

Different degrees of career success: social origin and graduates' education and labour market trajectories

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Abstract

Most research on social inequalities in higher education (HE) graduates' labour market outcomes has analysed outcomes at one or two points in time, thus providing only snapshots of graduates' occupational destinations. This study contributes to the existing literature by examining the education and labour market trajectories of degree holders across their life course and how these trajectories vary by social class of origin. We analyse data from the 1970 British Cohort Study and employ sequence analysis, followed by cluster analysis, to identify HE graduates' typical trajectories. We assess the degree of social inequalities in the chance of following more or less advantaged pathways from age 16 up to the age of 42 and the extent to which these inequalities are explained by differences in higher education experiences. The results show that graduates from lower social classes of origin have more diverse and less stable trajectories, are less likely to enter top-level jobs in their 20s and more likely to enter and remain in lower social classes than their more socially advantaged counterparts. The age at which people graduate from HE emerges to be a key factor in explaining some of these patterns. Interestingly, HE factors - such as class of degree, fields of study and type of university attended - only partially explain social class differences. Our research provides new insights into the dynamic nature of inequalities among graduates showing that not only does the final destination matter but also the timing and sequencing of trajectories are important.

Key words: Social inequalities; graduates' education and labour market trajectories; life course; sequence analysis.

Introduction

In UK policy debates, the acquisition of higher education (HE) qualifications by individuals from lower social origins is often portrayed as the main means of equalizing their life chances. However, while there is evidence that a HE qualification enhances one's chances of employment (BIS 2011, 2015), entering top social classes (Bukodi and Goldthorpe 2011a) and earning higher salaries (Blundell, Dearden and Sianesi 2005), there is also evidence that social inequalities in labour market outcomes exist even among HE graduates. These inequalities are manifested in both graduates' social class of destination (Duta and Iannelli 2018; Jacob, Klein and Iannelli 2015; Macmillan, Tyler and Vignoles 2015) and their earnings (Britton, Dearden, Shepard and Vignoles 2016; Crawford and Vignoles 2014). This calls into question whether simply achieving higher levels of education automatically translates into better labour market outcomes for all graduates irrespective of their social origin.

Our paper aims to contribute to the existing literature on social inequalities in HE graduates' labour market outcomes in three ways. First, our study provides a more holistic insight into graduates' education and employment trajectories across the life course and how these relate to their social origin. Most of the previous research on HE graduates' labour market outcomes has focused on outcomes measured at one or two points in time, usually at the time of entry (Crawford and Vignoles 2014; Jacob, Klein and Iannelli 2015; Macmillan, Tyler and Vignoles 2015; Triventi 2013) or several years after graduation (Bukodi and Goldthorpe 2011a; Britton et al. 2016). This research has been useful to provide evidence on the extent to which family background factors influence graduates' outcomes, but it has been unable to analyse what happens in between these two time points, and so how inequalities develop during graduates' careers. Employing a more holistic approach is important because neglecting the entire 'journey' might conceal inequalities which occur in relation to the smoothness of the labour market trajectories followed and the timing of education and occupational transitions among individuals from different origin classes who eventually reach the same destination in midlife. In turn, different pathways might have different consequences for individuals' income and for other markers of transition to adulthood (e.g. house ownership and family formation) and more broadly for their quality of life. Therefore, we argue that adopting a life course perspective is key to fully understand the transmission of intergenerational inequalities.

Secondly, even though a few studies have more recently explored individual occupational trajectories and their relation to education and social origin over a long time span (e.g. Bukodi, Goldthorpe and Halpin 2016; Sturgis and Sullivan 2008), they have not specifically focused on HE graduates and have analysed only occupational trajectories of people who were in employment. A recent study by Jacob and Klein (2019) focuses on university graduates' occupational destinations since their time of graduation using a longitudinal perspective. However, also this study does not pay attention to what happens before and after graduation in terms of spells of education, unemployment and inactivity, with the latter being not uncommon experiences in individual lives, especially among the less privileged groups or among women who are more likely to take career breaks due to childbearing and childrearing. In our paper, the full spectrum of graduates' education and labour market experiences is analysed to understand the intergenerational transmission of (dis)advantage.

Thirdly, the paper analyses whether and the extent to which social-origin effect can be explained by differences in graduates' HE experiences, i.e. specific field of study and institution attended, HE achievement, age at which people graduate and any further postgraduate studies. These factors are generally associated with both parental background and career opportunities, hence, they are likely to explain, at least in part, social inequalities in graduates' destinations.

Three main questions are addressed in this study:

- (1) What are the typical education and labour market pathways followed by HE graduates?
- (2) How do these pathways vary by parental social class?
- (3) Do differences in graduates' HE experiences (i.e. age of graduation, field of study and institution attended, degree class achieved and postgraduate studies) explain class-of-origin differences?

This paper answers these questions using data from the 1970 British Cohort Study which provides rich education, employment and occupational histories together with other key information such as respondents' parental background and HE experiences. These data allow us to analyse graduates' long-term trajectories covering the time before and after graduation, from age 16 up to the age of 42. We use sequence analysis and cluster analysis to identify the typical trajectories followed by HE graduates. We further employ a series of binary logistic regression models to examine whether and to what extent there are social inequalities in the

chance of following more or less advantaged pathways and whether these inequalities are explained by differences in graduates' HE experiences.

The intergenerational transmission of (dis)advantage across the life course: theoretical considerations

Social inequalities in HE graduates' labour market outcomes result from inequalities which develop before and after graduation. Thus, explaining how these inequalities come about requires uncovering differences in individuals' circumstances, experiences and opportunity structures before entering and while they are in the education system, in the transition from education to the labour market and during their occupational career.

Social Reproduction theories (Bourdieu 1984; Coleman 1988) as well as Rational Choice theories (Boudon 1974; Breen and Goldthorpe 1997) offer valuable insights into the mechanisms which lead to inequalities at key points of individual lives. In particular, *Social Reproduction Theories* focus on the influence of economic, cultural and social resources in the family of origin on individuals' educational and occupational career and on the role of the education system and labour market structure in maintaining the existing social stratification. Limited family resources and, more generally, the environment in which children and young people grow up directly and indirectly (for example through the formation of their aspirations) strongly constrain educational and employment decisions and outcomes of disadvantaged students.

Rational Choice Theories, on the other hand, stress the importance of individuals' evaluations of the costs and benefits of continuing studying after school which in turn affect individuals' chances of gaining a higher-level qualification and better occupational destinations both in terms of prestige and earnings. In this perspective, children from higher social classes have more to lose (risking downward mobility) from not reaching the highest educational levels than children from less advantaged social classes.

Even though through different mechanisms, both Social Reproduction and Rational Choice theories predict that, compared to their more advantaged peers, individuals from disadvantaged backgrounds are more likely either to abstain from continuing studying after secondary school or to choose HE programmes which minimise costs and the risk of failure (for example, shorter vocational programs in colleges) or choose to pursue a HE qualification

at a later stage, once they acquire the necessary resources. In addition, social stratification in education does not occur only vertically, i.e. through the unequal chances of continuing to the higher levels of education by people from different social backgrounds, but also horizontally, in relation to the quality or status of the curriculum or the institution attended at a particular level (Lucas 2001). Thus, within the HE sector, more advantaged social groups are more likely than less advantaged groups to choose more prestigious universities and fields of study (e.g. medicine and law) and this often translates into better labour market outcomes in terms of occupational status and/or economic rewards.

