Institute of Education

'First in family': higher education choices and labour market outcomes

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Contents

1. Executive Summary

1.1 Overview

Despite the Widening Participation (WP) agenda's use of 'first in family' (FiF) status as an important indicator of disadvantage, little is known about this group and how they fare at university and in the labour market. Nor do we know much about the way this indicator relates to other measures of social disadvantage and personal characteristics. 'First in family' students are those whose parents do not have a university degree but they themselves go on to obtain a university degree: thus focusing on the inter-generational dimension (i.e. not older siblings). This project documents the characteristics of 'first in family' students in England, including prior education attainment, other measures of family background, ethnicity and non-cognitive skills. We also document how the first in family students fare while at university compared to those students whose parents already have a degree: this includes an examination of subject studied, institution type and whether they complete their degree or not. We also compare the first in family measure with other WP measures; examine how the first in family graduates fare in the labour market compared to non-first in family graduates; and consider whether the proportion of potential first in family students have changed over time.

1.2 Key Findings

University participation

- For a cohort born in 1989 who were in secondary schools in England in 2004, we find that 18% of young people are first in family graduates while 8.5% match their parents' education with a degree; 65.3% match their parents' education with no degree, and 7.9% are downwardly mobile (their parents have a degree but they do not). Thus, FiF comprise more than two-thirds of graduates (68%).
- First in family students have higher prior educational attainment than those who match the educational level of their parents with no degree.
- Conditional on early education attainment, having higher non-cognitive skills (specifically, academic self-concept and work ethic) is associated with an increase in university participation for potential first in family students.

Experience at university

- While at university, first in family students are more likely to select and be accepted on Law, Economics and Management (LEM) courses and less likely to select and be accepted on other Social Sciences, Arts and Humanities (OSSAH) courses than non-FiF students.
- Conditional on important background control variables, we see a differential effect of being FiF by ethnicity; those from Black and minority ethnic groups are more likely to outperform their parents in achieving a university degree than those who are White. We also see that prior attainment remains an important predictor of graduating from university.
- FiF students are less likely to attend (apply to and be accepted by) Russell Group universities than their peers with university-educated parents and more likely to attend 'Other' universities.
- FiF students are four percentage points more likely to drop out of university than students whose parents have a degree, conditional on their prior attainment and a range of demographic characteristics.

First in family as an indicator

- As a measure, we argue that first in family status captures additional disadvantage over and above other widening participation (WP) measures.
- We find that having non-graduate parents is an important barrier to university participation and graduation, even after controlling for other sources of disadvantage. Therefore, our research provides evidence that the first in family indicator could be key in efforts to widen

participation at universities through the use of contextualised admissions and early interventions.

<u>Labour market outcomes</u>
- In terms of labour market differences, we find that for men, being the first in family to graduate from university is not associated with lower wages compared to non-FiF graduates. Whereas FiF women earn on average 7.4% less than graduate women whose parents are also graduates, net of the effect of earlier educational attainment (ability differences) and other measures of family background.
- The female FiF-pay gap is partially explained through pre-university educational attainment and elite university attendance, working in smaller firms, working in jobs that do not require a degree and motherhood.

<u>First in family over time: comparing cohorts born in 1989, 1998 and 2000</u>
- We find that although the share of potential FiF has decreased over time, in more recent cohorts the proportion of students with higher education aspirations has increased.
- The university aspirations of potential FiF women increased more than those of potential FiF men.
- The share of potential FiF is stable across England, Wales, Scotland and Northern Ireland.

1.3 Recommendations
In light of the findings from this report, we make the following recommendations:
- Universities should target First in Family students in their recruitment and ensure that there are systems to support them whilst at university. We recommend that universities target some of their successful mentoring schemes specifically to first in family students to reduce the risk of dropout among this group.
- The evidence presented in this report suggests the need for a continued commitment for universities to use Contextual Admissions in order to make offers to students which consider socioeconomic status, individual characteristics and type of school attended. It remains all the more important that universities are able to identify students who have a high potential to succeed, irrespective of their background.
- Given that first in family status is an important indicator that could be key in efforts to widen participation at universities: we recommend that University College Admissions Service (UCAS) increase its efforts to improve measurement and validity of the first in family measure.
- We recommend that early intervention among the *potential* first in family group is important, where there should be more coordination and resource to raise attainment [and non-cognitive skills] among this group throughout schooling to ensure that students are able to pursue higher education should they choose to.
- We recommend that efforts are made by graduate employers to support the Widening Participation agenda beyond higher education. By targeting these groups in their graduate training programmes and recording first in family status data in applications through to recruitment, they can ensure a diverse workforce.

2. Introduction

2.1 Motivation

We are interested in how first in family (FiF) students navigate the higher education system and the labour market compared to their peers. A FiF student by our definition is when neither of the cohort member's biological parents (or resident step parents) had achieved a university degree (BA/BSc or higher) by the time the cohort member was aged 16/17 (i.e. before having an opportunity to apply to a university), but the cohort member themselves achieved a degree by the age of 25. This is an important topic for two main reasons. Firstly, in terms of social justice, it is important to understand the ways in which a person's origin (including parents' education and occupation) determines their destination in terms of social status. Secondly, it is a highly relevant policy issue in higher education. More specifically, the policy discussion about Widening Participation (WP) in UK Higher Education (HE) has expanded beyond traditional socioeconomic gaps to identifying 'first in the family to attend university' students as a specific form of disadvantage. Fifteen of the 24 Russell Group universities target these potential students in their WP campaigns, although until now, little was known about their characteristics (Henderson et al., 2019). This project is the first large-scale research study on FiF in the UK, and its findings should inform national and university level WP policies.

2.2 Project Aims

This project had five aims, which coincide with chapters in the present report (as well as the published working papers and academic articles).

First, to identify whether FiF young people have different experiences at university in terms of institution attended, subject studied, and probability of dropout. Despite the overall expansion in HE provision, there is evidence of horizontal stratification. Students from poorer backgrounds are less likely to access top universities and study for high-status subjects. Establishing whether the sorting of subject and institutional choice is also present by parental education will help direct policy makers to consider more support for applicants who are FiF.

Our second aim is to interrogate how the FiF measure compares to other WP indicators. That is to say whether the FiF distinction captures the same individuals who have a disability, live in poorer neighbourhoods or meet other WP characteristics used by universities, or it captures a different group of disadvantaged students. Addressing this aim would help steer policymakers to either consider the added value of the FiF measure or provide some evidence to reconsider its use.

The third project aim is to identify whether there are differences by FiF status on the graduate labour market in terms of working hours and labour market returns compared to peers whose parents had graduated. Here we are interested in whether the 'shadow' of being FiF continues into the labour market or not, even after taking into account degree subject and institution. This information would provide a deeper understanding of how processes of inequalities work in the labour market.

Fourth, we aim to document any substantive differences in non-cognitive skills such as locus of control, academic self-concept, work ethic and self-esteem of the potential FiF students. Here we compare the non-cognitive skills of those potential FiF students (students whose parents do not have a degree) with actual FiF students. If universities are to actively widen the participation of FiF students they need to draw on the wider pool of students who *could* apply to university.

Given that aims one-four are addressed using data from a cohort born in 1989/90, our fifth aim is to record whether the proportion of potential FiF students has changed among more recent cohorts (born in 1998-99 & 2000). Here we look at comparisons across time and across the home nations

within the UK to understand how the proportion and university aspiration of the potential FiF has shifted or whether they remain constant.

2.3 Previous Literature

Despite an extensive literature FiF in family students; however, there is some quantitative research from the USA and Australia, limited to participation rates and some evidence on labour market returns.

Research from the USA has shown that students born around 1985 without two college-educated parents were 5.4–11.4% less likely to earn a Bachelor's degree than those with two college-educated parents (Toutkoushian et al., 2019). Moreover, in the US, there is evidence that FiF students are less likely to earn a degree once enrolled, a difference of 7–18 percentage points compared to non-FiF students (Forrest Cataldi et al., 2018). The US evidence also suggests that FiF students tend to have lower high-school GPAs and SAT scores (Riehl, 1994), tend to go to college later (Fallon, 1997) and choose less selective institutions (MacDermott et al., 1987). The magnitude of the estimated effects in the literature reflects variation in the methods, variation in the definition of FiF, and the different cohorts in question. Specifically, Toutkoushian et al. (2019) find that using different definitions of FiF can halve or double the estimates in multinomial models, when definitions of FiF range from '*neither parent has more than high school graduation*' to '*at most one parent has a BA degree*'. A further source of heterogenous results is that the share of students whose parents have not attended college is decreasing over time, along with the expansion in HE. In the US, for example, 77% of high school students had parents who never attended college in 1980 but only 62% in 2002 (Forrest Cataldi et al., 2018). There is somewhat limited and contradictory evidence from the USA documenting the differences in how FiF fare in the labour market, including Manzoni and Streib (2019); Nunez and Cuccaro-Alamin (1998); and Thomas and Zhang (2005), which documents either small gaps or no difference.

The only study looking at FIF students in the UK, of which we are aware, examines the biographical histories of 129 'first generation' undergraduates to learn more about their experience at university (Stuart, 2006). This autobiographical method enables participants to highlight the importance of particular experiences and influences, providing subjectivity. Stuart finds that friendships were a major factor in determining their success in terms of school and at university attainment, a sense of belonging and a source of academic and emotional support.

This project aims to address these gaps and document participation rates in higher education among the FiF group as well as the educational-labour market trajectories in England.

2.4 Policy context

Widening Participation (WP) has been a focus of the UK educational policy agenda since 1999 in response to increased targets for HE participation. The aim of WP is to improve access to university for disadvantaged groups, including FiF students, by encouraging universities to reach out to low participation groups (Department for Education and Skills, 2003). According to its central premise, everyone with the potential to benefit from higher education should have equal opportunity to access it and be successful within it (Business Innovation and Skills, 2014). A recent picture of the WP characteristics used by Russell Group universities is documented in Henderson et al. (2019).

Identifying whether a student has WP characteristics is achieved through the application form for Universities and Colleges Admissions Service (UCAS). UCAS is the centralised application system for British universities and includes optional questions on the application form for equality monitoring. These questions include information on parental education, whether they have ever been in care, or taken part in any WP activities (such as summer schools) in order to help admissions tutors identify support needs and to monitor access (UCAS, 2018).

This 'contextualised admissions' information provides admissions tutors with a more complete picture of the circumstances that prospective students have faced. Contextualised admissions may lead universities and colleges to make contextual [or lower] offers to students with particular socio-demographic characteristics in order to widen access. The contextualised admissions agenda has aimed to improve fair access since the publication of the Schwartz Report in 2004 and attempts to use a wider range of indicators to identify who 'merits' a place, rather than just looking at attainment alone. The stakes for universities are high. Over time, the WP agenda has become a metric on which to judge universities' success beyond traditional league tables (Sundorph et al., 2017). While there is some evidence on 'what works' in terms of Widening Participation (e.g., HEFCE, 2010), there needs to be a greater understanding of the policy interventions to increase participation among these underrepresented groups.

The remainder of the report proceeds as follows: Chapter 3 outlines the HE participation rates by first in family status; Chapter 4 discusses the value of first in family as a WP measure; Chapter 5 looks at how the first in family group compares in the labour market; Chapter 6 examines differences by first in family status in non-cognitive skills; Chapter 7 documents aspirations among the first in family group on more recent cohorts and across the UK. Finally, Chapter 8 summarises the findings and offers some recommendations.

3. Who are 'first in family' students and how do they experience university?

3.1 Background

Despite the overall expansion in Higher Education (HE) provision, there is evidence of horizontal stratification, where students from poorer backgrounds are less likely to access top universities and study for high-status subjects (Britton et al., 2016; Sutton Trust, 2017). Establishing whether the sorting of subject and institutional choice is also present by first in family (FiF) status will help direct policy makers to consider more support for applicants who are FiF.

As noted, there were no quantitative studies on FiF students in the UK. There is, however, an extensive literature on socioeconomic gaps in access to higher education in the UK (e.g., Crawford & Greaves, 2015). We know that parental education has a substantial impact on the educational levels of children (e.g., Strand, 2014). Pupils from lower socioeconomic status (SES) backgrounds are less likely to aspire to attend university and have concrete plans backing up these aspirations (Jerrim & Shure, 2016). They are also less likely to apply to high-status universities than those from a private school background or with parents from higher professional or managerial occupations (Boliver, 2013). Even if low-SES students decide to apply to a Russell Group university, they are less likely to be accepted (Boliver, 2013).

Socioeconomic gaps in HE participation might manifest through several channels. The most important is early educational attainment: educational attainment gaps begin early in life and have a strong influence on access to HE (Adamecz-Völgyi et al. 2019; Rasbash et al., 2010). Pupils from lower SES backgrounds may also have access to fewer resources to spend on their education, be less informed about the university application process and choices, or have fewer role models than their peers.

The following research questions are addressed in this chapter:

RQ1   What proportion of young people in England are FiF?
RQ2   What are the individual and socio-demographic characteristics of those who are FiF?
RQ3   How does the institution type, subject studied, and non-completion rate differ by FiF status compared to those who match their parental education with a degree?

3.2 Data and Methods

To address these research questions, we make use of Next Steps, which follows a cohort of young people born in 1989/1990, and comprises eight waves of data until age 25 (University College London, 2018). Next Steps began in 2004 when the sample members were aged between 13-14 years: these young people answered questions about their own lives in all waves while their parents were surveyed for the first four years. The information on the cohort members' undergraduate degree attainment comes from the age 25 data that covers 7,707 young people, 36.7% of the initially drawn sample and 49% of the actual sample of the first wave. In order to avoid dropping cases with missing or unknown information on WP measures or background variables, we take the first available response mentioned over the first four waves. We take care of any remaining item non-response using missing flags.

Our main variable of interest is whether the young person is the first in the family to achieve a degree. That is, neither the cohort member's biological mother or father (or resident step parents) had achieved a university degree (BA/BSc or higher) by the time the cohort member was aged 16-17 (i.e. before having an opportunity to apply to a university) but the cohort member themselves achieved a degree by the age of 25.

We also examine whether subject, institution, and university non-completion varies by FiF status. With respect to undergraduate degree subject choice, following the approach taken by Walker and Zhu (2011), we group degree subjects into four main categories: Science, Technology, Engineering and Mathematics (STEM); Law, Economics and Management (LEM); Social Sciences, Arts, Humanities and Languages (OSSAH) and Combined or Other degrees (OTHER) which may include a degree in French and Management, for example. While earning higher or lower wages is certainly not the only relevant measure of success, wages provide a simple and measurable outcome to consider (Belfield et al., 2018a, 2018b). In particular, we examine whether FiF students are more likely to choose 'high-earning' or 'low-earning' subjects. Grouping degree subjects to the above mentioned four categories enables us to examine the ranking of labour market returns by subject group in three datasets, namely Next Steps, the Labour Force Survey (LFS) and the Longitudinal Educational Outcomes (LEO) data (LFS, 2016). Table 1 shows the average wage measures in the three databases by course categories and shows that graduates of STEM and LEM courses earn more in all of them. Moreover, we estimate Mincer-type wage models (Bjorklund & Kjellstrom, 2002) on Next Steps data that collects information on young persons' wages and find that the wage-return ranking remains, albeit with a narrowing of the gaps, even after taking into account gender; age; age-squared; duration of employment; duration-squared; potential experience and potential experience squared, and find that the ranking remains stable. On the basis of these results, we create a binary category which defines high-earning subjects as STEM and LEM subjects and the
OSSAH and OTHER as low-earning subjects.

