BERJ British Educational Research Journal

BERA BRITISH EDUCATIONAL RESEARCH ASSOCIATION

British Educational Research Journal
Vol. 44, No. 4, August 2018, pp. 663–680

DOI: 10.1002/berj.3453

Elite universities, fields of study and top salaries: Which degree will make you rich?

Alice Sullivan*, Samantha Parsons, Francis Green, Richard D. Wiggins and George Ploubidis
University College London, UK

This article assesses the chances of entering the top 5% of earners for a British cohort currently in their 40s. We assess the difference made by a university degree from an elite (Russell Group) or non-elite university, and from different undergraduate fields of study. Our study uses rich longitudinal data from the 1970 British Cohort Study (BCS70). This allows us to control for an unusually large range of potential confounding factors, including childhood socio-economic circumstances, cognitive scores, secondary schooling and prior qualifications. We find that large raw differences in the chances of achieving a top salary are strongly attenuated by our controls, but substantial differences between degree subject areas remain. The large gap between men and women in the chance of gaining a top salary is not explained by the type of degree achieved, and we found no evidence of gender differences in the gains from institutional prestige or particular fields of study.

Keywords: higher education; field of study; gender; income; longitudinal

Introduction

Do university degrees from elite institutions and in particular subjects confer a substantial advantage, or is the reason that graduates of these courses have high salaries because they were already destined for success by their socio-economic backgrounds, prior schooling and prior academic attainment? This article assesses the difference made to the chances of being a high earner in mid-life by the type of undergraduate degree achieved for a British cohort born in 1970 (the 1970 British Cohort Study, BCS70). We have an advantage in addressing the problem of selection into prestigious courses, in that we exploit uniquely rich controls on the study members' socio-economic backgrounds, type of secondary school attended, and academic and cognitive attainments prior to university entry. We examine salaries at age 42, rather than shortly after graduation, which is advantageous because returns to higher education are likely to be underestimated by estimates that rely on wages relatively early in life (Kim *et al.*, 2015). Our particular focus is on the top 5% of earners, who can be seen as enjoying an 'elite' economic position with increasing material benefits. Since the beginning of the 1990s, while overall earnings inequality in Britain has remained relatively steady, incomes at the very top have drawn further away from the rest of the

*Correspondence author. Centre for Longitudinal Studies, 55–59 Gordon Square, London WC1H 0NU, UK. E-mail: alice.sullivan@ucl.ac.uk; Twitter: @ProfAliceS.

population (Jenkins, 2015). As such, our study provides new evidence on the role of higher education as a conduit to top positions in British society.

As higher education systems expand, there is increasing interest in differentials between university degrees (Marginson, 2016). There is evidence of higher wage returns to degrees from elite universities compared with non-elite universities (Brewer *et al.*, 1999; Chevalier & Conlon, 2003). As well as status differentials between universities, there are also differences in status and wage returns between degrees in different subject areas (Blundell *et al.*, 2000; O'Leary & Sloane, 2005; Jackson *et al.*, 2008; Wolniak *et al.*, 2008; Roksa & Levey, 2010; Patrignani & Conlon, 2011; Walker & Zhu, 2011, 2013; Anders, 2012; Ma & Savas, 2014; Croxford & Raffe, 2015; Hu & Vargas, 2015). Selection into elite courses reflects social origins, largely but not entirely via academic selectivity (Davies & Guppy, 1997; Grodsky, 2007; Grodsky & Jackson, 2009; Boliver, 2013, 2015; Triventi, 2013; Sullivan *et al.*, 2014; Hemsley-Brown, 2015; Crawford *et al.*, 2016). Private schooling gives an additional advantage in access to elite universities, both via enhanced school results (Ogg *et al.*, 2009) and over and above this (Sullivan *et al.*, 2014; Hemsley-Brown, 2015). Fields of study and institutional status are interlinked (Dilnot, 2016), yet few studies consider these two aspects in conjunction. Studies typically examine earnings a few years after graduation rather than in the longer term (Britton *et al.*, 2016). The problem of unobserved selection into selective institutions and courses remains a major concern for research in this area (Kim *et al.*, 2015). Walker and Zhu (2017) find that college and subject selectivity according to A-level entry scores account for a large portion of the apparent wage premiums attached to degrees from selective universities and courses.

The sociological theories of maximally maintained inequality (MMI) (Raftery & Hout, 1993) and effectively maintained inequality (EMI) (Lucas, 2001) state that, as education systems expand, inequalities will be maintained via access to the next level (MMI), or via status distinctions within a given level (EMI). Therefore, the expansion of higher education can be expected to be accompanied by increasing differentials in access to high-status universities and courses and differential returns to higher education courses (Gerber & Cheung, 2008; Boliver, 2011; Marginson, 2016). It is vital to take this into account when assessing the role of elite universities and courses in determining access to highly paid jobs.

Women in mid-life continue to be lower paid than men at the same level of qualifications (García-Aracil, 2007; Joshi *et al.*, 2007), and are less likely to be employed at the top end of the wage and social class distribution. Although women's chances of entering higher education are now higher than men's in many countries, persistent differences in field of study remain (Riegle-Crumb *et al.*, 2012). There is evidence that returns to university degrees vary by sex (O'Leary & Sloane, 2005), and field of study differences at degree level contribute to the gender pay gap (Machin *et al.*, 2003; Machin & Puhani, 2006). It has been suggested that returns to higher education by field of study may be expected to vary by sex, if women with more traditional views of a woman's role are more likely to select into female-dominated subject specialisms (Kim *et al.*, 2015). Conversely, one could argue that women who select specialisms which are traditionally male-dominated are thereby signalling a level of ambition which may be rewarded in the labour market.

The stereotypical trajectory to an elite, highly paid position would include upper-class social origins, a private school education and an elite university (Macmillan *et al.*, 2015). Past work using cross-sectional data has established the disproportionate representation of the elite in Britain and elsewhere in particular universities and degree courses (Wakeling & Savage, 2015a,b; Feeney *et al.*, 2017). We build on the existing evidence base on higher education and elite salaries and positions by examining the role of elite institutions and fields of study in the attainment of top salaries, using rich longitudinal data.

Research questions

This article addresses the role of elite universities and fields of study as a channel to high-paid jobs. According to the theory of EMI (Lucas, 2001), within-level differences in education are important to the maintenance of educational inequality. Institution and subject domain form two important axes of within-level inequality. In addressing the questions below, we examine the interaction between institutional prestige and field of study, rather than treating the two variables separately, as British undergraduates are admitted to a degree course within an institution, and academic entrance requirements vary widely both within and between institutions.