In recognition of the importance of identifying the processes which relate early advantaged or disadvantaged conditions in life to later outcomes, a *life course perspective* has emerged and grown in popularity as a new appealing, holistic theoretical approach (Elder 1998; Mayer 2009; Shanahan, Mortimer and Johnson 2016). The main assumption behind this approach is that, during their lives, individuals go through a series of interdependent social statuses which span various life domains (e.g. education, employment, family, health) and understanding each status requires a holistic and dynamic approach. The impact of different life transitions also depends on the timing in which the transition or event occurs (Elder 1998). In particular, to understand HE graduates' final occupational destinations, it is important to analyse the statuses and trajectories which lead to these destinations, which include education and training spells, experience of unemployment and inactivity, career mobility, as well as their timing.

Moreover, the life course perspective recognises that lives are interdependent (Elder, 1998). In line with the Social Stratification theories, parents and children are presented as having 'linked' fates and parents' advantage or disadvantage is shared with their children. One key theoretical explanation connecting the life course perspective to social stratification is the *cumulative advantage* (CA) theory. This theory describes the process of reproduction of inequalities by analysing how the initial advantage of certain social groups over others leads to a multiplication of rewards across the life course (DiPrete and Eirich 2006; Mayer 2009). In the context of our study, we expect the cumulative advantage associated with the social class of origin to manifest itself through HE graduates following more smooth and advantaged career trajectories. Moreover, in addition to cumulative advantage, we expect socially advantaged graduates to benefit from *compensatory* advantage. In this latter case more advantaged families mobilize their higher resources to help their children to move away from less favourable outcomes in their early career and achieve better outcomes, thus

ensuring their status maintenance across generations (Bernardi 2014). Thus, we expect graduates from more advantaged origins to be more likely than graduates from other social classes to experience upward mobility from lower occupations into professional and managerial occupations.

Finally, in common with the Rational Choice theories, the life course perspective recognises the role of human agency (Elder 1998). Individuals and their families make choices on which course of action to follow within the constraints and opportunities available to them. This leads to variations in the trajectories followed by people from the same social origins and the possibility for a less deterministic account of social reproduction processes.

Previous studies

Social inequalities in graduates' occupational outcomes

Although social stratification research has provided evidence that education is a key (even though not always sufficient) instrument for social mobility (e.g. Breen and Goldthorpe 2001), a *direct effect of social origin* (not mediated by education) on people's occupational destinations has been documented in several countries (for a recent summary see Bernardi and Ballarino 2016). Even though to a lesser extent, this pattern has also been found among HE graduates (Breen and Jonsson 2007; Hout 1988; Iannelli and Paterson 2007; Torche 2011; Vallet 2004).

Recent evidence in the UK shows considerable inequalities by parental education and social class in HE graduates' early labour market outcomes, such as occupational prestige and the probability of entering the service class (Jacob, Klein and Iannelli 2015; Macmillan, Tyler and Vignoles 2015), and earnings (Britton et al. 2016; Crawford and Vignoles 2014). Differences by parental education in graduates' early occupational status and wage were also found in Norway, Germany, Italy and Spain (Triventi 2013). Yet, most of the data used in these studies were limited to early labour market outcomes (up to 5 years since graduation - except Britton et al. 2016 where graduates spent up to 10 years in the labour market) and were based on graduates who left university in the early 2000s. Other research based on the 1970 British Cohort Study (Gugushvili, Bukodi and Goldthorpe 2017) examined the probability of entering salariat and working classes and it also found parental background differences among highly educated people up to the age of 38. However, this study did not

explicitly focus on HE graduates but rather used a relative measure of education, with the highly educated group consisting of those in the top educational tertile of their generation.

Among the main factors behind the persistent effect of social origin on graduates' outcomes identified in the above studies were differences in the prestige of the HE institution attended, in the class of degree achieved, in the field of study entered and in participation in further education. This is not surprising given that HE entrants from higher social backgrounds are indeed more likely to obtain higher grades (e.g. Crawford 2014) and attend more prestigious universities (Iannelli, Smyth and Klein 2016; Sullivan et al. 2014) and these are in turn important predictors for success in the labour market (Britton et al. 2016; Walker and Zhu 2011). The evidence related to social inequalities in enrolment in more economically rewarding fields of study is mixed. Some studies emphasise that access to top traditional professions such as medicine and law are heavily dominated by the offspring of higher managerial and professional people (Laurison and Friedman 2016; Reimer and Pollak 2010; Van de Werfhorst, Sullivan and Cheung 2003). Also, the choice of more creative careers, such as those in acting or media, are highly dependent on prolonged financial support from the family (Friedman and Lauriston 2020). Other research found that students from lower social classes of origins were more likely than those from higher social classes to choose fields of study with high income returns, such as engineering and business (Davies and Guppy 1997; Goyette and Mullen 2006; Iannelli, Gamoran and Paterson 2018). Among the other mediating factors investigated in previous research are cognitive ability and sense of locus of control (Gugushvili et al. 2017) and social networks (Gugushvili et al. 2017; Macmillan et al., 2015). In their recent book, Friedman and Laurison (2020) provide a very detailed account of the different mechanisms through which the 'invisible hand' of social origin can continue to shape people's promotion and financial success within the same occupations (e.g. reliance on family's financial support, working in London, dominant behavioural codes and working for bigger companies).

Inter- and intra-generational social mobility

There is a growing interest in examining social inequalities through a life course perspective and directly assessing the relationship between social origin and individuals' intra-generational mobility not only in the UK (Bukodi, Goldthorpe, Halpin and Waller 2016; Jacob & Klein 2019; Sturgis and Sullivan 2008) but also internationally (Härkönen &

Bihagen 2011; Karhula, Erola, Raab and Fasang 2019). Generally, these studies show that early disadvantage in the labour market has a long-lasting effect on occupational attainment which is not compensated by intra-generational mobility (Barone, Lucchini & Schizzerotto 2011; Bukodi and Goldthorpe 2011b; Härkönen & Bihagen 2011). This relationship is rather stable across cohorts in several countries (e.g. Britain, Sweden, Italy), only showing a slight weakening over time in the Netherlands (Wolbers, Luijks and Ultee 2011). The magnitude of the direct effect of social origin on the first job appears to be very strong in Italy (Bison 2011), fairly strong in Britain (Bukodi and Goldthorpe 2011b), moderate in Sweden (Härkönen & Bihagen 2011) and the Netherlands (Wolbers, Luijks and Ultee 2011) and much weaker in Germany (Hilmert 2011). The degree of career mobility also varies by country, with Italy and Germany being particularly less mobile (Barone & Schizzerotto 2011). Moreover, in all these studies, the higher the level of education, the higher the chances of career progression, regardless of the first job, with the exception of Sweden where HE graduates, especially men, enjoy early stability in top occupations and hence lower intra-generational mobility (Härkönen & Bihagen 2011).

A series of studies have used the richness of the British cohort studies to examine how social background shapes individuals' occupational histories. Applying latent growth curve models to analyse occupational trajectories followed by the members of the 1970 British Cohort Study (BCS70), Sturgis and Sullivan (2008) found that working class people who were upwardly mobile into professional, managerial and technical occupations had high general ability and academic motivation, mothers with post-compulsory education and a high interest in their children's education.

