Longitudinal and Life Course Studies • vol 12 • no 1 • 1–21
 • Paper received May 2020/Revised February 2021/Published online March 2021
Online ISSN 1757-9597 • https://doi.org/10.1332/175795921X16137561576439

RESEARCH ARTICLE

Formal differentiation at upper secondary education in Finland: subject-level choices and stratified pathways to socio-economic status and unemployment

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We study labour market outcomes by formal differentiation at upper secondary and tertiary level in Finland. Using full population register data, we take individuals born in 1976 and explore their socio-economic status and the probability of unemployment by educational qualifications and social origin in early adulthood (age 30) and at occupational maturity (age 40). We differentiate based on the level of maths, the most consequential subject choice at general upper secondary education, and show that subject-level choices divert students to stratified tertiary-level degrees and labour market positions net of prior school performance, social origin and gender. In addition, we show that educational performance and qualifications mediate the association between social origin and socio-economic status by 81–83%, leaving around one fifth to unobserved social origin differences. We also find that there are no major differences between upper secondary school tracks with respect to experiencing unemployment at age 30 or 40. Moreover, further educational degrees do not appear to provide additional protection against unemployment than having obtained an upper secondary qualification.

Key words educational differentiation • social origin • socio-economic status • unemployment

Key messages

- Subject-level choices at general upper secondary education lead to differences in socio-economic status.
- Vocational qualifications protect against unemployment but lead to lower socio-economic status.
- Further degrees after secondary education do not provide additional protection against unemployment.

To cite this article: Heiskala, L., Erola, J. and McMullin, P. (2021) Formal differentiation at upper secondary education in Finland: subject-level choices and stratified pathways to socio-economic status and unemployment, *Longitudinal and Life Course Studies*, vol xx, no xx, 1–21, DOI: 10.1332/175795921X16137561576439

Introduction

Separating students into different tracks in the educational system decreases equality of opportunity as it limits further educational options and eases school-to-work transitions by providing skill specialisation (Bol and van de Werfhorst, 2013). On the one hand, vocational education qualifications protect against unemployment; however, they can also divert students away from most prestigious occupations (Shavit and Muller, 2000) and are, for example, associated with lifetime flat earning curves compared to general upper secondary graduates (Korber and Oesch, 2019).

We aim to explore the relationship between educational differentiation and labour market outcomes in Finland. The country context makes this a particularly interesting case study, as the Finnish educational system sorts students relatively late (Triventi et al, 2016: 390) and is considered to be particularly equal by family background (for example, Pfeffer, 2008; OECD, 2018). However, educational tracking at the upper secondary level plays a major role in the Finnish context, as the transition from comprehensive school to general upper secondary school explains almost 80% of intergenerational educational inequality in Finland (Härkönen and Sirniö, 2020). Differentiation between and within tracks at later stages (that is, upper secondary and tertiary level) might be particularly consequential because family background matters very little at the beginning of educational pathways.

In this paper, we distinguish four types of educational choices relevant for tracking: first, after compulsory schooling, not continuing to upper secondary education, vocational or general (academic) upper secondary education. Second, within general upper secondary education, selection of advanced maths courses. Third, within tertiary education, selection between lowest-level tertiary education, polytechnics and university. Fourth, within tertiary education degrees, selection between different fields of study. Choosing advanced-level maths in general upper secondary education is entirely voluntary and not restricted by ability, grades, recommendations or quotas. Although one could assume that the freedom to choose would reduce the importance of family background, previous studies have shown that subject choices are socially stratified in educational systems that favour individual choice, even after controlling for prior school performance (see McMullin and Kulic, 2016, for instance). We assume that this also applies to choosing the level of maths courses in Finnish general upper secondary schools. In addition, while the choices within tertiary education are not always considered as forms of educational tracking, they are path-dependent on the track choices made in secondary education and can also be, by themselves, highly consequential for later occurring labour market outcomes.

We ask whether subject-level choices divert students within general upper secondary education leading to differences in tertiary degrees and fields of study, which, in turn, may shift into differences between those with and without advanced maths in labour market outcomes. By having prior school performance and parental education in our

models, we can control for selection into tracks based on grades and social origin. As our outcome of interest, we focus on socio-economic status, as it captures the hierarchical structure of labour market positions. Second, we are interested in those who are part of the labour market but are out of work: the unemployed.

We begin by describing the institutional context and continue by formalising our theoretical framework and hypotheses. After introducing the data and methods, we present our empirical analyses based on the full population register data from Statistics Finland for birth cohort 1976. Finally, we conclude our study with suggestions for future research.

The Finnish institutional context

The Finnish educational system follows an inclusive model of differentiation similar to the other Nordic countries (Triventi et al, 2016). The tracked system of basic education was replaced in the 1970s by nine years of compulsory education in a comprehensive system. This de-tracking reform had multiple positive effects: it decreased the gender wage gap at occupational maturity (Pekkarinen, 2008), reduced intergenerational income elasticity (Pekkarinen et al, 2009) and improved cognitive skills of the children of low-educated parents (Kerr et al, 2009).

