Downward mobility, opportunity hoarding and the 'glass floor'

Research report

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About the Commission

The Social Mobility and Child Poverty Commission is an advisory non-departmental public body established under the Child Poverty Act 2010 (as amended by the Welfare Reform Act 2012) with a remit to monitor the progress of the Government and others on child poverty and social mobility. It is made up of 10 commissioners and is supported by a small secretariat.

The Commission board comprises:

- The Rt. Hon. Alan Milburn (Chair).
- The Rt. Hon. Baroness Gillian Shephard (Deputy Chair).
- Tom Attwood, Chairman of HG Capital Group and of Attwood Academies Trust
- Paul Cleal, Africa Business Group Leader at Price Waterhouse Coopers.
- Paul Gregg, Professor of Economic and Social Policy, University of Bath.
- Christian Guy, Director of the Centre for Social Justice.
- Douglas Hamilton, Director of the RS Macdonald Charitable Trust.
- David Johnston, Chief Executive of the Social Mobility Foundation.
- Catriona Williams OBE, Chief Executive of Children in Wales.

The functions of the Commission include:

- Monitoring progress on tackling child poverty and improving social mobility, including implementation of the UK's child poverty strategy and the 2020 child poverty targets, and describing implementation of the Scottish and Welsh strategies.
- Providing published advice to ministers on matters relating to social mobility and child poverty.
- Undertaking social mobility advocacy.

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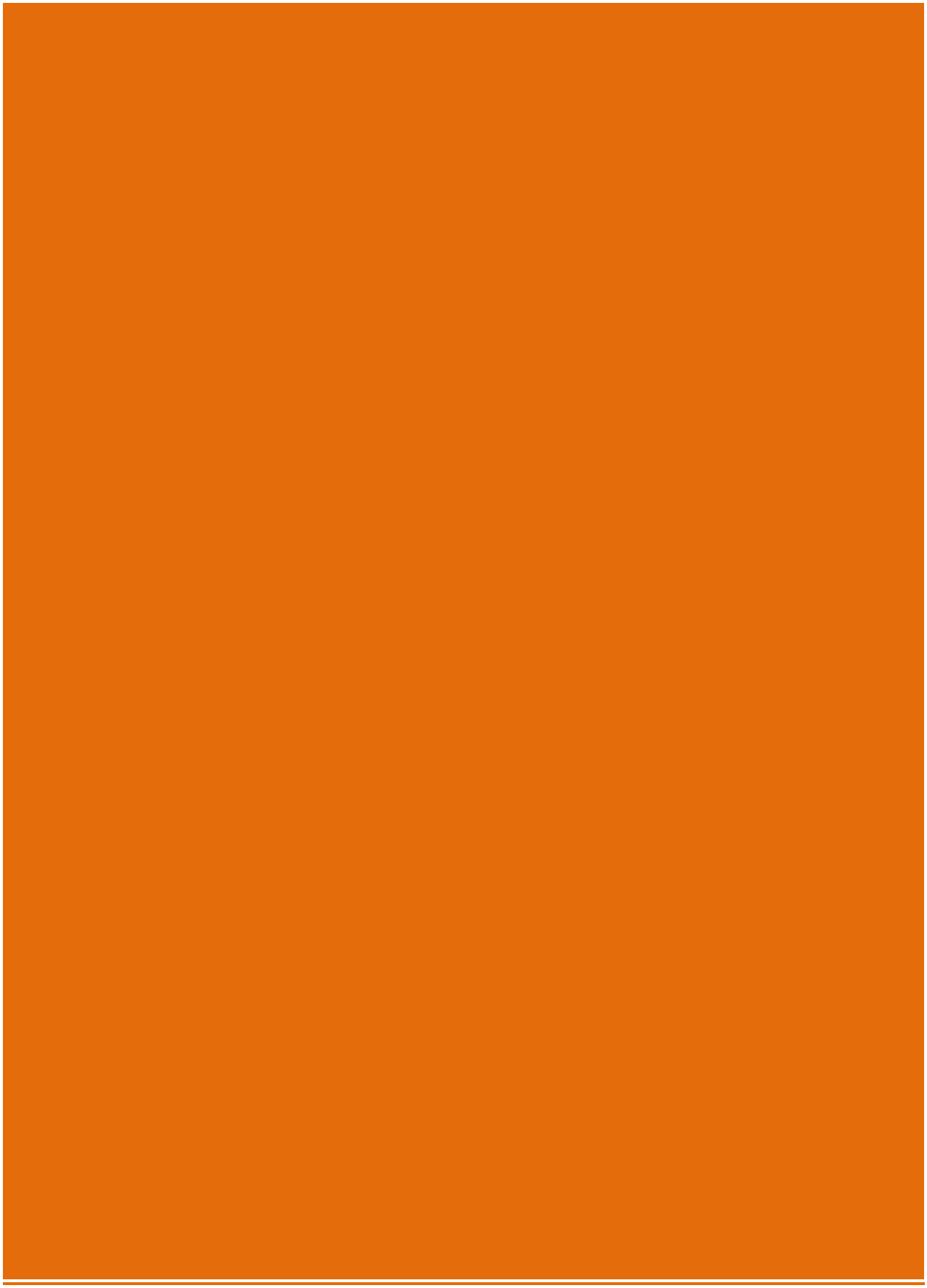


Executive Summary

Success is considered to be just reward where it has been achieved on the basis of merit and effort but a social injustice where it has been gained as a result of parental wealth and status. A society in which the success or failure of children with equal ability rests on the social and economic status of their parents is not a fair one. Not only is it unfair but it is a waste of the talents of those with potential from less advantaged backgrounds; damaging for the individuals, the economy and society.

Social mobility describes the relationship between an individual's starting point and where they end up as adults; usually in terms of their occupational status, individual earnings or household income. It can be measured within a lifetime or between generations. Earlier analysis of social mobility tended to focus on a set of fairly narrow empirical questions including whether social mobility has risen or fallen over time, what the best way to measure social mobility is, the extent to which social mobility varies between countries and the relationship between social mobility and inequality. In more recent years research on social mobility has broadened. Firstly, it has moved away from simply measuring average rates of social mobility or single indicators of the degree of mobility at a point in time, or among a particular age cohort, to considering how rates of mobility vary across the distributions of interest (social class, earnings, income, wealth) and measuring the likelihood of moving up or down and how far in either direction. A second important development has been a move away from exclusively focusing on social mobility among men. Not only was this ludicrous because women make up at least half the population but, with the rise in single parent families, the group of men included in studies comparing fathers and sons was increasingly less representative of the population of men. Another welcome development has been the growth in research examining the factors that help to explain not just overall rates of social mobility but why individuals' chances of mobility vary. The multi-disciplinary interest in this topic has provided a strong evidence base from which policy recommendations can be made.