1. What were the characteristics of those achieving degrees in different subjects and from elite and non-elite institutions? Did they differ greatly in terms of socio-economic background, secondary schooling, and prior cognitive and academic attainment? *H1: Degrees vary substantially in social and academic exclusivity*.
2. What were the characteristics of those in the top 5% of earnings? Is this group dominated by individuals with degrees from elite institutions or in particular fields of study? *H2: Degrees from elite institutions or in particular fields of study are linked to subsequent high earnings*.
3. Controlling for socio-economic background, prior attainment and other relevant characteristics, were individuals who studied at elite universities, and those who studied particular subjects, more likely to be high earners in mid-life? *H3: Degrees from elite institutions or in particular fields of study are linked to subsequent high earnings, net of relevant confounders*.
4. Were there differences between men and women in the gains from institutional prestige and field of study? *H4: We expect that field of study may be more important for women, in line with prior literature*.

Research questions 1 and 2 are addressed via a descriptive analysis. The remaining research questions are addressed by a logistic regression analysis predicting who is in the top 5% of earners at age 42.

Data and historical context

BCS70 follows the lives of more than 17,000 people born in England, Scotland and Wales in a single week of 1970 (Elliott & Shepherd, 2006). An understanding of the educational progress of this cohort during their childhood is vital to understanding their later life-course trajectories. Cohort members resident in Scotland were

excluded, because Scotland's system of school qualifications differs from that in England and Wales.

BCS70 is particularly rich in measures of cognition. The range and sources of these tests is described under our modelling strategy below. We make use of the full set of cognitive tests at the ages of 5, 10 and 16. We use varimax principal components analysis (PCA) to extract a single main component score for cognition using all available tests at each age. The resulting PCA score is standardised in our analyses. Full information on the BCS70 cognitive scores is provided by Parsons (2014).

We control for both school-level academic attainment and the type of secondary school attended. Within the private sector, it is important to distinguish between elite 'public' schools and other private schools, as it is the 'public' schools that most strongly dominate the British ruling elite. We have used the Tatler[1] list of 'public' schools to identify the most prestigious establishments. Within the state sector, most pupils attended all-abilities comprehensive schools, but a minority of schools retained a selective system, whereby those who passed a competitive entrance exam at age 11 were allocated to grammar schools, and those who failed went to secondary moderns, which offered a less academic curriculum.

We also exploit fine-grained data on higher education collected retrospectively at age 42. BCS70 cohort members who attended university would typically have started their courses in around 1988, graduating during the early 1990s economic recession. This was before the substantial expansion of student numbers in the 1990s (Blanden & Machin, 2004). British school leavers in the late 1980s still had access to means-tested maintenance grants, paid for by the state. All universities were public, and none charged tuition fees. However, universities were limited in the number of students they could accept by government caps on places. This meant that there was some pent-up demand for places. Course acceptance requirements were largely based on the A-level grades achieved by the applicant. Subsequent changes to the higher education system included the freezing of student maintenance grants and the introduction of student loans in 1990. Tuition fees were first introduced in 1998.

Until 1992, higher education institutions were divided into universities and polytechnics. Our measure of an elite university is based on the Russell Group[2] of universities, which promotes itself as representing the leading UK universities (Boliver, 2013).[3] We acknowledge the element of arbitrariness in this measure, but substantial cultural as well as economic differences between Russell Group and other university graduates are apparent (Sullivan & Brown, 2015). A limitation of the current article is that we do not have sufficient numbers to examine heterogeneity between universities within our broad categories (Boliver, 2015). We include anyone gaining a degree awarded by a polytechnic within the non-elite university degree category. Following Walker and Zhu (2011), we group degree subjects into: STEM (Science, Technology, Engineering and Mathematics), LEM (Law, Economics and Management) and OSSAH (Other Social Sciences, Arts and Humanities, including languages). Of course, there is much diversity within these categories, but a more fine-grained breakdown would lead to small cell sizes.

We exploit data from all of the childhood waves of BCS70, and therefore the problem of missing data must be addressed (Mostafa & Wiggins, 2015). List-wise deletion is not a practical or desirable option, so we use multiple imputation to 'fill in' values

of any missing items in the variables selected for our analysis, adopting Schafer's (1997) data augmentation approach under the assumption of 'missing at random' (MAR). In order to strengthen the MAR assumption and to protect against departures from multivariate normality, we also included a set of auxiliary variables in our imputation model. Our analytical sample includes all cohort members resident in England and Wales in 1986 with a full set of birth characteristics, who participated in the age 42 survey and had information on school type and on our dependent variable of earnings at 42. 9,841 cohort members were interviewed at age 42, 813 of which were excluded because they attended secondary school in Scotland, which has different qualifications from England and Wales. Of this sample, 7,645 were in paid employment, and 7,087 provided information on their pay. The sample was further reduced to 6,136 by the exclusion of cohort members who were not present in the original birth survey. Missing values for variables other than the birth characteristics and outcome are imputed. All reported analyses are averaged across 20 replicates based upon Rubin's rule for the efficiency of estimation under a reported degree of missingness across the whole data of around 0.20 (Little & Rubin, 2002).

Analysis

We begin with a descriptive analysis of the characteristics of those with degrees from each subject group at elite and non-elite universities. Next, we describe the sample in terms of how likely individuals with different characteristics were to be in the top 5% of earnings at age 42. This is followed by a logistic regression analysis assessing the advantage gained via the different categories of university degree once prior characteristics are controlled. Logistic regression is an appropriate tool for the analysis of binary outcomes (Agresti, 1996). However, logistic regression and the use of odds ratios have been criticised, including in an influential paper by Mood (2010), on the grounds that odds ratios are non-collapsible (i.e. adjusting for a covariate that is not a confounder can alter the magnitude of the estimate) (Hernán *et al.*, 2011). Mood's argument has in turn been criticised by Buis (2017) and Kuha and Mills (2017), who point out that Mood's thesis rests on an interpretation of the dependent variable as a manifestation of an unobserved latent propensity, whereas in fact this would not typically be a natural interpretation of the binary outcome variable in most social-scientific analyses. In parallel discussion in the epidemiological literature, it is pointed out that, while odds ratios have the potential to mislead under certain circumstances, they approximate well to the relative risk ratio (which is collapsible) when the initial risk is rare (≤10%) (Davies *et al.*, 1998; Shrier & Pang, 2015).

