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OPPORTUNITY, CHOICE, AND BARRIERS

A Register-Based Study on Social Stratification
in Higher Education in Finland

Laura Heiskala



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ABSTRACT

According to the concept of equality of educational opportunity, individuals should have equal opportunities to educate themselves regardless of their family background. However, the educational levels of parents and children often correlates, which has been explained by the association between social origin and school performance, as well as the social origin differences in school continuation decisions. According to previous studies, social origin differences in educational transitions are largest among poorly performing students. A compensatory advantage thesis states that families of high social origin can compensate for negative life events and children's poor school performance better than those from lower social origins. Previous literature has largely interpreted the findings through the lens of families in higher social positions: how poor success can be compensated with better resources and support from the family. In addition, the literature on resource accumulation has shown that extrafamilial factors, such as the resources of close relatives, can compensate for the family's own resources or even strengthen family background differences.

This dissertation examines how equality of opportunities in higher education is realised in Finland and aims to expand the understanding of why children of highly educated parents end up in higher education and especially university more often than others. The aim of this dissertation is to describe how the dual model of higher education, competition for education places, and parents' heterogeneous environments shape family background differences in higher education transitions. This dissertation consists of three studies utilising statistical regression-based methods and high-quality Finnish register data from Statistics Finland.

The first article focuses on the dual model of the Finnish higher education sector. This study examines enrolment in polytechnics and universities based on parental education and comprehensive school grades. The results show that polytechnics attract particularly well-performing children from lower-educated families diverting them away from universities, while providing a pathway to higher education for below-average-performing children from higher-educated families. In other words, the dual model of higher education divides well-performing students according to their parental education into polytechnics and universities and, in addition, maintains

social origin differences in higher education enrolment among below-average-performing children.

The second article focuses on the selectivity and re-applying system of Finnish universities. This study focuses on a large majority of university applicants who do not get accepted on their first attempt. According to the results, children with highly educated parents keep applying to university despite being rejected. The results show that re-application rounds contribute to the overrepresentation of children with highly educated parents at universities. These results enhance the understanding of how children from high social origins utilise second chances compared to others.

The third article examines the association between parental workplace environment and children's higher education enrolment. This study examines whether the proportion of highly educated employees in a parent's workplace can moderate the association between parents' and children's educational levels. According to the results, children from lower-educated families whose parents work with highly educated co-workers enrol in higher education more often than children from lower-educated families whose parents' workplaces have few highly educated workers. The results indicate that when family members operate in heterogeneous environments where people from different educational groups meet, the differences in higher education enrolment between children from less- and higher-educated families are smaller.

In summary, equality of opportunity is not fully realised in higher education in Finland, even according to the so-called conservative conception of equality of educational opportunity which calls for utilising the national talent reserve. The dual model and selective admissions exclude both high-achieving children and those with strong educational intentions from lower-educated backgrounds from entering the highest levels of education. Based on the results of this dissertation, it can be estimated that educational decision-making occurs largely in less-educated families. For children from highly educated families, poor school performance, university application rejections, and parents' homogeneous work environments were smaller factors in transitioning to higher education than for children from less educated families. Although much of the literature focusing on compensatory advantage assumes that privileged families compensate for adversity in their children's educational paths, the decision to enrol in higher education may, at the same time, be a 'non-decision'.

KEYWORDS: social origin; parental education; intergenerational inequality; educational decision-making; educational transition; compensation

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TIIVISTELMÄ

Koulutuksen mahdollisuuksien tasa-arvo -käsityksen mukaan yksilöillä pitäisi olla yhtäläiset mahdollisuudet kouluttautua perhetaustasta riippumatta. Vanhempien ja lasten koulutustaso kuitenkin usein korreloi keskenään, mitä on selitetty yhtäältä perhetaustan ja koulumenestyksen välisellä yhteydellä ja toisaalta perhetaustaeroilla päätöksissä edetä koulutuspolulla. Aiemman tutkimuksen mukaan perhetaustaerot koulutussiirtymissä ovat suurimpia heikosti koulussa menestyvien kesken. Kompensaatioetuteorian mukaan hyväosaiset perheet pystyvät kompensoimaan negatiivisia elämäntapahtumia ja lasten heikkoa koulumenestystä paremmin kuin matalammasta asemasta tulevat. Aikaisempi kirjallisuus onkin tulkinnut löydöksiä paljolti korkeassa asemassa olevien perheiden kautta: kuinka huonoa menestystä pystytään kompensoimaan perheen paremmilla resursseilla ja tuella. Tämän ohella kirjallisuus resurssien akkumuloinemisesta on näyttänyt, että myös perheen ulkopuoliset tekijät, kuten läheisten sukulaisten resurssit, voivat paikata perheen omia resursseja tai jopa vahvistaa perhetaustaeroja.

Tämä väitöskirja tarkastelee, miten mahdollisuuksien tasa-arvo korkeakoulutuksessa Suomessa toteutuu, ja pyrkii lisäämään ymmärrystä siitä, miksi korkeakoulutettujen vanhempien lapset päätyvät muita useammin korkeakouluun ja erityisesti yliopistoon. Väitöskirjan tavoitteena on kuvata, miten korkeakoulutuksen duaalimalli, kilpailu koulutuspaikoista ja vanhempien heterogeeniset elinympäristöt muovaavat perhetaustaeroja korkeakoulutussiirtymässä. Väitöskirja koostuu kolmesta osa-artikkelista, joissa kaikissa hyödynnetään tilastollisia regressiopohjaisia menetelmiä ja laadukasta suomalaista Tilastokeskuksen rekisteriaineistoa.

Ensimmäinen artikkeli keskittyy suomalaisen korkeakoulusektorin kahtiajakautumiseen. Tutkimuksessa tarkastellaan opintojen aloittamista ammattikorkeakoulussa ja yliopistossa vanhempien koulutustason ja peruskoulun arvosanojen mukaan. Tulokset osoittavat, että ammattikorkeakoulu houkuttelee erityisesti hyvin pärjäävät matalammin koulutettujen perheiden lapset pois yliopistosta samalla, kun se tarjoaa korkeakoulutettujen perheiden keskiarvoa heikommin koulussa pärjääville lapsille väylän korkeakouluopintoihin. Toisin sanoen korkeakoulun duaalimalli jaottelee hyvin koulussa pärjäävät lapset vanhempien koulutustason mukaan ammattikorkeakouluihin ja yliopistoihin ja ylläpitää perhetaustaeroja korkeakouluttautumisessa myös keskiarvoa heikommin koulussa pärjäävien lasten kesken.

Toinen artikkeli syventyy suomalaisen yliopistosektorin selektiivisyyteen ja uudelleenhakujärjestelmään. Tutkimus keskittyy siihen suureen enemmistöön hakijoista, jotka eivät ensimmäisellä hakukerrallaan pääse yliopistoon. Tulosten mukaan korkeakoulutettujen lapset jatkavat yliopistoon hakemista hylkäyksistä huolimatta. Tulosten mukaan uudelleenhakukierrokset kasvattavat korkeakoulutettujen perheiden lasten yliedustusta yliopistoissa. Tulokset lisäävät ymmärrystä korkeakoulutettujen jälkipolven tavasta hyödyntää toisia mahdollisuuksia suhteessa muuhun väestöön.

Kolmas artikkeli tarkastelee vanhemman työpaikkaympäristön yhteyttä lasten korkeakouluttautumiseen. Artikkelissa tutkitaan, voiko vanhemman työpaikan korkeakoulutettujen työntekijöiden osuus säädellä vanhemman ja lapsen koulutustason välistä yhteyttä. Tulosten mukaan ei-korkeakoulutettujen perheiden lapset, joiden vanhempi työskentelee korkeakoulutettujen ympäröimänä, aloittavat korkeakouluopinnot useammin kuin ei-korkeakoulutettujen perheiden lapset, joiden vanhemman työpaikalla on vähän korkeakoulutettuja työntekijöitä. Tulokset antavat viitteitä siitä, että perheenjäsenten toimiessa heterogeenisissä ympäristöissä, joissa eri koulutusryhmistä tulevat kohtaavat, erot korkeakoulusiirtymässä korkeakoulutettujen ja ei-korkeakoulutettujen perheiden välillä ovat pienempiä.