There has tended to be a focus on upward social mobility and this is perhaps understandable as it is more politically palatable to make the case for policies that help to increase the chance of the least advantaged improving their social or economic position without apparent damage to the interests of the more advantaged. Concerns about growing poverty and social exclusion also fuelled this interest. Upward social mobility in the latter part of the twentieth century was helped by an expansion of higher level jobs, through structural and sectoral change, requiring more high skilled workers (more "room at the top"). Education policies and an expansion of higher education helped support this and for a number of years it became an expected norm that, on average, children would 'do better' than their parents in some sense. Whether the *relative* chances of children from less advantaged backgrounds doing well as adults improved or not was possibly of less importance to a population enjoying high average rates of growth in living standards both within and between generations. However, trouble was on the horizon way before the recent financial and economic crisis. Growth in demand for high skilled workers slowed and some commentators worried about a growing polarisation in the labour market which made it difficult, perhaps increasingly so, for workers starting in relatively low skilled jobs to climb the career ladder (Goos and Manning, 2007; Gardiner and Corlett, 2015).

Attention has started shifting to the examination of advantage. Increases in the shares of income and wealth held by a small elite, the growth of an international 'super-rich' group and continued domination of the top professions and positions of power by those from highly advantaged family backgrounds have led more people to question how advantaged families manage to hold on to their position. Equally, in a world where "room at the top" is increasing only slowly it is simply not possible to increase any form of upward mobility without a commensurate rise in downward mobility.

A recent US study focused on understanding why those born to affluent families appear to be, to some extent, protected from downward mobility even when, based on their cognitive ability, one would predict that they would occupy a lower socio-economic position, providing evidence of "opportunity hoarding" or a "glass floor" (Reeves and Howard, 2013).

A better understanding of the factors that help children from advantaged backgrounds succeed in the labour market to a greater extent than their less advantaged peers can help to identify how policies can be shaped to ensure that opportunities are more equally and justly shared.

In this paper we examine the evidence for a cohort of British children born in 1970 in terms of the relationship between family background, childhood cognitive skills and adult success in the labour market. We focus on two groups of children. The first group has relatively low levels of cognitive skills at age 5 and on this basis are predicted to be less likely to have highly successful careers. The second group have relatively high levels of cognitive skills at age 5 and are therefore more likely, on average, to have highly successful careers. We compare actual outcomes using a measure of high earnings and "top job" status and find social gradients in family background measured by family income and parental social class. We estimate statistical models to seek to identify which variables account for these gradients, factors that could allow advantaged families effectively to construct a 'glass floor' to ensure their children succeed irrespective of cognitive ability. In particular we consider the role of parental education, later childhood performance in reading and maths assessment, social and emotional skills in childhood (self-esteem, locus of control and behaviour), type of secondary school attended and whether or not individuals go on to attain a degree qualification.

Findings

In the raw data we find that, on average, children from lower income families or those with less advantaged social class backgrounds do not perform as well in a series of cognitive tests taken at age 5 as children from higher income families or those from advantaged social class backgrounds.

Children from more advantaged family backgrounds are more likely to have high earnings in later adult life and are more likely to be in a "top job". This is not simply due to different levels of cognitive ability as it holds within attainment groups as well as over the complete distribution. We focus our analysis on a group of initially high

attaining children and a group of initially low attaining children and follow their progress through to labour market outcomes at age 42.

For *low attaining* children in cognitive skill tests taken at age 5 we find:

- A social gradient in the likelihood that these children go on to achieve high earnings or employment in a top job.
- Parental education is an important explanatory factor, particularly whether or not parents have degree level qualifications.
- Other factors that contribute to these gradients are later maths skills and childhood social and emotional skills (in particular, locus of control).
- These childhood factors also contribute to educational attainment, with non-cognitive skills largely acting through an increased likelihood of achieving high level qualifications.
- Secondary education at a Private or a Grammar school is also associated with an increased chance of labour market success among this initially low attaining group of children.
- Attainment of a degree level qualification has a large and significant marginal effect on career success.

For *high attaining* children in cognitive skill tests taken at age 5 we find:

- A social gradient in the likelihood that these children go on to achieve high earnings or employment in a "top job".
- A similar set of inputs are available and are deployed by advantaged families to help ensure that their children are able to translate this early attainment into later labour market success.
- There remains an unexplained additional advantage associated with high income or advantaged social class background.
- High attaining children from disadvantaged family backgrounds appear to be less successful at or less able to convert early high attainment into later labour market success.

Women are considerably less likely to be in high paid work or a "top job" than their male peers. The holds true for both initially low attaining and high attaining children.

More advantaged families are able to protect early low attaining children in cognitive tests from downward mobility who appear to benefit from their parents' higher levels of education, being able to improve their cognitive skills (particularly maths skills) by age 10, they benefit from higher social and emotional skills, being able to secure places in Grammar or Private secondary schools and being more likely to attain a degree qualification. In some cases part of the advantage observed in the raw data remains unexplained after controlling for these differences.