We define high earners as the top 5%. Any cut-off is bound to be somewhat arbitrary, and of course the disparity between the bottom and top of the top 5% is very large, but a more selective cut-off (say the top 1%) would not have been practicable given our sample size. We have checked the robustness of our results against a 10% and a 15% cut-off, and found a broadly similar pattern of results.

Table 1. Characteristics of non-graduates and university graduates according to institution status and field of study

	No degree	OSSAH non-elite	OSSAH elite	STEM non-elite	STEM elite	LEM non-elite	LEM elite
Overall percentage	75.6	8.7	3.6	4.8	2.7	3.7	1.0
Male	76.2	6.5	3.1	6.4	3.1	3.7	1.0
Female	75.1	10.9	4.1	3.2	2.2	3.6	0.9
Parents' qualifications (age 5)							
No qualifications	89.1	4.7	0.9	2.8	0.6	1.5	0.3
Vocational	83.1	5.8	2.6	3.6	1.5	3.1	0.3
O Levels	75.6	8.7	3.5	4.8	2.2	4.4	0.8
A Levels	69.2	10.7	4.7	6.8	3.6	4.0	0.9
Degree or higher	46.9	17.4	9.1	8.7	7.8	7.0	3.1
Social class (birth)							
IV/V	85.1	5.1	1.6	4.2	0.8	2.9	0.2
IIIm	85.7	5.7	1.7	3.5	0.9	2.3	0.2
IIInm	76.3	8.3	3.3	4.8	2.9	3.5	0.9
II or I	56.7	14.9	7.4	6.8	5.8	6.0	2.4
Family income (age 10)							
<£99	83.3	7.0	1.7	3.7	1.1	2.8	0.4
£100–£149	79.0	8.7	2.5	4.1	2.3	2.8	0.7
£150–£199	70.1	9.3	4.8	7.0	3.1	4.6	1.2
£200+	56.1	11.9	9.4	6.3	6.8	6.7	2.8
Cognitive score (age 5) (range: −3.94 to 5.02)							
Lowest quartile	89.2	4.1	1.5	2.3	0.6	2.1	0.3
2nd quartile	81.4	6.6	6.6	4.0	1.7	3.1	0.6
3rd quartile	73.8	9.9	9.9	4.9	2.9	3.8	1.3
Highest quartile	58.5	13.9	13.9	8.1	5.5	5.5	1.6
Cognitive score (age 10) (range: −4.11 to 3.25)							
Lowest quartile	94.1	3.0	0.5	1.3	0.3	0.7	0.1
2nd quartile	86.5	5.6	1.6	2.9	0.6	2.4	0.4
3rd quartile	74.3	9.8	3.1	5.5	2.0	3.9	1.4
Highest quartile	48.4	16.0	9.0	9.4	7.6	7.5	2.0
Secondary school type							
Comprehensive	78.5	8.5	2.6	4.7	2.2	2.8	0.7
Secondary modern	86.9	5.3	0.9	2.0	0.7	3.1	0.9
Grammar	57.4	12.2	7.0	9.6	4.4	7.4	1.9
Private (all schools)	34.0	13.5	18.1	6.7	11.3	12.7	3.8
Private (non-Tatler)	36.3	13.1	16.6	7.2	10.4	12.5	3.8
Private (Tatler)	25.6	14.6	23.2	4.9	14.6	13.4	3.7
Cognitive score (age 16) (range: −5.00 to 2.45)							
Lowest quartile	93.4	3.0	0.8	1.3	0.3	0.9	0.2
2nd quartile	86.7	5.9	1.7	2.6	0.8	1.9	0.4
3rd quartile	74.8	9.6	3.3	5.2	2.3	3.9	1.0
Highest quartile	48.5	15.8	8.5	9.9	7.3	7.8	2.2
Public examination score (age 16) (range: −1.24 to 4.61)							
Lowest quartile	89.3	4.2	1.1	2.2	0.8	2.0	0.5

Table 1. (Continued)

	No degree	OSSAH non-elite	OSSAH elite	STEM non-elite	STEM elite	LEM non-elite	LEM elite
2nd quartile	86.9	5.2	1.4	2.9	1.2	1.9	0.5
3rd quartile	81.1	8.1	2.1	4.4	1.2	2.6	0.6
Highest quartile	48.0	16.3	9.2	9.3	7.2	7.8	2.2
English O Level/CSE (age 16)							
No	90.6	3.7	0.9	2.4	0.7	1.4	0.3
Grade A–C	56.6	14.9	6.9	7.9	5.2	6.6	1.9
Maths O Level/CSE (age 16)							
No	89.1	5.1	1.2	2.1	0.7	1.6	0.3
Grade A–C	52.9	14.7	7.7	9.4	6.1	7.1	2.1
A Levels (by age 20)							
None	86.8	5.2	1.4	3.3	1.0	1.9	0.5
D–E Grade	45.8	21.1	4.8	16.7	1.8	8.4	1.3
1–2 A–C Grade	33.3	29.8	7.8	10.1	10.1	12.6	0.8
3+ A–C Grade	9.5	17.7	24.1	10.5	10.5	11.2	6.7

What were the social and educational characteristics of graduates of each type of degree?

It is important to understand the nature and level of social and academic selectivity into the different categories of university degree, as accounting for this selectivity is a major issue in the field of returns to higher education. Table 1 shows the proportions of individuals within each category who had no degree qualification vs degrees in the three subject groupings, STEM, LEM and OSSAH, divided in each case into elite and non-elite institutions. The table presents information according to all the characteristics that will be included in our logistic regression analysis. In the text below, we highlight differences according to some key characteristics.

Roughly three-quarters of both men and women in this generation did not gain a university degree by age 42. An OSSAH degree from a non-elite university was the most common degree for both sexes, but was more popular for women (11%) than for men (7%). There was a smaller gap in favour of women for elite OSSAH degrees (4% vs 3%). Men were twice as likely to gain non-elite STEM degrees than women (6% vs 3%), with a smaller gap for elite STEM degrees (3% vs 2%). In other words, the gender differential in STEM was more severe at the non-elite institutions. There was no substantial gender difference in the take-up of LEM degrees from elite and non-elite universities.