Currently, the first clear example of tracking in the Finnish educational system takes place after compulsory schooling. Students can apply to upper secondary education, and the intake is mainly based on their comprehensive school grade point average (GPA). Upper secondary education is divided into vocational and general upper secondary schools, both of which usually last for three years and provide eligibility to apply to higher education programmes. Almost 95% of students finishing comprehensive school continue directly to the upper secondary level, parental resources being a major predictor of track choice and the probability of dropping out, even after controlling for comprehensive school GPA (Kallio et al, 2016; Kilpi-Jakonen et al, 2016).

In vocational upper secondary education, students choose a specific field of study when they apply. Vocational education in Finland is practically oriented and school-based. At the general upper secondary level, students apply to general upper secondary institutions and are not sorted into streams in advance. Although the GPA level required for access varies between general upper secondary schools, recent studies have shown that there is no significant advantage for studying in the 'best ones' for later educational outcomes (Tervonen et al, 2017; Tervonen et al, 2018). The difference in performance between public and the few private institutions is insignificant (Kortelainen and Manninen, 2018).

Since the beginning of the 1980s, teaching in general upper secondary schools has been organised as courses. At the beginning of general upper secondary education, students construct their syllabus by selecting a combination of courses (some mandatory). This individual course selection affects the subject choices for the matriculation exam, which takes place at the end of general upper secondary education. Some of the subjects, mostly maths and languages, can be studied at different levels. The level of maths, divided into advanced and basic, can be seen as the most relevant form of educational differentiation within general upper secondary schools (Pursiainen et al, 2016). Students with advanced maths in their matriculation exams perform better in every subject on average compared to students without the

same (Kupiainen et al, 2018). Compared to basic maths, advanced maths includes more courses and different content. Students are allocated to different courses based on their interests, not by their ability. In 1995, when our target sample matriculated, advanced maths was one of the compulsory exams if a student had completed the advanced maths courses in the syllabus (Joutsenlahti, 2005: 44). In that year, exams in one's mother tongue, a second national language, a foreign language, and maths *or* a test battery in humanities and natural sciences were compulsory (Joutsenlahti, 2005: 44).

As in many other countries, those dropping out of the educational system without an upper secondary qualification have a much higher risk of unemployment, social assistance receipt and poverty (for example, Järvinen and Vanttaja, 2001; Sipilä et al, 2011; Vauhkonen et al, 2017). A vocational upper secondary qualification is associated with a higher level of employment compared to those without an upper secondary qualification, and differences in lifetime earnings between these two groups can be explained by non-employment (Koerselman and Uusitalo, 2014). Silliman and Virtanen (2019) show that admission to the vocational track increases annual income by 7% at the age of 31 and wage returns were higher for students who preferred vocational over the general upper secondary track in the application process.

Any qualification from the upper secondary education level provides eligibility to study at all levels of higher education, but those with a general upper secondary qualification are much more likely to continue to higher education compared to those with a vocational upper secondary qualification (Kilpi-Jakonen et al, 2016). Intake to university is based on upper secondary education grades and entrance exams, and the entrance competition is fierce, whereas intake to polytechnic schools is based on work experience and other qualifications in addition to upper secondary education grades and entrance exams (Thomsen et al, 2017). Today higher education is divided into these two institutions, but in 1995, when most of our target population graduated from upper secondary school, the system was divided into three different levels: lowest-level tertiary programmes (*opistoaste* in Finnish), newly established polytechnics, and universities.

Lowest-level tertiary programmes provided post-secondary vocational training. During the polytechnics education reform, which took place from the beginning of the 1990s until the end of the decade, most were upgraded to polytechnical degrees, and some of the study programmes became vocational upper secondary qualifications. Students with a lowest-level tertiary degree usually studied two to three years after upper secondary education. In polytechnics, studies usually last from three to four years. The polytechnic education reform increased graduates' short-run earnings only in some fields of study (Böckerman et al, 2009). Hämäläinen and Uusitalo (2008) argue that the reform did not increase human capital; instead, new degrees provided a signalling effect: when students graduated from the newly established polytechnics, there was a relative decrease in earnings among those with a lowest-level tertiary degree.

At universities, studies usually last from five to six years. Both polytechnics and universities provide bachelor-level degrees, but most of the master's programmes are provided by universities, and only those admitted to university programmes have the right to continue directly to a master's degree. A university degree is associated with substantially higher earnings over a lifetime compared to those without such degree (Koerselman and Uusitalo, 2014). There are large differences in later life earnings

Table 1: Summary statistics

	Year 2006 (age 30)		Year 2016 (age 40)	
	Mean (%)	SD	Mean (%)	SD
Comprehensive school grade point average (GPA)	7.7	1.2	7.7	1.2
Upper secondary education				
No degree	0.09		0.07	
Vocational upper secondary degree	0.40		0.42	
General upper secondary degree without advanced maths	0.33		0.33	
General upper secondary degree with advanced maths	0.19		0.18	
Tertiary education				
No degree	0.56		0.51	
Lowest-level tertiary degree	0.10		0.09	
Polytechnic degree	0.19		0.21	
University degree	0.16		0.20	
ISEI (International Socio-Economic Index)	45.7	16.5	47.8	17.5
Unemployed	0.05		0.08	
Parental education				
Basic	0.19		0.19	
Upper secondary or lowest-level tertiary	0.68		0.68	
University degree	0.13		0.13	
Gender				
Female	0.49		0.49	
Male	0.51		0.51	

between the fields of studies (Prix, 2013) and, except for fine arts, university education in terms of income is always worthwhile (Suhonen and Jokinen, 2018).