Children from less advantaged family backgrounds who were high attaining in early cognitive skill assessments are found to be less able or at least less successful at converting this early high potential into career success. Parents with relatively high income or social class position are more successful at ensuring that their early high

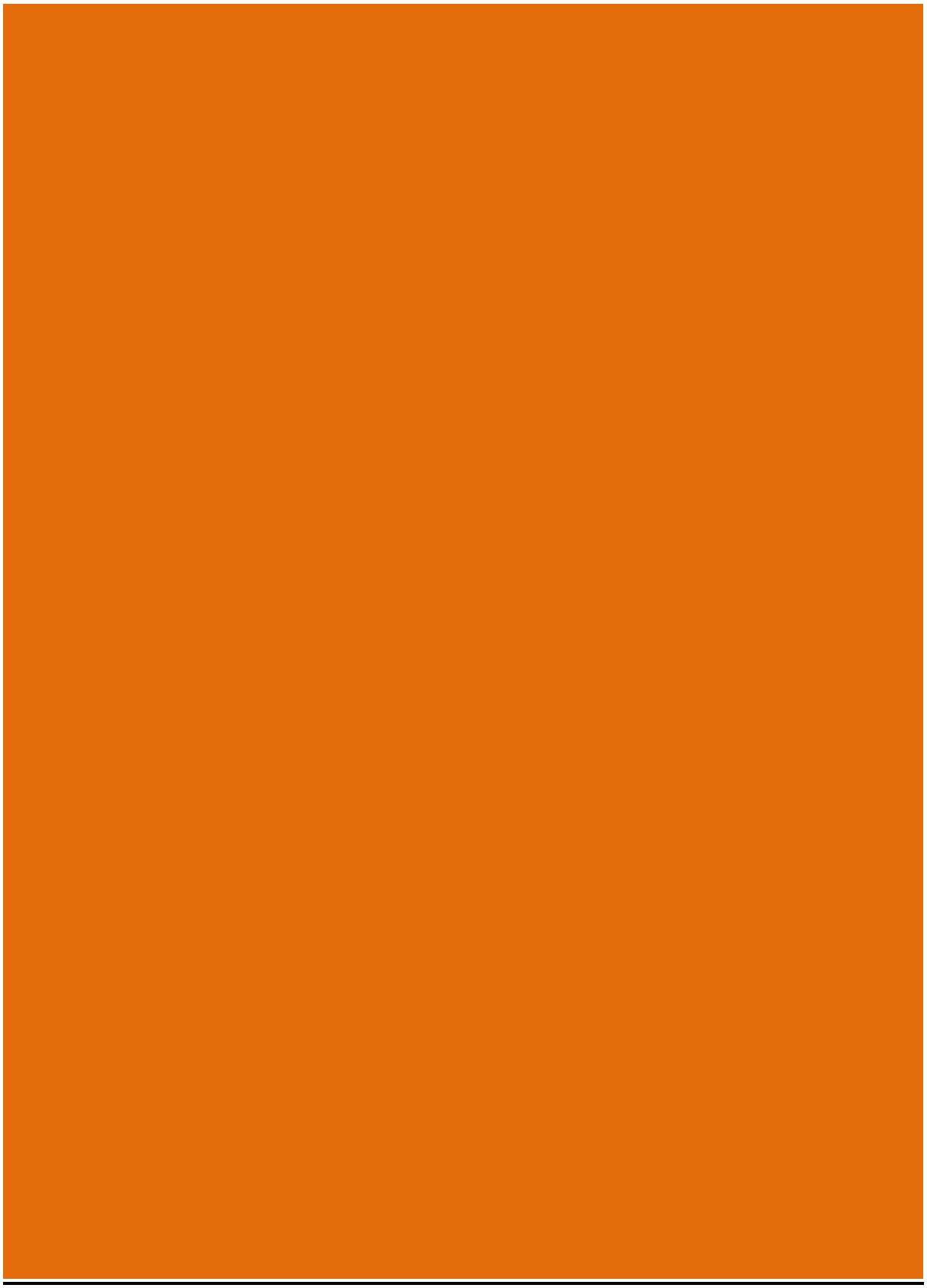
attaining children translate these cognitive skills into labour market success in adulthood. They draw on the same resources as they use to help their early low attaining children which are simply not available to less advantaged families to the same extent. This means that higher family income and parental social class advantage have an additional positive boost to later labour market success.

This limited downward mobility among initially low attaining children from advantaged backgrounds partly contributes to there being fewer opportunities for high attaining children from less advantaged backgrounds to succeed.

In the concluding section we discuss what factors could be behind the observed advantage found for children with highly educated parents and for those attending either a Grammar or a Private secondary school. We suggest that some could be meritocratic and others unmeritocratic. Families with greater means at their disposal, financial and otherwise, are assisting their children to accumulate skills, particularly those which are valued in the labour market. We observe this through improvements in cognitive skills (maths especially) by age 10 and a greater likelihood of gaining a degree. The allocation of high earning and 'top' jobs to highly qualified individuals is meritocratic. Giving children an equal chance also requires policy makers to look at inequalities in other areas. Educational inequalities among adults in the UK have so far been hard to tackle but this does not mean that we should give up, particularly given the research evidence that parental education has a direct influence on children's ability to succeed educationally and in the labour market. More needs to be done to break the link between low parental education and children's relatively poor education performance. School processes and practices that exacerbate socio-economic inequalities need addressing. Processes for allocating places at outstanding schools and for selecting children who attend the remaining Grammar schools in England could be improved.

Children in private schools work hard to achieve good exam results and they are assisted by some excellent teachers and are generally studying in environments that are conducive to success. Private schooling has a double benefit for children - not only do privately educated children achieve well in examinations and on this basis go on to have highly successful careers, but private school education also bestows a "little extra something". Some of the "extra" is made up of "soft skills" – for example, presentation, conduct in social settings, accent – which have little to do with productivity and a lot to do with what economists refer to as "signalling". It is these signals that have been shown to influence recruitment to elite professions (Ashley et al., 2015), raising concerns about unmeritocratic practices and opportunity hoarding. The recruitment practices that discriminate against children from less privileged backgrounds need to be examined in more detail and to be reformed where necessary.

There is evidence that children from better-off families are hoarding opportunities in the education system (places in Grammar schools, the ability to exercise 'choice' in the non-selective state school system) and then, in part as a result of higher levels of qualifications, they are able to hoard opportunities in the labour market. If policy makers are determined to increase social mobility in a climate where "room at the top" is not expanding then the factors that limit downward mobility will need to be addressed.



1. Introduction

Success is considered to be just reward where it has been achieved on the basis of merit and effort but a social injustice where it has been gained as a result of parental wealth and status. A society in which the success or failure of children with equal ability rests on the social and economic status of their parents is not a fair one. Not only is it unfair but it is a waste of the talents of those from less advantaged backgrounds; damaging for the individuals, the economy and society.

In the UK we don't need to go back many generations to find a situation where an individual's social and economic position was largely determined by the social status of the family into which they were born. Fortunately this is not the position today. The rigid social class structure of the not too distant past has been replaced by a more fluid one. However, children today do not have an equal chance of success in later life, which continues to be shaped by the social and economic circumstances of their family background.