Table 1. Average wages by subject categories

	Next steps[b], 2015–2016	LFS[c], 1994–2009	LEO[d], 2015
	Average gross hourly wage (GBP)	Average log weekly wages[a]	Median annual earnings 10 years after graduation (GBP)
STEM	13.0	2.87	34,696
LEM	14.2	2.92	34,145
OSSAH	11.4	2.72	27,060
OTHER	12.3	2.78	25,600
No. of observations	1,879	82,002	151,880

[a]Converted to January 2010 prices using the Retail Price Index (RPI) published by the Office for National Statistics. Sources: [b]UCL (University College London, UCL Institute of Education, Centre for Longitudinal Studies, 2018). [c]Walker and Zhu (2011). [d]DfE (Department for Education, 2018).

We explore whether FiF undergraduates are more likely to study at certain institutions. To capture this, we identify whether they have ever reported attending Oxbridge, a Russell Group or other university between the age of 18–25. 'Oxbridge' is a portmanteau for Oxford and Cambridge, the most historic and elite universities in England; Russell Group institutions are research intensive institutions and are considered prestigious; and the other group includes post-92 institutions and other non-Russell Group institutions e.g. Oxford Brookes University.

We are also interested in whether there is any evidence of differential degree non-completion by FiF status. This is computed by identifying whether the respondent ever mentioned attending university at age 18, 19 or 25 but did not report achieving a degree (from any university) by age 25. We have been careful to code those who are still studying because they are part-time or have deferred their studies as non-dropouts. There are some limitations to this approach, which we acknowledge. For example, in our data, university participation means that they may have only attended university for a week or a day, potentially without formal enrolment, while the national dropout figures only capture those who have formally enrolled and did not complete that particular course of study. Of the 7,707 who responded to the study at age 25, 34.7% (2,671) achieved a degree and 47% (3,619) reported attending university at some point. Therefore, we record 30.2% (1,094) of having not completed (excluding the 161 who are still studying at university at age 25). The proportion of non-completion is higher in Next Steps than the national average (which was between 7% and 11%

between 2014-2019, HESA (2021)), due to differences in the way they are calculated, and so care must be taken in interpreting the findings associated with non-completion.

Our modelling strategy is a combination of logit models and multinomial logit models. This is a descriptive analysis as we cannot identify the causal effect of being FiF on our outcomes. Parental education is clearly not random, and several (observable and unobservable) selection mechanisms might lie behind the data; for example, non-random selection of students into schools, which may bias the estimates. Thus, we aim at capturing conditional relationships between parental education and the child's education.

Drawing on the literature (e.g., Crawford & Greaves, 2015), we select the following independent variables in order to decrease the selection bias as much as possible:
- parental social class is measured by taking the highest class category of parents mentioned from age 13–16 using the National Statistics Socio Economic Classification (Office for National Statistics, 2010);
- we take an average of the household income over the first four waves and divide by the square root of household size to provide a measure of equivalised permanent income as reported by the parents; this has been shown to have a larger effect on young people's educational outcomes than transitory income (Jenkins & Schluter, 2002);
- housing tenure is measured by taking the highest tenure reported by parents when the cohort member was aged 13/14;
- ethnicity, gender, and special education needs (SEN) as reported by the young person;
- Key Stage 3 (KS3) scores, capped linear GCSE scores, and school type taken from administrative data (NPD); we also include the number of A levels studied for and a percentile rank of the young person's A level point score. While these measures are correlated with each other, they capture different facets of one's abilities and educational progress.

3.3 Results
RQ1   What proportion of young people in England are FiF?
We begin by quantifying the proportion of young people in England who are FiF. The results in Table 2 show that 27% of the sample achieve a university degree by age 25 (35% unweighted). This figure is somewhat comparable to the graduation rate captured by the 2015 Annual Population Survey (APS) where the weighted share of those with a degree in this cohort is 39.6% (Office for National Statistics, Social Survey Division, 2019). The sample and definitions differ between these studies.

Table 2. Cross tabulation: degree attainment by parental degree attainment

	Freq, (unweighted)	Percent of total, (unweighted)	Percent of total, (weighted)	HE graduation rate[a], percent (weighted)
	Next steps	Next steps	Next steps	Annual population study
Graduates at age 25	2,671	34.9	26.8	36.9
First in family	1,853	24.2	18.3	
Match parents with degree	818	10.7	8.5	
Non graduates at age 25	4,993	65.2	73.2	
Match parents with no degree	4,321	56.4	65.3	
Downwardly mobile group	672	8.8	7.9	
Total	7,664	100.0	100.0	

Information on parental education is not available for 43 persons.
[a]HE graduation rate in APS: the share of those having a Level-4 degree (below-degree level HE certificates and university degrees together) among those aged 25 in England in 2015.
Sources: UCL (University College London, UCL Institute of Education, Centre for Longitudinal Studies, 2018) and ONS (Office for National Statistics, Social Survey Division, 2019).

The breakdown of the weighted sample is that 18% are the FiF to achieve a degree while 8.5% are not the FiF to achieve a degree. The fact that FiF comprise around two-thirds of graduates (68%) is somewhat surprising and may be a by-product of the expansion in student places in higher education. Around 65% of the sample do not achieve a degree and have parents who also did not achieve a degree; and around 8% experience downward educational mobility; that is, they did not achieve a degree by the age of 25 but they have at least one parent who has a degree.

Table 3. Logit regression predicting degree attainment among those with parents with no degree, Computed Average Marginal Effects (AME)

	Model 1	
	AME	se
Parental education		
Ref: Higher education below degree		
GCE A level or equivalent	−0.05*	(0.02)
GCSE A-C or equivalent	−0.06**	(0.02)
Level 1 and below	−0.08*	(0.03)
Other	−0.04	(0.06)
No qualification	−0.09**	(0.03)
Ref: Male		
Female	0.02	(0.01)
Ref: White		
Mixed	0.12***	(0.03)
Indian	0.38***	(0.04)
Pakistani/Bangladeshi	0.28***	(0.03)
Black Caribbean	0.27***	(0.05)
Black African	0.56***	(0.04)
Other	0.26***	(0.05)
Ref: No special educational needs		
Special Educational Needs	−0.03	(0.04)
Ref: Not Eligible for Free School Meals (FSM)		
Eligible for FSM	−0.00	(0.03)
Ref: State funded secondary school		
Independent School	0.36***	(0.07)
Parental profession		
Ref: Higher Professional Managerial		
Intermediate occupations	−0.02	(0.02)
Routine and manual occupations	−0.04+	(0.02)
Long term unemployed/other	−0.00	(0.04)
Ref: Owns_Mortgage		
Rent/other	−0.05**	(0.02)
Equivalised household income (multiple of £10,000)	0.02+	(0.01)
GCSE capped linear point score	0.00***	(0.00)
Key stage 3 score	0.02***	(0.00)
A level Standardised rank		
Number of A levels studied		
Observations	6,174	
Subsample of young people with parents who have no HE degree	✓	
Subsample of students taking any level 3 qualification		
Subsample of students taking A levels		

Cluster robust standard errors in parentheses.
*** p < 0.001, ** p < 0.01, * p < 0.05, + p < 0.10.
Source: University College London, UCL Institute of Education, University College London, UCL Institute of Education, Centre for Longitudinal Studies (2018). *Next Steps: Sweeps 1–8, 2004–2016: Secure Access.*

RQ2   What are the individual and socio-demographic characteristics of those who are FiF?

We compare the actual FiF group (those whose parents do not have a degree but they themselves achieve a degree) to those who are *potential* FiF (those whose parents do not have a degree and the cohort member also do not achieve a degree). This will help us to understand the differential characteristics between FiF and those who are potential FiFs. Table 3 shows the

average marginal effects (AME) computed from a logit model predicting degree achievement on the full subsample of young people whose parents do not have a degree. AMEs can be interpreted as percentage point differences. The results in Model 1 show that having higher levels of prior attainment predict degree achievement (therefore belonging to the FiF group). Moreover, we see that compared to those who are White, those who are Mixed race, Indian, Pakistani/Bangladeshi, Black Caribbean, Black African and Other (which includes Chinese and Arab students, among others) are significantly more likely to achieve a degree and therefore be FiF. Young people whose parents rent their home compared to those who own it or have a mortgage are less likely to achieve a degree. We also see a negative gradient by parental education below-degree level, where belonging to the FiF group is less likely for those whose parents have no qualifications. However, we do not see any significant difference by gender, SEN status or FSM eligibility.

These results signal that degree attainment among those whose parents do not have a degree (and therefore FiF status) is driven by higher levels of prior attainment and ethnic diversity compared to those who are potential FiF.   There is a sense that some socio-economic characteristics, including housing tenure and parental education on a disaggregated level, are also important for FiF status. If universities wish to widen participation on the dimension of parental education, then contextual admissions strategies which consider socio-economic characteristics should be used to support this.

Table 4. Multinomial logit regression predicting degree subject studied with Computed Average Marginal Effects

	Science technology engineering & maths		Law, economics & management		Other social sciences, arts & humanities		Other	
	AME	se	AME	se	AME	se	AME	se
Model 1								
Ref: Match Parents with Degree								
FiF	−0.05*	(0.02)	0.06***	(0.01)	−0.04*	(0.02)	0.03**	(0.01)
Model 2								
Ref: Match Parents with Degree								
FiF	−0.05*	(0.02)	0.04**	(0.02)	−0.02	(0.02)	0.03*	(0.01)
Individual Characteristics			✓					
Model 3								
Ref: Match Parents with Degree								
FiF	−0.04+	(0.02)	0.05**	(0.02)	−0.03	(0.02)	0.02+	(0.01)
Individual Characteristics			✓					
Socioeconomic characteristics			✓					
Model 4								
Ref: Match Parents with Degree								
FiF	0.00	(0.02)	0.05*	(0.02)	−0.05*	(0.02)	−0.00	(0.01)
Individual Characteristics			✓					
Socioeconomic characteristics			✓					
Prior attainment			✓					
N			2,671					

Individual characteristics include Gender, ethnicity, SEN.
Socioeconomic characteristics include Class, income, housing tenure, FSM eligibility and school type.
Prior attainment includes Key stage 3, GCSE, Number of A levels studied and standardised A level grades.
Cluster robust standard errors in parentheses.
*** p < 0.001, ** p < 0.01, * p < 0.05, + p < 0.10.
Source: UCL (University College London, UCL Institute of Education, Centre for Longitudinal Studies, 2018).

RQ3 How does the institution type, subject studied, and non-completion rate differ by FiF status compared to those who match their parental education with a degree?

Table 4 shows the AME computed from a multinomial logit model which categorises degree subjects into the four groups presented in Table 1: STEM; LEM; OSSAH; and OTHER. The results are relatively stable across models where the control variables are included additively. Model 4 shows that FiF students are five percentage points more likely to study LEM subjects compared to those who match

their parents' education with a degree and are five percentage points less likely to take OSSAH subjects. These results are net of prior attainment, individual characteristics and socioeconomic status. We may interpret this finding as those who match their parents' education with a degree are more likely to study subjects which have more classical routes and that are less vocational (e.g., History) whilst those who are FiF are more likely to study subjects which have a direct route to the labour market (e.g., Law). Clearly studying these courses is contingent on two stages, first selecting the course and second being accepted onto the course.

With respect to institutional choice, we run a multinomial logistic regression on attending either Oxbridge, Russell Group, or 'Other' universities, which includes the 'grey brick' universities and post-92 institutions (Table 5). We find that once taking into account prior attainment, individual characteristics and socioeconomic status that FiF are three percentage points less likely to attend the elite Russell Group universities and six percentage points more likely to attend Other universities compared to the more advantaged group. This suggests that the group who match their parents' education with a degree maintains its advantaged position through institutional selection and acceptance.

Table 5. Multinomial logit regression predicting institutional type attended with computed Average Marginal Effects

	Russell group		Oxbridge		Other university		Missing	
	AME	se	AME	se	AME	se	AME	se
Ref: Match Parents with Degree								
FiF	−0.03**	(0.01)	−0.00	(0.00)	0.06**	(0.03)	−0.03	(0.03)
N				2,671				
Prior attainment				✓				
Individual Characteristics				✓				
Socioeconomic characteristics				✓				

Individual characteristics include: Gender, ethnicity, SEN.
Socioeconomic characteristics include Class, income, housing tenure, FSM eligibility and school type.
Prior attainment includes Key stage 3, GCSE, Number of A levels studied and standardised A level grades.
Cluster robust standard errors in parentheses.
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$.
Source: UCL (University College London, UCL Institute of Education, Centre for Longitudinal Studies, 2018).

Table 6. Logit model predicting non-completion, with computed Average Marginal Effects

	Model 1		Model 2		Model 3		Model 4	
	AME	se	AME	se	AME	se	AME	se
Ref: Match Parents with Degree								
FiF	0.06**	(0.02)	0.04**	(0.02)	0.04*	(0.02)	0.04*	(0.02)
Observations	3,619		3,619		3,619		3,619	
Prior attainment			✓		✓		✓	
Individual characteristics					✓		✓	
Socioeconomic status							✓	

Individual characteristics include Gender, ethnicity, SEN.
Socioeconomic characteristics include Class, income, housing tenure, FSM eligibility and school type.
Prior attainment includes Key stage 3, GCSE, Number of A levels studied and standardised A level grades.
Cluster robust standard errors in parentheses.
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$.
Source: University College London, UCL Institute of Education, University College London, UCL Institute of Education, Centre for Longitudinal Studies (2018). *Next Steps: Sweeps 1–8, 2004–2016: Secure Access.*

Next, we examine the relationship between FiF status and non-completion in a logit regression model, with computed AMEs. We include everyone in the estimation sample who ever attended university and define dropping out as neither being currently at a university nor achieving a degree at any university by age 25. The final model (Table 6, Model 4) shows that those with parents with no degree are four percentage points more likely to drop out than their peers who would match their parents' education with a degree net of prior attainment, individual characteristics and socioeconomic status.

3.4 Summary

The evidence presented in this chapter suggests that those who experience intergenerational educational mobility and become FiF have higher prior educational attainment than those who match the educational level of their parents with not going to university. Moreover, net of prior attainment we see a differential effect of being FiF by ethnicity; those from Black and minority ethnic groups are more likely to outperform their parents in achieving a university degree than those who are White.

With respect to subject choice at degree level, we find that FiF are five percentage points more likely to study LEM subjects and five percentage points less likely to study OSSAH subjects than graduates who match the educational level of their parents. We also examined whether FiF take potentially 'high-earning degrees' and find a weakly significant difference, with the FiF group being five percentage points more likely to study high earning subjects. In summary, there are some horizontal differences in subject selection and acceptance by educational mobility. In addition to this, we see that FiF students are less likely to attend Russell Group universities than their peers with university-educated parents and more likely to attend 'Other' universities, after controlling for early educational attainment. One important policy outcome related to this finding is that universities and schools should ensure that all students have access to high-quality information on the costs and benefits of higher education. Moreover, we find evidence of a statistically significant difference between FiF status and the likelihood of dropping out of university, even after we take into account prior attainment, individual characteristics and socioeconomic status: FiF students are four percentage points more likely to drop out than students whose parents have a degree. As noted, the measure of non-completion used is a noisy one and so we must exercise caution in interpretation; however, it may be prudent to suggest universities offer support and introduce interventions (e.g., a mentoring scheme) to FiF students.

Universities already make use of information on prospective students' socioeconomic background, the types of school they attended, and contextualise results in order to make fairer offers. It will remain a challenge for universities to identify those students who have some form of social disadvantage but high potential to succeed.

While there is some evidence on 'what works' in terms of Widening Participation (e.g., HEFCE, 2010), there needs to be a greater understanding of the policy interventions to increase participation among these underrepresented groups. Given that attainment drives some of higher education participation and progression, but not all of it, there needs to be an increase in interventions early on during the educational process to raise awareness of the costs, benefits and opportunities of HE for young people.