Using the National Child Development Study (NCDS) data, Bühlmann (2010) found that within the service class, occupational trajectories differ, with some trajectories being more direct and others involving passing through a series of 'feeder positions.' These differences were more salient for women, who tend to follow more indirect and longer pathways to the service class, than men.

Employing sequence and cluster analysis to analyse data from three British cohort studies (1946, 1958, 1970), Bukodi and colleagues (2016) also showed that there is more than one route for entering the service class: *a direct route*, at the start of individuals' working lives, (which has become even more common in the 1970 cohort compared to the other two cohorts) and *more indirect routes*, following a journey of upward intra-generational class mobility, both routes disproportionately taken by those from upper classes.

Finally, using the BCS70 data, Jacob and Klein (2019) applied growth curve models to analyse the dynamics of graduates' occupational prestige score over ten years since entering the labour market. Interestingly, they found no direct effect of social origin on occupational trajectories with the exception of social sciences graduates from working-class backgrounds who start with lower occupational prestige but eventually catch up with their counterparts from higher classes.

Our paper focuses on social inequalities in HE graduates' education and labour market trajectories using a more holistic approach than used in these studies. By analysing educational, employment and occupational trajectories as they evolve from teenage years up to the age of 42 we are able to capture the diversity of these trajectories and their relation with social inequalities.

The UK higher education system and its relation to the labour market

The UK HE system is characterised by high participation rates, high differentiation of institutions and low standardisation of entry requirements. Higher education participation rose ten-fold between the beginning of the 1960s and 2017/18 (from 5% to 50%; Mayhew, Deer and Dua 2004 and DfE 2019). At the time the cohort members of the 1970 British Cohort Study left upper secondary school (around 1988), this rate was 17% (Mayhew et al. 2004). The most rapid expansion occurred in the 1990s when, in only one decade, the rate doubled and reached 34% (in 1997-98). Therefore, most graduates in our cohort entered the labour market in early 1990s and faced substantially lower competition compared to their peers who graduated later, during the period of intense higher education expansion.

This expansion was accompanied by an important change in the history of the British HE system, the upgrading of the polytechnics to university status. Until 1992 the HE system in the UK was a binary system composed of universities and polytechnics (and central institutions in Scotland), two distinctive institutional types, the first with a strong focus on academic education and research, the second more teaching-oriented, offering technical and professional education (Carpentier 2018; Croxford and Raffe 2013). The shift from a binary system to a formally unified system in reality hides important informal status differences between HE institutions linked to the date when institutions were founded or became universities (Croxford and Raffe 2013). Thus, the HE sector is *de facto* a diversified system (Arum, Gamoran and Shavit 2007) characterised by a range of stratified higher education

institutions with distinct status which has remained stable over time (Croxford and Raffé 2013): the old universities (founded before 1950), the newer universities (founded from 1950s to 1992), the post-92 universities (polytechnics and central institutions) and colleges which offer vocational, tertiary qualifications (sub-degrees) lasting one or two years, including Higher National Certificates (HNC) and Higher National Diplomas (HND). Empirical evidence shows that the diversification of HE institutions correlates with social stratification within the system. Thus, in the UK (but also in other countries) the most prestigious universities mainly gather students from the most advantaged social classes while less advantaged groups disproportionately enter lower-status institutions (Arum, Gamoran and Shavit 2007; Boliver 2011; Iannelli, Gamoran and Paterson 2011).

Education is loosely connected to the labour market in the UK (Hannan et al. 1996; Gangl 2003). In contrast to countries such as Germany or Austria where education and vocational training are strongly linked to jobs, both secondary and tertiary education in the UK tends to focus on general education and skills. Thus, a HE qualification provides a weak signal in the UK on potential employees' specific skills and knowledge required for the job and this creates room for the influence of non-credentialist factors on job allocation, among them class of origin. Evidence of this was found in the study by Jacob et al. (2015) who showed that parental education had a stronger positive influence on graduates' chances of entering the higher-service classes in the UK than in Germany (in particular at the time of labour market entry). The authors explain this pattern by referring to the higher competition for graduate jobs, the lower signalling power of higher educational credentials and the weaker links between education and the labour market in the UK.

Compared to other countries, such as Germany (Manzoni, Härkönen & Mayer 2014; Hilmert 2011) or Italy (Barone, Lucchini & Schizzerotto 2011; Bison, 2011), the UK was found to display a higher level of career mobility up to age 40 (Bukodi and Goldthorpe 2011b; Jacob & Klein 2019). Moreover, the number of occupational changes between job entry and maturity emerged to be associated with higher occupational prestige, at least for men, and a direct effect of parental social class remained even after controlling for the first job (Bukodi and Goldthorpe 2011b). These distinct features make the UK a particularly interesting case to examine.

Data and measurement

The data were drawn from the 1970 British Cohort Study, the most recent cohort study providing detailed education and employment histories up to middle adulthood. Our sample is restricted to respondents who held a first HE degree and were present in the 2012 sweep, when they were 42 years old (N=2236).¹ Throughout the paper, for simplicity, we refer to our sample members as ‘graduates’. However, it is important to keep in mind that they obtained their university degree any time between the ages of 20 and 42 and their trajectories cover the time both before and after graduation.

Out of the total initial samples, 27 per cent of cases had missing values for at least one of the key explanatory variables.² By conducting an analysis of the patterns of missing data, we found that item non-response was not Missing Completely At Random (MCAR) but it depended on the variables used in our analysis (i.e. parental social class, type of university and postgraduate studies). Following the recommendation of Mostafa and Wiggins (2015) missing values for the covariates were imputed using multiple imputation. We used Multiple Imputation by Chained Equations (20 chains of multiple imputation) through the MICE package in STATA. The multiple imputation models were based on all the key variables used in our analysis. Also, given that cognition has been suggested to be one of the strongest predictors of missingness (Mostafa et al. 2020), we included cognitive ability at age 10 as an auxiliary variable. Sensitivity checks together with key descriptive statistics of the sample are included in the electronic supplementary material (Tables S1-S2). They showed that the distribution of the imputed sample was generally very similar to the complete sample after listwise deletion. Nevertheless, since the missing data pattern is not MCAR, we prefer multiple imputation both to correct for any under/overrepresentation based on the observed variables, and to maximise the sample size. However, given that techniques tackling imputation of longitudinal data in the context of sequence analysis are still under development (Halpin 2012), the missing spells in the activity history were kept as a separate ‘missing’ state.

Besides item non-response, BCS70 data also suffers from unit non-response (i.e. attrition), a common issue among longitudinal studies. Out of the initial BCS70 sample, only 54% responded at the age 42 sweep. Those who were more likely to drop out of the survey were men, single people, those living in London and those from more disadvantaged backgrounds (Mostafa and Wiggins 2015). Gender and social class of origin are among our dependent variables, so we control for these sources of bias. Moreover, it is worth noting that

because our subsample includes only HE graduates, our graduates from lower social classes of origin are likely to be more advantaged, e.g. having higher resources and motivation, than other people from a similar origin. As a result, the attrition rate for this group may be lower.