Theoretical framework and hypotheses

Considering final educational attainment, different theories of the education-employment linkage have been examined. First, time spent in education increases individuals' human capital as they attain skills and knowledge, which leads to higher productivity in the labour market (Becker, 1964). However, even if individuals had the same number of years of education, many previous studies have shown that labour market outcomes also vary across fields of study within the same education level (for Finland: Prix, 2013; Suhonen and Jokinen, 2018). Thus, the human capital argument fails to paint the whole picture, especially when considering horizontal differences in education. The main purpose of education can also be seen to sort individuals into different groups to help employers use qualifications as signals of the job applicants, as they seldom have direct information of the latter's skills (Spence, 1973). Educational qualifications send signals about the applicants' characteristics and capacities and they serve as 'positional good' (Bol, 2015) as employers use educational qualifications to compare between applicants.

Education can also be seen as a legitimised form of social closure (Murphy, 1988) that, in turn, produces occupational closure in the labour market (Bol and Weeden, 2015). First of all, differentiating students into tracks may create path dependencies.

Path dependency refers to situations in which students' locations at a specific stage of the educational pathway limit their possible locations at the next stage (Pallas, 2003). Thus, track placement in upper secondary schools may be consequential for further educational degrees and labour market positions. This might also happen within educational systems with no formal dead-ends, if atypical transitions, such as from vocational upper secondary to university, are rarely used (Härkönen and Sirniö, 2020).

In this paper, we lean on the conceptual framework presented by Triventi et al (2020) and apply it to the Finnish case to illustrate the differentiation at the upper secondary level. In their definition, secondary level educational tracking is divided into two dimensions: (1) regulated (formal) and hidden (informal) differentiation and (2) taking place among schools (external) and within schools (internal). Considering formal external differentiation, track placement in vocational or general upper secondary schools, previous literature emphasises both positive and negative consequences of tracking on labour market outcomes. Vocational education diverts individuals from further educational degrees and consequent higher labour market positions, but it also works as a 'safety net' (Shavit and Muller, 2000) as vocational tracks provide skill specialisation, which eases labour market allocation (Bol and van de Werfhorst, 2013) and protects against unemployment. Thus, our first two hypotheses read as follows:

> Hypothesis 1a: Those with general upper secondary qualification end up in higher socio-economic status than those with vocational upper secondary qualification.
> Hypothesis 1b: Any upper secondary qualification protects against unemployment.

In addition to capturing external differentiation, vocational and general upper secondary tracking taking place between schools, we also distinguish within-school tracking in Finnish general upper secondary education by measuring the most consequential subject choice for further educational transitions (Pursiainen et al, 2016): the level of maths. In the Finnish educational system, subject-level choices at matriculation exams is an official sorting mechanism within general upper secondary education (formal internal differentiation). Previous literature emphasises that subject choices are driven by individual factors, such as social origin, irrespective of school performance (McMullin and Kulic, 2016), or by contextual factors such as differences in curricula offered by schools (Anders et al, 2018). Interestingly, there are no institutional constraints, such as quotas, within general upper secondary education in choosing advanced-level maths, and no differences between schools in offering these courses as the curricula are state-regulated.

Lucas (2001), with his famous thesis of effectively maintained inequality, argues that while a certain educational level becomes almost universal, families aim to secure their advantages via qualitative differences in education, such as choosing the 'right' courses at secondary education. Thus, as the quantitative differences in educational levels between students from different class backgrounds diminish, privileged families are increasingly more likely to enrol their children in educational tracks that will pay off afterwards (Panichella and Triventi, 2014). We assume that those with advanced maths in general upper secondary school are more likely to enrol in fields of study at tertiary level that 'pay off afterwards', in other words, which lead to higher socio-economic status. Considering the probability of unemployment, there are fields of study at tertiary level, such as education, in which most students have not chosen advanced maths at general upper secondary education (Pursiainen et al, 2016) but for which unemployment is less

likely (Kivinen et al, 2000). Therefore, we do not assume that we will find differences by within-school tracking at general upper secondary education in the probability of unemployment. Thus, our second set of hypotheses read as follows:

> Hypothesis 2a: Those with advanced maths in general upper secondary education end up in higher socio-economic status compared to those without advanced maths.
> Hypothesis 2b: There are no differences in the probability of unemployment between those with and without advanced maths in general upper secondary school.

Data

We use the full population register data from Statistics Finland to test these hypotheses. Our analytical sample comprises all individuals born in 1976 and living in Finland in the years 2006 and/or 2016 and linked to their parents. We link census data including labour market outcomes and individual qualifications with application registers to upper secondary education, including comprehensive school GPA and matriculation exam registers. This gives us a data set containing annual information on individuals' educational qualifications and their labour market outcomes in early adulthood (age 30) and at occupational maturity (age 40). We measured educational qualifications in the same years that we observed the outcomes, that is, 2006 and 2016. Measuring labour market outcomes at occupational maturity in addition to early adulthood is highly relevant in Finland, as students graduate from higher education relatively late compared to other European countries (OECD, 2018). Table 1 presents the summary statistics for the variables used.