3.5 Project Outputs

More information on this research can be found here:

Henderson, M., Shure, N., & Adamecz-Volgyi, A. (2020). Moving on up: 'First in family' university graduates in England. Oxford Review of Education. doi:10.1080/03054985.2020.1784714

Henderson, M., Shure, N., & Adamecz-Völgyi, A., (2019). First in Family' university graduates in England. IZA Discussion Paper No.12588, Institute of Labour Economics.

4. How does 'first in family' compare to the other Widening Participation indicators?

4.1 Background

We started this project with some scepticism about whether first in family (FiF) status would just overlap with other WP indicators such as socio-economic status, or whether it would be able to capture other sources of disadvantage (and therefore help to widen participation further). In this chapter, we provide the first robust analysis of a range of WP indicators and ask whether 'FiF' is a good indicator for widening participation. As we noted in Chapter 3, we use the term 'potential FiF' to describe the indicator that identifies young people who *could* be the first in their family to achieve a university degree because neither of their parents has one. If accepted by a university, they will become FiF university attendees and if they graduate, they will become FiF graduates.

The majority of elite (Russell Group) universities in the UK use potential FiF as an explicit characteristic in order to widen participation in addition to a range of other universities and employers. It is likely that an even higher proportion of universities will use potential FiF for Contextual Admissions (CA) (Boliver et al., 2017), increasing the need for robust evidence on this measure. Currently, potential FiF is treated by universities as a measure of disadvantage, which may manifest in terms of impeded aspirations and expectations, lack of understanding of higher education and the labour market, and lower parental human capital.

Theoretically, potential FiF is a reasonable criterion to use as a WP measure because a broad literature documents the generally positive, although usually small, causal effects of parental education on children's schooling outcomes (see a review in Holmlund, Lindahl, & Plug (2011)). Although we know less about the causal effects of parental HE graduation in particular, the literature agrees that children of university graduates enjoy advantages in several domains. Currie and Moretti (2003) find that maternal higher education increases infant health; Suhonen and Karhunen (2017) reveal large and positive effects of parental graduation on children's university participation and years of schooling; while Maurin and McNally (2008) show that children of university graduates are less likely to repeat grades during their studies compared to children of parents who have never been to university.

Another strand of the literature investigates the best WP measures to use in the UK context. None of these papers, however, have explicitly looked at parental education. Boliver, Gorard, and Siddiqui (2015) review WP measures used by universities as CA indicators qualitatively. In follow-up research, Gorard, Siddiqui, and Boliver (2017) use an empirical approach to examine the quality and the overlap of various WP measures. They find IDACI scores, school type (private/public) and educational attainment to be less valuable and instead suggest that universities use gender; month of birth; and FSM eligibility (as a measure of poverty). They also find special educational needs (SEN) and living in care as useful WP indicators.

Given these gaps in the existing evidence, this chapter examines potential FiF status as an indicator of disadvantage, we address the following research questions:

RQ4 Does potential FiF status capture additional disadvantage beyond other traditional WP indicators?
RQ5 What is the relative importance of WP measures and potential FiF status in predicting HE participation and graduation?

4.2 Data and Methods

We use the same data for this analysis as noted in Chapter 3; Next Steps which follows a cohort of young people born in 1989/1990. This cohort of young people is linked with the National Pupil Database, allowing us to access their national school exam results.

For the purpose of this analysis we think about FiF (and all WP measures) from the point of view of universities: when looking at a pool of applicants, should universities use FiF to widen participation? As we do not observe university applications in the data, we impose a sample restriction in order to pin down the potential pool of applicants for university, i.e. those with enough formal education. Therefore we restrict our analytical sample to those who theoretically would have had the possibility to apply and attend university, i.e. who decided to stay in school after completing compulsory exams at age 16. Formally, this means they started "Level 3 education". The most common form of Level 3 education are A level qualifications, but individuals can also pursue vocational Level 3 studies at college that still enable them to attend university.

The main point of any sample restriction is to create comparable groups. Ideally, we would want to compare the HE outcomes of students who do not differ from each other in any other dimension other than potential FiF. Whatever sample restriction we use based on prior educational achievement, we leave out the lower part of the distribution of students in terms of their potential HE attainment. As children with lower-educated parents are less likely to progress to Level 3 study than children of higher-educated parents, those excluded are more likely to be FiF and less likely to go to university. Thus, this procedure, while helpful in creating more comparable groups, would also cause us to underestimate the negative statistical relationship between being FiF and HE outcomes. Out of the 7,707 individuals at age 25, 5,047 young people attended Level 3 studies. We use this subset of Next Steps for the main empirical analysis in this section; however, our main results hold on the total sample as well.

We use two binary outcome variables: HE participation and HE graduation. Both variables are supplied as derived variables at age 25 based on information gathered from all waves and they have no missing values. University participation is defined broadly as "ever been to university", independent from the length of university attendance. University graduation is defined as whether a young person achieved a first degree/foundation degree (BA/BSc) by age 25. It does not cover any other types of higher education qualifications that are usually awarded after shorter-than-three-year higher education courses (diplomas, certificates, awards, etc.).

We examine a range of commonly used WP measures to which we compare the FiF measure. A young person is a potential FiF if neither his/her biological mother or father (or resident step parents) had achieved a university degree (BA/BSc or higher) by the time the young person was aged 17, i.e. before university application. Although their parents may return to higher education once the young person is older than 17, we choose this cut-off in order to examine the importance of growing up with parents without university degrees. Our focus is on intergenerational educational mobility as we are unable to look at whether a sibling attended university due to data constraints. This also corresponds with the Widening Participation indicator, which only asks whether or not an individual's (step) parents achieved a degree.

In order to identify the prevalence and overlaps of the indicators of socioeconomic disadvantage that are used by the Widening Participation agenda, we focus on 10 forms of WP indicators currently applied by universities. As previously mentioned, there is substantial heterogeneity in how universities measure disadvantage (Selby, 2018), which means we take a pragmatic approach: the focus on these 10 measures is the result of data availability, i.e. what measures are available in Next Steps, and WP policy. We make use of the first 5 waves of Next Steps to capture these measures. In particular, based on Boliver, Gorard, and Siddiqui (2015) and Ilie, Sutherland, and Vignoles (2017), we look at the following binary indicators:

1. SEN: whether the young person ever reported any special educational needs from age 13/14 to 16/17;
2. FSM: whether the young person ever reported being eligible for Free School Meals from age 13/14 to 17/18;
3. Low social class: whether the highest parental social class of the family mentioned from age 13/14 to 17/18 was "Routine occupations or not currently working";
4. Income deprivation: whether the family belonged to the top 20% of deprived families based on the Income Deprivation Affecting Children Index (IDACI)7 at least once in ages 14/15 and 15/16;
5. Young carer: whether the young person ever reported to regularly providing unpaid care to anyone in the household from age 13/14 to 15/16;
6. Non-White: whether the young person belongs to a non-White ethnic group;
7. Living with disability (classified according to the Disability Classification Equality Act (2010)) or long-term illness that affects schooling at least once in ages 13/14 to 16/17;
8. Single HH: lived in a single-parent household at least once anytime at or before age 17/18;
9. Care leaver: whether the young person has ever been in care by age 13/14 or lived at least once with no parent in the household in ages 13/14 to 17/18;
10. Multiple deprivation: top 20% of the 2004 Index of Multiple Deprivation (IMD)8 at least once in ages 14/15 to 15/16. IDACI and IMD are measured at the neighbourhood level and linked to the individual using postcode while all other measures of disadvantage are measured at the household or individual level.

In terms of the individual characteristics of young people, we control for gender and educational attainment captured by Key Stage 2 (KS2) total score measured at age 11 and capped linear GCSE (Key Stage 4) score measured at age 16 In some models, we also use Key Stage 3 (KS3) total scores measured at age 14. We create categorical variables based on the quintiles of all of these measures, which allows us to construct a sixth category for missing values due to linkage issues between Next Steps and the National Pupil Database.

In the full paper a number of different methods are applied, in this extract we first make use of descriptive analysis and then in order to rank the measures in terms of their importance in making a prediction we employ a nonparametric approach, a random forest classification algorithm.

A non-parametric algorithm, a random forest, to predict HE participation and graduation and look at the relative importance of WP measures in this prediction. The random forest classification algorithm works by constructing series of decision trees and predicting the outcome from each series as the modes of predictions (Breiman, 2001). A decision tree is an algorithm that repeatedly splits the data to subsamples (*branches*) along certain values of the explanatory variables in order to create as homogenous clusters (*leaves*) in terms of the outcome variable as possible. The predicted outcomes of a decision tree depend heavily on the order of variables used to split the sample; thus, the random forest algorithm randomly chooses different explanatory variables to start with on bootstrapped samples of the data and appoints the most frequent predicted class from all repetitions. The main advantage of using the random forest algorithm is that it provides a straightforward ranking of variables in terms of how important they are in predicting the outcome even if they are not independent.

A variable is considered more important if splitting the sample based on the variable leads to more homogenous subgroups in terms of the outcome variable than splitting the sample based on another. The more homogenous, or in other words, the less heterogeneous the resulting subgroups are, the better the variable classifies the observations according to the categories of the outcome variable. Thus, we measure the relative importance of explanatory variables by the Mean Decrease

in Gini measure, which captures how well the variable decreases the heterogeneity of subgroups by splitting the sample on a given variable averaged across all decision trees (Friedman et al. 2009).

4.3 Results

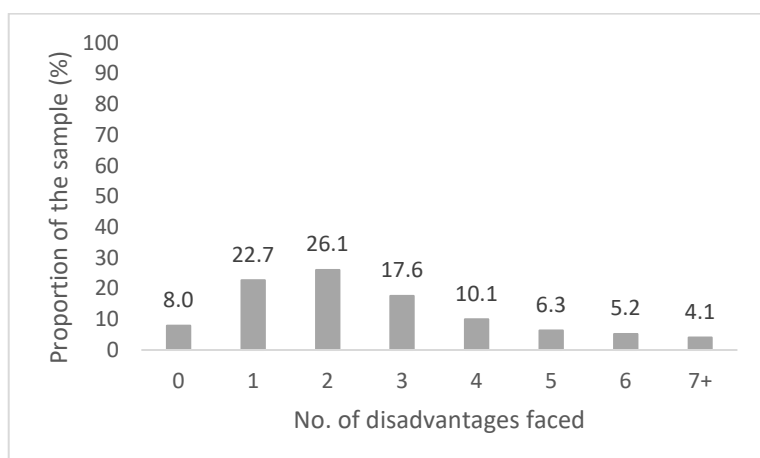## RQ4 Does potential FiF status capture additional disadvantage beyond other traditional WP indicators?

We begin our analysis of potential FiF and the other WP indicators by assessing their prevalence in the sample (Table 7). Having parents with no degree, i.e. being potentially FiF, is the most common disadvantage: over 75 percent of those with Level 3 education are potential FiF. This means that being a potential FiF should perhaps be viewed as a measure of "non-advantage" as opposed to disadvantage since it applies to the majority of this cohort. Being a potential FiF does not occur in isolation: Table 7 shows that 81.6% of the potential FiF face at least one additional disadvantage. This proportion is lower than other WP indicators, where the share of those facing at least one more disadvantage is between 91.7-100% (Table 7, third column). In other words, almost one-fifth of the potential FiF face no any other types of disadvantage; they could be viewed as not "really" disadvantaged in practice, but may still face barriers in terms of lack of role models and information about HE. The potential FiF group may be disadvantaged in a way not captured by the other WP measures. Taken together, this indicates that the potential FiF group is heterogeneous in nature.

Table 7. The prevalence of socioeconomic disadvantage used by the Widening Participation agenda among those having any Level 3 education

Disadvantage (age of measurement)	No. of observations with non-missing data on the disadvantage	Proportion of young people with non-missing data facing the disadvantage	Proportion of these who face at least one more disadvantage
Potential FiF (by age 17)	5,020	75.8%	81.6%
Single household (by age 17/18)	5,047	41.5%	92.4%
FSM (age 13/14-17/18)	4,270	10.0%	99.8%
Low social class (age 13/14-17/18)	4,971	40.2%	94.9%
Young carer (age 13/14-15/16)	4,931	9.6%	96.7%
Non-White	5,047	19.0%	96.2%
SEN (age 13/14-16/17))	5,023	16.4%	91.7%
Disabled (age 13/14-16/17)	5,025	5.7%	96.2%
Care leaver (age 13/14-17/18)	4,535	5.2%	98.8%
Multiple deprivation (age 14/15-15/16)	4,666	14.6%	99.9%
Income deprivation (age 14/15-15/16)	4,666	13.8%	100.0%

Notes: Weighted using Wave 8 final weights. N = 5,047. Source: University College London, UCL Institute of Education, Centre for Longitudinal Studies. (2018). Next Steps: Sweeps 1-8, 2004-2016: Secure Access. DOI:10.5255/UKDA-SN-7104-4.

Figure 1. The distribution of the sample in terms of the number of disadvantages young people face

Notes: complete cases only. N=3,880. Unweighted. Source: University College London (2018).
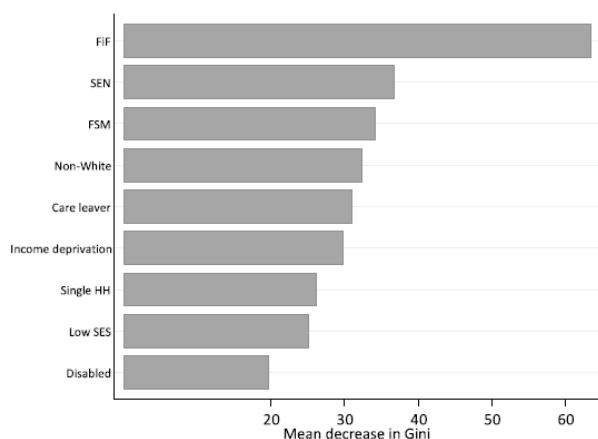
Next, we examine the overlap of these WP indicators by calculating the proportion of our sample facing multiple disadvantages. Fig. 1 shows that only 7.9 percent of those with Level 3 education face no form of social disadvantages; 22.7% of the sample face one, 26.1% face two, and more than 40% face three or more types of disadvantage at the same time. This shows that while disadvantages cluster in some individuals, a surprisingly large proportion of the population is disadvantaged according to at least one of these measures.

RQ5 What is the relative importance of WP measures and potential FiF status in predicting HE participation and graduation?
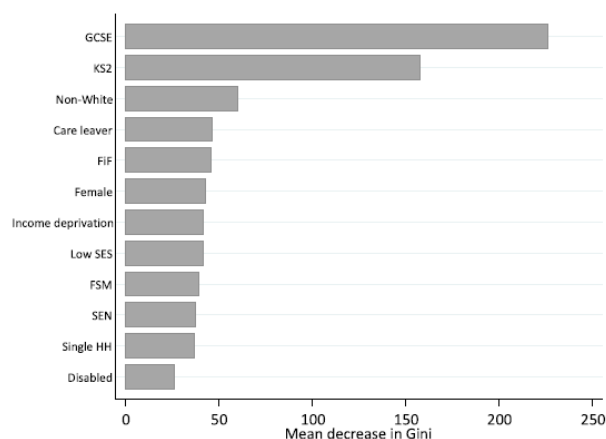
Figures 2 and 3 compare the relative importance of widening participation measures for higher education participation and graduation (including potential FiF) without controlling for early educational attainment (left panel (a)) and then with attainment controls ((b) right panel). Figure 2 shows that without controlling for early educational attainment, potential FiF ranks first in terms of its importance captured by the Mean Decrease in Gini to predict HE participation ((a) left panel). The rest of the WP measures have fairly similar importance measures. When early educational attainment is added to the model, the importance of GCSE and KS2 scores turn out to be highest.

Figure 2. The importance of predictors in predicting HE participation in random forest models: the estimated Mean Decrease in Gini coefficients of the predictors

a) Without early educational attainment

b) With early educational attainment

Notes: N-5,047. Generated using the randomforest package in R. Missing values of the variables are controlled for by using missing flags. 'Low SES' refers to Low NS-SEC. Source: Next Steps, UCL, (2018).