It has been suggested that the reason success runs in families is that ability is inherited: the only reason that poorer children don't succeed is because they are not as bright or don't work as hard, or are not academic. This is simply not the case. There is a growing body of evidence demonstrating that children of equal ability at a young age vary in terms of their capability to convert this into educational qualifications and this variability is shaped by family socio-economic circumstances.

Feinstein (2003) demonstrated that gaps in cognitive skill development opened up between children from advantaged and disadvantaged families at a young age, even before they attended primary school. This gap and a desire to reduce it has motivated much of the recent 'early years' policy development. However, Feinstein also showed that among initially high attaining children, those from disadvantaged families went on to perform less well than their peers from advantaged families. Likewise, children who performed less well in cognitive skill assessments at an early age also had divergent trajectories with children from advantaged families doing a lot better than children from disadvantaged families.

Concern has been raised that these findings could be partly driven by measurement error (Jerrim and Vignoles, 2013). It has been suggested that given the social gradient in performance in cognitive tests, children from disadvantaged families with high scores are more likely to be having a 'lucky' day and young children from advantaged families with low scores were more likely to be having an 'unlucky' day than their peers. The consequence is that this could make the results from cognitive skill tests taken at a later age simply a more accurate reflection of 'true' cognitive skill ability. However, further research suggests that while there is undoubtedly some measurement error, there is evidence of convergence between higher attaining disadvantaged children and lower attaining advantaged children, although some suggest that this may occur at a later age than originally thought (Crawford et al., 2014).

Social mobility describes the relationship between an individual's starting point and where they end up on a social or economic scale. It can be measured within a life time or between generations. Position on the scale can be categorised into classes

based on theoretical criteria (such as social class) or represent a ranked position across a population (such as position in an income distribution), often with reference to a peer group such as individuals in the same birth cohort. The first can be used to measure absolute mobility due to the size of the classes varying over time, or relative mobility comparing the relative chances of moving into a particular social class for those from different class backgrounds.

There exists an extensive body of literature on social mobility with many studies for the UK making use of the rich information available from a number of longitudinal birth cohort studies (for example: Dearden et al., 1999; Blanden et al., 2004; Goldthorpe and Mills, 2004). This shows that social mobility in the UK is relatively low by international standards and has not increased over the past 40 years, and it is also suggested that a contributing factor is relatively high levels of income inequality.

Those promoting higher social mobility as a public policy goal are more likely to make the case for upward mobility and seek ways to promote this form of mobility but, as many social scientists have been keen to highlight, if social position is measured in terms of rank order in an income or earnings distribution, greater upward mobility needs a commensurate increase in downward mobility. Although this is not necessarily the case if social position is measured in terms of social class or occupation in an economy characterised by an expanding employment in higher level/higher skilled occupations such as professional jobs "more room at the top". Differences in how socio-economic positions are defined tend to divide economists and sociologists and can affect the interpretation of findings and even conclusions. In the UK in the latter part of the 20th Century such an expansion at the top of the occupation distribution took place and was fuelled by expansions in education, particularly higher education.

Many studies have focused on limited upward mobility for children from disadvantaged family backgrounds, identifying the negative influences of childhood disadvantage on adults' educational and employment success. The UK literature on social mobility highlights the fact that family background is a strong determinant of children's adult success in the labour market (Gregg and Machin, 1999; McKnight, 2000). Factors that have been identified to play an important role in determining social mobility either directly or indirectly are parents' education, family income, cognitive and non-cognitive skills in childhood, and educational attainment (Blanden et al., 2007).

At the other end of the distribution, a recent US study has focused on understanding why those born to affluent families appear to be, to some extent, protected from downward mobility even when evidence on their skills would predict that they should occupy a lower socio-economic position, providing evidence of "opportunity hoarding" or a "glass floor" (Reeves and Howard, 2013).

An international study examining differences in movement up or down the income distribution between generations for men in the US, Canada and Sweden found that there were larger cross-country differences in the extent of downward mobility from the top of the distribution than upward mobility from the bottom (Corak et al., 2010). Björklund et al. (2008) show that while Sweden is characterised as a country where social mobility is relatively high, intergenerational transmission of advantage is very high among high earners and high income families, particularly at the extreme top of

these distributions. They find that this cannot be explained by ability or education but is most likely to result from wealth. Other recent studies have also been exploring downward mobility and the factors that explain why some people are more likely to under-achieve relative to their parents (Alm, 2009; Acs, 2011). Alm (2009), also studying downward mobility in Sweden, hypothesised that upward mobility in the parents' generation could predict a greater likelihood of children returning to the lower social position occupied by their grandparents, but didn't find evidence to support this hypothesis. She did find that parents' education was very important with downward mobility more likely in families where parents' education was lower than expected for a social group. Acs (2009) focuses on downward mobility from the middle-class in the US and finds that marital status, education and drug use are important predictors of downward mobility along with race (for men) and gender.

Why might limited downward mobility be of concern? Tilly (1998) coined the phrase "opportunity hoarding" and Reeves and Howard (2013) refer to it as a "glass floor"; both of these descriptors highlight the undesirable nature of lower-skilled advantaged children blocking the success of higher-skilled disadvantaged children through the hoarding of opportunities. Laurison and Friedman (2015) show that in some high paid occupations (such as law and medical practitioners) children are considerably more likely to find employment in these professions if their parents had also worked in them. They also found that higher professionals and higher managers (NS-SEC 1) earn considerably more if they followed in the footsteps of their parents than those who were upwardly mobile. This stickiness between generations in high level occupations represents opportunity hoarding; allowing less room for the upwardly mobile to fill these positions.

A better understanding of the factors that help advantaged children succeed to a greater extent than their less advantaged peers can help to identify how policies can be shaped to ensure that opportunities are shared more equally.

In this paper we focus on two groups of British born children. The first group have relatively low levels of cognitive skills at age 5 and on this basis are predicted to be less likely to have highly successful careers. The second group have relatively high levels of cognitive skills at age 5 and on this basis are more likely, on average, to have highly successful careers. This is not to say that early cognitive skill is deterministic, or that children cannot develop at different rates or make-up for early poor attainment; they are statements about average expectations.