The education and labour market trajectories were constructed based on the monthly activity and employment histories of each graduate from April 1986 (when respondents were 16 years old) to April 2013 (when respondents were 42 years old). A total of nine states were used in the final analysis (Table I, column D): (1) Education, (2) Inactive or Other (3) Employed: occupation not known, (4) Higher managerial and professional occupations (NS-SEC 1), (5) Lower managerial and professional occupations (NS-SEC 2), (6) Intermediate occupations (NS-SEC 3-4), (7) Routine and manual occupations (NS-SEC 5-7), (8) Unemployed and (9) Missing spell. The job episodes are measured by a four-level classification of the National Statistics Socio-economic Classification (NS-SEC), constructed based on the Socio-Economic Group (SEG), the only consistent measure available for both parents and respondents across waves. Therefore, the NS-SEC measure is used for both parental and respondents' social class. More details about the grouping are shown in Table I, column C.

>>Table I<<

A number of explanatory variables were included in the analysis. First, our key variable, *social class of origin* (classified as described above), was obtained from the information collected when the participants were 10 years old and was based on mother's or father's occupation depending on which one was higher. A *gender* indicator was also included in the analysis to explore whether HE graduates' trajectories varied by gender.

We further included a set of potential mediators which may explain variations by parental background. First, HE *graduation age* was classified into four age groups and was calculated from the year when the university degree was awarded: 20-22, 23-25, 26-31 and 32-42. In our sample, half of HE graduates obtained their university degree between the ages of 20 and 22, another 24% between 23 and 25 and about 26% after 26 years of age (Table S1 in the supplementary material). Then, we used the information about respondents' HE attainment, type of institution and field of study attended which was collected at different waves from age 30 to 42. HE attainment was measured by the *class of degree* achieved: First, Upper second [2:1], Lower Second [2:2], Third and Pass. The *type of HE institution* attended was classified into Old Universities, Newer (pre-92) universities, Polytechnics/Post-92 and Other (i.e. originally coded as 'other answers'). *Field of study* was categorised following

Parsons et al. (2016) and Walker and Zhu (2011) in four subject groupings: STEM (Science, Technology, Engineering and Mathematics), LEM (Law, Economics and Management), OSSAH (other social sciences, arts and humanities, including languages), and COMB (combined subject degrees, including graduates who reported studying more than one subject). In addition to these four groups, those who reported studying ‘other subjects’ were treated as a separate category. Finally, the information on whether respondents achieved a *higher degree* in addition to their undergraduate degree was also included in the analysis (the distributions of all HE variables are reported in Table S1 of the supplementary material).

Methods

We used sequence analysis followed by cluster analysis to derive the typology of HE graduates’ education and employment trajectories. This method is a useful technique to address questions about processes (Aisenbrey and Fasang 2010) and it uses ordered sequences, rather than data points, as an input (Abbott and Tsay 2000). This better reflects the definition of career as an unfolding sequence of any person’s education and occupation experiences over time. A sequence consists of a series of states in which respondents are found at different points in their life course within an observation period; in our case between the ages of 16 and 42. The sequences in this analysis were built based on the nine states described in the measurement section and shown in Table I.

Generating typologies of trajectories based on sequence analysis involves several stages. The first step involves the specification of the cost for transforming one sequence into another. Given the non-hierarchical definitions of states, we used a constant cost matrix which assigns the same cost for each operation (i.e. insertion, deletion and substitution). There is no general consensus regarding the preferred specification. However, robustness checks based on different methods (e.g. Transition rate and theory-based matrices Hamming distance, Longest Common Suffix) led to very similar results. Second, we relied on optimal matching to compute dissimilarities between each pair of sequences using the TraMineR package in R. Third, a set of clustering solutions was obtained using the method proposed by Studer (2013) which combines the Partitioning Around Medoids (PAM) algorithm and hierarchical Ward’s method (Murtagh and Legendre, 2014). The WeightedCluster package in R was used to conduct the clustering procedure. Finally, the choice of number of clusters was guided both theoretically and based on various statistical tests. Most of the tests (e.g. Point Biserial Correlation, Average Silhouette Width, Hubert’s Gamma, Hubert’s Somers’ D)

indicated that a five-cluster solution is the most parsimonious partitioning. However, we examined more cluster solutions to rule out the possibility of not excluding any theoretically relevant cluster. Two more clusters emerged as distinct and worth further investigation: ‘Upwardly mobile from Lower to Higher Managerial & Professional occupations’ and ‘Predominantly inactive starting with late 20’s’. We considered both these clusters very interesting from a theoretical point of view as they illustrate the dynamic nature of the life course, the first cluster capturing the climbing route to the top social class, and the second one evidencing the transition to inactivity after a period in the labour market. Hence, we opted for a seven-cluster solution. This cluster solution includes one cluster characterised by a systematic truncation at the beginning of the observation window (see Figure S1 in the supplementary material; 139 cases), therefore this latter cluster is only shown in the supplementary material and we focus our core analysis on the other six substantive clusters.

To investigate differences in the sequences followed by HE graduates from various social classes of origin we used the entropy index as it captures the diversity of states at a given time across the observation window. In particular, a plot of *transversal entropies* shows whether and how the diversity of states varies across time and by certain groups (Billari 2001). The entropy is zero when all cases are in the same state and is maximal when the same proportion of cases are in each state (Gabadinho et al. 2011).

Finally, a series of binary logistic regression models was used to estimate the probability of belonging to each cluster for graduates from different social origins. The results from these models are presented using average marginal effects (AMEs) to enable comparison across models (Mood 2010). We rely on seven models, starting with the baseline Model 1 which shows the magnitude and the statistical significance of the gross parental class differences. In building the models, we first include one HE covariate at a time (Models 2-6) in order to assess which of the HE variables has a stronger mediating power in explaining the identified differences by parental background. These models show how the initial differences by parental background change once we include different HE variables in the model (i.e. age at graduation in Model 2, class of degree in Model 3, type of university in Model 4, field of study in Model 5 and Higher Degree in Model 6). The final model (Model 7) includes all the HE variables together to assess their total mediating power and to test whether there is any remaining difference by parental background once all the HE variables are taken into account. We also tested whether respondents’ cognitive ability at age 10 could explain any remaining social-origin gap and found that it did not. This is because cognitive ability is

associated with our measures of HE experiences. Thus, when the HE variables were introduced in the model, ‘cognitive ability’ was not statistically significant and did not reduce the social-origin gap.

HE graduates’ education and labour market trajectories

The results of the cluster analysis are presented in Figures Ia and Ib (showing both index and state distribution plots) and are organised from the most common to the least common cluster (as established by the percentage of graduates falling under each cluster). It is worth noting that although three-quarters of graduates are following trajectories dominated by Lower or Higher managerial and professionals (i.e. ‘graduate’ jobs), another quarter follows trajectories which are less advantaged since they lead to or involve a considerable amount of time spent in ‘non-graduate’ jobs (i.e. jobs for which higher education qualifications are generally not required).