While the order of other WP measures changes, their importance is of about the same magnitude (Figure 2(b), right panel). Similarly, potential FiF ranks first in terms of its importance in predicting HE graduation (Figure 3(a), left panel), but when early educational attainment is added to the model the relative importance of all WP measures becomes very similar and much lower than the importance of early educational attainment (Figure 3(b), right panel). It seems that GCSEs, test scores captured at the end of compulsory schooling at age 16, are the most important factors of HE participation and graduation, followed by test scores captured at age 13. The fact the both are important shows that abilities and compulsory school progression (i.e. whatever happens between age 13 and age 16) matter as well. The importance of WP measures is about a third to a half of the importance of test scores. Thus, test scores present the real barrier between those who make it to university and those who do not.

Figure 3. The importance of predictors in predicting HE graduation in random forest models: the estimated Mean Decrease in Gini coefficients of the predictors

a) Without early educational attainment
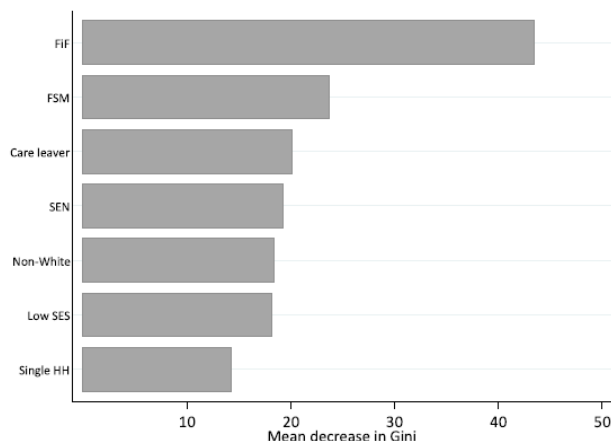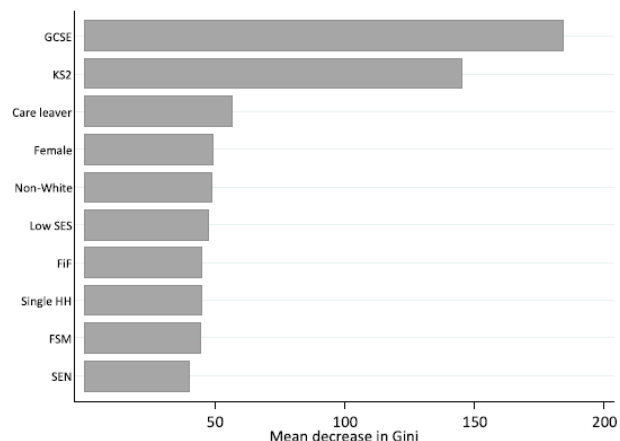
b) With early educational attainment

Notes: N-5,047. Generated using the randomforest package in R. Missing values of the variables are controlled for by using missing flags. 'Low SES' refers to Low NS-SEC. Source: Next Steps, UCL, (2018).

4.4 Summary

The analysis presented in this chapter is the first step in unpacking the extent to which using 'first in family' as an indicator captures the same or different individuals as the other sociodemographic characteristics used by universities in their Widening Participation agendas. The fact that universities have been using potential FiF as a Widening Participation indicator without any exploration of its validity as an indicator has motivated this analysis. Universities already make use of information on prospective students' socioeconomic background, the types of school they attended and their national exam results in order to inform their admission process. Our results show that being a potential FiF overlaps more with family-background and income-type measures of disadvantage (income deprivation, living in a single household, low SES) while it is independent of some individual-level characteristics as SEN or disability.

We draw two main conclusions. First, the potential FiF indicator seems to be just as valid a WP measure as other measures, and it is informative above and beyond the usually used indicators as well. Having non-graduate parents is an important barrier to university participation and graduation, even after controlling for other sources of disadvantage. This seems to work through the channel of early educational attainment. Second, our research also provides evidence that the potential FiF indicator could be key in efforts to widen participation at universities through the use of contextualised admissions; however, the predictive power of all WP measures altogether is surprisingly low. A large share of the individual heterogeneity of HE success is still unexplained, even after controlling for early educational attainment, and thus should be the subject of further research.

We acknowledge that there should be some consideration of the nature of the WP measures from a practical point of view, for example, taking into account how 'gameable' the measures are. This reopens the debate about whether they are verifiable, accurate, and reliable. We believe that this can be achieved with some careful innovations, discussed further in Chapter 8.

4.5 Project Outputs

More information on this research can be found here:

Adamecz-Volgyi, A., Henderson, M., & Shure, N. (2020a). Is 'first in family' a good indicator for widening university participation?. Economics of Education Review. doi:10.1016/j.econedurev.2020.102038

Adamecz-Völgyi, A., Henderson, M., Shure, N. (2019). Is 'First in Family' a Good Indicator for Widening University Participation? IZA Discussion Paper No. 12826, Institute of Labour Economics.

5. How do 'first in family' labour market outcomes compare to their peers?

5.1 Background

Chapters three and four of this report examine the application process, university choices and the conditions prior to attending university, whilst in this chapter we exploit linked survey-administrative data from England to examine how first in family (FiF) graduates fare in the labour market compared to those graduates whose parents also graduated.

Previous literature on the returns to a university degree has presented convincing evidence that university degrees lead to large labour market returns in terms of earnings and income compared to those without a degree (Card 1999; Blundell, Dearden, and Sianesi 2005; Dickson 2013; Oreopoulos and Petronijevic 2013). This had led policymakers to view university access as a key to social mobility and spurred a large literature on higher education and social mobility (Blanden and Machin 2004; Chetty et al. 2014; 2017; Britton et al. 2016), but it also puts into sharper focus the need to ensure that access to university is fair and drawing from the widest pool of able students.

The existing evidence on how FiF individuals fare in the labour market is limited and contradictory. Manzoni and Streib (2019) show that there is a substantial gap in wages between first-generation and continuing-generation students (those whose parents have degrees) 10 years after graduation in the US. They find a similar raw 'generational' wage gap among men and women (11% and 9%, respectively). Controlling for race and motherhood decreases the gap to an insignificant 3% among women while controlling for these characteristics as well as for early educational attainment and labour market choices (industry, occupation, hours worked, and location) decreases the gap to an insignificant 4% among men. Simply comparing raw wages across FiF and non-FiF graduates in the 90's, Nunez and Cuccaro-Alamin (1998) find no difference in wages one year after graduation among those employed in the US. In this same period, Thomas and Zhang (2005) find a small FiF penalty shortly after graduation that increases to about 4% by the end of the fourth year on the labour market.

Whilst this chapter uniquely focuses on the labour market returns by FiF status in England, it builds on existing work which examines wage differences within groups of individuals who obtain university degrees (Chevalier and Conlon 2003; Britton, Shephard, and Vignoles 2015; Britton et al. 2016; 2021). Recently, research on returns to university in the UK have benefitted from the linkage of administrative schooling, higher education, and tax authority data. Britton et al. (2016) use the Longitudinal Education Outcomes (LEO) administrative data to examine heterogeneity in returns to university degrees by institution, subject, gender, and socioeconomic status. They find that graduates from higher income households earn 25 percent more than their peers from low income households, but that this earning premium shrinks to 10 percent once institution and subject are included in their model. Belfield et al. (2018) use LEO data to differentiate between differences in earnings due to university courses and the differences between individuals on the same course. While administrative data provides objective and accurate measures of earnings and large sample sizes, it does not include the same nuanced measures of socioeconomic status as cohort studies, including parental education.

The published working paper associated with this chapter includes more detailed analysis, including an examination of the gender-wage gap, robustness checks and additional sub-group comparisons, but here we focus on presenting the results on the labour market earnings of FiF graduates in England compared to non-FiF graduates. We want to know whether university serves as an equalizer for two university graduates who studied the same subject, at a similar institution, with similar prior attainment, but one is FiF and one is not. This is important evidence for university widening participation (WP) teams. As FiF is a commonly used indicator in the WP agenda, currently used by a majority of Russell Group and many other universities. These universities are not only interested in

getting WP candidates 'through the door', but also in understanding how they fare at and beyond university. Therefore the following research questions are addressed in this chapter:

RQ6   Does the probability of employment for graduates differ by FiF status?
RQ7   Do the labour market returns differ for graduates by FiF status?

5.2 Data and Methods
As before, we make use of Next Steps, a longitudinal cohort study of those born in 1989/90 and followed up in early adulthood at age 25. All results that we present in this section are estimated using the final weights that are constructed by the data provider to take care of initial oversampling of disadvantaged schools and ethnic minority students, school non-compliance, the Wave 4 ethnic boost, and attrition across all waves. In order to avoid dropping cases with missing or unknown information on WP measures or background variables, we take the first available response mentioned for parental class, parental education and household tenure over the first four waves. We take care of any remaining item non-response of explanatory variables using missing flags.

We are looking at four outcome variables: employment, log annual wage (when dealing with income level or wage, the numbers are generally quite large and so taking a logarithm of the wage has the effect of de-scaling effect of the large number for ease of handling), hours worked, and log hourly wage. Out of the 7,683 observations having data on employment, 81% worked in 2015 when the data were collected (Table 8). From the wage models, we exclude observations with outlier values on annual wage, hours worked, and hourly wage according to the following criteria. We exclude those whose annual wage is less than 50 GBP (14 observations) or more than 1,000,000 GBP (six observations), those who reported working less than one hour per week (nine observations) or more than 80 hours per week (10 observations), and those earning less than one GBP per hour (nine observations) or more than 200 GBP per hour (seven observations).

Table 8. Descriptive statistics

	Total sample			Men			Women			Gender gap (women –men)
	Obs	Mean	SE	Obs	Mean	SE	Obs	Mean	SE	
Employed	7,683	0.81	0.01	3,417	0.84	0.01	4,266	0.78	0.01	-6 pp
Annual wage	5,374	22413	377	2,381	24,901	617	2,993	19834	417	-20%
Hours worked per week	6,196	37.99	0.18	2,870	40.28	0.25	3,326	35.41	0.25	-4.9
Hourly wage	5,213	11.20	0.15	2,328	11.70	0.22	2,885	10.69	0.22	-9%
Parents have no degree	7,664	0.84	0.00	3,403	0.83	0.01	4,261	0.84	0.01	1 pp
Graduated	7,707	0.27	0.01	3,426	0.25	0.01	4,281	0.28	0.01	3 pp
FiF	7,664	0.18	0.00	3,403	0.16	0.01	4,261	0.20	0.01	4 pp
FiF among the graduated	2,689	0.68	0.01	1,155	0.64	0.02	1,534	0.71	0.01	7 pp

Obs refers to the number of non-missing observations. Total number of unweighted observations: 7,707. Weighted using Wave 8 weights.

In our sample, 27% of young people have graduated from university. The most comparable statistics capturing the share of graduates in this cohort comes from the Annual Population Survey (APS) and gives a higher estimate, 39.6% (Office For National Statistics 2019). There are however significant differences between the two samples and the two definitions. The APS samples everyone who lived in England in 2015 and is aged 25/26, while Next Steps includes only those who have lived in England since age 13/14. The APS graduation rate also takes all types of Level 4 degrees into account, while in Next Steps we only look at BA/BSc and higher university degrees (and thus exclude Level 4 specifications below university degree level). Out of university graduates, 68% are FiF (Table 8), i.e. none of their (step) parents have earned a university degree (BA, BSc or above). Note that the share of FiF among graduates would be 45% in Next Steps if we used the same definition of parental graduation as the UK Higher Education Statistical Agency (HESA) that considers parents as graduates not only if they hold university degrees but also if they hold below-degree level higher education

diplomas or certificates. We have chosen the definition of FiF in this report to stay in line with WP policy.

5.3 Results

RQ6   Does the probability of employment for graduates differ by FiF status?

Table 9 shows the association between being FiF and the probability of employment, log annual wages, hours worked, and log hourly wages estimated in linear models on the sample of university graduates in our main models (Models 1 & 2). There is no meaningful difference in the probability of employment and hours worked between FiF and non-FiF graduates; neither for men nor for women (Models 5 & 6).

RQ7   Do the labour market returns differ for graduates by FiF status?

Table 9 shows the association between being FiF and the probability of employment, log annual wages, hours worked, and log hourly wages estimated in linear models on the sample of university graduates in our main models. There is no meaningful difference in the probability of employment and hours worked between FiF and non-FiF graduates, neither for men nor for women (Model 1-2). In terms of log annual wages, FiF graduate men earn an insignificant 0.044 log points more than non-FiF graduate men (Model 3), while in terms of log hourly wages, they earn 0.075 log points (7.8%) more (Model 7). This difference is statistically significant at the five percent significance level. Among women, this relationship is reversed: FiF graduate women earn 0.059 log points less per annum (Model 4) and -0.077 log points (7.4%) less per hour than non-FiF graduate women (Model 8). This relationship is significant at the 10 percent significance level. To put it another way, there is a FiF advantage for men but a FIF disadvantage for women in terms of wages compared to non-FiF graduates.

Table 9. The 'first in family' gap in labour market outcomes

	(1) Employed Men	(2) Employed Women	(3) Log annual wage Men	(4) Log annual wage Women	(5) Hours worked Men	(6) Hours worked Women	(7) Log hourly wage Men	(8) Log hourly wage Women
FiF	0.026	0.003	0.044	-0.059	-1.129	0.523	0.075**	-0.077*
	(0.031)	(0.024)	(0.042)	(0.044)	(0.781)	(0.688)	(0.037)	(0.040)
Constant	0.996	0.894	8.466***	8.154***	14.832	51.895**	1.981	0.637
	(0.827)	(0.674)	(1.309)	(1.147)	(28.594)	(23.415)	(1.206)	(0.899)
No. of unweighted observations	1,147	1,524	863	1,167	863	1,167	863	1,167
R-squared	0.086	0.076	0.218	0.186	0.144	0.139	0.186	0.140

Sample of university graduates. Weighted using Wave 8 weights. Robust standard errors clustered by school in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Control variables: Sample boost: whether the individual belongs to the sample boost added to the survey in Wave 4. Demographics and family background: age measured in months in 2015 as a continuous variable; ethnicity (White); whether born in the UK; region at age 13; mothers' and fathers' age and social class, number of siblings, FSM eligibility. Early educational attainment: math and reading Key stage 2 test scores in quintiles measured at age 11. Educational progression: capped linear GCSE score quintiles at age 16. The missing values of the control variables are controlled for using missing flags. Interpretation of the estimated coefficients: Employment: All coefficients are interpreted as one-hundredths of a percentage point, i.e. 100 times the coefficients are interpreted as percentage points. Hours worked: number of hours per week. Log annual and hourly wage: coefficients are in log points and may be transformed to percentages through the following transformation: $100*(e^{beta}-1)$, where beta is the estimated coefficient.

In Table 10, we extend our main wage model (Table 9, Model 4) to look at whether adding further control variables to the model changes the magnitude of the estimated FiF gap on the sample of graduates. The goal here is to identify variables that may be driving the FiF gap. We include measures on the details of university degree (university quality, subject choice), the details of employment and finding a job, fertility and living conditions, and non-cognitive skills. We think about these measures as potential channels of the effects of being FiF on wages, and we are interested in whether they attenuate the FiF gap. Model 1 in Table 10 is our previous main model (i.e. the same as Table 9, Model 4), which we include as a point of comparison.

One potential source of the female FiF penalty could be if FiF graduates study at lower quality institutions or do degrees in lower return subjects. Thus, in Table 10, Model 2, we add variables on the details of the university degree of individuals, on top of the variables used in the main model. These are:
- Having an MA/MSc degree (as opposed to a BA/BSc);
- University course in seven categories: Medicine; Sciences; Engineering, tech, architecture; Law and business; Social sciences, humanities, languages; Education; Other;
- Attending a Russell Group university (a group of 24 research intensive universities, often used as a measure of elite university);
- Having a student loan;
- Working while at university at age 19/20 in wave 7 as a career step or for other reasons.