Those who were relatively disadvantaged in terms of their childhood social origins, measured in terms of parental qualifications, social class and childhood household income, were relatively unlikely to gain a degree of any kind. For example, 89% of individuals whose parents had no qualifications did not gain a degree. Perhaps more surprisingly, although those whose parents had a degree were relatively likely to become graduates, nearly half (47%) of those who had at least one graduate parent failed to gain a degree themselves. For those who did gain degrees, the type of institution attended also varied widely according to social origins. For example, the offspring of graduates were 13 times more likely than the children of parents with no

qualifications to gain a STEM degree from an elite institution (7.8% vs 0.6%), but only three times more likely to gain a STEM degree from a non-elite institution (9% vs 3%).

Childhood cognitive scores at the ages of 5, 10 and 16 were linked to the chances of getting a degree, but not as decisively as one might assume. Those who scored in the lowest quartile of the cognitive distribution at age 5 were certainly unlikely to make it to university and gain a degree, although 11% managed to do so. However, it was also only a minority (41%) of those who scored in the top quartile who gained a degree. By age 10, the individual's cognitive score has become a better predictor of going on to gain a degree. Only 6% of those in the bottom cognitive quartile at age 10 gained a degree, compared with a bare majority (52%) of those in the top quartile. So, while approximately a quarter of this generation gained a university degree, the overlap between this group and the top quarter in terms of cognitive test scores was not as great as one might expect. Like the population as a whole, those in the top quartile of cognition at age 10 who got degrees were most likely to have non-elite OSSAH degrees (16%). However, the biggest differentials according to cognition were seen in the degrees from elite institutions. For example, an individual in the top cognitive quartile at age 10 had 25 times the probability of having an elite STEM degree by 42 compared with someone in the bottom cognitive quartile (8% vs 0.3%). This compares to seven times the chance for non-elite STEM. On this basis, non-elite OSSAH was the least academically select degree, as those in the top quartile were only five times more likely than those in the bottom quartile to gain this degree.

People who had been to private schools were far more likely than those from comprehensives to get a degree (66% vs 21%). There were also striking differences in the likelihood of getting a degree from an elite institution. In the fields of OSSAH and STEM, people who went to private schools were actually more likely to gain degrees from elite universities than from non-elite institutions. This is in contrast to the pattern for all other schools, including grammar schools.

School-level qualifications were of course an important indicator of the chances of gaining a degree. For example, a minority of this cohort stayed on at school post-16 and took 'A levels', the main university-track qualification in England and Wales. The high-achieving group who gained three or more A levels at A–C grade (only 7% of the sample achieved this) were highly likely to gain a degree (90%). They were most likely to gain an elite OSSAH degree (24%) followed by a non-elite OSSAH degree (18%). Those who gained STEM degrees were equally likely to attend elite or non-elite universities (11% in each case), while those who studied LEM were more likely to gain their degree from a non-elite (11%) than an elite (7%) institution.

Who was in the top 5% of earners at age 42?

Table 2 shows the profile of the sample overall, the composition of the top 5% group and the proportion of each category in the top 5% of earners at age 42. The column percentages (which sum to 100%) tell us what proportion of top earners had a given characteristic (e.g. 24% of top earners were women), while the row percentages tell us what proportion of people in a given category became top earners (e.g. 3% of women were top earners). By examining both the row and column percentages, we

Table 2. Sample description and characteristics of top 5% of earners

	Sample characteristics (%)	*Original N*	*Missing (%)*	Column %: characteristics of those in top 5%	Row %: chance of being in top 5%
		6,136	***0***		**5.0**
Degree status		*6,136*	*0*		
No degree	75.6			33.7	2.3
OSSAH, ordinary university	8.7			8.9	5.2
OSSAH, elite university	3.6			12.1	17.4
STEM, ordinary university	4.8			13.0	13.8
STEM, elite university	2.7			11.7	22.2
LEM, ordinary university	3.7			14.6	20.5
LEM, elite university	1.0			6.0	31.7
Male	50.6	*3,108*		76.2	7.7
Female	49.4	*3,028*		23.8	2.5
Parents' qualifications (age 5)		*5,426*	*11.6*		
No qualifications	32.6			11.4	1.2
Vocational	15.8			10.1	3.3
O Levels	23.7			24.7	5.4
A Levels	11.0			13.1	6.1
Degree or higher	16.9			40.7	12.3
Social class (birth)		*6,136*	*0*		
IV/V	14.8			9.8	2.2
IIIm	29.9			20.6	2.5
IIInm	30.9			32.2	5.5
II or I	24.5			37.3	9.6
Income (age 10)		*5,127*	*16.4*		
<£99	31.8			17.5	11.1
£100–£149	35.8			22.9	13.7
£150–£199	19.1			25.2	17.9
£200+	13.3			34.3	20.2
Cognitive score (age 5) (range: −3.94 to 5.02)		*4,870*	*20.6*		
Lowest quartile	24.6			10.2	2.1
2nd quartile	25.0			21.5	4.4
3rd quartile	25.2			26.0	5.3
Highest quartile	25.2			42.3	8.6
Cognitive score (age 10) (range: −4.11 to 3.25)		*4,882*	*20.4*		
Lowest quartile	24.4			5.6	1.2
2nd quartile	25.0			13.4	2.8
3rd quartile	25.2			25.9	5.3
Highest quartile	25.4			55.2	11.1
Secondary school type		*6,136*	*0*		
Comprehensive	81.0			61.9	3.9
Secondary modern	8.7			2.9	1.7
Grammar	4.3			9.5	11.4
Private (all schools)	6.0			25.7	22.3
Private (non-Tatler)	4.7			16.2	18.1
Private (Tatler)	1.3			9.5	37.0

Table 2. (Continued)

	Sample characteristics (%)	*Original N*	*Missing (%)*	Column %: characteristics of those in top 5%	Row %: chance of being in top 5%
Cognitive score (age 16) (range: −5.00 to 2.45)		*1,304*	*78.7*		
Lowest quartile	24.5			6.6	1.4
2nd quartile	24.8			14.7	3.0
3rd quartile	25.2			24.8	5.1
Highest quartile	25.5			53.9	10.8
Public examination score (age 16) (range: −1.24 to 4.61)		*2,699*	*56.0*		
Lowest quartile	23.8			12.3	2.6
2nd quartile	23.4			13.4	2.9
3rd quartile	26.2			17.3	3.4
Highest quartile	26.6			57.0	11.0
English O Level/CSE (16)		*5,789*	*5.7*		
No	55.9			22.9	2.1
Grade A–C	44.1			77.1	9.0
Maths O Level/CSE (16)		*5,790*	*5.7*		
No	62.8			24.7	2.0
Grade A–C	37.2			75.2	10.4
A Levels (by age 20)		*6,136*	*0*		
% none	81.3			48.9	3.1
D–E Grade	3.7			3.8	5.3
1–2 A–C Grade	8.3			16.5	10.2
3+ A–C Grade	6.7			30.8	23.4

assess both the characteristics of the top 5% and the chances of entering the top 5% for each group.