The first three quarters of graduates follow trajectories illustrated in the first three clusters (Figure 1a). The most frequent cluster of graduates’ trajectories is ‘Direct and early entry into Lower Managerial and Professional occupations’ (38.6 per cent). From the age of 21 (typical age of graduation in the UK), the percentage of those entering Lower Managerial and Professional occupations increases rapidly. Around the age of 30, about three quarters of them occupy this position. This proportion further increases to about 83 per cent by the age of 42. The second most frequent cluster is ‘Direct and early entry into Higher Managerial and Professional occupations’ (22 per cent). By the age of 24, around 45 per cent of respondents already reached this position. This percentage almost double by the age of 29 and remains stable until the end of the observation period. The third most typical cluster, labelled ‘Upwardly mobile from Lower to Higher Managerial and Professional occupations’ (13.7 per cent), portrays indirect entries into the Higher Managerial and Professional occupations, mostly occurring when respondents reach their 30s, generally after having spent their 20s in Lower Managerial and Professional occupations. By the age of 42, the vast majority of the respondents in this cluster have progressed to top-level jobs.

>>Figure Ia<<

Among the remaining quarter of graduates (Figure Ib), 10.5 per cent of them are in the ‘Predominantly Intermediate occupations’ cluster, with the majority of graduates

occupying these positions in their early 20s to mid-30s. For about 35 per cent of respondents, these occupations are their final destination, while for others they are stepping stones to enter Lower or Higher Managerial and Professional occupations either directly or after a period of further education. Another less advantaged typology is the ‘Predominantly Routine and manual occupations’ cluster (7.2 per cent). These occupations represent the predominant state from the late teenage years to the early 30s. However, at this latter point, the trajectories within this cluster start to diverge, with about a third of graduates remaining in the same position until the age of 42 and almost half moving up to lower managerial and professional occupations. In some cases, this is linked to later spells of education which are also characteristic of this cluster. The final cluster of trajectories, labelled ‘Predominantly inactive starting with late 20’s’ (7.1 per cent), is marked by a high percentage of people who are inactive from their late 20s and throughout most of their 30s (around 80 per cent of respondents are inactive in the mid-30s). Not surprisingly, this cluster is dominated by women (97 per cent of cluster members). Quite a significant portion of them enter lower managerial positions immediately after leaving continuous education and stay in these occupations until their mid-30s, the time in which they are most likely to be inactive due to family responsibilities. By the age of 42, about 50 per cent remained inactive, around 26 per cent re-entered the labour market in (mostly lower) managerial and professional occupations and another 21 per cent ended up in intermediate and manual and semi-routine occupations or were unemployed.

>>Figure Ib<<

Social inequalities in graduates’ trajectories and the role of higher education experiences

One of the key aims of this study is to investigate the extent to which labour market pathways vary by graduates’ social class of origin. We start by showing transversal entropy plots measuring the degree of diversity in the states occupied by HE graduates from different social classes of origin. The overall pattern emerging from Figure II reveals that *graduates from the least advantaged backgrounds experience more diverse and less stable trajectories* (see higher entropy values). This is particularly the case before the age of 22 (the age around HE graduation for half of our respondents). An explanation for this pattern is that, compared to graduates from higher social backgrounds, graduates from lower social classes are more likely to alternate spells of work and studying as opposed to continuously studying.

Moreover, they are more likely to complete their studies at a later age: in our data the mean age of HE graduation is 26-27 for people from the bottom two social classes of origin and 23-24 from the top two social classes. During the period immediately after the typical HE graduation age, all social classes show a very high entropy index (about 0.8), after which it diverges again, with those from higher managerial and professional backgrounds showing again a lower level of entropy (around 0.6 after the age of 28) compared to those from the bottom two social classes (still 0.8 around that age). The entropy indexes tend to converge again at the age of 42 when graduates have reached more stability in their destinations.

>>Figure II<<

We now turn to analyse the probability of belonging to each cluster by HE graduates from different social origins using several binary logistic regressions followed by the calculation of average marginal effects (AMEs).³ Because the overall prevalence of the various outcomes differs and this may affect the AMEs, odds ratios are also provided for the baseline models in the supplementary material (Table S3). The reference category for the outcome variable is 'Direct and early entry into Lower managerial & Professional occupations' (the most common pathway among all graduates, irrespective of social origin); hence, the probability of belonging to each cluster is contrasted with the probability of belonging to this reference cluster.⁴

Table II (Models 2-7) presents the results of the analyses exploring the role of graduates' HE characteristics in explaining the association between parental social classes and graduates' labour market trajectories. For the sake of parsimony, we only show the gaps by parental background and limit these results to the clusters for which we found significant differences (all clusters except for 'Predominantly Intermediate occupations' and 'Predominantly Inactive'). However, we provide the full models in the online supplementary material (Tables S4-S9).

Starting with '*Direct and early entry into Higher Managerial & Professional occupations*', the only statistically significant difference found shows that graduates from routine and manual social classes are 8.3 percentage points less likely than those from top social classes to follow this cluster compared to the reference cluster. Part of this gap appears to be explained by age at HE graduation (5.8 percentage points difference in M2), type of HE institution (6.6 percentage points difference in M4) or whether the respondent has gained a postgraduate degree (7.7 percentage points in M6). Including any of these three variables in

the model makes the social class gap statistically non-significant. When adding all our explanatory variables together in M7, the magnitude of the difference further drops to 3.4 percentage points.

Regarding the *‘Upwardly mobile from Lower to Higher managerial & professional occupations’* cluster, those from lower managerial and professional backgrounds together with those from intermediate social class backgrounds appear to be 7.4 and 8.8 percentage points significantly less likely than their peers from top social classes to follow this trajectory (compared to *‘Direct and early entry into Lower managerial & professional occupations’*, the reference category). *In this case, the HE variables explain very little.* It is worth noting that there is no significant difference between graduates from top and bottom parental social classes in their probability of belonging to this cluster of upwardly mobile people compared to belonging to the reference cluster *‘Direct and early entry into Lower managerial & Professional occupations’*.

The *‘Predominantly Routine and manual occupations’* typology is clearly more likely to be followed by those from lower social classes, with those from intermediate and routine & manual social classes being 8.4 and 16.5 percentage points more likely to be in this cluster than in the reference cluster, compared to those from top social classes. *‘Age at HE graduation’* appears as the main factor behind this association in both cases, indicating that people from low and intermediate classes of origin tend to graduate later and this partly explains their higher chances of ending up in more disadvantaged pathways. In the case of intermediate classes, the initial gap is reduced to 3.4 percentage points difference and is not statistically significant any longer (M2). In the case of routine & manual classes, *‘age at HE graduation’* reduces the gap between top and bottom social classes to 8.5 percentage points but it remains statistically significant. When all the HE variables are introduced in the model this latter gap is further reduced to 7.8 percentage points but still statistically significant (see M7).

>>Table II<<

Conclusions

Previous research has documented persistent social inequalities in graduates’ labour market destinations but has been unable to establish how these inequalities unfold over time before and after HE graduation. Our analysis investigated the education and labour market pathways

followed by graduates from HE up to the age of 42 and examined how and why these pathways differ by graduates' social origin. By adopting a life course approach, our research has provided a deeper understanding of the dynamic nature of inequalities unveiling that timing, sequence and transitions matter.