Second, it also may be that they choose different occupations, work in different industries, have different preference about jobs, or they have less social capital that would help them to find good jobs, than non-FiF graduates. In Table 10, Model 3, we add variables on the details of employment on top of the variables used in the previous model:
- Preference for a high-paying job at age 13/14;
- Finding job through social network;
- Whether qualification was needed to get current job;
- Working more than 45 hours a week;
- Working part-time;
- Occupation (1-digit Standard Occupational Classification (SOC) code);
- Industry (1-digit Standard Industrial Classification (SIC) code);
- Living in London;
- Employment tenure in month;
- Firm size (small, medium, large).

Another potential explanation for why we observe a FiF penalty for women may be that FiF women might be more likely to have children earlier than their non-FiF graduate peers. If they have already taken time out of the labour market to have children, they may face a child penalty, which might explain part of the FiF penalty. Similarly, they might also make different living and fertility choices. Thus, in Table 10, Model 4, we add variables on their family and living circumstances at age 25/26 on top of the variables used in the previous model:
- Having a partner: defined as a partner living in the same household;
- Living with parents;
- Having children (binary).

Lastly, it may be that FiF graduates have different non-cognitive skills than their non-FiF graduate peers, which leads to lower labour market outcomes. Thus, we test this hypothesis by adding non-cognitive measures measured at age 25/26 in Model 5 including:
- Locus of control: the extent to which participants believe that they have control over events in their lives; derived using a 4-item scale based on (Lefcourt 1991);
- Trust: how trusting they are of other people on a scale from 0 to 10;

- Risk-taking: how willing individuals are to take risks on a scale from 0 to 10; and
- Patience: how patient individuals believe themselves on a scale from 0 to 10.

Table 10. The 'first in family' gap in log hourly wages: potential channels

	Model 1	Model 2	Model 3	Model 4	Model 5
			Men		
FiF	0.075**	0.075**	0.099***	0.106***	0.100***
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Constant	1.981	2.222*	1.812	1.753	1.596
	(1.206)	(1.213)	(1.123)	(1.114)	(1.127)
Observations	863	863	863	863	863
R-squared	0.186	0.213	0.377	0.386	0.394
			Women		
FiF	-0.077*	-0.059	-0.054	-0.051	-0.047
	(0.040)	(0.038)	(0.036)	(0.036)	(0.035)
Constant	0.637	0.418	1.008	0.917	1.057
	(0.899)	(0.905)	(0.820)	(0.821)	(0.822)
Observations	1,167	1,167	1,167	1,167	1,167
R-squared	0.140	0.202	0.348	0.353	0.363
			Control variables		
Sample boost	yes	yes	yes	yes	yes
Demographics and family background	yes	yes	yes	yes	yes
Early educational attainment	yes	yes	yes	yes	yes
Educational progression	yes	yes	yes	yes	yes
Details of HE degree		yes	yes	yes	yes
Details of employment and finding a job			yes	yes	yes
Family and living conditions				yes	yes
Non-cognitive skills					yes

Sample of university graduates. Linear regression models estimated by OLS, weighted using Wave 8 weights. Robust standard errors clustered by sampling school are in parenthesis. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Control variables: Sample boost: whether the individual belongs to the sample boost added to the survey in Wave 4. Demographics and family background: age measured in months in 2015 as a continuous variable; ethnicity (White); region at age 13; whether born in the UK; mothers' and fathers' age, mothers' and fathers' social class, number of siblings, FSM eligibility. Early educational attainment: math and reading Key stage 2 test scores in quintiles measured at age 11. Educational progression: capped linear GCSE score quintiles at age 16. Details of HE degree: having an MA degree; course (7 categories: Medicine; Sciences; Engineering, tech, architecture; Law and business; Social sciences, humanities, languages; Education; other); going to a Russell Group university, having student loan; working while at university. Details of employment and finding a job: industry, occupation, preference for a high-paying job at age 13, finding job through social network, whether qualification was needed to get current job, working more than 45 hours a week; occupation (1-digit SOC); industry (1 digit SIC), living in London, firm size, employment tenure. Family and living conditions: having children; living with parents; having a partner. Non-cognitive skills: locus of control; preference for risk; patience; trust. The missing values of control variables are controlled for using missing flags.

For men, the estimated significant, positive effects survive through all five models, and the magnitude of the estimated coefficients stay similar, that is to say for men details on university degree; employment and finding a job; family formation and non-cognitive skills do not explain the male FiF advantage. For women, adding information on the university degree slightly decreases the originally estimated coefficient from -0.077 to -0.059; adding the details of employment has no effect on the magnitude of the coefficient (-0.054), while adding information on family circumstances again cause a small decrease (-0.051). Lastly, adding variables on non-cognitive skills produces a coefficient of -0.047. While this effect is not significant, its magnitude is not different in a statistical sense from the one estimated in Model 1 (two-sided t-test p-value= 0.5725). We can say that these additional details on university degree; employment; family formation and non-cognitive skills explain away the female FiF disadvantage.

5.4 Summary

This analysis is the first to investigate the early career labour market outcomes of first in family university graduates in England. Our empirical approach allows us to examine whether FiF individuals face a premium or a penalty on the graduate labour market as compared to their peers who match their parents with a degree. We find for men, being the FiF to graduate from university is not associated with lower wages compared to non-FiF graduates. Whereas FiF women earn on average 7.4% less than graduate women whose parents are also graduates, net of the effect of earlier educational attainment (ability differences) and other measures of family background. Whilst these are average effects, this translates to a FiF female graduate earning approximately £2,000 less compared to a non-FiF graduate who is earning £27,000. This female FiF-gap is partially explained through degree subject studied , employment context and fertility choices. This raises some important policy implications about the information and guidance on degree subject selection and higher education institutional prestige, particularly for women.

5.5 Project Outputs

More information on this research can be found here:

Adamecz-Völgyi, A., Henderson, M., Shure, N. (2020b). The Labour Market Returns to 'First in Family' University Graduates. IZA Discussion Paper No. 13911, Institute of Labour Economics.

Revised paper under review at a peer reviewed journal November 2021.

6. How do the non-cognitive skills of 'first in family' compare to their peers?

6.1 Background

While it is documented that young people from disadvantaged backgrounds are less likely to go to university despite the potential gains, there is less evidence regarding why some disadvantaged young people beat the odds and attend university, but others do not. In this chapter, we try to explain why some individuals achieve intergenerational educational mobility. To do this, we look beyond traditional measures of academic attainment and socioeconomic status to measures of non-cognitive skills, specifically locus of control, academic self-concept, work ethic, and self-esteem. We look at a specific group of disadvantaged youth: those whose parents did not go to university. As before, we call this group *the potential 'first in family' or potential FiF.* Within this group, we make a distinction between those who graduate and thus become *first in family or FiF* university graduates and the rest, who match their parents without a university degree. We exploit a cohort study from England, Next Steps, which has been linked to administrative data on test scores from national high-stakes school examinations. Importantly, the study also includes rich data on family background, adolescent non-cognitive skills, and educational achievements.

Up until now, there has been very little, clear evidence about why some potential FiF students make it to university while others do not. Early educational attainment has been shown to be an important factor for HE participation (Gorard *et al.*, 2017; Adamecz-Völgyi, Henderson, and Shure, 2020a). Young people who do not have the grades will have a much lower probability of making it to university. There is a range of literature that shows that young people from disadvantaged backgrounds, including potential FiF, have lower average secondary school performance than their peers whose parents are university graduates (Henderson, Shure, and Adamecz-Völgyi 2020; Woessmann 2004), and educational attainment is a driver of intergenerational mobility (Blanden, Gregg, and Macmillan 2007; Chetty et al. 2020). A growing empirical literature documents the role of non-cognitive skills, over and above cognitive abilities on several domains such as educational attainment, labour market success and health (Kautz et al. 2014). This literature has benefitted from rich survey data, which allows economists to include measures of non-cognitive skills in the education production function. Blanden, Gregg, and Macmillan (2007) also include measures of non-cognitive skills as mechanisms in their calculation of the intergenerational elasticity of wages, concluding that non-cognitive skills impact educational outcomes for a cohort of people born in 1970 in the UK, but that they do not directly affect wages. Thus, this analysis builds on existing literature by examining the role of non-cognitive skills in intergenerational educational mobility to university.

The term '*non-cognitive skills'* is sometimes seen as vague. In the economics literature, noncognitive skills might encompass various things such as personality characteristics, motivation, attitudes, efforts, emotions, etc. (as opposed to cognitive skills that refer to innate intelligence (IQ) or learnt abilities captured through test scores in math, for example) (Almlund et al. 2011). A rich literature documents the importance of non-cognitive skills for life outcomes. A key conclusion of the literature is that non-cognitive skills truly are "skills" and not "traits" – they can be developed and thus are potentially interesting for education policy. This is especially true if we consider that cognitive skills may be less malleable after a certain age while non-cognitive skills might stay malleable throughout adolescence and beyond (Kautz et al. 2014). Empirical evidence shows that certain policy interventions can influence non-cognitive skills (O'Mara et al. 2006) and thus potentially counteract the negative effects of low parental education on their accumulation. Looking at a cohort of university entrants at an Australian university, Schurer et al. (2020) find that non-cognitive skills, in particular, conscientiousness, one of the Big Five personality traits, help FiF students to compensate for the academic penalties produced by social origin. However, there is a gap in the literature on the role of non-cognitive skills in university entry.

In this chapter we focus on four key non-cognitive skills: locus of control, academic self-concept, work ethic, and self-esteem. Heckman, Stixrud, and Urzua (2006) find that high inner locus of control

(when one believes that they themselves are responsible for their life outcomes as opposed to luck or faith) and self-esteem just as strongly influence schooling decisions as cognitive skills, while Jacob (2002) shows that some non-cognitive factors (effort put into learning, which may be related to work ethic) influence college enrolment even after controlling for education attainment in high school. Prada and Urzúa (2017) show that locus of control, self-esteem, and low levels of adolescent reckless behaviour increases the probability of four-year college attendance (as well as wages), after controlling for cognitive abilities. Academic self-concept, the belief in one's own academic ability, has been shown to be associated with an increase in educational attainment (e.g. Hansen and Henderson 2019; Valentine, DuBois, and Cooper 2004; Chowdry, Crawford, and Goodman 2011). Prevoo and ter Weel (2015) use a British cohort study, the BCS70, to investigate the association between conscientiousness and several outcomes. They find that conscientiousness is associated with higher levels of education, as well as fewer unhealthy behaviours, greater savings, and higher life satisfaction. Conscientiousness has been found to be closely related to work ethic (Mendolia and Walker 2014). Walker and Buchmueller (2020) use the same dataset as this report and show that locus of control, work ethic, and self-esteem do not drive the graduate wage premium because they contribute equally to the wages of university graduates and non-graduates. Taken together this literature shows that the four skills we explore in this chapter have predictive power in explaining university participation and other life outcomes, but it does not show how they contribute to intergenerational educational mobility and socioeconomic gaps in university participation.

Therefore we seek to address this gap by answering the following research question:

RQ8 How do non-cognitive skills compare between FIF young people who graduate and those who are potential FiF?

6.2 Data and Methods
We use non-cognitive measures from adolescence, collected in the first four waves of Next Steps, at ages between 13 and 16, to construct four indexes of non-cognitive skills: external locus of control, academic self-concept, work ethic and self-esteem. We use the earliest available data and decrease the share of missing values (that is between 0-5%) by replacing them from later waves. Importantly, all these measures are collected before the individuals would have been applying to university and are described in more detail below and additional detail in Adamecz-Volgyi et al. (2021).

External locus of control captures whether one believes that external circumstances, like luck or faith, are responsible for the outcomes of their life, and not they themselves (Rotter 1966). Having high external locus of control has been shown to be negatively associated with numerous educational, behavioural, labour market, and health outcomes (Mendolia and Walker 2014). Therefore, we expect higher levels of external locus of control to be negatively related with university participation. Following Schurer (2017) and Mendolia and Walker (2014), we conduct a principal component analysis (PCA) on the answers to six questions on locus of control from the first wave. We use the first resulting factor as an index of external locus of control and standardise it to mean 0 and standard deviation 1. This allows us to interpret our results as the change in probability in going to university for a one standard deviation increase in locus of control.

Academic self-concept is a student's general perception of their ability in school Gutman and Schoon 2016). Empirical evidence shows that self-concept of ability is malleable in school; interventions targeting the development of academic self-concept are effective on average (O'Mara et al. 2006). We expect higher values of academic self-concept to be positively related with university participation since a positive perception of ability in school should mean that individuals want to continue their education. We use questions on how individuals perceive their school achievement to construct a standardised measure of academic self-concept using a PCA (Cronbach's alpha: 0.68). Out of the six questions, five come exclusively from the age 13 wave; while in the case of one

question, 95.5% of the answers come from the first wave, 3.8% come from the second wave and 0.7% come from the third wave.

Work ethic is closely related to conscientiousness, the first of the Big Five personality inventory (Mendez and Zamarro 2016), which has been shown to positively influence many educational and other outcomes (Almlund et al. 2011). Therefore, we expect higher work ethic to be positively related to university participation since these individuals should have higher motivation and drive for applying to university. We create a standardised index of work ethic using a PCA (Cronbach's alpha: 0.56) on three questions that capture hard work and the importance of school success. Two questions come exclusively from the second wave: while for the third question, 96%, 3.6%, 0.4% of the answers come from the first, second and third waves, respectively.

Self-esteem captures one's perceptions on their own value (Coopersmith 1959). Following Mendolia and Walker (2014), we use two questions from the age 14 and age 16 waves that capture how useful/worthless one perceives themselves. In this case, as we only have two questions, we do not use PCA but define individuals having a low self-esteem if they put themselves in the lowest category at least once. We expect low self-esteem to be negatively related to university participation since individuals must have the confidence in their value to apply to university.

In our main empirical models, we control for variables that are expected to affect university participation but could not have been affected by adolescent non-cognitive skills. This includes the following variables:

Demographics and family background: gender, age, number of siblings, fixed effects (FE) for the region of school at age 13, whether the young person is a care leaver, whether the young person had a low birth weight or was born prematurely, ethnicity, mother's social class, father's social class, age of mother, age of father, single parent household, an area-level measure of income deprivation (IDACI), disability, whether or not their grandparent(s) attended university, FSM eligibility status, whether they went to private school, and highest qualifications of the mother and the father (only in models where parents are non-graduates). For all missing values for these variables, we include a missing flag.

We are interested in whether non-cognitive skills affect university participation above and beyond cognitive skills. We do not have a direct measure of cognitive skills, but we observe the results of national exam scores in school. Thus, we control for national exam scores measured at the end of primary school at age 11, Key Stage 2 (KS2) scores, as a proxy for cognitive abilities. Note that this educational attainment measure was assessed years before the non-cognitive measures. In some models, we also control for high-stake exam test scores measured at age 16, capped linear GCSE (Key Stage 4) scores. Controlling for age 16 test scores might help to absorb any potential omitted variable bias, while as they are measured years after non-cognitive skills, they could also act as a channel through which non-cognitive skills are related with university participation. If we control for rich measures of social background, age 11 test scores and non-cognitive skills, there are probably few remaining omitted variables. Moreover, as non-cognitive skills, age 16 test scores and university participation are all positively correlated with each other, adding age 16 test scores to the models will attenuate the estimated coefficients on non-cognitive skills further. Thus, we interpret the estimated coefficients from these models as the lower bounds of the statistical relationship between non-cognitive skills and university participation. We use all test scores as categorical variables based on the quintiles of achievement and set a sixth category to capture their missing values.