Yhteenvetona voidaan todeta, että mahdollisuuksien tasa-arvo ei Suomessa korkeakoulutuksessa täysin toteudu edes niin kutsutun suppean tasa-arvokäsityksen mukaan, joka peräänkuuluttaa kansallisen lahjakkuusreservin hyödyntämistä. Duaalimalli ja selektiivinen sisäänotto sulkevat ulos koulutuksen korkeimmilta tasoilta niin hyvin pärjääviä kuin myös korkeat koulutusintention omaavia ei-korkeakoulutettujen lapsia. Väitöskirjan tulosten perusteella voidaan arvioida, että koulutussiirtymiin liittyvä päätöksenteko tapahtuu paljolti ei-korkeakoulutetuissa perheissä. Korkeakoulutettujen perheiden lapsille heikko koulumenestys, hylkäykset yliopistoon hakiessa ja vanhempien homogeeninen työympäristö ovat pienempiä tekijöitä korkeakoulusiirtymässä kuin matalammin koulutettujen perheiden lapsille. Vaikka suuri osa kompensatioetuun keskittyvästä kirjallisuudesta olettaa korkeassa asemassa olevien perheiden kompensoivan vastoinkäymisiä lasten koulutuspoluilla, saattaa korkeakoulutettujen perheiden lapsille päätös korkeakouluopiskelusta olla yhtä lailla valinta, jota ei välttämättä edes tehdä.

ASIASANAT: perhetausta; vanhempien koulutus; ylisukupolvinen eriarvoisuus; kouluksellinen päätöksenteko; koulutussiirtymä; kompensatio

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Laura Heiskala

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List of Original Publications

This dissertation is based on the following original publications, which are referred to in the text by their Roman numerals:

- I Heiskala, Laura, Erola, Jani, and Kilpi-Jakonen, Elina. Compensatory and multiplicative advantages: Social origin, school performance, and stratified higher education enrolment in Finland. *European Sociological Review*, 2021; 37(2): 171–185.
- II Heiskala, Laura, Kilpi-Jakonen, Elina, Sirniö, Outi, and Erola, Jani. Persistent university intentions: Social origin differences in stopping applying to university after educational rejection(s). *Research in Social Stratification and Mobility*, 2023; 85, 100801.
- III Heiskala, Laura, and Pruel, Margus. The compensatory role of diverse workplaces: Parental workplace educational composition and children’s higher education enrolment. Submitted manuscript.

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1 Introduction

Through an extensive educational expansion taking place in all Western countries over the last century, attaining a higher education degree has become increasingly common and, at the same time, remained a remarkable determinant of an individual's life chances. Currently, approximately 40% of the working-age population in the OECD (Organization for Economic Cooperation and Development) countries has attained a tertiary-level degree (OECD, 2023).

While educational opportunities have increased, studies are constantly finding those from privileged family backgrounds to be overrepresented at higher education institutions (Shavit & Blossfeld, 1993; Shavit et al., 2007). In other words, inequalities in education seem to prevail, to some extent, despite the remarkable expansion of the higher education sector. Achieving a higher education degree is associated with high socioeconomic position and earnings, good health, and longer life expectancy, amongst many other things (Hout, 2012). The distribution of these advantages to only a certain portion of the population, particularly when these institutions are publicly funded, underlines the importance of understanding the mechanisms that result in unequal participation rates.

It has been stated that '[t]he observation that the educational attainment of students depends on their social origins is one of the most established findings in sociology' (Erikson, 2020, p. S45). During the extensive history of examining the correlation between parental and children's education, numerous theories have emerged to explain this association. The quantitative social stratification literature, a research tradition studying and measuring the hierarchical structure of societies and its consequences, has mainly focused on social origin differences in students' educational choices, school performance, and the interplay between the two. Numerous studies have shown that children from higher social origins continue their educational pathway further than children from lower social origins (e.g. Mare, 1980; 1981; Shavit & Blossfeld, 1993; Breen et al., 2009). Studies have also shown that this association is partly explained by the fact that students of high social origin, on average, perform better in school (Boudon, 1974; Erikson et al., 2005; Jackson et al., 2007; Jackson, 2013a). The unexplained component of this association—the social origin gradient in educational choices at the same level of performance—has also been

a key finding in many of these studies (Boudon, 1974; Erikson et al., 2005; Jackson et al., 2007; Jackson, 2013a). In the formal educational decision-making literature, this difference is often interpreted as a status-maintenance process, in which educational choices are made to ensure that children do not end up in a lower socioeconomic position than their parents (Boudon, 1974; Breen & Goldthorpe, 1997).

Furthermore, several recent studies have focused on the family background differences in educational decisions at certain performance levels—not only despite them, but also in terms of whether social origin differences are smaller or larger among well-performing or poorly performing students. Most studies have shown that the social origin gradient is strongest among poorly performing students, thus indicating that the resources of the family are beneficial particularly for those students who lack the skills or competence themselves (Bernardi & Cebolla-Boado, 2014; Bernardi & Triventi, 2020). The theory on compensatory advantage suggests that high social origin families are better equipped to offset prior negative life events due to their greater resources, compared to families with lower socioeconomic positions (Bernardi, 2014). Moreover, literature on resource accumulation has expanded the focus from within-family compensation to include other forms of compensation, such as extrafamilial compensation through resources outside the immediate family (Erola & Kilpi-Jakonen, 2017).

However, studies testing these educational decision-making theories in the context of stratified and selective educational transitions are scarce. This dissertation addresses this gap by examining educational transitions and disparities in higher education participation by family background in Finland. Finland's institutional context is useful for examining these themes in several ways. The Finnish educational system is free at all levels, contains no dead ends, and is famous for its achievements, specifically regarding the PISA (Programme for International Student Assessment) results at the beginning of this millennium (Kupiainen et al., 2009). The higher education sector has expanded tremendously since the second half of the last century (Kivinen et al., 2007), the correlation between parental and children's education has been internationally compared at a low level (Hertz et al., 2007; Pfeffer, 2008), and students receive financial student aid, aiming to make studying at higher education possible for all. Thus, owing to these factors, the social origin differences found in this dissertation can be assumed to be even larger in other contexts with less extensive welfare state policies. Moreover, Finnish higher education operates as a dual-system and accessing higher education is highly competitive, with admission barriers being one of the highest among OECD countries imposing specific entry criteria (OECD, 2019). The formal equality of educational opportunity, a stratified higher education sector, and high admission

barriers make Finland an interesting case for expanding our understanding of educational decision-making, particularly the role of resource accumulation.

This dissertation examines the role of social origin, measured by the level of parental education, in higher education access and enrolment in Finland, and explores how equality of educational opportunity is achieved in this context. It studies why students of low social origin students are excluded from the highest levels of education by analysing the roles of prior school performance, university application decisions, and parental embeddedness in heterogeneous environments using high-quality register data from Statistics Finland. The work consists of a summary section and three research articles.

The first article examines the interplay between students' social origins and school performance in enrolling in higher education in a two-tier higher education system. This article studies the differences between parental education groups in enrolling in polytechnics, universities, or neither, at fixed levels of school performance. The second article focuses on social origin differences in re-applications to universities after failure to access with the first attempt. This study aims to determine whether selective university admissions accompanied by second chances contribute to unequal participation rates in universities. The third article examines the role of parental co-worker composition in moderating the social origin gap in higher education enrolment. This study examines whether parental embeddedness in educationally heterogeneous work environments can enhance children's upward educational mobility.

The main contribution of this dissertation lies in demonstrating how children from lower-educated families are diverted from the highest levels of education, due to the dual model and selectivity, despite their good school performance or high educational intentions. Interestingly, these differences diminish when their parents are embedded in diverse environments. At the same time, this work provides important updates on the state of equality of opportunity in Finnish higher education by studying both sectors of higher education as well as following those who face admission barriers. Thus, the main findings of this dissertation should be of interest to empirical social stratification scholars and Finnish educational policy makers.

The summary section, prior to the three articles, is organised as follows: Chapter 2 discusses the concept of equality of educational opportunity, introduces theories of educational decision-making, and considers the institutional features of stratification and competition in higher education transitions. Chapter 3 introduces the institutional context and identifies gaps in previous research. Chapter 4 outlines the research design, data, and methods. Chapter 5 presents the main results. Chapter 6 discusses the results in relation to previous research and the theories presented, making suggestions for future research, and Chapter 7 concludes with policy implications.

2 Social origin and educational attainment

2.1 (In)equality of educational opportunity

Societies are hierarchically structured, implying that individuals, based on their ascribed or achieved qualifications, are in unequal positions in relation to each other in terms of, for example, socioeconomic status, income, or wealth. This ranking of social strata is often deemed acceptable if achieving these positions is possible for all—if everyone has the opportunity to achieve it. Education-based meritocracies, referring to (idealistic) societies in which achieved socioeconomic status is determined by individuals' own merits and educational levels (Bernardi & Ballarino, 2016), enable the equality of opportunity as long as achieving education is possible for all. In other words, equality of educational opportunity is one of the premises of equality of opportunity in this kind of society (Goldthorpe, 2003). The inequality of educational opportunity is usually measured simply through social origin differences in educational attainment. For example, for Raymond Boudon (1974), inequality of educational opportunity explicitly implies 'differences in level of educational attainment according to social background' (Boudon, 1974, p. xi). Prior to measuring and examining the factors explaining the unequal attainment rates, this dissertation briefly describes the meaning of individuals having equal opportunities in the context of education.