Our outcomes of interest are individuals' socio-economic status and the probability of unemployment. The former was measured using the International Socio-Economic Index of Occupational Status (ISEI) score (ranging from 16 to 90; for more details, see Ganzeboom and Treiman, 1996) and thus, is a continuous variable. Unemployment is measured as registered as unemployed for at least six months in 2006/2016, and thus, is a binary categorical variable. Individuals who were out of the labour market, such as individuals on parental leave, were excluded from our analyses. For analyses of socio-economic status, the unemployed were excluded. Also, the ISEI score was missing for around 3% of the employed and these were excluded for analyses of socio-economic status.

Our explanatory variables include upper secondary school track attainment, tertiary education level, comprehensive school GPA and parental education. In addition, in all regression models, we controlled for gender. Track attainment at upper secondary school has three categories at the broad level: (1) no upper secondary qualification, (2) vocational upper secondary qualification and (3) general upper secondary qualification. At a more detailed level, we measured the choice of advanced maths in general upper secondary education, and it has four categories: (1) no upper secondary qualification, (2) vocational upper secondary qualification, (3) general upper secondary qualification without advanced maths in matriculation exams and (4) general upper secondary qualification with advanced maths in matriculation exams. The level of tertiary education also has four categories: (1) no tertiary degree, (2) lowest-level tertiary degree (*opistoaste*), (3) polytechnics degree and (4) university degree. The first category,

no tertiary degree, includes individuals who dropped out of the educational system at the tertiary level as well as individuals who did not apply to tertiary education at all.

Comprehensive school GPA is a continuous variable that runs from 4 to 10 (also the scale used in schools) and is based on academic subjects. Intake to upper secondary school is based on these teacher-given grades. GPAs are not centrally registered at the end of schooling but are acquired from application registers to upper secondary schools. Not everybody applies to upper secondary education, which is why this variable is missing for approximately 5% of the sample (N = 3,076). These individuals were excluded from the analytical sample. In all our models, the comprehensive school GPA is centred to its mean (7.7).

We measured social origin using parental education. Parental education was measured in the years 1987–1996 when the individuals were 11-20 years old using the highest level of education either of the parents had achieved during that period. We divided them into three groups: those with (1) basic education or less (or unknown), (2) upper secondary or lowest-level tertiary degree and (3) a university degree. The last category also contains a small number of parents with a polytechnic degree.

In the first two parts of our analyses, we also control for an individual's field of study within each tertiary education level based on the ISCED 2013's broad classification of education and training and specify no tertiary education (as well as no field of study) as our reference category. The ISCED 2013 categories included education, arts and humanities, social sciences, journalism and information, business, administration and law, natural sciences, mathematics and statistics, information and communication technologies (ICTs), engineering, manufacturing and construction, agriculture, forestry, fisheries and veterinary, health and welfare, and services.

Analytical strategy and methods

In all our analyses, we use linear regression models for our continuous outcome variable, ISEI, and linear probability models for our binary outcome variable, unemployment. We prefer linear probability models to logistic regression for its ease of interpretation, and because coefficients are comparable between nested models (Mood, 2010). With linear probability models, we use heteroscedasticity-consistent robust standard errors.

In the first part of our analyses (Table 2), we predict socio-economic status and unemployment in early adulthood (age 30), as well as occupational maturity (age 40), and display our analyses in four steps. In the first step (model 1), we present the association between upper secondary education and labour market outcomes, controlling for parental education, comprehensive school GPA and gender. We adjusted for social origin and prior school performance in all the models in order to take into account selection into the tracks by family background and grades. In the first part, our models are as follows (where W refers to the control variables comprehensive school GPA, parental education and gender):

$$\text{ISEI score}_i = \beta_1 + \beta_2 \,\text{broad secondary track}_i + \beta_3 \,\mathbf{W}_i + \varepsilon_i$$

$$\Pr(\text{Unemployment}_i = 1|\mathbf{x}_i) = \beta_1 + \beta_2 \,\text{broad secondary track}_i + \beta_3 \,\mathbf{W}_i + \varepsilon_i$$

In the next step (model 2), we split general upper secondary qualification into two groups, general upper secondary qualification with and without advanced maths at matriculation exams, to focus on differences arising from the most consequential subject choice within the general upper secondary school (Pursiainen et al, 2016):

$$\text{ISEI score}_{\mathbf{i}} = \beta_1 + \beta_2 \text{ detailed secondary track}_{\mathbf{i}} + \beta_3 \mathrm{W}_{\mathbf{i}} + \varepsilon_{\mathbf{i}}$$

$$\Pr(\text{Unemployment}_{\mathbf{i}} = 1|\mathrm{x}_{\mathbf{i}}) = \beta_1 + \beta_2 \text{ detailedsecondarytrack}_{\mathbf{i}} + \beta_3 \mathrm{W}_{\mathbf{i}} + \varepsilon_{\mathbf{i}}$$