Those without a degree were least likely to be in the top 5% of earners (2%), followed by those with OSSAH degrees from non-elite universities (5%) and STEM degrees from non-elite universities (14%), then OSSAH degrees from elite universities (17%). The degrees most commonly held by top earners were elite LEM (32%), elite STEM (22%) and non-elite LEM (21%). These represent very substantial differences. Nevertheless, the top 5% could not be said to be dominated by graduates from any particular field of study or type of institution. Looking at the column percentages, we see that around a third (34%) of the top 5% of earners were non-graduates, and no one category of degree accounted for more than 15% of top earners.

Our sample is 51% male and 49% female. 8% of men and 3% of women were in the top 5% of earners at age 42. This means that over three-quarters (76%) of the top earners were men.

There is also a clear gradient according to socio-economic background. For example, 12% of people with graduate parents became top earners, compared with 1% of

individuals whose parents had no qualifications. The column percentage shows that 41% of top earners came from graduate households.

There is also a clear, but not decisive, link between childhood cognitive scores and top earnings in mid-life. A slight majority (55%) of top earners were in the top cognitive quartile at age 10, although only 11% of those in the top cognitive quartile became top earners.

Over a quarter (26%) of people who attended private secondary schools went on to achieve top earnings. Although only 6% of the sample attended private schools, they constitute over a fifth (22%) of the top earnings group.

School-level attainment also matters, but again is not a decisive determinant of pay. For example, 23% of those with three A–C grades at A level entered the top 5% of earners, meaning that this group represented nearly a third (31%) of top earners. However, nearly half (49%) of top earners had no A levels.

How far are degree type differentials accounted for by prior factors?

Table 3 presents a logistic regression analysis showing the predictors of being in the top 5% of earners at age 42. Model 1 shows degree type with no controls. Model 2 accounts for childhood socio-economic origins, cognitive scores, type of secondary school attended and school-level qualifications.

The odds ratios shown in Model 1 reflect the large raw differences shown in Table 2. Those with non-elite OSSAH degrees had 2.4 times the odds of being in the top 5% of earners, and the differentials for all other degrees were even greater: for elite OSSAH, OR=9.0; non-elite STEM, OR=6.8; elite STEM, OR=12.2; non-elite LEM, OR=11.0; and elite LEM, OR=19.8.

Controlling for prior factors, we see a clear hierarchy of university degrees, but the differentials are substantially attenuated compared with those shown in Model 1. At the bottom of this hierarchy are non-elite OSSAH degrees. People with non-elite OSSAH degrees had 1.3 times the odds of being a top earner compared with non-graduates, but the difference was not statistically significant. Therefore, it appears that the apparent salary differential between non-elite OSSAH graduates and non-graduates that we observed in the raw data and in Model 1 is accounted for by prior socio-economic and educational factors.

LEM is at the top of the degree hierarchy. Graduates with LEM degrees from elite universities had 6.5 times the odds of being top earners compared with non-graduates. Those with LEM degrees from other universities had 4.5 times the odds of being top earners compared with non-graduates, which is a larger advantage than that associated with STEM and OSSAH degrees from elite universities. The LEM advantage is statistically significant in comparison with non-elite OSSAH degrees, but not compared with other degrees.

In the middle of the hierarchy of degrees, we have OSSAH degrees from elite universities and STEM degrees from both elite and non-elite universities. The odds ratios associated with these degrees are similar, ranging from 2.6 to 2.9. The difference between these degrees and non-elite OSSAH is not statistically significant. The lack of any substantial difference in the chances of being a top earner for STEM graduates from elite compared with non-elite universities, once prior factors have been

Table 3. Top 5% of earners: binary logistic regression

	Model 1		Model 2	
	Exp B	95% CI	Exp B	95% CI
Degree (ref. cat.: No degree)				
OSSAH, non-elite	2.35***	0.87–2.63	1.30	0.80–2.09
OSSAH, elite	9.02***	1.15–3.93	2.61***	1.57–4.32
STEM, non-elite	6.81***	1.65–4.31	2.83***	1.83–4.38
STEM, elite	12.16***	8.04–18.37	2.92***	1.73–4.90
LEM, non-elite	11.04***	2.99–8.54	4.51***	2.86–7.10
LEM, elite	19.79***	2.10–11.72	6.47***	3.27–12.82
School type (ref. cat.: Comprehensive)				
Secondary modern			0.58	0.29–1.17
Grammar			1.41	0.89–2.22
Private, other			1.73**	1.16–2.59
Private, Tatler			2.82***	1.60–4.96
Sex (F)			0.27***	0.20–0.36
Parents' qualifications (ref. cat.: No qualifications)				
Vocational			1.25	0.73–2.15
O Levels			1.43	0.89–2.28
A Levels			1.29	0.76–2.22
Degree or higher			1.45	0.87–2.40
Social class (ref. cat.: RGSC IV/V)				
III manual			1.10	0.63–1.92
III non-manual			1.52	0.90–2.59
II or I			1.29	0.74–2.25
Family income			1.19**	1.05–1.34
Cognitive score				
Age 5			1.00	0.79–1.25
Age 10			1.05	0.80–1.36
Age 16			1.14	0.83–1.56
Exam performance age 16				
Exam score			1.12	0.96–1.32
English grade A–C			1.30	0.87–1.96
Maths grade A–C			1.37	0.93–2.04
A Levels (age 18) (ref. cat.: None)				
D–E grades			0.59	0.30–1.12
1–2 A–C grades			1.17	0.79–1.74
3+ A–C grades			1.61*	1.09–2.38
R^2			0.23	
N			6136	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

taken into account, is striking, and contrasts with the large and significant raw differential shown in Model 1.