One of the early scholars to discuss the concept of equality of educational opportunity is James Coleman, who, with his colleagues, wrote the 'Coleman report', studying the inputs and outputs of public schooling in the USA, focusing specifically on the racial achievement gap (Coleman et al., 1966). Coleman et al. (1966) concluded that schools play a minor role in equalising opportunities for children, as the positive effect of high parental education on students' learning achievements explains most of these differences. The main challenge in understanding the concept of equality of opportunity in the context of education was, according to Coleman (1968; 1975), whether society should aim to equalise the inputs of education, such as funding and quality of schooling, or the outputs of education, referring to equal achievement results.

Following the conceptualisation and discussion around the definition, Torsten Husén (1972, pp. 28–39) distinguished three types of equality of educational opportunity. He titled these types conservative, liberal, and radical conceptions of the equality of educational opportunities. These views on the equality of educational opportunities differ in how the formation of talent is understood, what is seen as the purpose of education, and how it should be achieved.

Based on the conservative conception of equality of educational opportunity, talent is inherited, and the purpose of education is to screen and select the most talented individuals to the highest positions for the benefit of the common good, thereby, societies can get the ‘full potential’ out of its citizens (Husén, 1972). Based on this conception, utilising the ‘reserve of talent’ is beneficial for society in general and that can be seen as the main motivation for educating also the talented lower-class individuals. The conservative conception builds heavily on meritocratic beliefs and views competitive intake, ability tests, differentiation, and the freedom to make individual choices along the educational pathway as useful practices for selecting the most talented individuals in an equal way. Intergenerational social mobility, referring to individuals’ positions being not determined by their parents’ positions, is, based on this conception, achieved with an educational system containing differentiation and selection based on talent.

The liberal conception of equality of educational opportunity, as distinguished by Husén (1972), holds that individuals should be treated equally and that no external factors, such as economic costs or geographical barriers, should limit individuals’ opportunities to attain education. Based on the liberal conception, talent is inherited, and the educational system should not ‘prevent able students from the lower classes taking advantage of their inborn intelligence which entitles them to due social promotion’ (Husén, 1972, p. 31). In contrast to the conservative conception, the liberal conception states that societies should identify and remove all external barriers which prevent lower-class students from continuing their educational pathway. Based on this view, an important practice is to provide universal education for a sufficient period of time rather than differentiating students at a very young age.

The third conception of equality of educational opportunity, for which Husén uses the name the ‘new conception’ as well as the ‘radical conception’ (1972, pp. 37–38), acknowledges that inherited talent is formulated in unequal environments before the individuals’ school careers begin. As talent is unequally distributed, selection into the next levels of education based on academic ability will not discard unequal participation rates in education. Thus, achieving equality in educational opportunities cannot be based on treating everyone in the same way and should, in contrast, be pursued by compensating for the differences that have already taken place in the pre-school years. This is the conventional paradox of equality or the

broad definition of equity; based on this conception, equality is achieved when individuals are treated differently to achieve some kind of similarity. The radical conception acknowledges that equality of educational opportunity is not achieved only by formal education but also by larger social reforms levelling the differences in home environments.

Even though Husén (1972) conceptualised these views—conservative, liberal, and radical conceptions of equality of educational opportunity—as subsequent phases, many of them remain applicable to current societies. This distinction helps in understanding the different perspectives on what is considered fair in educational outcomes and is later employed in this dissertation to evaluate how equality of educational opportunity is realised in Finnish higher education.

2.2 From opportunity to decisions: Social origin and educational choices

Equalising opportunities in education aims at ‘levelling the playing field’ and possibly compensating for initial disadvantages but leaves individuals accountable for some level of choice and effort (Roemer, 1998). Over the last few decades, several Western societies have taken steps towards more equal educational opportunities with extensive educational reforms, such as increasing the length of compulsory education, expanding the higher education sector and removing external barriers in educational pathways. These changes aim to address the increasing demands of labour markets and provide more equal opportunities in education (Jackson, 2013b, p. 1). Social origin differences, particularly in higher education transitions, have still prevailed (Shavit & Blossfeld, 1993; Breen et al., 2009), with some studies showing increased equalisation for cohorts born around the first half of the 20th century followed by a stagnation among more recent cohorts (Barone & Ruggera, 2018; Bernardi et al., 2018). To understand the determinants of unequal participation rates, the formal educational decision-making literature with individual-level models has broken this association into two main parts: social origin differences in performance and choices. This division has been seen to help clarify the mechanisms of inequality of educational opportunity.

In his seminal work, Boudon (1974) studied the relationship between inequality of educational opportunity and inequality of social opportunity. To define inequality of educational opportunity, Boudon considered the factors contributing to differences in educational attainment across groups of social origin. He conceptualised the inequality of educational opportunity as, first, the association between social origin and school performance, and second, the association between social origin and educational choices after taking into account the differences in

performance. He distinguished between primary effects, which he also called cultural effects and secondary effects.¹

Primary (or cultural) effects refer to differences in school performance among students from different family backgrounds. Several studies have shown that children from higher social backgrounds tend to perform better at school than those from lower social backgrounds. Erikson and Jonsson (1996, pp. 10–13) discuss five explanations for why social origin is associated with school performance. These five explanations include genetic differences, differences in home environment, class and cultural biases in schools, differences in health and nutrition, and differences in sibship size. Thus, social origin differences in educational performance occur mostly because of the unequal distribution of material or immaterial resources between families.

Secondary effects refer to social origin differences present in educational choices conditional on educational performance. In other words, the secondary effects refer to the social origin gap in the probability of continuing higher levels of education, which is not explained by youngsters of high social origin performing better in school. An extensive number of studies have compared whether primary or secondary effects explain more of the social origin gap. The results vary by context and year, most showing an important role for both but a slightly larger role for primary effects (Erikson et al., 2005; Jackson et al., 2007; chapters in edited volumes of Jackson, 2013a and Blossfeld et al., 2016). Secondary effects seem to be large especially in countries and educational systems accompanied by lots of individual choice (Triventi et al., 2016, p. 383), and the strength of secondary effects has been shown to explain the cross-national variance in overall inequality of educational opportunity (Jackson & Jonsson, 2013). Thus, secondary effects play an important role in the differences in educational attainment in several Western countries. Hence, reducing inequality of educational opportunity is not possible by just levelling out differences in performance. These findings highlight the need to understand the mechanisms that produce these secondary effects.

Considering secondary effects, Boudon (1974) explains the differences in educational choices conditional on performance, to be driven by status maintenance attempts across generations. Students of high social origin are more likely to experience social demotion in relation to their parents if they choose less demanding educational options compared to students from lower social backgrounds, which explains the differences in educational choices even with the same level of performance (Boudon, 1974, p. 29). This model of educational decision-making was

1 Boudon was not the first to conceptualise primary and secondary effects as these concepts were already presented in French sociological literature in the 1960s (Jackson 2013b, p. 7).

formally developed especially by Breen and Goldthorpe (1997). Their educational decision-making model assumes that families, as rational decision-making units, make the educational choice of leaving or staying in education motivated by the avoidance of children ending up in lower-class positions than their parents (Breen & Goldthorpe, 1997). According to this model, families consider the costs, benefits, and probability of success in the ‘leaving versus staying’ decision, while avoiding downward class mobility. This relative risk aversion together with class differences in resources, ability, and expectations of success explain why high social origin students continue their educational pathways further. The model acknowledges the hierarchical structure of society and assumes that the social origin differences in educational choices are not due to class-related differences in educational attitudes, values, or beliefs, but rather to the risk aversion of downward mobility relative to parents’ class position.

Breen and Goldthorpe’s (1997) model of educational decision-making has been influential in explaining secondary effects, referring to differences in educational choices conditional on educational performance. Some limitations of it are worth mentioning. Rational choice models assume that families are equipped with similar levels of information about their educational system, perceived risks of success, and returns to education. However, to attain a higher education degree, parents’ knowledge of the educational system has been shown to be an essential factor in explaining social origin differences (Forster & van de Werfhorst, 2020). In general, socially stratified information biases partly explain why children from lower-educated families choose ‘safer’ educational pathways (Barone et al., 2018). Some interventions providing accurate information on the costs and benefits of education or financial aid have been able to reduce the social origin gap in higher education access and attainment, but not all types of information are equally beneficial (Herbaut & Geven, 2020). Thus, families operate with dissimilar levels of information, and this information barrier can be difficult to overcome.