In model 3, we additionally control for tertiary-level education, as a tertiary degree is strongly linked to upper secondary school track choice (Kilpi-Jakonen et al, 2016) as well as to our labour market outcomes (Koerselman and Uusitalo, 2014):

$$\text{ISEI score}_i = \beta_1 + \beta_2 \text{ detailed secondary track}_i + \beta_3 \text{ tertiary education level}_i + \beta_4 W_i + \varepsilon_i$$

$$\Pr(\text{Unemployment}_i = 1|x_i) = \beta_1 + \beta_2 \text{ detailed secondary track}_i + \beta_3 \text{ tertiary education level}_i + \beta_4 W_i + \varepsilon_i$$

In the last model (model 4), we additionally control for the field of study within the tertiary level, as previous studies have shown large differences in labour market outcomes among the tertiary educated (Prix, 2013; Suhonen and Jokinen, 2018).

$$\text{ISEI score}_i = \beta_1 + \beta_2 \text{ detailed secondary track}_i + \beta_3 \text{ tertiary level and field of study}_i + \beta_4 W_i + \varepsilon_i$$

$$\Pr(\text{Unemployment}_i = 1|x_i) = \beta_1 + \beta_2 \text{ detailed secondary track}_i + \beta_3 \text{ tertiary level and field of study}_i + \beta_4 W_i + \varepsilon_i$$

In the second part of our analyses, we are interested in whether there is an association between parental education and labour market outcomes, and how much prior school performance and educational qualifications at the upper secondary and tertiary levels can explain this association. We start with an unadjusted model (with only parental education as the independent variable) and add mediating educational variables in chronological order: GPA, broad upper secondary track, detailed upper secondary track, tertiary education level, and field of study within the tertiary level (controlling for gender in all the models). In Tables 3 and 4, we present the proportion of the parental education coefficient explained after adding new variables to the models.

In the third part of our analyses, we explore whether different combinations of upper secondary and tertiary degrees produce differences in labour market outcomes. Thus, we add an interaction term for the detailed secondary track and tertiary education level, and calculate adjusted predictions for every track combination (controlling for GPA, parental education and gender in all models).

Results

Our results show that individuals with a general upper secondary qualification, compared to individuals without an upper secondary qualification or those with

a vocational qualification, have achieved a substantially higher socio-economic status (ISEI score) at both ages (Table 2). There are almost no differences in the socio-economic status observed between those who are vocationally educated and individuals without an upper secondary qualification (model 1). Those with vocational and general upper secondary qualifications are almost equally likely to be unemployed at ages 30 and 40, with a difference of 0.9 percentage points at age 30 and around zero at age 40. These differences between general and vocational upper secondary qualifications in the probability of unemployment are not statistically or substantively significant. Those with any upper secondary qualification are 10–13 percentage points less likely to be unemployed compared to those without any upper secondary qualification. Thus, even if individuals with a vocational upper secondary qualification do not differ from those without a qualification concerning socio-economic status, vocational qualification seems to protect against unemployment.

Next, we split the general upper secondary qualification into two groups (model 2). Regarding socio-economic status, the much better outcomes of those with advanced maths become immediately apparent: those individuals have substantially higher ISEI scores in early adulthood and occupational maturity compared to those who graduated from general upper secondary education without advanced maths at their matriculation exams, even after controlling for prior school performance, gender and parental education. There are no big differences between those with and without advanced maths in general upper secondary school in terms of the probability of unemployment.

Adding tertiary education level to the model, differences between upper secondary qualifications are partly explained (model 3) in the case of socio-economic status. Thus, continuation to tertiary education partially explains why those with a general secondary qualification are more likely to acquire higher socio-economic status than those with either no upper secondary education or vocational upper secondary education qualification. This is shown in the differences in the estimates for the two groups of general secondary education becoming smaller, in contrast to the two other groups (vocational qualification or no qualification). The statistically significant difference in socio-economic status between a vocational upper secondary qualification and no qualification disappears; however, this difference has already been small (in model 2). The results indicate that those who follow the atypical route from vocational education directly to tertiary level are those who explain the relative advantage of vocational education in socio-economic attainment, compared to not having a qualification at all.

The most surprising result is nonetheless shown in the case of unemployment. None of the estimates change substantially, even if tertiary education is controlled for. Thus, acquiring further education – beyond acquiring any secondary qualification – does not provide additional protection from unemployment, net of comprehensive school GPA, gender and parental education. This holds for both observations at ages 30 and 40.

In the last models, a tertiary degree is divided into specific fields of study within tertiary education levels (model 4). Even after controlling for the field of study, individuals with advanced maths have a higher socio-economic status on average, net of prior school performance, gender and parental education. However, the substantial difference in the ISEI score between those with and without advanced maths in general upper secondary education becomes rather small – around two units

Table 2: Socio-economic status (ISEI) and unemployment at the age of 30 and 40, linear regression and linear probability models

