with unique opportunities to address questions that cannot be addressed with most other data sources while simultaneously controlling for several observed and unobserved factors that potentially could bias the estimates. These studies can provide direction both for further empirical research on how peers affect each other's educational decisions and

also for how interpersonal influence on educational decisions and ambitions between students is theorized.

The four studies in this dissertation consistently show that peers matter for several different educational decisions such as applying to ambitions educations, applying to gender typical and atypical educations, and also the decision to stay or leave an upper secondary education. The studies examine two main avenues of influence: encouraging and discouraging influences. Encouraging influence is when the students influence each other to make similar educational decisions through local educational norms and asymmetric exposure to information about different educational options. Students are discouraged by their peers through relative comparisons, where they are less likely to apply to ambitious educations and more likely to leave such educations when they are surrounded by high-achieving peers compared to situations with lower achieving peers. Previous research has either studied encouraging or discouraging effects, finding support for both forms of influence. However, these two influence functions are interrelated and omitting one could potentially bias the estimate of the other. Moreover, studying these influence functions separately masks the students' emphasis on different reference groups in different situations. For instance, the studies show that encouraging effects mostly go through same-sex peers' educational decisions and that students with an immigrant background to a larger extent rely on the educational decisions of their peers with a native background. On the other hand, discouraging effects vary less with gender and there is a tendency for discouraging effects to vary more with ego's expectations of self and various peer group achievements, where the grades of students with characteristics of lower achievers on average tend to have stronger discouraging effects. Such heterogeneity was suggested in early theoretical work on reference groups (Davis 1959; Merton and Rossi 1968; Shibutani 1955), but has largely been missing in more recent empirical works on peer influence effects on educational outcomes. Study I also shows that students in the middle of the achievement distribution are more susceptible to both encouraging and discouraging influence, probably because their educational careers are less clear and they rely more on their peers for guidance. This is a highly relevant observation for potential policy makers interested in altering students' educational decisions by changing student compositions to whiten schools.

Study II addresses a previously overlooked implication of encouraging influence from peers by showing that there is a positive relationship between leaving demanding and ambitious upper secondary educational tracks and the share of peers in lower secondary educations who also applied to the track. This relationship is argued to emerge when students are myopic and put too much emphasis on their peers' educational decisions and too little on their own interests and abilities. These findings are also potentially relevant for policy makers and offer some opposition to the critique that models of educational attainment put too much emphasis on myopic behavior, not acknowledging that educational ambitions might be formed at earlier stages of the life course (Cameron and Heckman 1998; Morgan 2005). That is, students' educational decisions are at least partly myopic, given that these decisions are formed by peer influence to the extent that they tend to make educational decisions they later regret.

Studies II and III also add to a growing research field that examines how educational transitions affect educational achievements and attainment by showing that having old peers in new educational contexts can have protective effects on the student and reduce the risk of leaving the education early, since such familiarity is argued to increase the collective affiliation to the new peer group. In addition to showing that same-sex peers are the primary influencers when students apply to upper secondary educations that are considered gender typical or atypical, Study III shows that girls are more likely to leave an atypical education compared to their sisters enrolled in another type of education, while no such differences are found among brothers. Such inequalities have previously been argued to exist within the labor market (Acker 1990; Williams 1992) while I am not aware of any studies that have shown such inequalities within upper secondary educations.

Study IV examines peer influence effects with a different approach and finds that positive effects of achievement sorting on the likelihood of applying to prestigious tertiary educations among high-achieving students are partly mediated by the application behavior of the students' peers and their average grades. These findings suggest that school choice reforms can have polarizing effects on students' educational ambitions where high achievers are positively affected by their expanded opportunity to choose their educational context, while lower achieving students' educational ambitions were less affected or unaffected. A relevant extension of this study would

be to investigate negative outcomes such as leaving education early as an effect of increased ability sorting.

The findings described above can also provide some additional directions for further research on peer influence and on educational inequalities. For instance, we know relatively little about which peers matter in different situations. Study I indicated that students use different points of reference when they are influenced through comparisons and when they are influenced through educational norms or information. These findings would provide more insight into the peer influence literature if they were reexamined using data with opportunities for more versatile and fine-grained peer measures. Additionally, little is known about the long run effects of peer influence on educational decisions. The literature on peer influence would benefit from studies that examine outcomes in later stages of the life course, for example, educational attainment in later stages of life, employment status, and income. In summary, increased understanding of how inequalities of opportunities emerge and how they could be altered could be gained through such further research in combination with this dissertations consistent finding that peers matter for educational attainment.

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