The analysis presented provides estimates of the relationship between family income or parental social class and the likelihood of achieving high earnings or work in a high ranking job in adult life, looking specifically for evidence of a 'glass floor' where initially low attaining children from privileged backgrounds are more likely to succeed in the labour market than their peers from less advantaged families. Conversely the analysis also provides estimates for initially high attaining children and examines how family background shapes their chance of converting this early high attainment into career success. Documenting these relationships is important but the analysis goes one step further through a series of statistical analyses seeking to identify the factors that account for later success for these different groups of children. In particular it seeks to identify which factors account for any differences by social class or family income background.

2. British Birth Cohort Study (1970)

To provide reliable estimates of this nature, high-quality longitudinal data are required. We are very fortunate to have a number of ongoing birth cohort studies in the UK that have periodically followed random samples of children from birth through their lives. Here we use information from the British Cohort Study 1970 (BCS70) which has been following the lives of around 17,000 people born in Britain in a single week in 1970. Since the birth survey in 1970, there have been eight main follow-up surveys at ages 5, 10, 16, 26, 30, 34, 38 and 42. Health professionals, parents, teachers and cohort members themselves have all provided information. This allows us to obtain contemporaneous measures of childhood circumstances at a number of ages and adult outcomes at a number of points in time. The cohort has now reached sufficient maturity to provide reliable measures of adult outcomes.

As with any longitudinal survey, members can be lost because they choose not to take part, some move and cannot be traced for a follow-up survey, although some re-join in a later survey. This is called attrition. The consequence is that the sample size varies between the different follow-up surveys. For this research the sample comprises all cohort members who were present in both the birth survey and the age 42 survey. This excludes those who entered the sample later (766) (mainly immigrants) and generates a sample size of 9,075 cohort members. The size of the sample at different interviews is shown in Appendix A.

For the analysis we use information from the birth, age 5, age 10 and age 16 surveys to measure family background, cognitive skills and social and emotional skills. To assess adult success we use information on employee earnings and self-employed income, and occupation at ages 34 and 42. Our preferred set of results measures outcomes at age 42 as careers are less stable at age 34 and, in particular, women's employment is affected by family formation at the earlier age. Age 34 outcomes are also assessed to validate our findings to allow for differential rates of labour force participation and employment due to childcare commitments and macroeconomic factors. The cohort was aged 34 in 2004 and aged 42 in 2012. Although in 2012 employment prospects were influenced by the economic downturn, this age group was less affected than younger people (McKnight, 2015).

3. Classifying Family Background

In this study, family background is defined in terms of net family income (equivalised to adjust for differences in family size) and *social class* defined using the Registrar General's Social Class (RGSC) classification based on occupation.

The choice of two measures for family background reflects the view that although social class is correlated with family income, it captures more than a simple measure of economic resources at a point in time (Goldthorpe and McKnight, 2005). These differences may well be important in terms of determining children's educational achievement and labour market success.

RGSC is not an ideal measure of social class but it is consistently available during the childhood of this birth cohort and has been shown to be fairly good at differentiating between socio-economic groups. We take a gender neutral approach by assigning the highest Social Class from the mother or father where both parents are present.

RG Social Class based on Occupation

Five categories (social classes):

I	Professional
II	Managerial and Technical
III–NM	Skilled – Non-Manual
III-M	Skilled – Manual
IV	Partly Skilled
V	Unskilled

Note: Sometimes an additional category is added to RGSC for those working in the armed forces (for whom detailed occupational information was typically not available) and the never worked/long-term unemployed.

Net *family income* is recorded when the children were age 10 and age 16. For the main analysis we use family income at age 10 to provide an estimate of the level of resources available to families in mid-childhood. Income in BCS70 is recorded in bands. Mid-point estimates are allocated within bands and then income is adjusted for family size using the square root of family size equivalence scale[1]. This equivalisation allows us to compare families on an equal basis through accounting for differences in need due to family size and economies of scale. Families' incomes are ranked then split into equal sized segments of the distribution. Here we use quintiles, providing a measure of families' relative position in the family income distribution.

[1] There is no "correct" equivalence scale and a range of different scales are adopted in the literature. For example, the ONS's Households Below Average Income (HBAI) series uses the OECD modified equivalence scale (= 1*first adult member + 0.5*number of other members aged 14 or over + 0.3 * number of children below 14) while the Luxembourg Income Study (LIS) uses the square root of the number of household members. Different scales make different judgements on economies of scale and the weight given to children versus adults. The OECD modified scale implicitly assumes that economies of scale are lower than for the square root of family size scale. Larger households will have lower equivalised family income where income has been equivalised using the OECD modified scale relative to the square root of family size scale. Family size is less variable among BCS70 families than in the general population and therefore results are less sensitive to the choice of equivalence scale.

4. Measuring Low and High Attainment in Cognitive Ability

Cognitive skills

There is a common notion of 'intelligence', or IQ, as an underlying component of skills in reasoning, memory, and other cognitive abilities. These 'talents' may be to some extent innate, or be cultivated by appropriate training, incentives and challenges (Joshi, 2014).

At age 5 children in BCS70 sat a series of assessments to test their cognitive ability. We follow the work of Parsons (2014) and compute a composite measure of cognitive skill based on the following five tests:

- **Copying Designs Test**: An assessment of visual-motor co-ordination.
- **English Picture Vocabulary Test**: A test of verbal vocabulary.
- **Human Figure Drawing (Draw-a-Man) Test**: Intended to reflect conceptual maturity.
- **Complete a Profile Test**: Similar to the draw-a-man test, the child completes an outline picture of a human face in profile by filling in features (eyes, ears, etc.).
- **Schonell Reading Test**: a reading test originally designed to assess a child's 'reading age'.

For each test, scores were standardised, then scores from the five tests were summed and standardised again to compute a composite cognitive skill score (valid according to Principal Component Analysis and scale validity tests conducted by Parsons (2014)). For more detail on the tests and on the procedure used to compute this standardised score see Parsons (2014).

The composite skill score was used to identify individuals with lower and higher cognitive skills in early childhood. Although these tests were taken at a young age and have been used by some as measures of intelligence or ability (Stumm et al., 2009), cognitive test scores are not independent of learning (which is known to be influenced by environmental factors such as social class) and therefore are not pure measures of innate ability.