	Year 2006 (age 30)				Year 2016 (age 40)			
	Model 1 (Broad upper secondary track)	**Model 2** (Detailed upper secondary track)	**Model 3** (+Tertiary education level)	**Model 4** (+Field of study)	**Model 1** (Broad upper secondary track)	**Model 2** (Detailed upper secondary track)	**Model 3** (+Tertiary education level)	**Model 4** (+Field of study)
Outcome: ISEI								
Upper secondary education (ref. None)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Vocational	0.324 (0.257)	0.571* (0.256)	−0.318 (0.236)	−0.382 (0.229)	0.839** (0.317)	0.997** (0.316)	−0.340 (0.289)	−0.418 (0.281)
General	8.102*** (0.297)				9.373*** (0.354)			
General without advanced maths		7.390*** (0.296)	3.678*** (0.277)	4.021*** (0.270)		8.787*** (0.354)	3.439*** (0.330)	3.681*** (0.320)
General with advanced maths		12.488*** (0.336)	6.524*** (0.315)	6.049*** (0.309)		13.009*** (0.392)	5.285*** (0.365)	4.668*** (0.358)
Tertiary education (ref. None)			(.)	(.)			(.)	(.)
Lowest-level tertiary			6.282*** (0.198)				7.042*** (0.222)	
Polytechnic			9.731*** (0.164)				11.161*** (0.171)	
University			18.865*** (0.199)				20.434*** (0.206)	
Field of study at tertiary level				x				x
Constant	47.446*** (0.311)	45.829*** (0.315)	41.426*** (0.293)	41.026*** (0.285)	49.317*** (0.366)	47.991*** (0.370)	42.554*** (0.342)	42.045*** (0.332)
N	**48,828**	**48,828**	**48,828**	**48,828**	**49,547**	**49,547**	**49,547**	**49,547**
Outcome: Unemployment								

(*Continued*)

Table 2: (*Continued*)

	Year 2006 (age 30)				Year 2016 (age 40)			
	Model 1 (Broad upper secondary track)	**Model 2** (Detailed upper secondary track)	**Model 3** (+Tertiary education level)	**Model 4** (+Field of study)	**Model 1** (Broad upper secondary track)	**Model 2** (Detailed upper secondary track)	**Model 3** (+Tertiary education level)	**Model 4** (+Field of study)
Upper secondary education (ref. None)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Vocational	−0.100*** (0.006)	−0.099*** (0.006)	−0.095*** (0.006)	−0.095*** (0.006)	−0.129*** (0.008)	−0.129*** (0.008)	−0.122*** (0.008)	−0.121*** (0.008)
General	−0.109*** (0.006)				−0.129*** (0.008)			
General without long maths		−0.109*** (0.006)	−0.102*** (0.006)	−0.102*** (0.006)		−0.128*** (0.008)	−0.111*** (0.008)	−0.111*** (0.008)
General with long maths		−0.106*** (0.007)	−0.100*** (0.007)	−0.098*** (0.007)		−0.134*** (0.008)	−0.117*** (0.009)	−0.116*** (0.009)
Tertiary education (ref. None)			(.)	(.)			(.)	(.)
Lowest-level tertiary			−0.026*** (0.003)				−0.038*** (0.004)	
Polytechnic			−0.018*** (0.002)				−0.042*** (0.003)	
University			−0.011** (0.003)				−0.031*** (0.004)	
Field of study at tertiary level				x				x
Constant	0.142*** (0.006)	0.141*** (0.006)	0.143*** (0.006)	0.142*** (0.006)	0.198*** (0.008)	0.200*** (0.008)	0.206*** (0.008)	0.202*** (0.008)
N	**53,898**	**53,898**	**53,898**	**53,898**	**56,537**	**56,537**	**56,537**	**56,537**

Notes: In models 4, the estimates for the fields of study are omitted from the table. All the coefficients that are not shown here are available if needed.
All the models control for gender, comprehensive school GPA and parental education.
Standard errors in parentheses for linear regression models.
Robust standard errors in parentheses for linear probability models.
* $p < .05$, ** $p < .01$, *** $p < .001$.

at age 30 and around one unit at age 40, respectively. A difference of two units in the ISEI score is found, for example, between mathematicians (score: 71) and architects (score: 73) (Ganzeboom and Treiman, 1996: 222–3), and we do not consider this as a substantial difference. Thus, tertiary-level education and the field of studies within it explain the differences arising from subject-level choices made in general upper secondary education. For unemployment, there were no differences between models 3 and 4 at both ages.

One possible confounder in these associations between educational qualifications and labour market outcomes is social origin, which is why we controlled for parental education in all the models in Table 2. We now explore the association between parental education and labour market outcomes further. As shown in Table 3, individuals with a parental lowest-level tertiary degree or less have lower socio-economic status on average compared to individuals with a parental university degree. Comprehensive school GPA explains approximately half of the association between parental education and socio-economic status in early adulthood and occupational maturity. Including GPA and broad upper secondary qualification in model 3, the association is explained by approximately 60%. Splitting upper secondary qualifications into detailed tracks (general upper secondary qualification with and without advanced maths) explains extra 3–4% of the association. With all the educational variables added in model 6, approximately 80% of the association between parental education and socio-economic status is explained. In other words, there remains one fifth of the association between social origin and socio-economic status which cannot be explained by comprehensive school GPA, upper secondary school tracks and tertiary degrees, and thus is due to other unobserved factors, such as social network resources or differences in non-cognitive skills valued by the employers (Erikson and Jonsson, 1998).

For unemployment at the ages of 30 and 40, the differences between parental education groups are rather small (Table 4). Those with parental basic education or less are only 4 percentage points more likely to be unemployed compared to those with a parental university degree at both ages observed. Those with parental upper secondary or lowest-level tertiary education are around 2 percentage points more likely to be unemployed compared to those with a parental university degree at both ages observed. Comprehensive school GPA explains 77% of this association in early adulthood for those with the lowest level of parental education. All the other coefficients for parental education were statistically insignificant after adding more variables, which is why these mediation percentages were not computed. Thus, controlling for school performance, the association between social origin and unemployment is fully explained.