Other significant predictors of being a top earner in mid-life include having attended a private secondary school. Those who attended prestigious Tatler private schools had 2.8 times the odds, and graduates of other private schools 1.7 times the odds, of being a top earner, compared with people who had attended comprehensive

schools. This is over and above the advantage that private school pupils had in university access (Sullivan *et al.*, 2014).

Cognitive scores and school-level examination performance were generally not independently significant in this model, as their influence is largely mediated via degree status. The exception is A-level performance, where top grades are associated with 1.6 times the odds of being a top earner.

Women were much less likely than men to be top earners—women's chances were roughly a third those of equally qualified men. We tested whether the raw differential between the sexes in the chances of becoming a top earner was mediated by educational attainment including degree type, and found that it was not. We investigate the sex difference further in Table 4.

While much of the influence of family background operates via education, those from families with higher incomes were significantly more likely to be top earners, taking all other factors into account.

Our model includes rich measures of childhood circumstances, cognitive development, educational attainment at school and higher education. Nevertheless, the model explains only 23% of the variance in individuals' chances of joining the top 5% of earners, leaving over three-quarters of the variance unexplained. Elsewhere, we have investigated the roles of social networks and psychological factors such as aspirations (Green *et al.*, 2017), and found that psychological factors do have some influence on earnings, but do not greatly reduce the unexplained variance. This is a salutary reminder that status attainment is not a deterministic process (Payne, 2012) and unmeasured factors, no doubt including luck, may play as great a role as those which are given pride of place in social-scientific models (Jencks, 1979).

To investigate whether there were differential effects of degree type for men and women, we ran our analyses for each sex separately. The results for degree type in Model 2 are shown in Table 4. These results suggest some possible differences, including a much larger odds ratio attached to elite LEM for women than for men. However, the confidence intervals are wide, and overlapping for the sexes. In supplementary analyses, we tested formally whether there was an interaction between sex

Table 4. Model 2 degree results for men and women separately

	Men		Women	
	Exp B	95% CI	Exp B	95% CI
Degree (ref. cat.: No degree)				
OSSAH, non-elite	1.49	0.85–2.61	1.00	0.38–2.61
OSSAH, elite	2.04*	1.08–3.85	3.72**	1.53–9.05
STEM, non-elite	2.62***	1.60–4.28	4.05**	1.53–10.72
STEM, elite	2.67**	1.45–4.90	3.67*	1.30–10.38
LEM, non-elite	5.06***	2.95–8.66	3.78**	1.51–9.45
LEM, elite	4.72***	1.97–11.32	11.18***	3.68–33.93
R^2	0.22		0.20	
N	3108		3028	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

and degree type, but found no statistically significant evidence of differential effects for men and women, implying that we cannot say there is a different hierarchy of degrees for women and men. Thus, we can offer no firm support for the hypothesis that degree discipline matters more for women, although our results suggest that this hypothesis warrants further investigation using other data sources.

Conclusions

Our findings reveal a hierarchy of university degrees in terms of the chances of joining the top 5% of earners, once prior socio-economic and educational factors have been taken into account. OSSAH degrees from non-elite universities are at the bottom of this hierarchy, while LEM degrees are at the top. A limitation of our study is that the sample size compels us to group degree subjects into broad categories (this is also true for most prior work in this field). An important strength of the study is that we are able to control for the pre-university characteristics of our sample in a more refined way than is typically possible in research on higher education. The raw differentials between degree types are severely attenuated by our rich controls, which shows that estimates of returns to higher education may easily be exaggerated.

The rich set of controls that we are able to draw on gives us some confidence that the differences in chances of achieving a top salary associated with the different categories of undergraduate degree are not simply due to differences in academic and social selectivity into the degrees. Nevertheless, our findings should not be interpreted as causal in the naïve sense that the increased odds of becoming a top earner associated with each type of degree are necessarily directly bestowed by taking that degree. It is likely that unmeasured factors play a role, for example, individuals who opt to take LEM degrees may be more materialistic and driven to pursue high salaries, as opposed to other life goals. This would play a role in their choice of LEM, and it is impossible to unpick the extent to which they may therefore have been more likely to become high earners even if they had taken a different degree.

Our descriptive findings show a strong degree of differential social and academic selectivity between university degrees according to whether the university attended was elite or non-elite. The level of differential social and academic selectivity was stronger between types of institution than between fields of study. Our findings can be seen as complicating the theory of EMI, referred to earlier, in that the most selective degrees are not necessarily those that are most likely to lead to elite positions. For example, LEM degrees from non-elite universities were less academically and socially selective than OSSAH degrees from elite universities, yet non-elite LEM degrees are associated with a stronger chance of gaining a top salary.

One of the advantages of our study is that we are able to examine incomes in mid-life. Nevertheless, from a policy perspective, it is natural to ask what the implications are for young people entering higher education today, and a limitation of the current study is that it cannot address this question directly. The higher education system in England and Wales has expanded substantially since the late 1980s, when the 1970 cohort were of an age to start university. Tuition fees have been introduced and maintenance grants abolished. Current graduates face greater competition than those of the 1970 generation, and will face debts when they leave university. Nevertheless,

evidence suggests that returns to a degree overall have not declined, and returns to first class degrees have increased (Naylor *et al.*, 2015). If the theory of EMI is correct, then we would also expect differentiation between institutions and fields of study to have increased in importance due to increased participation in higher education, so that the differentiation in the chance of gaining a top salary according to the type of course is likely to be greater for undergraduates starting university today than it was for the 1970 cohort.

While education in general, and degree type in particular, are important factors in determining who gains top salaries, our analysis shows that other factors also matter. We found that individuals who grew up in high-income families had a greater chance of making it into the top 5% than those from lower-income families, taking into account all other factors. In contrast to our previous findings regarding social class (Sullivan *et al.*, 2017), this suggests a direct path from family income to individual income, not mediated by education. Similarly, even at the same level of educational attainment, individuals who had attended private secondary schools were advantaged. Women had roughly half the chance of being top earners compared with men, and this was in no way mediated by their educational attainment, including the field of study and institutional prestige of their degrees.

Do our findings have implications for those who wish to use the higher education system to promote social mobility and wider access to elite occupations and incomes? Much attention has been given to promoting access to elite universities for young people from state schools and lower socio-economic groups. Our findings suggest that promoting access to the most lucrative fields of study may have more potential to widen access to the economic elite than the current focus on the status of the university.