The findings showed a diversity of sequences followed by graduates, with some pathways more advantaged and smooth (e.g. 'Direct entry into Lower/Higher managerial and professional occupations' and 'Upwardly mobile from Lower to Higher managerial and professional occupations') than others which involved a considerable amount of time spent in 'Intermediate' or 'Routine and manual occupations'. These patterns confirm that having a HE qualification does not automatically translate into a 'graduate' job in the UK and that a lot of career mobility is a very common experience among graduates. Moreover, another distinct trajectory also emerged dominated by women whose prevalent state was 'Inactivity'. Inactivity appeared particularly pronounced when they were in their 30s, an age in which many women prioritize family responsibilities over employment.

In line with social reproduction and cumulative advantage theories, we found that even among the most educated there are clear differences in their education and labour market trajectories linked to their family of origin. Thus, graduates from socially advantaged backgrounds are more likely to experience more smooth and advantaged career trajectories than graduates from lower classes. More specifically, we found that graduates are more likely to attain top managerial and professional occupations either directly after HE graduation or through upward mobility from lower managerial and professional occupations than their less advantaged counterparts. In contrast, graduates from lower social backgrounds (i.e. routine and semi-routine and intermediate backgrounds) had a higher chance of following the least privileged typology of trajectories, i.e. 'Predominantly Routine and manual occupations'. These patterns show that both cumulative and compensatory advantages may be at play for the most advantaged graduates. On the other hand, we need to recognise that only a minority of graduates end up in the disadvantaged trajectories dominated by intermediate or routine and manual occupations (about 11% and 7% respectively) and that a large proportion of them manage to reach a lower managerial and professional occupation by the age 42.

By adopting a life course perspective, we were able to identify 'age of HE graduation' as a key factor explaining a considerable part of these differences. Previous studies, which have analysed graduates' occupational destinations at one or two time points or have focused on intra-generational mobility after HE graduation, have overlooked the importance of

variations in the time of HE graduation for explaining social origin differences in graduates' labour market outcomes (a notable exception is Elman and O'Rand 2004).

Perhaps surprisingly, with the exception of the cluster 'Direct entry into Higher Managerial and Professional Occupations', we found that the HE characteristics analysed (i.e. class of degree, fields of study and types of HE institution attended) played a weaker role than expected given the results from other studies. We believe that, also in this case, the difference is likely to lie in the life course perspective that we have adopted. Previous studies have looked at early labour market outcomes (Jacob et al. 2015; Macmillan, Tyler and Vignoles 2015; Triventi, 2013) and it may be that HE factors are more important in determining graduates' early occupations than the labour market pathways they follow in the long run. Moreover, it is plausible that distinctive features of the HE experience are most relevant in explaining social inequalities in the chances of following elite pathways (Laurison and Friedman, 2016) but are not as crucial for explaining inequalities in following the other pathways. This is in line with the Rational Choice theories which predict that to maintain their elite status, children of higher social classes will try to differentiate themselves from the other graduates through qualitative differences in their education experience (Lucas 2001).

However, even after accounting for different HE experiences, graduates from more privileged backgrounds continue to have a strong advantage over other graduates in the chances of being upwardly mobile to high managerial and professional occupations and in the chances of ending up in the 'predominantly routine occupations' pathway. We were able to discard the possibility that differences in cognitive abilities may contribute to explain the remaining social class gap. This is not surprising since, differently from previous research (e.g. Sullivan et al. 2017), we are focusing on HE graduates, a select group of academically able people, and we are taking into account differences in HE attainment, fields of study, institution attended and post-graduate qualifications (factors which are associated with cognitive ability). Of course, there are non-cognitive factors which may be at play at individual and family levels (such as self-esteem, confidence and communication skills and family support in the form of shared networks), and other experiences (such as geographical mobility, unpaid internships and extra-curriculum activities) which may have helped graduates from more advantaged social classes of origin to achieve the best possible occupational outcomes while avoiding the worst. An examination of such additional factors was beyond the scope of the current paper but will require more attention in future research.

Compared to the period when most of the 1970 cohort members who graduated from HE started their careers, i.e. early 1990s, the HE landscape in the UK has changed dramatically: the participation rate in higher education has tripled, tuition fees have increased substantially (except for Scottish students who benefit from free tuition), postgraduate studies have become much more common, and the share of students graduating with a first or upper second class of degree has steadily increased to three quarters in recent years. These changes have increased labour market competition among graduates and at the same time have put more financial pressure on graduates from less advantaged families. These factors, together with the growing job uncertainty related to structural economic and political changes (e.g. the 2008 financial crisis, Brexit and economic implications of the more recent global pandemic), are likely to lead to stronger social inequalities in graduates' labour market outcomes in the future.

Our findings have important implications for future research and policy which focus on social mobility. Analysing occupations at a single point in time or at two time points masks inequalities related to the process of status attainment and are likely to affect other life domains which are part of the transition to adulthood (leaving the parental home, home ownership, family formation, childbearing and earnings). This implies that social mobility patterns should not only analyse the degree of mobility or immobility of a society but also the journeys that people from different social backgrounds follow to reach their final destinations. In the UK context, there are clear differences in these journeys and this is likely to be the case in other countries characterised by a high degree of intra-generational mobility, a diversified HE system and weak links between education and the labour market (e.g. the USA).

In policy terms, the findings that graduates from lower-class origins are prone to follow more unstable and less advantaged pathways indicate that achieving a HE qualification does not fully act as an equalizer of life chances and (dis)advantages perpetuate also among graduates. This confirms that promoting access to HE to people from disadvantaged social backgrounds does not automatically translate into equal access to top-level jobs. Our finding that timely HE graduation is associated with more successful transition into top-level jobs calls for policies which support disadvantaged students to graduate early in life, e.g. providing grants to help them financially and mentoring throughout their HE studies. To improve the chances of upward mobility, policies should also support disadvantaged students in their transition from HE to the labour market by providing tailored

career advice, by addressing the occupational barriers they may face (e.g. due to professional occupational closure or unfair recruitment practices), and by supporting their geographical mobility and participation in internships. In conclusion, ensuring that people from lower social origins can reap the benefits associated with a HE degree and have rewarding trajectories requires sustained support which starts early on and goes beyond the years spent in education.

Notes:

¹ We also conducted additional analyses on a sample of sub-degree holders (N=825) to investigate whether their trajectories were substantially different from those of degree holders. The findings showed that sub-degree holders had more diverse and generally less advantaged trajectories than degree holders but they did not display substantial social-origin inequalities. For parsimony, we do not present the results for this group in the paper but we include them in the supplementary material (Figures S2-S3 and Table S10).

² The variables with the highest percentage of missing values were *parental background*, *age at HE graduation* and *class of degree*, each having between 14-15 per cent cases with missing values. The missing data for *field of study* and *university* was under 1 per cent.

³ We use binary logistic regressions, instead of multinomial logistic regression, to be able to use AMEs to contrast each cluster to the same reference cluster. This is because the STATA command used to calculate the AMEs from the multinomial regression coefficients only retrieves the contrast of each cluster to all other clusters, making the results difficult to interpret. Thus, using the same logic as for the multinomial logistic regression, we ran binary logistic regressions to obtain the AMEs for each cluster vs. the chosen reference category. As a robustness check, we also ran the multinomial logistic estimation and the results were not different.