For the purpose of this study we define two groups:

- Low attainers in early childhood cognitive tests are those with scores in the two lowest quintiles of the distribution.
- High attainers in early childhood refer to those whose composite test score at age 5 was in the two highest quintiles of the distribution.

We examine variation in cognitive skill attainment across family income groups and parental social classes to describe the relationship between position in the cognitive skill distribution and family background. We also estimate the correlation between family background and later labour market success. This provides a useful description of the correlations between these variables. To take the analysis a step further we estimate a series of statistical models to identify key factors that account for variation in labour market success in adulthood by family background for higher attaining and lower attaining groups.

5. Explanatory Variables

In seeking to account for differences in the likelihood of achieving high adult earnings and labour market success measured by occupation we identify a number of potential explanatory variables. In this section we provide a description of these variables.

5.1 Family background

In addition to family socio-economic background measured by family income or parental social class we also include a measure of parental educational attainment. This variable indicates the highest level of qualification held by either parent when cohort members were age 5. A measure of parental educational attainment when their children were starting school is chosen to provide the best measure of the level of parents' educational resources that they could draw on to assist their children throughout their school years. Parents can gain further qualifications during the cohort member's childhood but this is not included in the analysis.

5.2 Cognitive skill development

Age 5 cognitive skills are used to define our two groups of interest: higher attainers and lower attainers. For the explanatory variables we also include measures of cognitive skills at age 10. This allows us to control for different skill trajectories and understand the importance of cognitive skill development between age 5 and age 10. Two measures are selected reflecting the importance placed on literacy and numeracy:

Maths assessment at age 10 – Results from the Friendly Maths Test: A multiple choice test including arithmetic, number skills, fractions, algebra, geometry and statistics.

Reading assessment at age 10 – Results from the Shortened Edinburgh Reading Test: A test of word recognition, which examined vocabulary, syntax, sequencing, comprehension and retention.

Detail on both the Maths and Reading assessments can be found in Parsons (2014).

For the statistical analysis we rank standardised test scores and include information on children's relative position in the overall distributions.

5.3 Social and emotional skills in childhood – non-cognitive skills

Social and emotional skills are sometimes referred to as non-cognitive skills or 'soft' skills (or even personality traits). Joshi (2014) conducted an extensive literature review of non-cognitive skills covering definition, sources and labour market rewards including an examination of how they can be measured in BCS70. The conclusion she reaches from the literature is that non-cognitive skills play a role in shaping labour market outcomes over and above cognitive skills but they operate in complex ways.

Non-cognitive skills

Non-cognitive skills cover a vast array of personal attributes but here we focus on those that are considered to contribute to the formation of 'human capital' through, for example, facilitating learning and gaining educational qualifications and those which are directly demanded and rewarded in the labour market.

Personal characteristics such as motivation, self-discipline, communication skill, energy, impulse control, perseverance, sociability, confidence, self-esteem, decisiveness, grit, etc., have all been linked in the literature to labour market rewards (Joshi, 2014).

Parents' nurturing role in developing and positively reinforcing non-cognitive skills has been noted in the literature which suggests that these skills are particularly malleable in the early years (Heckman and Kautz, 2013).

The way cognitive and non-cognitive skills interact and enhance each other is still not well understood but it is thought that this relationship is socially differentiated. It may also be the case that particular non-cognitive skills can provide protection (resilience) against some hardships associated with childhood poverty. They are thought to partially mediate effects of parental social class on educational and social status attainment (Stumm et al., 2009).

Early intervention policy in the UK has sought to develop policies that address cognitive and non-cognitive skill deficits in children from less advantaged families, reflecting a growing understanding of the independent role of social and emotional skills.

The measures of non-cognitive skills we use are based on assessments made at age 10. As noted above, these skills appear to be particularly malleable in early years and so by age 10 will have been influenced by environment factors. Other evidence from psychologists suggests that they can be unstable during adolescence (reviewed by Joshi, 2014) and therefore for the purpose of this study an age 10 assessment, towards the end of primary education, seems an appropriate point at which to assess their impact on later employment outcomes. Three measures in BCS70 have been selected for this research:

1) Self-Esteem
It has been suggested that self-esteem can affect individuals' performance in examinations and in the labour market (Goldsmith et al., 1997; Schoon, 2001). There is likely to be an element that is innate but psychologists and sociologists note the importance of environment in shaping self-esteem (Stumm et al., 2009). In particular, parenting styles are thought to have a direct impact on the development of self-esteem (see, for example, Putnam, 2015).

The answers to a series of questions given by cohort members when they were aged 10 make up a self-esteem scale (LAWSEQ) (Lawrence, 1973, 1978). The full set of

questions and details on how the scale is constructed can be found in Table A3 in Appendix A.

2) Locus of Control
Locus of control is a survey instrument developed to measure the extent to which individuals feel that they are in control of their own destiny (believe in their own ability to control events). A high locus of control could result in individuals being prepared to put more effort into study or work having a direct and indirect effect on labour market outcomes (Stumm et al., 2009). As with self-esteem, while an element is likely to be innate it is also likely to be shaped by family and school environments and individuals' own experiences.

In BCS70 a series of questions were asked of cohort members at age 10 that make up the locus of control scale (CARALOC). The full set of questions and details on how the scale is constructed can be found in Table A4 in Appendix A.

3) Rutter's Behaviour Score
The ability to moderate behaviour in a socially acceptable way is an important skill that children learn. However, severe behavioural problems can reflect mental health problems and a response to maltreatment of children by others, rather than simply reflecting the inability of a child to moderate behaviour. Behavioural difficulties are also likely to stem from a combination of innate and childhood experiences (parenting and schooling). Behavioural problems have been linked in the literature to school performance and employment outcomes (see review in Stumm et al., 2009).

Rutter (Rutter et al., 1970) developed a set of survey instruments to measure behavioural difficulties. In BCS70 parents were asked a series of questions in relation to the behaviour of their children at age 10. The full set of questions and details on how the indicator variable for behavioural difficulties is constructed can be found in Table A5 in Appendix A.

All three social and emotional skill measures are assessed at age 10. As noted they will have been shaped by experiences up to that age and could change through childhood beyond age 10 and through adult life.

5.4 Schooling and educational attainment
Two variables are used to control for differences in schooling and education. The first is *type of secondary school* attended at age 16 distinguishing between: comprehensive, grammar, secondary modern, private and other. This is included to assess whether or not there are advantages or disadvantages associated with different types of secondary school.