We estimate the linear probability models where the outcome is a binary variable for attending university that include one non-cognitive measure at a time (Model 1-4) and the control variables. Then, we re-estimate the model including all four non-cognitive measures in the model at once. The

sample includes potential FiF individuals only, as we want to understand how non-cognitive skills facilitate intergenerational educational mobility for those whose parents are non-graduates.

6.3 Results

RQ8 How do non-cognitive skills compare between FiF young people who graduate and those who are potentialFiF?

The results of this analysis are presented in Table 11. In Models 1-4, we regress the binary outcome variable on each of the non-cognitive measures one at time while controlling for the background characteristics previously outlined. In Model 5, we enter all four non-cognitive measures at the same time and in Model 6 we additionally control for age 16 exam score quintiles. Table 3 shows that non-cognitive skills play an important role in facilitating intergenerational educational mobility. All non-cognitive skills are statistically significant predictors of university attendance on their own. In a joint model, when all measures are included at the same time, their magnitudes decrease, but they all remain statistically significant. One standard deviation higher external locus of control decreases the probability of university participation by 3.8 percentage points, while one standard deviation higher work ethic and academic self-concept increases it by 2.5 and 8.9 percentage points, respectively.

Table 11. The relationship between non-cognitive skills and the probability of university participation among the potential first in family

	(1)	(2)	(3)	(4)	(5)	(6)
External locus of control (continuous, standardized)	-0.071***				-0.038***	-0.003
	(0.008)				(0.008)	(0.008)
Work ethic (continuous, standardized)		0.071***			0.025***	0.017**
		(0.008)			(0.008)	(0.008)
Academic self-concept (continuous, standardized)			0.110***		0.089***	0.028***
			(0.009)		(0.009)	(0.008)
Low self-esteem (binary)				-0.099***	-0.054**	-0.033
				(0.023)	(0.023)	(0.022)
Constant	1.308**	1.389**	1.246**	1.436**	1.208**	1.152**
	(0.556)	(0.566)	(0.556)	(0.572)	(0.539)	(0.501)
Observations	3,753	3,753	3,753	3,753	3,753	3,753

Notes: Sample of potential first in family individuals (i.e. neither parent has a university degree). Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Weighted using Wave 8 weights. All models control for gender, age, number of siblings, region, whether the young person is a care leaver, whether the young person had a low birth weight or was born prematurely, ethnicity, mother's social class, father's social class, age of mother, age of father, single parent household, income deprivation, disability, whether their grandparent attended university, Free School Mean (FSM) status, private school, the highest qualification of the mother and father, and Key Stage 2 quintile of achievement. Column 6 additionally includes GCSE total points quintile. Model 5 using CFA instead of PCA to create the indexes of non-cognitive skills is reported in Table B1 in Appendix B.

Source: University College London, UCL Institute of Education, Centre for Longitudinal Studies. (2018). Next Steps: Sweeps 1-8, 2004-2016: Secure Access. DOI: 10.5255/UKDA-SN-7104-4

Having low self-esteem is associated with 5.4 percentage points lower likelihood of university participation. These relationships are over and above prior attainment (age 11 test scores) and a range of socio-demographic characteristics, all measured prior to these non-cognitive traits. Even in Model 6, where we introduce age 16 exam performance, which is expected to bias the estimated

coefficients on non-cognitive scores downwards in terms of magnitude, the statistical significance of work ethic and academic self-concept remain. One standard deviation higher work ethic is associated with 1.7 percentage point higher probability of university participation while one standard deviation higher academic self-concept is associated with 2.8 percentage point higher probability of university participation.

6.4 Summary

This section looked at the role of non-cognitive skills in facilitating intergenerational educational mobility. We have shown conditional on early education attainment, having higher non-cognitive skills (specifically, academic self-concept and higher work ethic) helps potential first in family university students to compensate for their relative disadvantage and beat the odds in terms of university participation. Our results are in line with Schurer et al. (2020) who find that non-cognitive skills are important for university participation.

6.5 Project Outputs

More information on this research can be found here:

Adamecz-Völgyi, A., Henderson, M., Shure, N. (2021). Intergenerational Educational Mobility – The Role of Non-cognitive Skills. IZA Discussion Paper No. 14580, Institute of Labour Economics.

7. How has the proportion of 'first in family' changed across cohorts?

7.1 Background

The Widening Participation (WP) agenda in England aims to increase the university participation rates of disadvantaged groups, including those who would be the first in their families to go to university ('first in family' or FiF). To increase educational mobility, WP teams need to target *potential FiF*, those young people with non-graduate parents. Potential FiF are an important WP group for several reasons. They may lack financial and information resources, which are crucial to accessing higher education; they may lack role models who have attended university, and therefore guidance and support in navigating the application process; and they are a large and heterogeneous group, accounting for the majority of a recent cohort in England. Potential FiF are also a dynamic group that is expected to change over time. Along with the expansion of higher education since the mid-1980s, the share of potential FiF students is expected to decrease as more parents obtain university degrees. In this chapter, we compare the share and the university aspirations of potential FiF students across two recent generations in England to show how they have changed. We use the data of two comparable studies that cover cohorts born in 1989 and in 1998. These two cohorts, although recent and close in age, highlight the dynamic nature of the FiF group. The share of their parents with tertiary degrees increased by about 50% between the two cohorts (see Figure 4).

RQ9 Has the share of potential FiF students, HE aspirations and parental aspirations changed over time?
RQ10 Does the share of potential FiF students, HE aspirations and parental aspirations differ across the home nations in the UK?
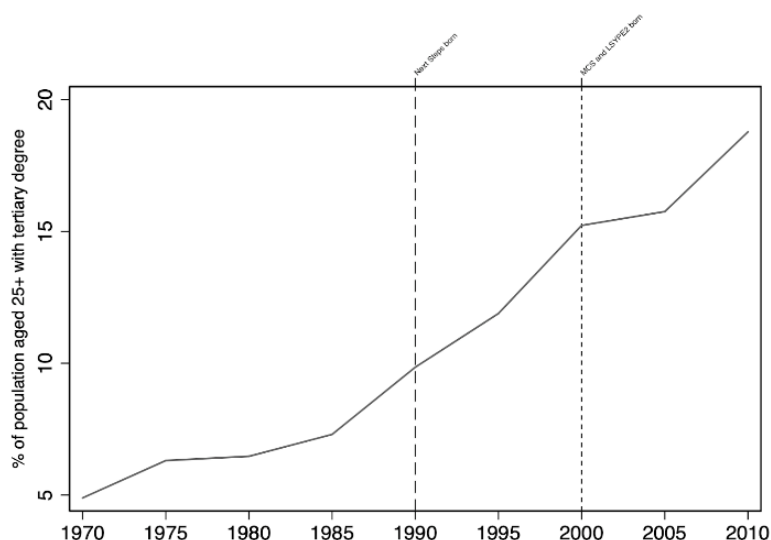
7.2 Data and Methods

This chapter uses the data of three cohort studies: Next Steps, the second Longitudinal Study of Young People in England (LSYPE2), and the Millennium Cohort Study (MCS). Next Steps follows the life of around 16,000 people born in 1989/1990 in England. It began in 2004 when the sample members were aged 14. The LSYPE2 covers 13,000 people born in 1998/1999 in England. Both Next Steps and LSYPE2 started following their cohort in secondary school when the sample members were aged 14. The LSYPE2 data enables easy comparison with Next Steps as it uses the same sampling frame and similar questions. Thus, we use these two data sources to look at changes over time. The Millennium Cohort Study is a birth cohort study of 19,000 young people born in 2000/2001 in the UK. This is the most recent generation to have grown up under the expanded HE landscape with increasing focus on Widening Participation, but have not yet attended university. The MCS enables cross-national comparison between England, Scotland, Wales and Northern Ireland. The sample size for the MCS is 11,714 individuals at age 14 in 2015 and this sweep contains information on the young person's university aspirations.

7.3 Results

RQ9 Has the share of potential FiF students, HE aspirations and parental aspirations changed over time?
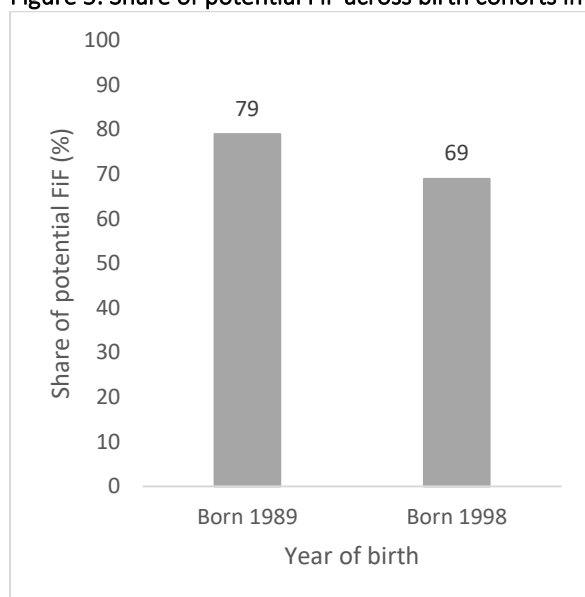
The share of potential FiF students decreased across the two cohorts (Figure 5). While among those born in 1989, 79% did not have parents with a university degree, this share decreased to 69% for those born in 1998. This reflects the increase in number of parents who are graduates over time (evident in Figure 4).

Figure 4: Share of the population aged 25 and over with tertiary degrees in the UK
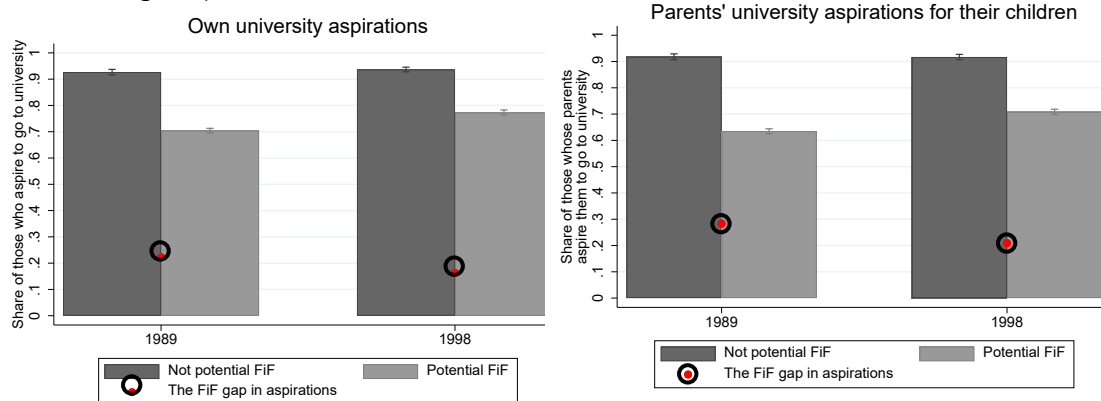

Source: Adapted from Barro and Lee (2013).

Figure 5: Share of potential FiF across birth cohorts in England (cohort members at age 14)

Notes: Sources: 1989 data, Next Steps, (UCL, 2018); and 1998 data, LSYPE, (Department for Education, 2018). Weighted using survey weights.
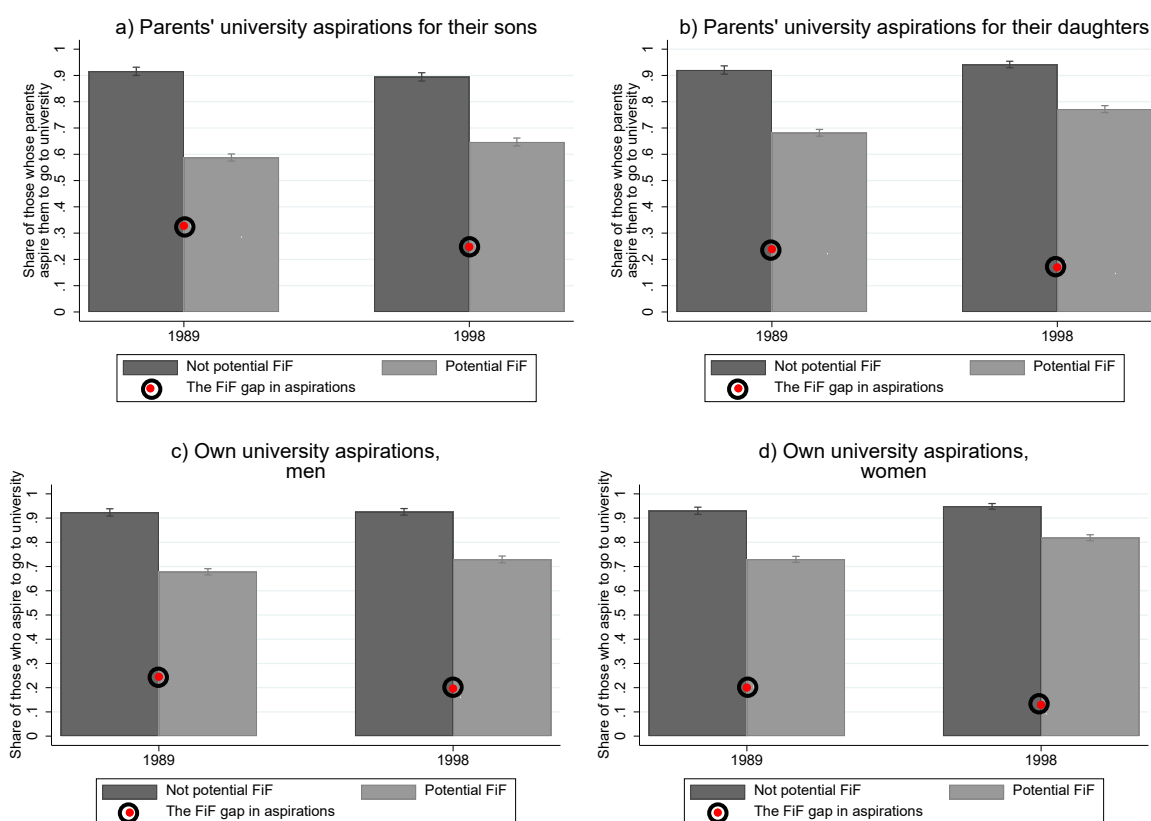
Potential FiF students are less likely to aspire to attend university than those whose parents are graduates (Figure 6, left panel). In the 1989 cohort, potential FiF young people were 23 percentage points less likely to aspire to university than children of graduate parents, and this gap decreased to 17 percentage points in the younger cohort. Similarly, non-graduate parents have lower university aspirations for their children than graduate parents (Figure 6, right panel). While parental university aspirations stayed constant between the two cohorts among graduate parents, they increased from 63% to 71% among parents who do not have a university degree themselves. Thus, the aspiration gap between young people with and without graduate parents decreased both in students' own and their parents' university aspirations over this decade.