⁴ We also investigated contrasts with other reference categories and, as expected, selecting more extreme clusters (either the most disadvantaged or the most advantaged) as reference group leads to even stronger differences by parental background. Nevertheless, we consider the 'Direct and early entry into Lower managerial & Professional occupations' cluster to be the most suitable reference group given its high prevalence. Moreover, for readers interested in comparing differences by parental background in cluster affiliation, the supplementary material also provides the proportion of degree holders within each cluster by parental social class (Table S2).

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Table I Classification of states used in the construction of HE graduates' education and labour market trajectories for sequence analysis

<i>Column A: Detailed Activity</i>	<i>Column B: Compressed category</i>	<i>Column C: SEG (destination)</i>	<i>Column D: Final Activity</i>
F/t Education Part-time education	Education		Education
Looking after home/family Maternity leave Permanently sick/disabled Temporarily sick/disabled Wholly retired Travelling/Extended holiday Government training scheme Voluntary work Employed, but unpaid Other	Inactive or Other		Inactive or Other
		Armed forces NA	Employed
		Employers - large estab Managers -large estab Prof: Employees Prof: Self-Employed	Higher managerial and professional
F/t paid employee (30+ hrs)		Intermed non-man: Ancilliary Intermed non-man: Foreman Managers - small estab	Lower managerial and professional
F/t self-employed P/t paid employee (lt 30 hrs) P/t self-employed Employed, not known if FT/PT Self-employed, not known if FT/PT Work but not known if ft/pt pr emp/se	Employed	Employers - small estab Junior non-manual Farmers:employers & mngrs Farmers: own account Own account: non prof Foremen &supervisors: manual Personal service Semi-skilled manual Unskilled manual Agricultural workers Skilled manual	Intermediate Semi-routine and routine
Unemployed seeking work	Unemployed		Unemployed
	Missing	Don't know/ Not enough info. Not applicable	Missing
Don't know/ Not enough info			

Figure Ia Degree holders' most common clusters of education and labour market trajectories: sequence index plot (left) and state distribution plot (right)

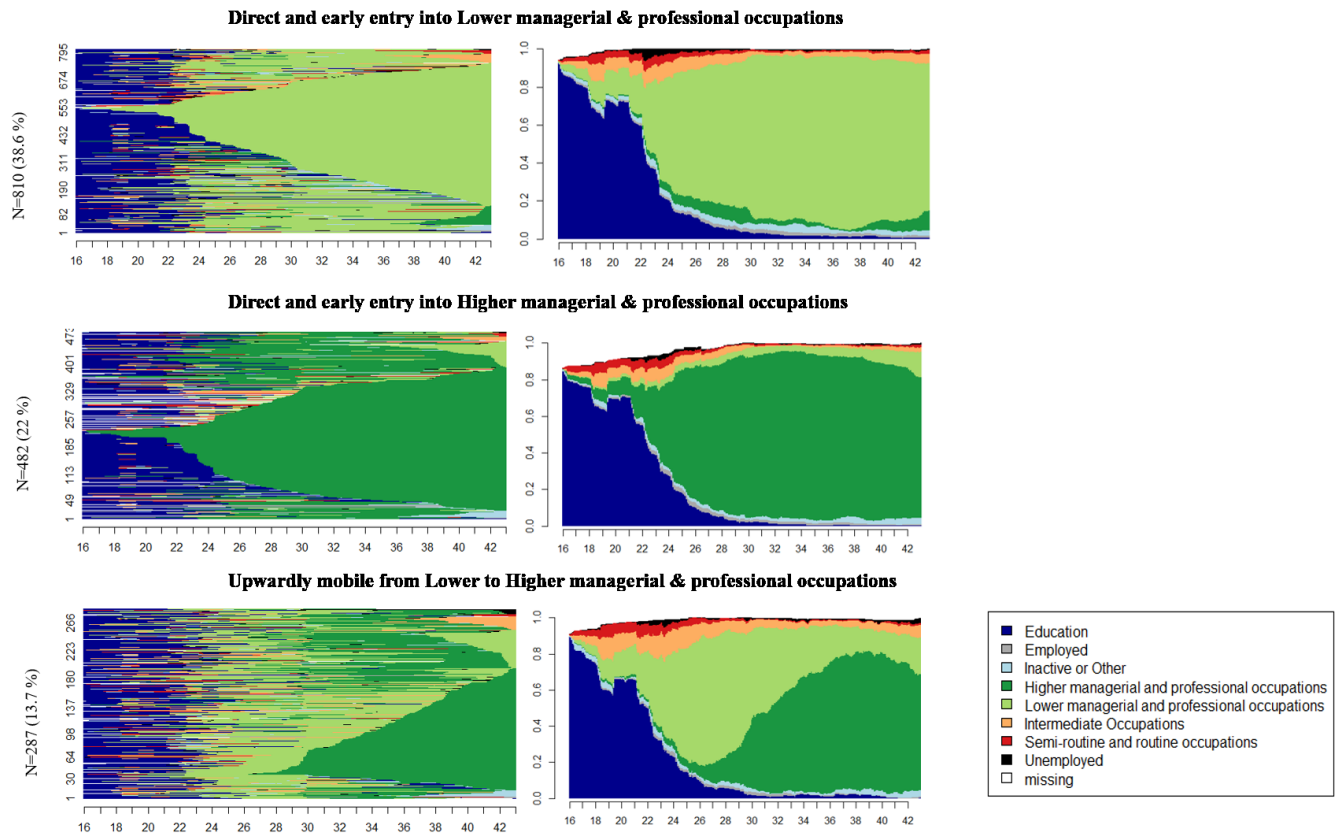


Figure 1b Degree holders' less common clusters of education and labour market trajectories: sequence index plot (left) and state distribution plot (right)