More recently, the literature on social origin and educational choices has shifted from ‘ruling out’ the effect of performance in educational decisions to comparing students with similar levels of performance. This also helps evaluate how the goal of equality of educational opportunity is achieved, as even the most conservative views of equality of educational opportunity are aimed at utilising the ‘reserve of talent’ (Husén, 1972). These studies have found that the largest social origin differences in educational transitions occur among below-average-performing students (Bernardi & Cebolla-Boado, 2014; Contini & Triventi, 2016; Bernardi & Triventi, 2020), following the thesis of ‘compensatory advantage’ (Bernardi, 2014). These results, and the thesis of compensatory advantage in general, are interpreted as high social origin families being capable of actively compensating for negative life events in better ways with their higher resources, such as the negative consequences of divorce

(Grätz, 2015), parental death (Prix & Erola, 2017), or poor school performance (Bernardi & Cebolla-Boado, 2014; Contini & Triventi, 2016; Bernardi & Triventi, 2020; Herbaut, 2021). In other words, the interpretations in these studies have concentrated on the agency of families of high social origin. For example, Bernardi (2014) suggested that in terms of educational transitions, families of high social origin may invest in private tutoring when facing low academic success. In summary, the compensatory advantage literature has mainly focused on explaining what high social origin families have or do when facing adversities or disadvantages.

An alternative perspective is to examine what low social origin families need in order to achieve comparable outcomes to those of high social origin families. For instance, Holm et al. (2019) indicate that children from high social origin backgrounds tend to be generally less responsive to negative life events, such as poor performance. In other words, for students of low social origin, school performance seems to be a more important component of educational decision-making. From this perspective, children from families of low social origin are portrayed as making proactive decisions; for example, higher educational performance increasing the chances of better educational outcomes. School performance plays a larger role in school continuation decisions among families of low compared to high social origin, as seen also in Breen and Goldthorpe's model of educational decision-making (Breen & Goldthorpe, 1997; Lucas, 2009).

Furthermore, the accumulation of resources does not operate only within families, such as the lack of academic ability in Bernardi's (2014) example, which was compensated for through other sources of resources in the family. Diverse forms of resource accumulation, as distinguished by Erola and Kilpi-Jakonen (2017), can also occur through resources from other people or institutional interventions. Whether these supplementary resources, being from another type of resource, another human being, or society, help those from lower or higher social origins is perceived as either compensation or a multiplication of resources. Supplementary resources from other people can be accessed through intrafamilial or extrafamilial relations. Extrafamilial compensation can occur in kin relationships, such as accessing the resources of grandparents, aunts, uncles, or other relatives. Immaterial and material extrafamilial resource compensation can also occur through non-kin connections such as family friends or neighbours. These non-kin connections may be particularly helpful for compensatory processes as these people have a higher probability of accessing different kinds of information, as argued by Granovetter in his thesis on strong and weak ties (1973). One of the channels by which social relations, inside and outside the immediate family, contribute to the human capital creation of children, as distinguished by Coleman (1988), is information flow, in addition to shared obligations and expectations, as well as social norms. Thus, the

compensatory processes that occur in intrafamilial or extrafamilial forms do not necessarily consist of transfers that are straightforward to measure.

2.3 Institutional features: Stratification and competition

Educational systems in which these students and families operate differ in many ways, such as in terms of standardisation, stratification, selection, and privatisation (Allmendinger, 1989; Shavit et al., 2007). These institutional features play an essential role in educational choices and their realisation. Considering educational choices and the transition to higher education, an essential factor contributing to class inequalities in educational attainment is not only staying in education compared to leaving but also horizontal differentiation within these decisions (Hällsten, 2010). Stratification of higher education systems may contribute to social origin differences in educational attainment by either reducing or increasing them. As proposed by Brint and Karabel (1989), introducing less prestigious higher education institutions may have lowered the threshold for higher education for children of low social origins, increasing upward educational mobility. However, the existence of these institutions may preserve the class divide as more prestigious institutions are accessed mainly by students of high social origin. Lucas (2001), in his effectively maintained inequality thesis, argued that families of high social origin strive to find qualitative differences in education with which to stand out as soon as quantitative differences in education, such as participation rates in higher education in general, become universal. Stratification of higher education by breaking it into different levels and institutions and especially educational expansion operating through the lower-threshold higher education institutions have shown signs of effectively maintained inequality (Shavit et al., 2007; Boliver, 2011; Triventi, 2013).

Despite the applicability and generality of primary and secondary effects in measuring the inequality of educational opportunity, breaking down social origin disparities into performance and choice oversimplifies the transition process into educational institutions. One specific avenue for social background differences in educational outcomes that has not yet been mentioned is through tertiary effects. Tertiary effects refer to the additional disadvantages that low social origin students receive via schools, such as teachers' bias in favouring high social origin students in terms of evaluations, efforts, and recommendations (Esser, 2016; Lievore, 2022). In addition to these teacher effects, the overall institutional arrangements of educational institutions constrain the decisions made throughout educational pathways (Kerckhoff, 1976), which is often overlooked in formal educational decision-making literature. For example, Boudon suggests that 'In Western societies [...] an individual cannot create a job just because he wants it, but he can go to college if he wants to,

provided he is qualified' (1974, p. 21). Similarly, Gambetta (1987), in his study of institutional constraints and educational choices, states that educational systems 'frequently let the supply of school and college places be determined by the demand so that all qualified people who wish to do so can choose to continue their education' (Gambetta, 1987, p. 32). Nevertheless, individuals do not shape the institutional structure with their choices, instead, the institutional structure shapes the individuals: decisions are constrained by the opportunity structure (Kerckhoff, 1976). Restricted intake is especially the case in publicly funded (Shavit et al., 2007), as well as highly selective elite higher education institutions.

As described above, the institutional features of restricted choice and selectivity are not central to educational decision-making models. It has been argued that selective educational transitions and admission rules based on performance would reduce the role of secondary effects (Jackson & Jonsson, 2013). However, selectivity is essential for unequal participation rates in higher education. High admission barriers have been shown to increase intergenerational educational inequalities, as high social origin students are more capable of adapting to increased competition (Alon, 2009). Thus, restricted intake that leads to competitive admissions benefits those of high social origin. By comparing different cohorts accessing higher education in the USA, Alon (2009) displayed how high social origin students adapt to increased competition by increasing test performance levels.

High admission barriers may also shape social origin differences in access to higher education via other pathways. First, increased competition leading to increased selection based on standardised test scores has contributed to the increased overrepresentation of high social origin students in the US higher education (Alon & Tienda, 2007). Thus, admission rules based only on 'merit' are insufficient to reduce the social origin gap in highly selective higher education transitions (Boliver et al., 2021; Finger et al., 2024). Second, the transition to higher education is conditional on application, making the application decision a decisive phase in the transition process. Students of low social origin anticipate admission barriers by excluding themselves from applying to higher education institutions (Nori, 2011; Boliver, 2013) and especially from the most selective programs (Hällsten, 2010). In line with this, Finger (2022) showed that a social origin gap in self-exclusion from higher education occurs despite low social origin students' university aspirations. In summary, competition seems to be an essential factor leading to socially stratified application decisions and admissions of low and high social origin students. In general, allocative rules and restricted intake require further attention in the formal educational decision-making literature (Jackson, 2019).

3 Institutional context and identified gaps in previous research

3.1 Finnish educational system

Finland is a Nordic welfare state, accompanied by universal social welfare policies such as free education. The Finnish educational system comprises a comprehensive school with no formal tracking until the age of 16 years, upper secondary education divided into general and vocational schools, and tertiary education, nowadays consisting of vocationally oriented polytechnics and academically oriented universities. Studying is free of charge at all levels, and the system contains no formal dead ends, implying that all options are open after completing the previous level of education. Comprehensive and upper secondary schools offer free school meals, and there are student benefits aimed at covering the cost of living for those studying full-time in post-comprehensive education.

Children usually enter comprehensive school in the autumn of the year they turn seven and finish nine years later, the year they turn 16, with most children completing within the target time. The Finnish comprehensive school has a great reputation largely because of its excellent PISA results from the beginning of the millennium (Kupiainen et al., 2009). Comprehensive schools follow the national core curriculum but are governed by municipalities, allowing teachers and local authorities considerable independence. There are no high-stakes student assessments, ability grouping, or formal tracking throughout the comprehensive school. However, there are growing concerns, particularly regarding school choice and urban segregation (Bernelius & Kosunen, 2023), as well as socially stratified pupil selection into classes with emphasised teaching, which challenge the idea of uniform schooling for all (Seppänen et al., 2023).