The second is*: highest level of education*. This is a five category variable denoting the highest level of education achieved by cohort members. (1) No qualifications; (2) GCSE or less; (3) A Levels or equivalents; (4) Further or higher vocational education; (5) Degree or above (academic).

6. Indicators of Labour Market Success

To assess success in the labour market we make use of two indicators, one which is a measure of labour market reward (earnings) and a second based on occupation.

High earners
We explored a number of different measures of earnings to define and identify high earners. Within the distribution of any of these variables individuals in the top quintile (the highest earning 20 percent) are classified as high earners. The different measures we explored were: (1) weekly earnings for employees; (2) hourly wage for employees; (3) weekly earnings for employees combined with weekly income for the self-employed; (4) hourly wages for employees combined with hourly income for the self-employed.

Our preferred set of estimates use hourly wages for employees combined with hourly labour income for the self-employed. We refer to this measure as hourly earnings or hourly labour income. The more comprehensive measure of labour market income across a wider set of workers is favoured to the more limited evidence available for employees. Focusing on an hourly measure of pay provides a direct measure of the labour market value placed on individuals' skill sets even if the capacity of some workers to work full-time is limited by other responsibilities, the level of demand, or through choice.

Including information on the income from self-employment is an important departure from most previous UK studies which have focused exclusively on earnings among employees. With self-employment growing from 9 per cent of all workers in 1975 to 15 per cent in 2014 (ONS, 2014) it is difficult to justify leaving this group out of any analysis. Self-employment can offer an opportunity for great success for some people but it can also represent precarious work on a low income for others. While there are some concerns about the reliability of reported self-employment income its inclusion gives a more comprehensive measure of labour market success.

Top ranking job/high status job
The second outcome measure we use is based on individuals' occupation. We follow Goodman et al. (2015) and define individuals who are large employers or working in higher managerial or higher professional occupations as being in a top ranking/high status job. This is NS-SEC Class 1 in the analytic 8 class version (comprising NS-SEC 1.1 Large employers and higher managerial and administrative occupations and 1.2 Higher professional occupations).

The top ranking job measure does not define a fixed proportion of a population and therefore can change in size unlike the earnings measures which are based on a fixed share of the highest earnings (top 20 percentiles of the distribution – quintile).

7. Methodology

We begin by examining bivariate relationships between three variables: family background, low cognitive skills in early childhood and labour market success in adulthood. These simple statistics provide estimates of the raw correlations between family income or parental social class and children's early cognitive test scores, the relationship between these test scores and position in the wage distribution at age 42 and the relationship between family background and position in the age 42 wage distribution.

To estimate the independent influence of different factors that can contribute to any observed social gradient, we then estimate regression models (probits) where the dependent variable is a binary indicator (1 identifies individuals in the top pay group or top ranking occupation; 0 otherwise).

We use these results to assess evidence of a 'glass floor' and identify factors that account for any lack of downward mobility among advantaged families or limited upward mobility for children from disadvantaged families based on what would be predicted from early cognitive skill assessments.

As noted earlier, previous research has shown that measurement error in cognitive test scores creates a statistical problem called 'regression to the mean' when looking at the relationship between family background and later attainment (Jerrim and Vignoles, 2013). This occurs because cases showing high achievement among children from disadvantaged family backgrounds and low achievement among children from advantaged family backgrounds are more likely to have been measured with error (being particularly 'lucky' or 'unlucky' in a test, for example). This means that in subsequent assessments of skills it appears that they follow an upward or downward trajectory with convergence to expected 'norms'. The result is that low achieving children from advantaged family backgrounds appear to show marked improvement and high achieving children from disadvantaged backgrounds appear to show marked deterioration.

Equally, there could be measurement error in the measure of advantage/ disadvantage used. This is often in family income for which a number of measurement concerns have been raised: point in time measures not reflecting 'usual' levels of income; values reported in bands which are used to create a continuous measure of income; misreporting and incomplete information collected (under-reporting). In this case the test score was correct but the child was allocated to the wrong family income group. Some studies use Free School Meal entitlement (or even claiming) as a measure of disadvantage where a point in time estimate is used to identify an economically disadvantaged childhood even though entitlement could be short-lived.

We attempt to minimise the impact of 'regression to the mean' in three ways. (1) In our research we define ability groups based on cognitive test scores at age 5 and define family background at a different age (age 10). (2) We use the results from five separate cognitive skill tests taken at age 5 to create a composite measure of attainment. This minimises the chance that the score from one test, driven by good

luck or bad, results in a child being allocated to a high or low attaining group in error. (3) We avoid looking at the extremes of the 'ability' distribution.

An alternative approach used by some researchers interested in estimating diverging attainment trajectories is to use the results from one test to measure 'ability' and the results from a second test taken at the same age or a later age to define the starting ability level from which attainment trajectories are measured (Crawford et al., 2014). However, for the purpose of this research, applying that method would not make sense as we are not examining education attainment trajectories.