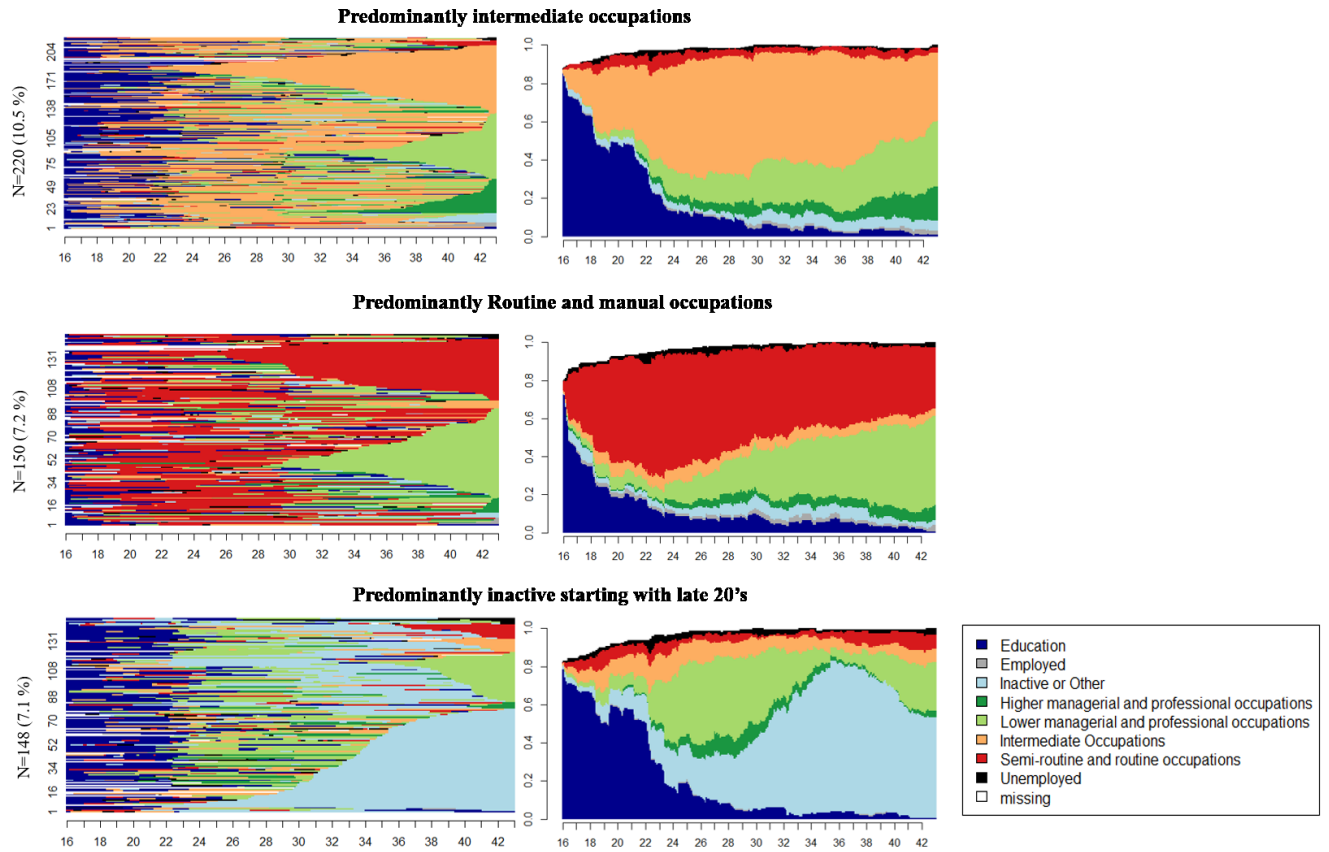


Figure II Transversal entropies of degree holders across the life course by parental social class

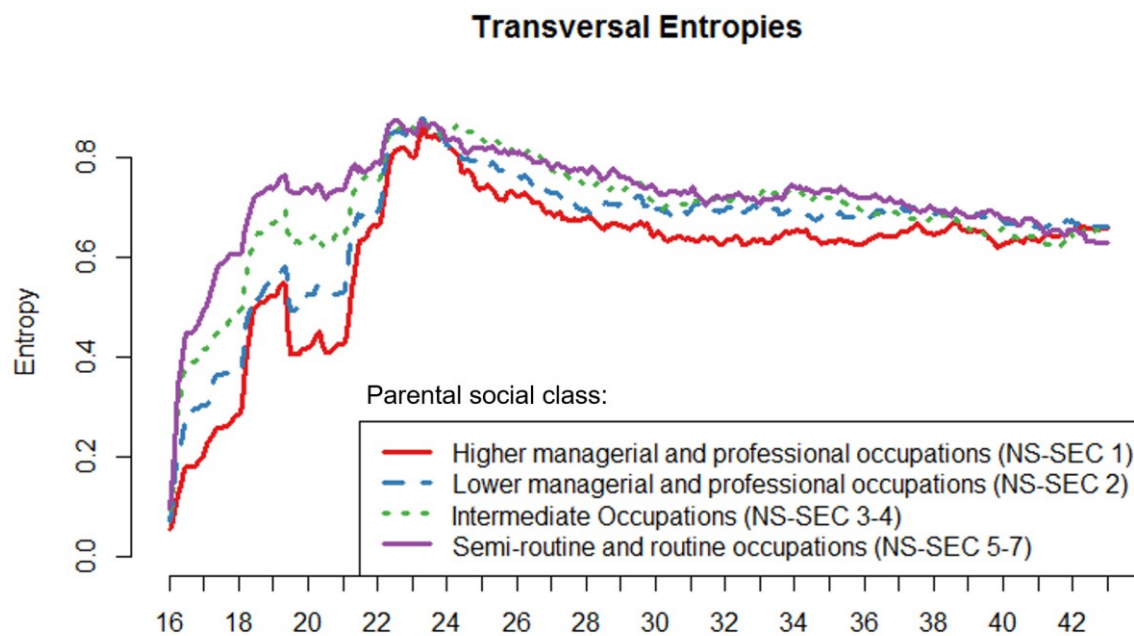


Table II Differences by parental social class in the probability of following different clusters of education and labour market trajectories among first degree holders and the role of HE experiences.

<i>Cluster</i>	Models						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Direct and early entry into Higher managerial & professional occupations</i>							
Lower managerial and professional occupations	-0.061 (0.036)	-0.056 (0.036)	-0.058 (0.037)	-0.047 (0.036)	-0.054 (0.035)	-0.059 (0.036)	-0.029 (0.035)
Intermediate occupations	-0.063 (0.039)	-0.043 (0.039)	-0.065 (0.038)	-0.044 (0.039)	-0.055 (0.037)	-0.054 (0.038)	-0.012 (0.037)
Routine and manual occupations	-0.083* (0.042)	-0.058 (0.043)	-0.085* (0.042)	-0.066 (0.042)	-0.083* (0.039)	-0.077 (0.041)	-0.034 (0.040)
<i>Upwardly mobile from Lower to Higher managerial & professional occupations</i>							
Lower managerial and professional occupations	-0.074* (0.036)	-0.069 (0.036)	-0.072* (0.035)	-0.072* (0.036)	-0.070* (0.035)	-0.073* (0.036)	-0.061 (0.035)
Intermediate occupations	-0.088* (0.038)	-0.085* (0.038)	-0.084* (0.038)	-0.087* (0.038)	-0.087* (0.037)	-0.087* (0.037)	-0.077* (0.037)
Routine and manual occupations	-0.026 (0.045)	-0.021 (0.045)	-0.019 (0.045)	-0.025 (0.045)	-0.024 (0.044)	-0.024 (0.045)	-0.014 (0.044)
<i>Predominantly Routine and manual occupations</i>							
Lower managerial and professional occupations	0.056 (0.029)	0.041 (0.033)	0.054 (0.030)	0.051 (0.030)	0.055 (0.029)	0.057 (0.030)	0.033 (0.032)
Intermediate occupations	0.084* (0.035)	0.034 (0.032)	0.081* (0.035)	0.074* (0.034)	0.082* (0.034)	0.082* (0.034)	0.031 (0.032)
Routine and manual occupations	0.165*** (0.039)	0.085* (0.035)	0.153*** (0.038)	0.157*** (0.039)	0.160*** (0.038)	0.160*** (0.038)	0.078* (0.035)

Note: Results based on a set of binary logistic regressions contrasting each cluster to the reference category cluster: Direct entry into Lower managerial & professional occupations; (only significant differences by parental social class shown);

Average marginal effects; Standard errors in parentheses; * p<0.05; ** p<0.01; *** p<0.001;

Ref. category parental social class: Higher Managerial and Professional occupations.

Model building: M1: parental social class+ gender; M2: M1+age at graduation; M3: M1+Class of degree; M4:M1+type of university; M5:M1+field of study; M6:M1+Higher Degree; M7: all variables (M1-M6) combined.