The most important decision along the educational pathway in the Finnish education system occurs after comprehensive school when students apply to vocational and/or general upper secondary schools. Currently, applying for post-comprehensive education is mandatory as the minimum school-leaving age has recently been extended to 18 years. Admission to vocational and general upper secondary schools is mainly based on teacher-given grades from the end of comprehensive school. Vocational and general upper secondary schools usually last

three years and provide eligibility to continue studies in higher education. Vocational upper secondary schools are practically oriented and divided into multiple study programs that provide students with vocational competence. General upper secondary schools offer students general knowledge and prepare them for further study (Finnish National Agency for Education, 2024). General upper secondary students must complete the required number of courses (or credits nowadays), including mandatory and optional ones. General upper secondary schools conclude with the matriculation examination, the only standardised national examination in the Finnish education system. The consequences of selected courses and matriculation exams have recently received much attention because of a higher education intake reform emphasising matriculation exam results (Kupiainen et al., 2023). The choice between vocational and general upper secondary education, as well as subject choices such as choosing advanced-level math within general upper secondary education, are associated with socioeconomic status in adulthood, as these choices are largely path-dependent on choices made in higher education (Heiskala et al., 2021). Upper secondary track choice is important for educational reproduction as well, as the choice of general upper secondary education explains 80% of intergenerational educational inequality in Finland (Härkönen & Sirniö, 2020).

Higher education in Finland has a dual model consisting of business- and practically oriented universities of applied sciences (also called polytechnics) and academically oriented universities. The dual structure was established in the 1990s during the polytechnic education reform, during which vocational colleges were upgraded into polytechnics awarding bachelor's degree levels. Both institutions, universities of applied sciences and universities, award bachelor's and master's degrees. At universities, most students enrol in programs consisting of bachelor's and master's level studies and then enter the labor market with a master's degree. Enrolling in a master's degree program in polytechnics requires students to acquire at least two years of work experience between studies; thus, all polytechnic graduates enter the labour market with a bachelor's degree. A smaller proportion of them, compared to university graduates, continue on to master's level studies. Clear distinctions exist between universities and polytechnics in terms of competition for access (Nori et al., 2021), social origin disparities among applicants and students (Kivinen et al., 2012; Nori et al., 2021), and the socioeconomic positions attained in the labour market (e.g. Heiskala et al., 2021; Isopahkala-Bouret et al., 2021).

Admission to higher education in Finland is restricted by a *numerus clausus* system and is highly competitive, even compared to other countries that select students at the gates of higher education (OECD, 2019). Previous studies have shown that social selection occurs both before and during the application process, with a high family background being associated with both applying to university and gaining access (Nori, 2011). Nowadays, intake is based on entrance exams,

matriculation exams, or, for polytechnics, grades from vocational upper secondary schools. Recent higher education intake reforms, which do not concern the study population in this dissertation, aimed to reduce the role of preparation for entrance exams and increased the role of matriculation exams. These time-consuming and expensive entrance exams used to be the main pathway to accessing universities (also for the study population in this dissertation), putting applicants in unequal positions in terms of family background, area of residence, and family situation. Numerous applicants, and particularly those from high social origins, used thousands of euros for private preparatory courses while preparing for entrance exams (Kosunen et al., 2021). Private preparatory course markets have, however, shifted their focus in preparing students for matriculation exams (Kosunen et al., 2022), which may have even increased social origin differences in their consumption (Niemelä et al., 2023).

Overall, and especially in international comparisons, the Finnish educational system performs well according to many indicators (Sahlberg, 2021). However, recent trends have shown some worrisome developments. Intergenerational educational inequality has either increased (Härkönen & Sirniö, 2020) or has not diminished (Karhunen & Uusitalo, 2017). Learning outcomes based on PISA evaluations have dramatically decreased (Hiltunen et al., 2023), and the increase in the working-age population with higher education degrees is stagnating (Kalenius, 2023).

3.2 Identified gaps in previous research

Despite the extensive number of studies focusing on intergenerational educational inequality, several questions remain unanswered, particularly concerning the mechanisms that limit educational mobility across generations.

Stratified educational systems have various implications for social stratification. On the one hand, the division into lower- and higher-threshold institutions may decrease intergenerational educational inequality by introducing a possibly less risky option (e.g. in terms of admission) to obtain higher education for students from low social origins. However, they may divert low social origin students away from higher-threshold institutions with the lower-threshold option, in which case they end up having less education than they would in a unitary system (Brint & Karabel, 1989; Rouse, 1995). Studies have shown that children from highly educated families continue their educational pathway further, partly because they perform better at school, but also despite their low performance (Bernardi & Cebolla-Boado, 2014). Studies have also shown increased inclusion of low social origin students via lower-threshold institutions, which has reduced intergenerational educational inequality (Brand et al., 2014), as well as diversion of low and high social origin students due

to the binary structure of higher education for some degree (Shavit et al., 2007). However, these two streams of research—compensatory advantage and the stratification of higher education—have not been studied in line with each other. Thus, studies focusing on resource accumulation that consider differences in participation rates among equally well or poorly performing students in stratified educational systems are still scarce.

Another institutional feature that requires further attention is restricted intake and admission barriers in higher education as a mechanism producing intergenerational educational inequalities, as high competition has been shown to increase the class divide in higher education (Alon, 2009). Previous studies have shown that students of high social origin are less likely to anticipate high admission barriers (Hällsten, 2010; Boliver, 2013; Finger, 2022) and, in general, are more likely to take advantage of ‘second chances’ (Bernardi, 2012; Bernardi, 2014). However, there have been no previous studies on overcoming admission barriers during selective educational transition. This refers to a situation in which students need to respond to educational rejection by giving up university plans or utilising the advantage of a second chance. Socially stratified (possibilities for) responses may reinforce social origin differences in higher education enrolment, highlighting their relevance in studying mechanisms producing intergenerational educational inequality.

Furthermore, previous studies have shown that despite the lack of resources in the immediate family, disadvantages can be compensated through extrafamilial processes (Erola & Kilpi-Jakonen, 2017). For example, studies have shown that having a highly educated extended family member is associated with better educational outcomes for low-educated families (Erola et al., 2018; Lehti et al., 2019). However, individuals are also embedded in non-kin environments, which have gained less attention in the resource accumulation literature but have a high probability of including members with access to different kinds of information (Granovetter, 1973). Thus, studies focusing on the contribution of weak rather than strong ties in educational decision-making are scarce. A kind of exception is studies on ‘neighbourhood effects’ (Leventhal & Brooks-Gunn, 2000; Dietz, 2002; Chetty & Hendren, 2018), which have shown how the surrounding environment can compensate for the lack of resources in the immediate family (e.g. Patacchini & Zenou, 2011). Another feasible example of an environment, in which individuals may be in heterogeneous surroundings, forming weak ties, and in which all individuals, regardless of their social class, are shown to make connections and friendships (Chetty et al., 2022) is the workplace. The resource accumulation literature has not considered the role of co-workers in intergenerational educational transmission, which possibly contributes to compensatory mechanisms.

4 Research design

4.1 Research objectives and questions

The starting point of this dissertation is the well-established association between parents' and children's educational attainment, which continues to exist even in the most egalitarian institutional contexts. Broadly, this dissertation examines why children from highly educated families are overrepresented in higher education, particularly at universities, and how equality of opportunity in higher education is realised in Finland. The research questions addressed in this dissertation are as follows:

1. What are the implications of two-tier higher education systems for social stratification in higher education?
2. What are the implications of selective university admissions accompanied by second chances for social stratification in higher education?
3. What are the implications of parents' educationally diverse work environments for social stratification in higher education?

The first article examines enrolment in polytechnics or university using Finnish register data. Multinomial logistic regressions are used to study how parental education and comprehensive school grade point average (GPA) predict the probability of enrolling in polytechnics, university, or neither during a period of eight years after finishing comprehensive school. This article displays the predicted probabilities of enrolling in polytechnics or university (or neither) at fixed values of comprehensive school GPA across parental education groups. This allows for testing how students' probability of enrolling in different higher education institutions differ among parental education groups with similar school performance.

The second article examines social origin differences in university re-application decisions among students who applied to university but were rejected, who, in the Finnish case, represent the majority of university applicants. With Finnish register data containing application registers of the centralised university application system, this article applies discrete-time event history models and focuses on the probability of stopping applying to university after one or multiple rejections. The main focus is on social origin differences in re-application decisions. Matriculation examination

grades before rejection, as well as starting studies at polytechnics, having children, and earnings after rejection are examined to understand why students with university intentions stop or keep applying.