A meritocratic view of the high-earning elite perceives them as the 'best and brightest', while the perspective of sociologists has often been a deterministic view that access to the elite is sewn up at birth (Payne, 2012, 2017). Our findings do not support either of these perspectives. Childhood cognitive scores matter as predictors of later educational attainment, but cannot be seen as decisive determinants of later income. Coming from a privileged background and going to a private school are advantages to be sure, and so is getting the right degree. Nevertheless, there is no uniformity in the characteristics of the highest-earning 5%.

Finally, we would not wish our findings to suggest that degrees in the arts, humanities and 'other' (non-economics) social sciences are not worthwhile. Individuals can prioritise values other than material gain, such as creativity and service to society, and, it should go without saying, the value of a graduate's education to society is not necessarily reflected in their income. Furthermore, graduates in the arts, humanities and social sciences from elite universities tend to be high in cultural capital, which figures in elite membership (Savage, 2015), and this may translate into attractive and even powerful positions, albeit not necessarily the most lucrative.

Acknowledgements

Our thanks are due to the BCS70 cohort members for their contribution over many years. This work was funded by an ESRC project on 'Schooling and unequal

outcomes in youth and adulthood'. BCS70 data is documented at the Centre for Longitudinal Studies (http://www.cls.ioe.ac.uk/BCS70) and can be accessed at the UK Data Service (https://www.ukdataservice.ac.uk).

NOTES

[1] Tatler Schools Guide 2014 (http://www.tatler.com/guides/schools-guide/2014)
[2] The Russell Group was established in 1994. Its current members are the universities of: Birmingham, Bristol, Cambridge, Cardiff, Durham, Edinburgh, Exeter, Glasgow, Imperial College London, King's College London, Leeds, Liverpool, LSE, Manchester, Newcastle, Nottingham, Oxford, Queen Mary University of London, Queen's Belfast, Sheffield, Southampton, University College London, Warwick, York.
[3] We also consulted data on university points entry from 1989–90 and 2011, and included two additional universities that have consistently featured in the top 30 most selective institutions: University of Bath and St Andrews.

References

Agresti, A. (1996) *An introduction to categorical data analysis* (New York, Wiley).
Anders, J. (2012) The link between household income, university applications and university attendance, *Fiscal Studies*, 33(2), 185–210.
Blanden, J. & Machin, S. (2004) Educational inequality and the expansion of UK higher education, *Scottish Journal of Political Economy*, 51(2), 230–249.
Blundell, R., Dearden, L., Goodman, A. & Reed, H. (2000) The returns to higher education in Britain: Evidence from a British cohort, *The Economic Journal*, 110(461), 82–99.
Boliver, V. (2011) Expansion, differentiation, and the persistence of social class inequalities in British higher education, *Higher Education*, 61(3), 229–242.
Boliver, V. (2013) How fair is access to more prestigious UK universities?, *British Journal of Sociology*, 64(2), 344–364.
Boliver, V. (2015) Are there distinctive clusters of higher and lower status universities in the UK?, *Oxford Review of Education*, 41(5), 608–627.
Brewer, D. J., Eide, E. R. & Ehrenberg, R. G. (1999) Does it pay to attend an elite private college? Cross-cohort evidence on the effects of college type on earnings, *Journal of Human Resources*, 34(1), 104–123.
Britton, J., Dearden, L., Shephard, N. & Vignoles, A. (2016) *How English domiciled graduate earnings vary with gender, institution attended, subject and socio-economic background*. Available online at: http://www.nuffieldfoundation.org/sites/default/files/files/wp1606.pdf (20 April 2016).
Buis, M. L. (2017) *Logistic regression: When can we do what we think we can do*. Unpublished note 2.
Chevalier, A. & Conlon, G. (2003) *Does it pay to attend a prestigious university?* (London, LSE).
Crawford, C., Gregg, P., Macmillan, L., Vignoles, A. & Wyness, G. (2016) Higher education, career opportunities, and intergenerational inequality, *Oxford Review of Economic Policy*, 32(4), 553–575.
Croxford, L. & Raffe, D. (2015) The iron law of hierarchy? Institutional differentiation in UK higher education, *Studies in Higher Education*, 40(9), 1625–1640.
Davies, H. T. O., Crombie, I. K. & Tavakoli, M. (1998) When can odds ratios mislead?, *British Medical Journal*, 316(7136), 989–991.
Davies, S. & Guppy, N. (1997) Fields of study, college selectivity, and student inequalities in higher education, *Social Forces*, 75(4), 1417–1438.
Dilnot, C. (2016) How does the choice of A-level subjects vary with students' socio-economic status in English state schools?, *British Educational Research Journal*, 42(6), 1081–1106.
Elliott, J. & Shepherd, P. (2006) Cohort profile: 1970 British birth cohort (BCS70), *International Journal of Epidemiology*, 35(4), 836–843.

Feeney, S., Hogan, J. & O'Rourke, B. K. (2017) Elite formation in the higher education systems of Ireland and the UK: Measuring, comparing and decomposing longitudinal patterns of cabinet members, *British Educational Research Journal*, 43(4), 720–742.

García-Aracil, A. (2007) Gender earnings gap among young European higher education graduates, *Higher Education*, 53(4), 431–455.

Gerber, T. P. & Cheung, S. Y. (2008) Horizontal stratification in postsecondary education: Forms, explanations, and implications, *Annual Review of Sociology*, 34, 299–318.

Green, F., Parsons, S., Sullivan, A. & Wiggins, R. (2017) Dreaming big? Self-evaluations, aspirations, high-valued social networks, and the private-school earnings premium, *Cambridge Journal of Economics*, 42(3), 757–778.

Grodsky, E. (2007) Compensatory sponsorship in higher education, *American Journal of Sociology*, 112(6), 1662–1712.

Grodsky, E. & Jackson, E. (2009) Social stratification in higher education, *Teachers College Record*, 111(10), 2347–2384.

Hemsley-Brown, J. (2015) Getting into a Russell Group university: High scores and private schooling, *British Educational Research Journal*, 41(3), 398–422.

Hernán, M. A., Clayton, D. & Keiding, N. (2011) The Simpson's paradox unraveled, *International Journal of Epidemiology*, 40(3), 780–785.

Hu, A. & Vargas, N. (2015) Economic consequences of horizontal stratification in postsecondary education: Evidence from urban China, *Higher Education*, 70(3), 337–758.