Lastly, we present adjusted predictions of socio-economic status and the probability of unemployment by every combination of upper secondary and tertiary degrees. Focusing on socio-economic status (Table 5), we can see that the highest predicted socio-economic status is for individuals with a general upper secondary qualification with advanced maths and university degree, net of gender, comprehensive school GPA and parental education. At both time points and within every tertiary education level, individuals with advanced maths end up in slightly higher positions on average compared to those who graduated from general upper secondary but did not have advanced maths in their matriculation exams. However, these models do not control for the choice of field of study in higher education, which may explain the

Table 3: Socio-economic status (ISEI) at the age of 30 (N = 48,828) and 40 (N = 49,547), linear regression models. Percentage of the association between parental education and ISEI explained by educational variables

	Parental education	Model 1 (Unadjusted)	Model 2 (+GPA)	Model 3 (+Broad upper secondary track)	Model 4 (+Detailed upper secondary track)	Model 5 (+Tertiary education. level)	Model 6 (+Field of study)
Age 30	(ref. University)	.	.	.	.	.	.
	Upper secondary or lowest-level tertiary	−11.741*** (0.218)	52 %	60 %	64 %	80 %	81 %
	Basic or less	−16.437*** (0.260)	54 %	62 %	65 %	80 %	81 %
Age 40	(ref. Tertiary)	.	.	.	.	.	.
	Upper secondary	−12.277*** (0.227)	52 %	60 %	63 %	83 %	83%
	Basic or less	−17.427*** (0.273)	52 %	61 %	64 %	82 %	82 %

Notes: All the coefficients that are not shown here are available if needed.
All the models control for gender.
Standard errors in parentheses.
* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 4: Unemployment at the age of 30 (N = 53,898) and 40 (N = 56,537), linear probability models. Percentage of association between parental education and probability of unemployment explained by educational variables.

	Parental education	Model 1 (Unadjusted)	Model 2 (+GPA)	Model 3 (+Broad upper secondary track)	Model 4 (+Detailed upper secondary track)	Model 5 (+Tertiary education level)	Model 6 (+Field of study)
Age 30	(ref. University)	.	.	.	.	.	.
	Upper secondary or lowest-level tertiary	0.023*** (0.002)	*n.s.*	*n.s.*	*n.s.*	*n.s.*	*n.s.*
	Basic or less	0.039*** (0.003)	77 %	*n.s.*	*n.s.*	*n.s.*	*n.s.*
Age 40	(ref. Tertiary)	.	.	.	.	.	.
	Upper secondary	0.022*** (0.003)	*n.s.*	*n.s.*	*n.s.*	*n.s.*	*n.s.*
	Basic or less	0.040*** (0.004)	*n.s.*	*n.s.*	*n.s.*	*n.s.*	*n.s.*

Notes: All the coefficients that are not shown here are available if needed.
All the models control for gender.
Robust standard errors in parentheses.
* $p < .05$, ** $p < .01$, *** $p < .001$
The mediation percentages are computed only for parental education coefficients significant at the 10% level or above; otherwise, they are displayed as *n.s.*

Table 5: Predicted ISEI score at the age of 30 (N = 48,828) and the age of 40 (N = 49,547) adjusted to upper secondary and tertiary degree combinations

		No tertiary degree	Lowest-level tertiary	Polytechnic	University
Age 30	No upper secondary qualification	37.1	.	.	.
	Vocational	36.0	44.9	51.1	61.3
	General without advanced maths	42.5	46.3	50.0	61.4
	General with advanced maths	47.9	48.0	53.3	62.5
Age 40	No upper secondary qualification	37.9	.	.	.
	Vocational	36.9	46.0	51.2	62.6
	General without advanced maths	43.0	47.4	51.7	62.9
	General with advanced maths	47.0	49.4	54.8	63.4

Note:
All the models control for gender, comprehensive school GPA and parental education.

differences. Individuals without any qualifications after comprehensive education have a higher predicted socio-economic status compared to those with a vocational qualification. This is not surprising because vocational upper secondary qualifications often qualify for routine non-manual and skilled manual professions, whereas non-qualification holders might be a more heterogeneous group. In addition, those without a qualification are more likely to be unemployed and, therefore, excluded from our analyses of socio-economic status.

Finally, we analysed unemployment. In Table 2, it was shown that acquiring further education (beyond any secondary education qualification) did not provide further protection from unemployment, net of comprehensive school GPA, gender and parental education. We can now see that there are no major differences between upper secondary and tertiary degree holders, controlling for GPA, gender and parental education, as the highest adjusted predicted probability of unemployment is among those without an upper secondary or tertiary degree (Table 6). Within every combination, the adjusted predicted probability of unemployment is higher in occupational maturity than in early adulthood. At both time points, there are no large differences in probabilities between general and vocational upper secondary qualifications for unemployment. In addition, there are no substantial differences between those with and without advanced maths in general upper secondary school in terms of the probability of unemployment.