The third article examines parents' educationally diverse work environments and aims to identify situations where social origin differences in higher education enrolment can be reduced. By analysing Finnish full population register data that cluster all employees into workplaces, the article displays the distribution of highly educated employees among parents' workplaces, assessing how homogeneous or heterogeneous these workplaces are in terms of educational level. This study examines higher education enrolment before the age of 25 comparing children with highly educated parents to those without and focuses on the moderating role of the share of highly educated co-workers at parents' workplaces.

The research designs of the articles are summarised in Table 1.

Table 1. Summary of the research designs.

ARTICLE	RESEARCH QUESTION	DATA	STUDY SAMPLE	OUTCOME VARIABLES	INDEPENDENT VARIABLES	METHOD
I	What are the implications of two-tier higher education systems for social stratification in higher education?	5% population sample from Statistics Finland	Individuals who finished comprehensive school in years 2000–2004 and were under the age of 25	Enrolment in polytechnics or university during eight years after comprehensive school	Parental education, comprehensive school GPA	Multinomial logistic regression
II	What are the implications of selective university admissions accompanied by second chances for social stratification in higher education?	Full population register data from Statistics Finland	Birth cohorts 1987–1990	Stopping applying to university after a failure to access the previous year	Parental education, matriculation examination GPA, polytechnics enrolment, earnings, entering parenthood	Discrete-time event history
III	What are the implications of parents' educationally diverse work environments for social stratification in higher education?	Full population register data from Statistics Finland	Birth cohorts 1989–1993	Enrolment in higher education by the age of 25	Parental education, share of highly educated employees at the parent's workplace	Logistic regression

4.2 Data

All articles in this dissertation rely on high-quality population-based unit-level register data provided by Statistics Finland. The data contain yearly register-based information on the Finnish population from 1987.² Using secured unit identifiers, the census data were linked to administrative registers from various authorities. Statistics Finland removes direct unit-level identifiers and thus, identifying a single individual from the data is not possible. Data protection and confidentiality practices were employed while preparing and analysing the data and publishing the results. Register data do not suffer from non-response or attrition bias and thus are, in many ways, superior to other types of quantitative data. By contrast, register data are not primarily collected for scientific research purposes which is why researchers often need to adjust their plans according to the available information and variables.

In Article I, a register-based population sample compiled by Statistics Finland is used. This sample comprises approximately 5% of individuals who completed comprehensive school between 2000 and 2004, were under the age of 25, and were residents of Finland in 2004 and 2005 (N=23,205). The data include an over-sampling of non-Finnish speakers, as they were originally compiled for studying the education of children of immigrants in Finland (Kilpi, 2010).³ Sampling probability weights are used in all the analyses to adjust for overrepresentation. The data include, among other things, individuals' comprehensive school GPA and annual information on enrolment in upper secondary and tertiary education until 2012. Individuals are linked to their parents, and the data also contain information on their educational level.

Articles II and III rely on full population registers provided by Statistics Finland. These data include yearly information on all individuals permanently living in Finland on the last day of each year. In other words, the data include the entire study population rather than a representative sample. In each article, individuals are linked to their parents. These administrative registers include individual-level information on a broad scale of topics such as educational performance, enrolment, qualifications, income information, and childbearing. The following sections describe the variables used in these studies. Most data run annually from 1987 onwards and various birth cohorts are covered in each article. Article II analyses those born between 1987 and 1990 (N=257,138) and follows them until 2014. Article III analyses birth cohorts from 1989 to 1993 (N=329,788) and follows them until the

² The study does not utilise questionnaire-based census data from earlier years, specifically 1950, 1970, 1975, 1980 and 1985. Since 1985, the census data collection has been based on registers.

³ To be precise, considering the over-sampling of non-Finnish speakers, the sample comprises 7% of the defined population.

age of 25. Further restrictions and specifications are described in the data sections of the articles.

4.3 Measures

This section presents the outcome variables and key independent variables included in the articles. The control variables are described in more detail in the articles.

Outcome variables

Outcome variables measuring representation in higher education consist of enrolment in higher education (Articles I and III) and stopping applying to university after a failure to access the previous year (Article II).

In Article I, the outcome variable is a categorical variable with three groups: enrolment in polytechnics, enrolment in university, and no enrolment in higher education during the eight years after completing comprehensive school. The few individuals (4% of the sample) who enrolled in both types of higher education are included in enrolling in university.

In Article II, the event of interest is stopping applying to university, which is conditional on having applied and being rejected from university in the previous year. This variable is derived from university application registers and includes all university applications and admission decisions.

In Article III, the outcome variable is a categorical variable comprising two groups: enrolment in higher education and no enrolment in higher education when the individual was 19–25 years old. Consequently, this study did not differentiate between enrolment in polytechnics and universities.

Independent variables

In each study, the key independent variable is the individual's social origin, which, in all articles, is measured by the level of parental education. There are multiple ways to define social origin, each with its own advantages and disadvantages. Parental education was chosen because it is a particularly relevant aspect of family background when examining children's educational decisions (Jæger & Holm, 2007; Bukodi et al., 2021). Educational level is typically attained at a relatively young age and provides a stable measure compared to income or socioeconomic status, which can vary considerably over time and are therefore more prone to measurement errors. Parental education has been shown to have the strongest association with children's educational attainment compared to other components of social origin (Bukodi et al., 2021; Strømme & Wiborg, 2024), especially within the Scandinavian mobility

regime (Jæger & Holm, 2007; Erola et al., 2016). Furthermore, parental education, class, and income are strongly interrelated, making parental education a suitable proxy for social origin in the Finnish context, particularly when measured during adolescence (Erola et al., 2016).

In Articles I and II, information on the highest level of either parent is used to define the level of parental education (i.e. the dominance approach). In Article III, fathers and mothers are analysed separately owing to the research setting, focusing on the share of highly educated employees at the parent's workplace. In Article I, parental education is measured at the time the child finished comprehensive school and is divided into four ordered groups: university degree, lowest-level tertiary education, secondary education, and basic education or less. Article II differentiates between parents without a higher education degree and parents with a higher education degree, and it is measured at the age of 18. In Article III, parental education is divided into four groups: both parents are lower educated, the father is highly educated, the mother is highly educated, and both parents are highly educated. In Articles I and II, unknown parental education is included in the lowest educational level group. However, because the combined information of both parents is used, this refers to only a small number of children. It is worth noting that very few parents in the cohorts had a polytechnic degree. Thus, highly educated parents refer to parents with a university education degree, but this group may include some with a bachelor's degree from the polytechnics.

Two measures of school performance are used: comprehensive school GPA and matriculation examination GPA. Comprehensive school GPA is based on teacher-assigned grades awarded at the end of comprehensive school around the age of 15–16 years. This GPA is derived from application registers to upper secondary education, as intake to vocational or general upper secondary schools is largely based on this criterion. This GPA can take values ranging from 4 (lowest) to 10 (highest). There are common evaluation criteria for grading, but it is worth noting that the validity and comparability of these teacher-given grades have been questioned (e.g. Ouakrim-Soivio, 2013). However, this measure of school performance is included as a key independent or control variable in Articles I and III because it is the only measure available for (almost) the whole birth cohort. In Article II, school performance is measured based on matriculation examinations conducted at the end of general upper secondary school. Unlike comprehensive school GPAs, these grades are based on central national examinations but are available only for approximately half of the birth cohorts. In Article II, matriculation examination GPAs are based on four mandatory exams and the grading runs from 1 (lowest, 'improbatur') to 7 (highest, 'laudatur').

Article II includes life-course changes in young adulthood, which may interrupt the application process to university, as independent time-varying variables. These

life-course changes refer to earnings, enrolment in polytechnics, and having the first child. In Article III, the key independent variable, in addition to parental education, is the share of highly educated employees in the parents' workplaces. This variable is a relative measure, calculated using employee registers with unique identifications for each workplace or establishment. The share of highly educated employees is based on all employees in the parent's workplace, dividing the number of workers with higher education by the total number of employees. This measure was calculated only for parents who worked with at least four co-workers.

In addition, the following variables are included as control variables in Articles I–III altogether: sex, registered language, year of birth, area of residence, unemployment status, general upper secondary school graduation year, parental earnings, parental workplace sector, parental social class, and the size of the parental workplace.

4.4 Methods

This dissertation employs various conventional regression methods. The choice of a particular regression method was determined by the form of the outcome variable. In Article I, the outcome variable has three distinct categories; thus, multinomial logistic regression is applied to estimate the probability of belonging to one category with reference to all other categories. In Article II, the method chosen is discrete-time event history analysis, as the outcome is time-varying and discrete by nature, due to application periods to university taking place once a year. In Article III, logistic regression is used for the binary outcome. All analyses in this dissertation are correlational in nature; therefore, the results should not be interpreted as indicating causal associations.