Figure 6: University aspirations across birth cohorts in England: own and parental aspirations (cohort members at age 14)

Notes: Sources: 1989 data, Next Steps, (UCL, 2018); and 1998 data, LSYPE2, (Department for Education, 2018). Weighted using survey weights. Own university aspirations: the share of those who are very likely or likely to go to university. Parents' university aspirations: share of parents saying that their children are very likely or likely to go to university

Figure 7: University aspirations across birth cohorts in England: own and parental aspirations (cohort members at age 14)

Notes: Sources: 1989 data, Next Steps, (UCL, 2018); and 1998 data, LSYPE2, (Department for Education, 2018). Weighted using survey weights. Own university aspirations: the share of those who are very likely or likely to go to university. Parents' university aspirations: share of parents saying that their children are very likely or likely to go to university

Potential FiF students are less likely to aspire to attend university than those whose parents are graduates (Figure 6, left panel). In the 1989 cohort, potential FiF young people were 23 percentage points less likely to aspire to university than children of graduate parents, and this gap decreased to
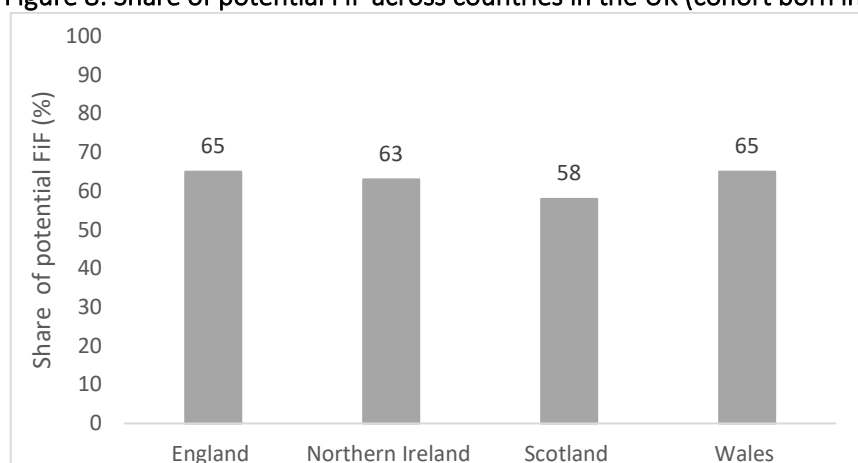
17 percentage points in the younger cohort. Similarly, non-graduate parents have lower university aspirations for their children than graduate parents (Figure 6, right panel). While parental university aspirations stayed constant between the two cohorts among graduate parents, they increased from 63% to 71% among parents who do not have a university degree themselves. Thus, the aspiration gap between young people with and without graduate parents decreased both in students' own and their parents' university aspirations over this decade.

In terms of the cohort members' own aspirations, women from non-graduate households have increased their aspirations for university more over this ten-year period than men (panel (c) and (d), Figure 7). This has led to a smaller gap in university aspirations between those from graduate and non-graduate households for women (0.20 to 0.13) than for men (0.25 to 0.20).

RQ10 Does the share of potential FiF students, HE aspirations and parental aspirations differ across the home nations in the UK?

The share of potential FiF students is similar across countries in the UK (Figure 8). Among those born in 2000, the share of young people whose parents do not have a university degree is highest in Wales (65%) and in England (65%), followed by Northern Ireland (63%) and Scotland (58%).
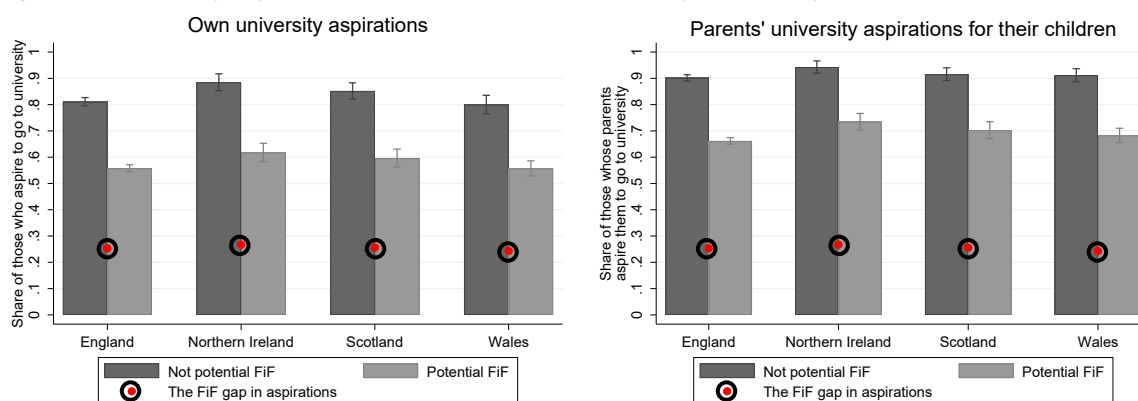
Figure 8: Share of potential FiF across countries in the UK (cohort born in 2000)

Notes: Source: Millennium Cohort Study (UCL, 2017). Weighted using survey weights.

Among those born in 2000, the young person's own as well as parental university aspirations are the highest in Northern Ireland for all young people (Figure 9). Interestingly, the potential FiF gap in aspirations (the difference in aspiration between those whose parents have a university degree and those whose do not) is very similar across the four countries. This points to a common set of disadvantages being faced by children in non-graduate households across the UK.

Figure 9: University aspirations across countries: own and parental aspirations (cohort born in 2000)

7.4 Summary

In summary, we find that the share of potential FiF students decreased from 79% to 69% in a decade in England and while the university aspirations of children of graduate parents did not change, the aspirations of potential FiF students increased. Similarly, parental university aspirations increased in the potential FiF group only, thus, the increased rates of university participation on average are due to an increase in intergenerational educational mobility. When we compared the FiF gaps in university aspirations across the home nations in the UK for a cohort born in 2000, we find some remarkable similarities.

If university aspirations translate into actual participation, then the increase in aspirations documented here will lead to increased intergenerational educational mobility. For the cohort of those born in 1989, we already see that over 60% of those with university aspirations went to university by age 25, while this share is below 20% among those who did not have aspiration for university at age 14. However, while adolescent university aspirations are predictive in terms of university participation, it is hard to tell how this statistical relationship would turn out to be exactly for the younger cohort. Only continuation of relevant data collection and further analysis will answer this question.

While university aspirations were stable among children of graduate parents between two cohorts born in 1989 and 1998, there is a rise in both the own university aspirations of potential FiF students as well as those of their parents. This is especially true for women from non-graduate households. This phenomenon is expected to contribute towards decreasing social inequalities in terms of the probability of graduation. However, as evidence indicates that FiF university students make different choices in terms of university quality and course (for example, they are less likely to enrol in Russell Group universities than children of graduate parents), our results also emphasize the need for interventions to reduce horizontal stratification. Across the UK, children from non-graduate households constitute a similar proportion of the population and demonstrate similar disadvantage in terms of lower aspirations for university than their peers with graduate parents. This highlights the potential for policy learning from WP practitioners across the UK as they share best practice for getting first in family students into and successfully through university.

8. Conclusions and recommendations

In this project we had five main aims. Firstly, we aimed to understand why some students whose parents are not university-educated make it to university and some do not. When comparing people with non-graduate parents, we found that those who attend university have higher prior educational attainment than those who don't attend university. Moreover, conditional on prior attainment and other important control variables, we see a differential effect of being FiF by ethnicity; those from Black and minority ethnic groups are more likely to outperform their parents in achieving a university degree than those who classify themselves as White. We also see some socioeconomic differences, where those with higher levels of parental education [below degree level]; and more stable housing tenure are more likely to graduate from university.

Our analysis also shows that for a cohort born in 1989, 18% of young people are FiF while 8.5% match their parents with a degree. The result that FiF comprise around two-thirds of graduates (68%) is somewhat surprising. Despite the overall expansion in Higher Education (HE) provision, there remains some evidence of horizontal stratification, where FiF students are less likely to access top universities and study for high-status subjects. More specifically, FiF students are less likely to attend Russell Group universities than their peers with university-educated parents; and FiF students are more likely to take Law, Economics and Management and less likely to take other Social Sciences, Arts and Humanities than non-FiF students. FiF students are more likely to drop out of university than those whose parents have a degree.

Given that we note these descriptive differences of FiF students compared to non-FiF students in terms of prior attainment, ethnicity, socio-economic status and HE choices, we recommend that universities should actively target FiF students in their recruitment and support them whilst at university through their mentoring schemes specifically targeted to FiF students.

Our second project aim was to interrogate how the 'first in family' measure compares to other Widening Participation (WP) indicators. That is to say whether the FiF distinction overlaps with the same individuals who have a disability, live in poorer neighbourhoods or fulfil other WP characteristics used by universities. We find that FiF status captures additional disadvantage over and above other WP measures we were able to model. This is important as the potential FiF group is a large pool from which to draw and may be an important target group to actually widen university participation. This work reaffirms the need to remain committed to contextualised admissions as a way to ensure university offers are made fairly and to ensure diversity of the university student body, and suggests that parental education should be a focus of the context.

We acknowledge there may be issues with measuring FiF in a practical sense as it is easier to prove the existence of a parental degree than the non-existence of a parental degree. In practice, if being FiF becomes a targeted WP indicator, it may also increase the risk of individuals attempting to game the system, therefore there is a need to ensure that any FiF measure is verifiable; accurate; and reliable. To do this UCAS should explore linked data opportunities (e.g. to Her Majesty's Revenue and Customs data to identify details of their occupation) and consider the way that the FiF information is collected currently. The current question wording is '*Do any of your parents, step parents or guardians have any higher qualifications, such as a degree, diploma, or certificate of higher education?'* with the response options as: yes, no, don't know and prefer not to say. The additional information provided on the form notes: *'Parental education please indicate whether or not any of your parents, step parents or guardians have taken a course at higher education level. If you are unsure, please select **don't know,** or if you do not wish to disclose this information please select **I prefer not to say**'*.

We recommend that, rather than a yes/no question about 'higher education', applicants select the highest qualification either parent has achieved from a set of response options showing the different

levels of qualification for example, below GCSE or equivalent/ GCSE or equivalent, A levels or equivalent etc. This specificity encourages accuracy and precision. In addition, having separate questions for mothers' and fathers' education may further encourage this. We also recommend including a question about parental occupation which would enable a sense check between parental education and parental occupation and possibly asking for a referee who could verify this information (i.e. an employer or a teacher). We also recommend putting a signed declaration next to this question, not at the end of the form, to improve the reliability of the measure. These approaches should be piloted and evaluated by UCAS in the first instance.

The third project aim was to identify whether there are differences by FiF status on the graduate labour market in terms of working hours and labour market returns compared to their peers whose parents are graduates. Here we are interested in whether the 'shadow' of being FiF continues into the labour market or not, even after taking into account degree subject and institution. We find that for men, being the FiF to graduate from university is not associated with lower wages compared to non-FiF graduates. Whereas FiF women earn on average 7.4% less than graduate women whose parents are also graduates, net of the effect of earlier educational attainment (ability differences) and other measures of family background. The female FiF-pay gap is partially explained by degree subject studied, employment context (industry, occupation and firm size) and fertility choices. We recommend that efforts are made by graduate employers to support the Widening Participation agenda beyond higher education, by recording FiF status in their graduate applications through to recruitment and to encourage diversity.

Fourth, we aimed to document whether there were any substantive differences in the non-cognitive skills of the potential FiF students. Here we compare the non-cognitive skills of those potential FiF students (young people whose parents do not have a degree) who make it to university with potential FiF students who do not. We find that conditional on early education attainment, having higher non-cognitive skills (specifically, academic self-concept and work ethic) helps potential FiF university students to compensate for their relative disadvantage and beat the odds in terms of university participation. We recommend that early intervention among the *potential* FiF group is important, where there should be more coordination and resource to raise attainment [and non-cognitive skills] among this group throughout schooling to ensure that young people are able to pursue higher education should they choose.

Our last project aim was to record whether the proportion of FiF students has changed among more recent cohorts (born in 1998-99 & 2000). Here we look at comparisons across time and across the home nations within the UK to try to understand how the proportion and aspirations of FiF have shifted or whether they remain constant. We find that although the share of potential FiF has decreased over time, in more recent cohorts, the proportion of young people with higher education aspirations has increased. The share of potential FiF and their higher education aspirations are stable across England, Wales, Scotland and Northern Ireland. This suggests some of the underpinning characteristics of FiF status are consistent across the home nations and WP practitioners should continue to share good practice.

As with all analyses that make use of observational data, there are a number of limitations. Firstly, we cannot claim any of our findings are truly causal, instead they capture conditional relationships between parental education and higher education participation for their children. This means that we are left with a conservative estimate of the relationship between parental education and their children's education. Nevertheless, we believe that these conditional relationships are important to document. Secondly, in the main, these findings are based on a single cohort of people born in 1989/90 who went to university at around 2010, since then, the higher education institutions have been more active in their widening participation activities, which means that this topic warrants further examination of how the relationship between parental education and higher education participation has changed. We have shown in this report that the share of potential FiF students has

fallen over time, but we need to better understand how more recent cohorts of young people navigate the education system and the labour market.

Taken together, our findings suggest that universities need to renew their commitment to Widening Participation strategies and refine their contextual admissions to include parental education, as well as focusing on ways to better support FiF students in particular. There is some work that needs to be done by graduate employers at continuing the efforts of the Widening Participation agenda beyond higher education to ensure diversity of recruitment. In addition to these recommendations, we believe that this project has highlighted the need to continue research on this topic to understand inequalities by parental education.

References

Adamecz-Völgyi, A., Henderson, M., & Shure, N. (2019). Is 'first in Family' a good indicator for widening university participation? IZA Discussion Paper No. 12826. Institute of Labor Economics.

Adamecz-Volgyi, A., Henderson, M., & Shure, N. (2020a). Is 'first in family' a good indicator for widening university participation?. *Economics of Education Review*. doi:10.1016/j.econedurev.2020.102038

Adamecz-Völgyi, A., Henderson, M., Shure, N. (2020b). The Labour Market Returns to 'First in Family' University Graduates. IZA Discussion Paper No. 13911, Institute of Labour Economics.

Adamecz-Völgyi, A., Henderson, M., Shure, N. (2021). Intergenerational Educational Mobility – The Role of Non-cognitive Skills. IZA Discussion Paper No. 14580, Institute of Labour Economics.

Almlund, M, Lee Duckworth, A., Heckman, J.J. and Kautz, T. (2011). 'Personality Psychology and Economics'. In *Handbook of the Economics of Education*, edited by Eric A. Hanushek, Stephen Machin, & Ludger Woessmann, 4:1–181. Handbook of The Economics of Education. Elsevier. https://doi.org/10.1016/B978-0-444-53444-6.00001-8.

Barro, R. J., and Lee, J.W., (2013). 'A New Data Set of Educational Attainment in the World, 1950–2010'. *Journal of Development Economics* 104: 184–98.

Belfield, C., Britton, J., Buscha, F., Dearden, L., Dickson, M., van der Erve, L, Sibieta, L., Vignoles, A., Walker, I., and Zhu, Y. (2018). 'The Impact of Undergraduate Degrees on Early-Career Earnings'. 27 November 2018. https://www.ifs.org.uk/publications/13731.

Belfield, C., Britton, J., Bushca, F., Dearden, L., Dickson, M., van der Erve, L., Sibieta, L., Vignoles, A., Walker, I., & Zhu, Y., (2018a). *The relative labour market returns to different degrees*. Research Report. Retrieved April 14, 2020, from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/714517/The_relative_labour_market-returns_to_different_degrees.pdf

Bjorklund, A., & Kjellstrom, C. (2002). Estimating the return to investments in education: How useful is the standard Mincer equation? *Economics of Education Review*, *21*(3), 195–210. https://doi.org/10.1016/S0272-7757(01)00003-6

Blanden, J, Gregg, P., Macmillan, L. (2007). 'Accounting for Intergenerational Income Persistence: Noncognitive Skills, Ability and Education'. *The Economic Journal* 117 (519): C43–60. https://doi.org/10.1111/j.1468-0297.2007.02034.x.

Blanden, J, and Machin, S. (2004). 'Educational Inequality and the Expansion of UK Higher Education'. *Scottish Journal of Political Economy* 51 (2): 230–49.

Blundell, R., Dearden, L., and Sianesi, B. (2005). 'Evaluating the Effect of Education on Earnings: Models, Methods and Results from the National Child Development Survey'. *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 168 (3): 473–512. https://doi.org/10.1111/j.1467-985X.2004.00360.x.