Jackson, M., Luijjkx, R., Pollak, R., Vallet, L.-A. & Van de Werfhorst, H. (2008) Educational fields of study and the intergenerational mobility process in comparative perspective, *International Journal of Comparative Sociology*, 49(4&5), 369–388.

Jencks, C. (1979) *Who gets ahead?: The determinants of economic success in America* (New York, Basic Books).

Jenkins, S. (2015) *The income distribution in the UK: A picture of advantage and disadvantage* (Colchester, University of Essex).

Joshi, H., Makepeace, G. & Dolton, P. (2007) More or less unequal? Evidence on the pay of men and women from the British Birth Cohort Studies, *Gender, Work and Organization*, 14(1), 37–51.

Kim, C.-H., Tamborini, T. R. & Sakamoto, A. (2015) Field of study in college and lifetime earnings in the United States, *Sociology of Education*, 88(4), 320–339.

Kuha, J. & Mills, C. (2017) On group comparisons with logistic regression models, *Sociological Methods & Research*, https://doi.org/10.1177/0049124117747306.

Little, R. J. A. & Rubin, D. B. (2002) *Statistical analysis with missing data* (Chichester, Wiley).

Lucas, S. R. (2001) Effectively maintained inequality: Education, transitions, track mobility, and social background effects, *American Journal of Sociology*, 106, 1642–1690.

Ma, Y. & Savas, G. (2014) Which is more consequential: Fields of study or institutional selectivity?, *The Review of Higher Education*, 37(2), 221–247.

Machin, S. & Puhani, P. (2006) *The contribution of degree subject to the gender wage gap for graduates: A comparison of Britain, France and Germany* IZA discussion paper.

Machin, S., Puhani, S. & Puhani, P. (2003) Subject of degree and the gender wage differential: Evidence from the UK and Germany, *Economics Letters*, 79, 393–400.

Macmillan, L., Tyler, C. & Vignoles, A. (2015) Who gets the top jobs? The role of family background and networks in recent graduates' access to high-status professions, *Journal of Social Policy*, 44(03), 487–515.

Marginson, S. (2016) The worldwide trend to high participation higher education: Dynamics of social stratification in inclusive systems, *Higher Education*, 72(4), 413–434.

Mood, C. (2010) Logistic regression: Why we cannot do what we think we can do, and what we can do about it, *European Sociological Review*, 26(1), 67–82.

Mostafa, T. & Wiggins, R. D. (2015) The impact of attrition and non-response in birth cohort studies: A need to incorporate missingness strategies, *Longitudinal and Life Course Studies*, 6(2), 131–146.

Naylor, R., Smith, J. & Telhaj, S. (2015) Graduate returns, degree class premia and higher education expansion in the UK, *Oxford Economic Papers*, gpv070.

O'Leary, N. C. & Sloane, P. J. (2005) The return to a university education in Great Britain, *National Institute Economic Review*, 193(1), 75–89.

Ogg, T., Zimdars, A. & Heath, A. (2009) Schooling effects on degree performance: A comparison of the predictive validity of aptitude testing and secondary school grades at Oxford University, *British Educational Research Journal*, 35(5), 781–807.

Parsons, S. (2014) *Childhood cognition in the 1970 British Cohort Study*. CLS data note.

Patrignani, P. & Conlon, G. (2011) *The long term effect of vocational qualifications on labour market outcomes*. BIS research paper no. 45.

Payne, G. (2012) A new social mobility? The political redefinition of a sociological problem, *, Contemporary Social Science*, 7(1), 55–71.

Payne, G. (2017) *The new social mobility: How the politicians got it wrong* (Bristol, Policy Press).

Raftery, A. E. & Hout, M. (1993) Maximally maintained inequality – expansion, reform, and opportunity in Irish education, 1921–75, *Sociology of Education*, 66(1), 41–62.

Riegle-Crumb, C., King, B., Grodsky, E. & Muller, C. (2012) The more things change, the more they stay the same? Prior achievement fails to explain gender inequality in entry into STEM college majors over time, *American Educational Research Journal*, 49(6), 1048–1073.

Roksa, J. & Levey, T. (2010) What can you do with that degree?: College major and occupational status of college graduates over time, *Social Forces*, 89(2), 389–415.

Savage, M. (2015) *Social class in the 21st century* (Harmondsworth, Penguin).

Schafer, J. L. (1997) *Analysis of incomplete multivariate data* (London, Chapman & Hall).

Shrier, I. & Pang, M. (2015) Confounding, effect modification, and the odds ratio: Common misinterpretations, *Journal of Clinical Epidemiology*, 68(4), 470–474.

Sullivan, A. & Brown, M. (2015) Vocabulary from adolescence to middle age, *Longitudinal and Life Course Studies*, 6(2), 173–189.

Sullivan, A., Parsons, S., Wiggins, R. D., Heath, A. F. & Green, F. (2014) Social origins, school type and higher education destinations, *Oxford Review of Education*, 40(6), 739–763.

Sullivan, A., Parsons, S., Green, F., Wiggins, R. D. & Ploubidis, G. (2017) The path from social origins to top jobs: Social reproduction via education, *The British Journal of Sociology*, https://doi.org/10.1111/1468-4446.12314.

Triventi, M. (2013) Stratification in higher education and its relationship with social inequality: A comparative study of 11 European countries, *European Sociological Review*, 29(3), 489–502.

Wakeling, P. & Savage, M. (2015a) Elite universities, elite schooling and reproduction in Britain, in: S. Ball, A. van Zanten & B. Darchy-Koechlin (Eds) *World yearbook of education 2015: Elites, privilege and excellence: The national and global redefinition of educational advantage* (London, Routledge), 169–184.

Wakeling, P. & Savage, M. (2015b) Entry to elite positions and the stratification of higher education in Britain, *The Sociological Review*, 63(2), 290–320.

Walker, I. & Zhu, Y. (2011) Differences by degree: Evidence of the net financial rates of return to undergraduate study for England and Wales, *Economics of Education Review*, 30(6), 1177–1186.

Walker, I. & Zhu, Y. (2013) *The impact of university degrees on the lifecycle of earnings: Some further analysis*. BIS research paper no. 112.

Walker, I. & Zhu, Y. (2017) *University selectivity and the graduate wage premium: Evidence from the UK*. IZA discussion paper.

Wolniak, G. C., Seifert, T. A., Reed, E. J. & Pascarella, E. T. (2008) College majors and social mobility, *Research in Social Stratification and Mobility*, 26(2), 123–139.