Some forms of logistic regression are applied in Articles I–III. In general, logistic regression analysis estimates the probability of an outcome occurring in relation to one or more independent variables. Instead of the odds ratios typically reported from logistic regression models, Articles I–III present coefficients converted into average marginal effects or predictive margins because of their straightforward interpretation, comparability between models, and usability when modelling interactions (Mood, 2010; Mize, 2019). All three articles include interaction effects in their analyses. Interaction effects enable the examination of relationships not only additive but also interactive in nature; for example, how the relationship between one independent variable and the dependent variable varies across different groups of a third variable.

Article II makes use of the longitudinal format of data by employing discrete-time event history analysis, specifically logistic discrete-time hazard models. The estimates from these models are also converted into average marginal effects.

Discrete-time event history models are suitable for modelling longitudinal data when interested in the occurrence of an event that can occur in discrete time intervals; in this case, stopping applying to university, conditional on rejection in the previous year. Including time-varying independent variables that may interrupt the re-application period was the main reason for choosing event history analysis. An important benefit of event history analysis is the possibility to censor other occurring events in the models, such as in this case getting accepted to university.

5 Results

5.1 Article I: Two-tier higher education systems and their implications for social stratification

Article I examines enrolment in higher education according to the student's parental education and school performance. Particular attention is paid to the Finnish dual model of higher education, in which students may enrol in vocationally oriented polytechnics or academically oriented universities after finishing any upper secondary education. Selectivity in admission and the rules of intake differ between these two institutions (and within these institutions) and previous research has shown that high social origin is associated particularly with enrolment in universities, whereas in polytechnics, the association between social origin and enrolment has been weaker (Kivinen et al., 2012). This article examines the implications of this two-tier higher education system for social stratification and pays special attention to differences in enrolment across school performance distribution.

In line with previous research, the results based on the register data from a 5% sample of the Finnish population show that children from higher-educated families perform better in school, on average, compared to children from lower-educated families. Students with higher grades have a higher probability of enrolling in higher education than children who perform poorly at lower levels of education. The results of multinomial logistic regressions reveal that the positive association between parental education and comprehensive school grades does not, however, fully explain why children of high social origin are more likely to be enrolled in higher education.

Altogether, the results show that students of low social origin require substantially higher grades to achieve the same probability of enrolling in higher education as students of high social origin. Exploring the association between parental education and higher education enrolment at fixed values of school performance, this study finds that students from highly educated families are likely to enrol in universities if they perform well at school, and below-average performers from these families are likely to enter polytechnics. Among lower-educated families, well-performing students were likely to continue their studies in polytechnics, whereas poorly performing students from these families often did not pursue higher

education at all. In other words, the diversion of students into lower- and higher-threshold institutions according to their social origin seems to occur among the well performers in a dual model of higher education. Furthermore, lower-threshold institutions provide access to higher education for below-average performing students from highly educated families. The dual model of higher education, specifically in a situation where the rules of intake and selectivity in admission differ between institutions, allows high social origin students to find their way to higher education even with poor grades, whereas low social origin students seem to be diverted from higher-threshold institutions even with good school performance.

5.2 Article II: University admission barriers and the use of second chances

Article II examines the social origin differences in university application decisions after an unsuccessful application to university in the previous year. In Finland, universities operate on the *numerus clausus* principle, and in most programs and fields of study, the number of applicants exceeds the number of study places. The high number of applicants and restricted intake leads to educational rejections which forces applicants to re-evaluate their plans even after carrying out their university intentions into actual applications.

This study explores whether admission barriers in Finnish universities draw away students from lower social backgrounds, even if they have had university intentions at some point. The objective of this article is to understand whether the overrepresentation of high social origin students in universities is partly due to their persistence in university applications. In practice, the study examines how applicants differ in their probability of stopping applying to university according to their parental education level. The Finnish full population register data containing yearly information on all university applications, including also the unsuccessful ones, allows this study to focus on failed and repeated applications which is not possible with most datasets.

The results, based on discrete-time event history models, show that students from lower-educated families have a substantially higher probability of stopping applying to university after rejection. The study tests several factors that may explain why high social origin students are more likely to keep applying after the rejections. Differences in prior school performance, namely grades from the matriculation examination, partially explain the differences between social origin groups, as applicants from highly educated families are likely to have better grades, and better performing applicants are more likely to re-apply. This study also considers the life-course changes that may occur after the rejection and before the next application period. However, differences in these life-course changes, namely starting studies at

polytechnics, having children, or entering the labour market, do not substantially explain the social origin gap. Thus, the results of the second article show that students of high social origin keep on applying to university after one or multiple failures more often than students of low social origin, even when their school performance and life situations are very similar. This social origin gradient in re-applications partly explains why students of high social origin are overrepresented in universities. Students from lower social backgrounds are more likely to adapt to the rejection and re-evaluate their plans for their educational pathways. Thus, selective intake and the socially stratified use of second chances reinforce the social origin gap in university enrolment.

5.3 Article III: Heterogeneous parental work environments and intergenerational educational mobility

Article III asks whether the diverse environments of family members can moderate the strength of the association between parental and children's education. Specifically, this study examines whether upward intergenerational educational mobility is enhanced when parents spend time in educationally heterogeneous environments. This study concentrates on parents' workplaces, as adults often spend a significant amount of time per day at work and might meet various kinds of people there. Co-worker networks are also an often-used example of weak ties, namely loose connections to people that you know somehow and who have access to different kinds of social circles and information (Granovetter, 1973).

With full population Finnish register data and utilising unique establishment identifications, the results show that many lower-educated parents work in educationally homogeneous workplaces: almost one-fifth of parents without a higher education degree work with only non-highly educated co-workers. Educationally heterogeneous workplaces, in which workers with and without a higher education degree might meet occasionally and share the same spaces or teams, seem to be, however, beneficial for intergenerational educational mobility. The results of the logistic regression models show that children from lower-educated families are more likely to enrol in higher education if their parents work with highly educated co-workers. Even after taking into account differences in or stratifying the results based on children's school performance, sex, area of residence, parents' earnings, workplace sector, social class, and workplace size, the results remain similar. Overall, the results highlight the benefits of diverse communities for educational and social mobility.

5.4 Summary of the main findings

The main findings of these articles, summarised in Table 2, show that the transition to higher education in Finland is determined by students' family background, school performance, the surrounding environment, and institutional constraints. More specifically, the importance of parental education, school grades, parental co-worker composition, and life-course changes during the university application phase were examined. Many of these factors demonstrate independent associations with higher education applications or enrolment, along with interactive associations.

Several mechanisms contributing to the overrepresentation of students from high social origins at Finnish universities within a tuition-fee higher education system have been identified. First, the dual model of Finnish higher education attracts well-performing students from lower-educated families to polytechnics leading to large social origin differences even among the very well-performing students. Conversely, lower-threshold institutions with less selective intake allow poorly performing students of high social origin to access higher education.

The second article shows that there are more university applicants with lower-educated parents than there are university students because many self-exclude themselves during the highly selective re-application process. High admission barriers and selective intake reinforce social origin differences in university enrolment, as these institutional constraints drive away especially students of low social origin. Thus, based on the first two articles, overrepresentation, particularly in university education in Finland cannot be justified by high social origin students' better school performance or their desire to study at university.

The third article demonstrates how the social origin gap in higher education enrolment can be reduced. Diverse parental weak ties boost upward educational mobility. Children with lower-educated parents whose parents work among highly educated co-workers end up in higher education more often than children whose parents work with lower-educated co-workers. One interpretation of this result is that diverse communities are beneficial for upward educational mobility through information flow.

Table 2. Main findings.

ARTICLE	RESEARCH QUESTIONS	MAIN FINDINGS
I	What are the implications of two-tier higher education systems for social stratification in higher education?	The dual model of higher education diverts especially the well-performing students according to their social origin and provides lower threshold access for the below-average performing high social origin students.
II	What are the implications of selective university admissions accompanied by second chances for social stratification in higher education?	Re-applications to highly selective Finnish universities are mainly used by high social origin applicants increasing their overrepresentation in universities. Prior school performance or intervening life-course changes do not fully explain these differences.
III	What are the implications of parents' educationally diverse work environments for social stratification in higher education?	Children from lower-educated families whose parents are working around highly educated co-workers have a higher probability to enrol in higher education compared to children from lower-educated families whose parents are working in educationally homogeneous environments.

6 Discussion

This dissertation aims to contribute to the extensive literature on inequality in educational opportunity in higher education. At a broader level, it explores why children from highly educated families are overrepresented at the highest levels of education. More specifically, it examines the roles of stratification and selectivity in higher education, as well as the role of diverse environments on educational decision-making. In the context of Finland, it examines how equality of opportunity in higher education is achieved.