Conclusions

Track choices in educational pathways shape individuals' life courses in various ways. In this study, we explored the labour market outcomes of individuals with different backgrounds and educational qualifications. This study contributes to the thin literature on labour market outcomes of within-school tracking based on subject-level choices in Finnish general upper secondary education. Furthermore, we explored the association between parental education and labour market outcomes in early adulthood and occupational maturity. We were also able to adjust our models by prior school performance and social origin in order to take into account selection into the tracks by family background and grades. In this study, we produce socially relevant descriptive information about the labour market outcomes of different educational qualifications and the level of intergenerational transmission of advantages therein.

Table 6: Predicted probability of unemployment at the age of 30 (N = 53,898) and the age of 40 (N = 56,537) adjusted to upper secondary and tertiary degree combinations

		No tertiary degree	Lowest-level tertiary	Polytechnic	University
Age 30	No upper secondary qualification	15 %	.	.	.
	Vocational	6 %	3 %	3 %	6 %
	General without advanced maths	5 %	3 %	3 %	4 %
	General with advanced maths	5 %	3 %	4 %	4 %
Age 40	No upper secondary qualification	21 %	.	.	.
	Vocational	9 %	5 %	4 %	6 %
	General without advanced maths	9 %	5 %	5 %	7 %
	General with advanced maths	9 %	7 %	6 %	5 %

Note:
All the models control for gender, comprehensive school GPA and parental education.

Finland is doing comparatively well in terms of intergenerational educational equality (Pfeffer, 2008), although inequality has increased from a very low to a moderate level within recent cohorts (Härkönen and Sirniö, 2020). Thus, Finland should be particularly suitable for clarifying the role of educational tracking in a country context of high equal opportunity: whether family background matters little because of its small role in educational tracking, or whether the role of tracking is actually stronger because family background otherwise plays a limited role. Our results indicate that inequalities that follow tracking are similar to those observed in many other country contexts. Thus, quite clearly, the relatively high level of equality of opportunity does not mean that educational tracking would be particularly weak in the Finnish context. Even though, or perhaps rather, *as* the Finnish educational system allocates students into different tracks relatively late (Triventi et al, 2016), the choices made at upper secondary education play a major role in intergenerational educational inequality (Härkönen and Sirniö, 2020).

Our results show that educational performance and qualifications explain approximately four fifths of the association between social origin and socio-economic status. The remaining part of the association can be interpreted as the 'direct effect' of social origin that operates through routes other than educational qualifications, such as social network resources or differences in non-cognitive skills valued by employers (Erikson and Jonsson, 1998). This unexplained part of the association is particularly worrying when considering inequality of outcomes. There are empirical indications that once changes in educational institutions reduce the importance of family background for some consequential educational choices, families tend to find ways to increase their role in other ways to guarantee their children's later socio-economic success (Pöyliö et al, 2018; cf. Raftery and Hout, 1993).

Our study also shows that individuals with a general upper secondary qualification, especially those with advanced maths in their matriculation exams, obtain a higher level of socio-economic status on average in early adulthood and occupational maturity compared to those with vocational or no upper secondary qualification, net of gender, social origin and prior school performance. Differences between those with and without advanced maths at general upper secondary school were for the most part explained by further educational degrees. Thus, we found support for two hypotheses regarding the level of socio-economic status: those with general upper secondary qualification end up with higher socio-economic status than those with vocational upper secondary qualification and those choosing advanced maths in general upper secondary education end up with higher socio-economic status than others.

Also, we found support for our first hypothesis on unemployment: any upper secondary qualification protects against unemployment. Thus, our results support the 'safety net' as well as the 'diversion' arguments presented by Shavit and Muller (2000) as those with a vocational qualification not only end up in lower occupational positions compared to those with a general qualification but also have a lower probability of being unemployed compared to those without an upper secondary qualification. According to our results, there is no advantage to having a vocational qualification over a general upper secondary qualification (or vice versa) in terms of avoiding unemployment. Also, we did not find any difference in the probability for unemployment by within-school tracks at general upper secondary school. Thus, our findings support also the fourth hypothesis: there are no differences in the probability of unemployment between those with and without advanced maths in general upper secondary school. What is more, the association between parental education and the probability of unemployment appeared to be rather weak, especially after controlling for school performance and educational qualifications. Focusing on different educational pathways, the highest probability of unemployment is for those without an upper secondary or tertiary degree. Surprisingly, none of the further degrees after upper secondary education provide additional protection against unemployment. This underlines the value of upper secondary qualifications in the Finnish labour market. As the education level among the population increases, those with little or no education are stigmatised by negative selection and pushed out of the labour market (Solga, 2002).

Unfortunately, we were able to analyse only those individuals who applied to upper secondary education, excluding those who did not graduate from comprehensive school or graduated but did not continue in education further. Thus, our results produce lower-bound estimates, as the most disadvantaged group is not included in the sample. Other limitations of the study are that we analysed only one case country and one specific cohort and thus, could not focus on country differences or trends over time. However, the topic of this study is surprisingly policy-relevant for our case country, as Finland is making the application to upper secondary education compulsory and, at the same time, renewing its higher education intake, putting more emphasis on choosing advanced maths. Hence, further research should focus on the effects of these contextual changes taking place at upper secondary education on social inequality.

Conflict of interest

The authors declare that there is no conflict of interest.

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