Boliver, V. (2013). How fair is access to more prestigious UK universities? *The British Journal of Sociology*, *64*(2), 344–364. https://doi.org/10.1111/1468-4446.12021

Boliver, V. et al. (2017) Admissions in Context: The Use of Contextual Information by Leading Universities. The Sutton Trust, p. 47. Available at: https://www.suttontrust. com/wp-content/uploads/2017/10/Admissions-in-Context-Final_V2.pdf (Accessed: 21 November 2018)

Boliver, V., Gorard, S., & Siddiqui, N. (2015). Will the use of contextual indicators make UK higher education admissions fairer? *Education Sciences, 5*(4), 306–322. https://doi.org/10.3390/educsci5040306.

Breiman, L. (2001). Random forests. *Machine Learning, 45*(1), 5–32. https://doi.org/10.1023/A:1010933404324

Britton, J., Dearden, L., and Waltmann, B., (2021). The returns to undergraduate degrees by socio-economic group and ethnicity. Institute of Fiscal Studies. 26 March 2021. https://ifs.org.uk/publications/15383

Britton, J., Dearden, L., Shephard, N., and Vignoles, A. (2016). 'How English Domiciled Graduate Earnings Vary with Gender, Institution Attended, Subject and Socio-Economic Background'. 13 April 2016. https://www.ifs.org.uk/publications/8233.

Britton, J., Dearden, L., Shephard, N., & Vignoles, A. (2016). *How English domiciled graduate earnings vary with gender, institution attended, subject and socio-economic background*. Institute for Fiscal Studies.

Britton, J., Shephard, N., and Vignoles, A. (2015). 'Comparing Sample Survey Measures of English Earnings of Graduates with Administrative Data during the Great Recession'. Working Paper W15/28. IFS Working Papers.

Card, David. 1999. 'Chapter 30 - The Causal Effect of Education on Earnings'. In *Handbook of Labor Economics*, edited by Orley C. Ashenfelter and David Card, 3:1801–63. Elsevier. https://doi.org/10.1016/S1573-4463(99)03011-4.

Chetty, R., Friedman, J.N., Saez, E., and Yagan, D. (2020). 'Income Segregation and Intergenerational Mobility Across Colleges in the United States'. *The Quarterly Journal of Economics* 135 (3): 1567–1633.

Chetty, R., Hendren, N., Kline, P., Saez, E., and Turner, N. (2014). 'Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility'. *American Economic Review* 104 (5): 141–47. https://doi.org/10.1257/aer.104.5.141.

Chevalier, A., and Conlon, G. (2003). 'Does It Pay to Attend a Prestigious University?' SSRN Scholarly Paper ID 435300. Rochester, NY: Social Science Research Network. https://papers.ssrn.com/abstract=435300.

Chowdry, H., Crawford, C. and Goodman, A. (2011). 'The Role of Attitudes and Behaviours in Explaining Socio- Economic Differences in Attainment at Age 16', 18.

Coopersmith, S. (1959). 'A Method for Determining Types of Self-Esteem'. *The Journal of Abnormal and Social Psychology* 59 (1): 87–94. https://doi.org/10.1037/h0048001.

Crawford, C., & Greaves, E. (2015). Socio-economic, ethnic and gender differences in HE participation. London: BIS (Department for Business Innovation and Skills), (Research Paper No. 186).

Currie, J., & Moretti, E. (2003). Mother's education and the intergenerational transmission of human capital: Evidence from college openings. *The Quarterly Journal of Economics, 118*(4), 1495–1532.

Department for Education and Skills. (2003) *The future of higher education*. Department for Education and Skills. Retrieved July 21, 2017, from www.educationengland.org.uk/documents/pdfs/2003-white-paper-higher-ed.pdf

Department for Education, Kantar Public. (2018). Our Future: Waves 1-3, 2013-2015. [data collection]. 2nd Edition. UK Data Service. SN: 7810, http://doi.org/10.5255/UKDA-SN-7810-2.

Dickson, M. (2013). 'The Causal Effect of Education on Wages Revisited*'. *Oxford Bulletin of Economics and Statistics* 75 (4): 477–98. https://doi.org/10.1111/j.1468-0084.2012.00708.x.

Fallon, M. V. (1997). The school counselor's role in first generation students' college plans. *The School Counselor*, *44*(5), 384–393. https://eric.ed.gov/?id=EJ553587

Forrest Cataldi, E., Bennett, C. T., Chen, X., & Simone, S. A. (2018) *First generation students: College access, persistence, and postbachelor's outcomes, Stats in Brief*, U.S. Department of Education. Retrieved October 7 2018, from https://nces.ed.gov/pubs2018/2018421.pdf

Gorard, S., Siddiqui, N., & Boliver, V. (2017). An analysis of school-based contextual indicators for possible use in widening participation. *Higher Education Studies, 7*(2), (79).

Gutman, L.M. and Schoon, I. (2016). 'A Synthesis of Causal Evidence Linking Non-Cognitive Skills to Later Outcomes for Children and Adolescents'. In *Non-Cognitive Skills and Factors in Educational Attainment*, edited by Myint Swe Khine and Shaljan Areepattamannil, 171–98. Contemporary Approaches to Research in Learning Innovations. Rotterdam: SensePublishers. https://doi.org/10.1007/978-94-6300-591-3_9.

Hansen, K., and Henderson, M. (2019). 'Does Academic Self-Concept Drive Academic Achievement?' *Oxford Review of Education* 45 (5): 657–72. https://doi.org/10.1080/03054985.2019.1594748.

Heckman, J. J., Stixrud, J., and Urzua, S. (2006). 'The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior'. *Journal of Labor Economics* 24 (3): 411–82. https://doi.org/10.1086/504455.

HEFCE. (2010) *Aim higher summer schools: Participation and progression to higher education, higher education funding council for England issues paper 2010/32*. Higher Education Funding Council for England. Retrieved July 20, 2017, from http://webarchive.nationalarchives.gov.uk/20180319114450/http://www.hefce.ac.uk/data/year/2010/Aimhigher,summer,schools,Participants,and,progression,to,higher,education/

Henderson, M., Shure, N., & Adamecz-Völgyi, A., (2019). First in Family' university graduates in England. IZA Discussion Paper No.12588, Institute of Labor Economics.

Henderson, M., Shure, N., & Adamecz-Volgyi, A. (2020). Moving on up: 'First in family' university graduates in England. *Oxford Review of Education*. doi:10.1080/03054985.2020.1784714

HESA. (2021), *Non-continuation Summary: UK Performace Indicators*. Higher Education Statistics Agency. Retrieved 9 July 2021, from https://www.hesa.ac.uk/data-and-analysis/performance-indicators/non-continuation-summary

Holmlund, H., Lindahl, M., & Plug, E. (2011). 'The causal effect of parents' schooling on children's schooling: A comparison of estimation methods. *Journal of Economic* https://doi.org/10.1920/wp.ifs.2015.1528.

Ilie, S., Sutherland, A., & Vignoles, A. (2017). Revisiting free school meal eligibility as a proxy for pupil socio-economic deprivation. *British Educational Research Journal, 43*(2), 253–274. https://doi.org/10.1002/berj.3260.

Jacob, B. A. (2002). 'Where the Boys Aren't: Non-Cognitive Skills, Returns to School and the Gender Gap in Higher Education'. *Economics of Education Review* 21 (6): 589–98.

Jenkins, S., & Schluter, C. (2002), The effect of family income during childhood on later-life attainment: Evidence from Germany. IZA Discussion Paper No.604, Institute of Labor Economics.

Kautz, T., Heckman, J.J., Diris, R., ter Weel, B. and Borghans, L. (2014). 'Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success'. Working Paper 20749. National Bureau of Economic Research. https://doi.org/10.3386/w20749.

LFS, Northern Ireland Statistics and Research Agency, Central Survey Unit, Office for National Statistics, Social Survey Division. (2016). *Labour force survey annual eurostat dataset, 2014*. [data collection]. UK Data Service. SN: 7941, https://doi.org/http://doi.10.5255/UKDA-SN-7941-1

MacDermott, K. G., Conn, P. A., & Owen, J. W. (1987). The influence of parental education level on college choice. *Journal of College Admissions*, *115*, 3–10. https://eric.ed.gov/?id=EJ353636

Manzoni, A, and Streib, J. (2019). 'The Equalizing Power of a College Degree for First-Generation College Students: Disparities Across Institutions, Majors, and Achievement Levels'. *Research in Higher Education*, no. 60: 577–605.

Maurin, E., & McNally, S. (2008). Vive la revolution! long-term educational returns of 1968 to the angry students. *Journal of Labor Economics, 26*(1), 1–33. https://doi.org/10.1086/522071.

Mendez, I, and Zamarro, G. (2016). 'Noncognitive Skills'. In *Non-Cognitive Skills and Factors in Educational Attainment*, edited by Myint Swe Khine and Shaljan Areepattamannil, 411–28. Contemporary Approaches to Research in Learning Innovations. Rotterdam: SensePublishers. https://doi.org/10.1007/978-94-6300-591-3_19.

Mendolia, S., and Walker, I. (2014). 'The Effect of Noncognitive Traits on Health Behaviours in Adolescence'. *Health Economics* 23 (9): 1146–58. https://doi.org/10.1002/hec.3043.

Nunez, A.M., and S Cuccaro-Alamin, S. (1998). 'First-Generation Students: Undergraduates Whose Parents Never Enrolled in Postsecondary Education'. Statistical Analysis Report. National Center for Education Statistics. https://www.researchgate.net/publication/242182970_Students_Whose_Parents_Did_Not_Go_to_College_Postsecondary_Access_Persistence_and_Attainment.

O'Mara, A. J., Marsh, H.W., Craven, R.G., and Debus, R.L. (2006). 'Do Self-Concept Interventions Make a Difference? A Synergistic Blend of Construct Validation and Meta-Analysis'. *Educational Psychologist* 41 (3): 181–206. https://doi.org/10.1207/s15326985ep4103_4.
of Economics and Statistics 75 (4): 477–98. https://doi.org/10.1111/j.1468-0084.2012.00708.x.

Office For National Statistics, Social Survey Division. (2019). 'Annual Population Survey, July 2015 - June 2016'. UK Data Service. https://doi.org/10.5255/UKDA-SN-8054-5.

Office for National Statistics, Social Survey Division. (2019). Annual population survey, January - December, 2015. [data collection]. 8th Edition. UK Data Service. SN: 7928. Office for National Statistics. https://doi.org/http://doi.10.5255/UKDA-SN-7928-8

Office for National Statistics. (2010). *Standard occupational classification 2010; Volume 3 The national statistics socio-economic classification: (Rebased on the SOC2010) user manual*. Office for National Statistics. Retrieved December 18, 2018, from http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/soc2010/soc2010-volume-3-ns-sec—rebased-onsoc2010—user-manual/index.html#5)

Oreopoulos, P, and Petronijevic., U. (2013). 'Making College Worth It: A Review of Research on the Returns to Higher Education'. Working Paper 19053. National Bureau of Economic Research. https://doi.org/10.3386/w19053.

Prada, M. F., and Urzúa, S. (2017). 'One Size Does Not Fit All: Multiple Dimensions of Ability, College Attendance, and Earnings'. *Journal of Labor Economics* 35 (4): 953–91. https://doi.org/10.1086/692477.

Prevoo, T., and ter Weel, B. (2015). 'The Importance of Early Conscientiousness for Socio-Economic Outcomes: Evidence from the British Cohort Study'. *Oxford Economic Papers* 67(4): 918–48. https://doi.org/10.1093/oep/gpv022.

Rasbash, J., Leckie, G., Pillinger, R., & Jenkins, J. (2010). 'Children's educational progress: Partitioning family, school and area effects'. *Journal of the Royal Statistical Society*, *173*(3), 657–682. https://doi.org/10.1111/j.1467-985X.2010.00642.x

Riehl, R. J. (1994). The academic preparation, aspirations, and first-year performance of first-generation students. *College and University*, *70*(1), 14–19. https://eric.ed.gov/?id=EJ499539

Rotter, J. B. (1966). 'Generalized Expectancies for Internal versus External Control of Reinforcement'. *Psychological Monographs: General and Applied* 80 (1): 1–28. https://doi.org/10.1037/h0092976.

Schurer, S., Harmon,C.P., Gibson, R., and Edwards, R. (2020). 'First in Their Families at University: Can Non-Cognitive Skills Compensate for Social Origin?' IZA Discussion Paper 13721. IZA Institute of Labor Economics. https://www.iza.org/publications/dp/13721/first-in-their-families-at-university-cannon-cognitive-skills-compensate-for-social-origin

Strand, S. (2014). Ethnicity, gender, social class and achievement gaps at age 16: Intersectionality and 'getting it' for the white working class. *Research Papers in Education*, *29*(2), 131–171. https://doi.org/10.1080/02671522.2013.767370

Stuart, M. (2006). 'My friends made all the difference': Getting into and succeeding at university for first-generation entrants. *Journal of Access Policy and Practice*, *3*(2), 162–184. https://eprints.kingston.ac.uk/3926/

Suhonen, T. and Karhunen, H. (2017) 'The intergenerational effects of parental higher education: Evidence from changes in university accessibility', *VATT Working Paper*.

Sundorph, E., Vasilev, D., & Coiffait, L. (2017) *Joining the elite: How top universities can enhance social mobility*. Reform Report. Retrieved April 11, 2018, from http://www.reform.uk/wp-content/uploads/2017/09/Joining-The-Elite-how-top-universities-can-enhance-social-mobility.pdf

Sutton Trust. (2017). *The state of social mobility in the UK*. Sutton Trust. Retrieved October 16, 2018, from https://www.suttontrust.com/wp-content/uploads/2017/07/BCGSocial-Mobility-report-fullversion_WEB_FINAL.pdf

Thomas, S. L., and Zhang., L. (2005). 'Post-Baccalaureate Wage Growth within Four Years of Graduation: The Effects of College Quality and College Major'. *Research in Higher Education* 46 (4): 437–59. https://doi.org/10.1007/s11162-005-2969-y.

Toutkoushian, R. K., May-Trifiletti, J. A., & Clayton, A. B. (2019). From "First in Family" to "First to Finish": Does college graduation vary by how first-generation college status is defined? *Educational Policy*, 089590481882375. https://doi.org/10.1177/0895904818823753

Universities and Colleges Admissions Services (UCAS). (2018). *Filling in your UCAS undergraduate application*. UCAS. Retrieved March 14, 2018, from https://www.ucas.com/ucas/undergraduate/apply-and-track/filling-your-ucas-undergraduate-application

University College London, UCL Institute of Education, Centre for Longitudinal Studies. (2018). *Next Steps: Sweeps 1-8, 2004-2016: Secure Access. [data collection]* (4th ed.). UK Data Service. SN 7104. https://doi.org/http://doi.10.5255/UKDA-SA-7104-4

University College London (2017). Millennium Cohort Study: First Survey, 2001-2003; Second Survey, 2003-2005; Third Survey, 2006; Fourth Survey, 2008; Fifth Survey, 2012; Sixth Survey, 2015; UK Data Service: SN4683; SN5350; SN5795; SN6411; SN7464; SN8156.

Valentine, J. C., DuBois, D.L., and Cooper, H. (2004). 'The Relation Between Self-Beliefs and Academic Achievement: A Meta-Analytic Review'. *Educational Psychologist* 39 (2): 111–33. https://doi.org/10.1207/s15326985ep3902_3.

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. https://doi.org/10.1016/j.econedurev.2011.01.002

Walker, I., and Buchmueller, G. (2020). 'The Graduate Wage and Earnings Premia and the Role of Non-Cognitive Skills'. *IZA Discussion Paper*, no. No. 13248.

Woessmann, L. (2004). 'How Equal Are Educational Opportunities? Family Background and Student Achievement in Europe and the United States'. 1284. *IZA Discussion Papers*. IZA Discussion Papers. Institute of Labor Economics (IZA). https://ideas.repec.org/p/iza/izadps/dp1284.html.