The first article demonstrates how the dual model of higher education reinforces social stratification within higher education systems. This occurs, firstly, by providing lower-threshold access for below-average-performing students from high social origins. This pattern is in line with previous studies showing the largest social origin differences among the poorly performing students across various educational transitions (Bernardi & Cebolla-Boado, 2014; Contini & Triventi, 2016; Bernardi & Triventi, 2020). Secondly, the dual model diverts high-performing students from less educated families away from the highest levels of education by offering them a less risky alternative. While previous studies have suggested that such diversion might occur (Brint & Karabel, 1989; Rouse, 1995), none have shown that it happens among students who perform well in school. Whether these students would attend universities in the absence of polytechnics remains unclear.

The second article provides a nuanced analysis of the mechanisms producing persistent educational inequalities by exploring the role of admission barriers. The results show that students from high social origins are overrepresented among those who continue applying after facing these institutional barriers, thereby widening the social origin gap among university students. Overall, these results underscore that educational transitions are not always one-time decisions and are certainly not solely about 'choice,' as institutional barriers also constrain these transitions. Given that the Finnish higher education system is more selective than those in many other countries (OECD, 2019), rejections may be interpreted differently in Finland compared to contexts where such rejections are rare. Even though rejections are common in Finland, the signal they send is strong—and stronger from some than others. Some applicants may interpret rejections as an indication to change or give up on their

plans, or to explore an alternative path, whereas others may take it as a cue to work harder (Isopahkala-Bouret, 2019). The findings of this dissertation suggest that students from different social origins interpret these institutional signals in distinct ways, in addition to facing socially stratified opportunities to participate in the resource-consuming re-application process.

The third article demonstrates the role of weak ties (Granovetter, 1973), such as connections to colleagues or other acquaintances, in resource compensation and educational decision-making. As Granovetter (1973) argues, weak ties are particularly valuable for information flow because they often link individuals who have access to different types of information. The results show that children from lower-educated families whose parents are working around highly educated co-workers have a higher probability to enrol in higher education compared to children from lower-educated families whose parents are working in educationally homogeneous environments. Thus, in addition to strong ties, such as those with close relatives (Erola et al., 2018; Lehti et al., 2019), compensating for a lack of resources in the immediate family can also occur through weak ties. This can occur, for example, by breaking down socially stratified information barriers regarding higher education. The strategic knowledge that families of low social origin may lack but can gain through workplace connections might differ from the types of information provided in intervention studies, many of which have failed to narrow the social origin gap in higher education enrolment (Herbaut & Geven, 2020). This type of informal information that could be beneficial may include, for example, understanding that one does not have to be overly smart to succeed in higher education (Erikson & Jonsson, 1996), lowering the threshold for higher education (and specifically university) intentions, and further university applications.

The main contribution of this dissertation, generalisable to other contexts, lies in examining how compensatory mechanisms operate during stratified and selective educational transitions. According to the results of this dissertation, high social origin students are less constrained by poor performance or educational rejections in accessing higher education. This is consistent with previous research showing that students of low social origin are more responsive to their academic signals (Lucas, 2009; Holm et al., 2019). These results also align with the compensatory advantage thesis, which states that families of high social origin are more capable of compensating for negative life events (Bernardi, 2014).

However, for stating that high social origin students are better equipped for making the decision of enrolling in higher levels of education or re-applying, depends on what is considered an educational decision. If an educational choice refers to an event, such as re-applying to university after rejection or enrolling in polytechnics in case of low performance, the decision-making process takes place in high social origin families. These students use their strategic knowledge to navigate

through the educational system and make the optimal educational decisions, in line with the thesis of effectively maintained inequality (Lucas, 2001). However, these choices can also be ‘non-decisions’, something that is not too much considered (Gambetta, 1987). This interpretation of the findings on compensatory advantage leads to conclusions that are rather similar to those of the educational reproduction literature rooted in Pierre Bourdieu’s work (e.g. Ball et al., 2002; Reay et al., 2005), two bodies of literature that have traditionally remained quite distant from each other. The compensatory advantage literature would benefit from expanding its focus from high social origin families to also include the decision-making processes of children from low social origin families. For them, there seems to be more variation in their educational decisions, shaped, for example, by school performance or parental embeddedness in diverse environments.

Despite the formal equality of educational opportunity, educational choices in Finland are still constrained by social origin, with admission barriers appearing to reinforce these differences, contrary to their intended purpose. Previous studies from Finland have shown that children from high social origins are overrepresented among university applicants, as well as among those gaining access (Nori, 2011). This dissertation builds on these findings by showing the overrepresentation of children from high social origins among re-applicants, while also broadening the focus to include both sectors of the dual model of higher education. The most important country-specific contribution of this dissertation is in showing how Finland’s merit-based higher education system has not achieved equality of educational opportunity even by the standards of conservative conceptualisation. In an institutional context in which education is free of charge and all individuals formally have the opportunity to apply for higher education (conditional on completing previous levels), it is necessary to consider how the concept of opportunity is understood. The conservative conceptualisation of the equality of educational opportunity notes that differentiation and selectivity in educational transitions help to utilise ‘the reserve of talent’ (Husén, 1972). However, based on the results of this dissertation, there are numerous talented individuals – measured by school performance – out of higher education, specifically out of university.

Several factors remain unexplored in this dissertation. First, this study uses parental education as a general proxy for social origin, leaving the comparison of different aspects of family background in the Finnish context unexplored. While high parental education is often associated with high parental earnings and social class, this is not always the case. Employing multiple measures of social origin could have provided a deeper understanding of the specific mechanisms driving social inequalities in higher education in Finland. Second, an intersectional approach considering the overlapping inequalities of individuals, such as those generated by gender or ethnic background, was not included in this study. Another limitation is

that the results consider an educational system that no longer operates in a similar manner. Recent changes in higher education intake and decreased learning outcomes may have changed the inequalities in the Finnish educational system. Finally, none of the results in this dissertation involve causal associations, and the results should be interpreted with this in mind. However, the absence of a causal design should not deter the description of patterns or mechanisms of inequalities.

The results of this dissertation open numerous avenues for future research. First, administrative datasets embedding families and individuals in multiple social contexts would allow researchers to examine the joint contributions of various overlapping environments and connections contributing to compensatory processes, such as extended family relations, schools, neighbourhoods, and workplaces. Second, as this dissertation focused on educational outcomes, the results do not indicate whether the poorly performing high social origin students who found their way to higher education through lower-threshold institutions were able to complete their studies or have the same returns to the higher education degree in the labour market as other higher education graduates. Third, the contribution of the lengthy re-application processes due to restricted intake accompanied by educational rejections may have detrimental consequences for youngsters applying that are not yet well understood, ranging from beliefs about inequality (Isopahkala-Bouret, 2020; Wetter & Finger, 2023) to mental health problems or delayed family formation.

7 Conclusions

The results of this dissertation show unequal participation rates in higher education in Finland, which are not due to differences in school performance or educational intentions. Stratification combined with the selectivity of the higher education system leads to substantial social origin differences even among the best performing students. Restricted intake in universities reinforces social origin differences. This social origin gap is reduced when families are embedded in educationally heterogeneous environments, in this case, parental co-worker networks.

The occurrence of these events is not marginal: most university applicants are rejected from university on their first attempt, and many of the parents were working among highly educated co-workers. Thus, the results of this dissertation have a population-level contribution. From the perspective of social stratification literature, this dissertation contributes to discussions on educational decision-making by emphasising the roles of resource compensation and institutional barriers in shaping educational choices.

Regarding policy implications, the results of this dissertation, first of all, underline the importance of non-segregated environments for educational mobility. Based on these findings, efforts to avoid segregation in environments where people spend time and interact with others, such as workplaces, schools, and neighbourhoods, are likely to be beneficial for social mobility. Second, though this dissertation did not aim to directly contribute to the heated debate around the Finnish educational system, particularly related to the decrease in learning outcomes and their increased stratification based on family background or higher education intake reforms, some results of this dissertation are useful for the current debate on Finnish educational policies. Considering these results, as well as previous research, it seems evident that equalising learning outcomes between students from different family backgrounds is insufficient to pursue higher levels of educational mobility across generations, even if it is an important starting point. What is more, there is potential to increase the volume of higher education as the 'reserve of talent' can be seen underused due to social origin differences in participation rates, even among the well performing students. Based on these results, the current higher education system is expected to exclude both well-performing and well-motivated students.

Abbreviations

GPA	Grade point average
OECD	Organization for Economic Cooperation and Development
PISA	Programme for International Student Assessment

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