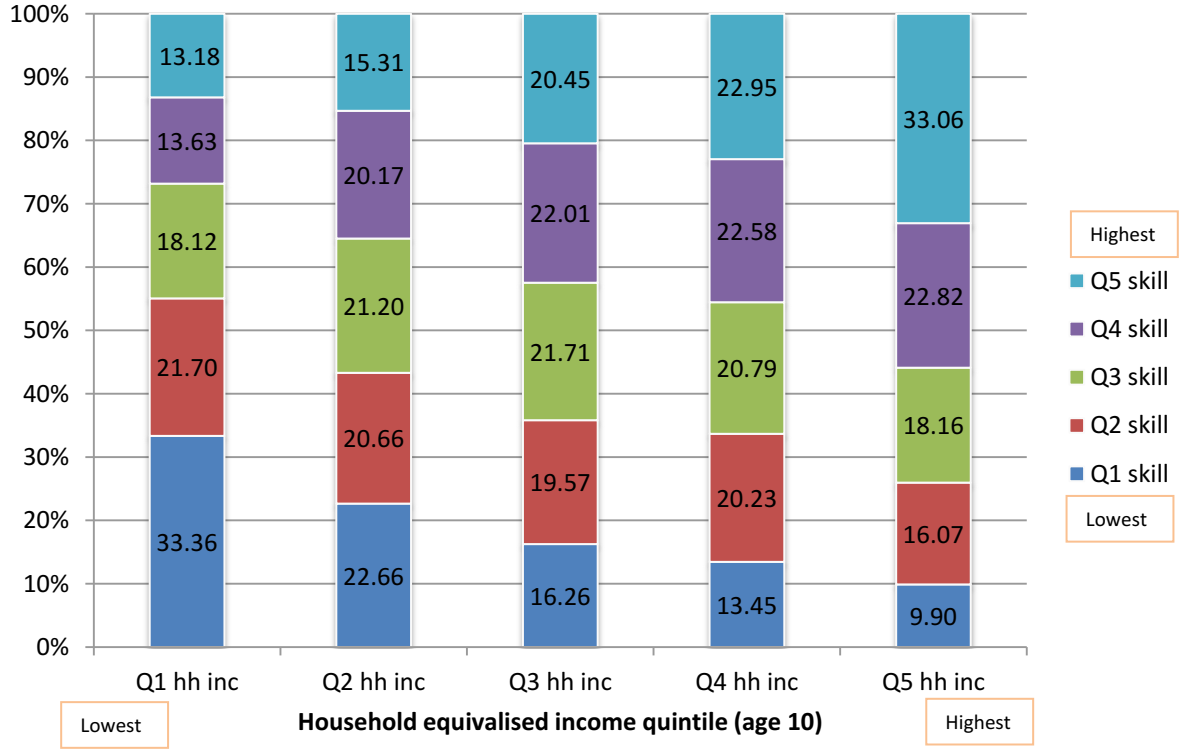
8. Describing the relationship between family background, early cognitive skills and labour market success

Previous studies have shown that a simple relationship exists between family background, early cognitive skills and later employment success. Here we provide a description of this relationship for BCS70 using the two measures of family background defined in Section 3, position in the composite cognitive test distribution at age 5 and the chance of being in the top earning group. We focus on our preferred measure of hourly earnings from employment or self-employment.

Family background and cognitive skill test scores in early childhood

Children from higher family income backgrounds are more likely to perform better in cognitive tests at age 5 than children from lower income families but within each income quintile there is a spread across the 'attainment' distribution (Figure 1). If cognitive skills were evenly distributed then we would expect that within each income quintile 20% of children would be found in each test score quintile. The results show that this is not the case with one-third of children in the lowest family income quintile scoring in the lowest quintile of the cognitive tests and one-third of children in the highest family income quintile scoring in the highest quintile of the cognitive test scores. There is a sizeable minority of children from low income backgrounds with high cognitive test scores and, similarly, a sizeable minority of children from high income backgrounds with low cognitive test scores in early childhood.

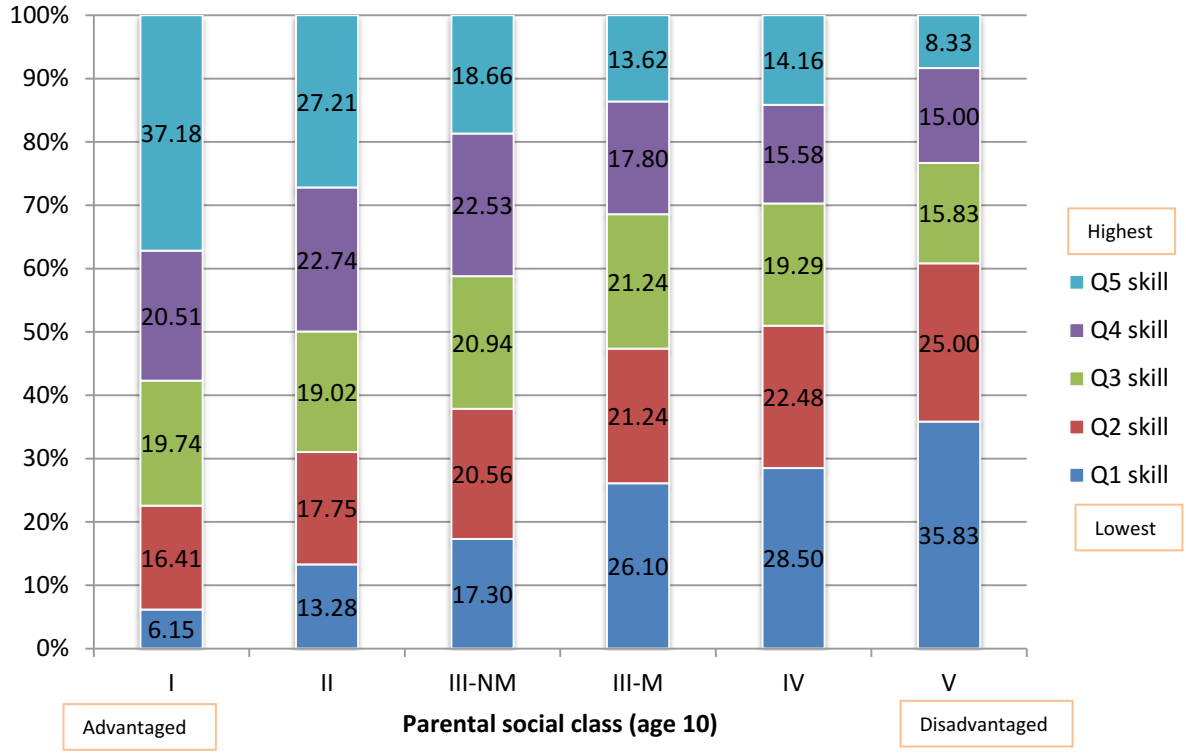
Figure 1 Composite cognitive test score quintile (age 5) by household income quintile (age 10)



Source: Analysis of BCS70 data

Figure 2 shows the relationship between parental social class (age 10) and the distribution of composite cognitive test scores at age 5. Again we see a clear gradient with children from advantaged social class backgrounds more likely to achieve higher test scores than children from less advantaged social class backgrounds. 37% of children from Social Class I have test scores in the top quintile and 36% of children from Social Class V have test scores in the bottom quintile. Again the results show that the relationship is not deterministic with some high skill children from less advantaged social class backgrounds and low skill children from advantaged social class backgrounds.

Figure 2 Composite cognitive test score quintile (age 5) by parental social class (age 10)

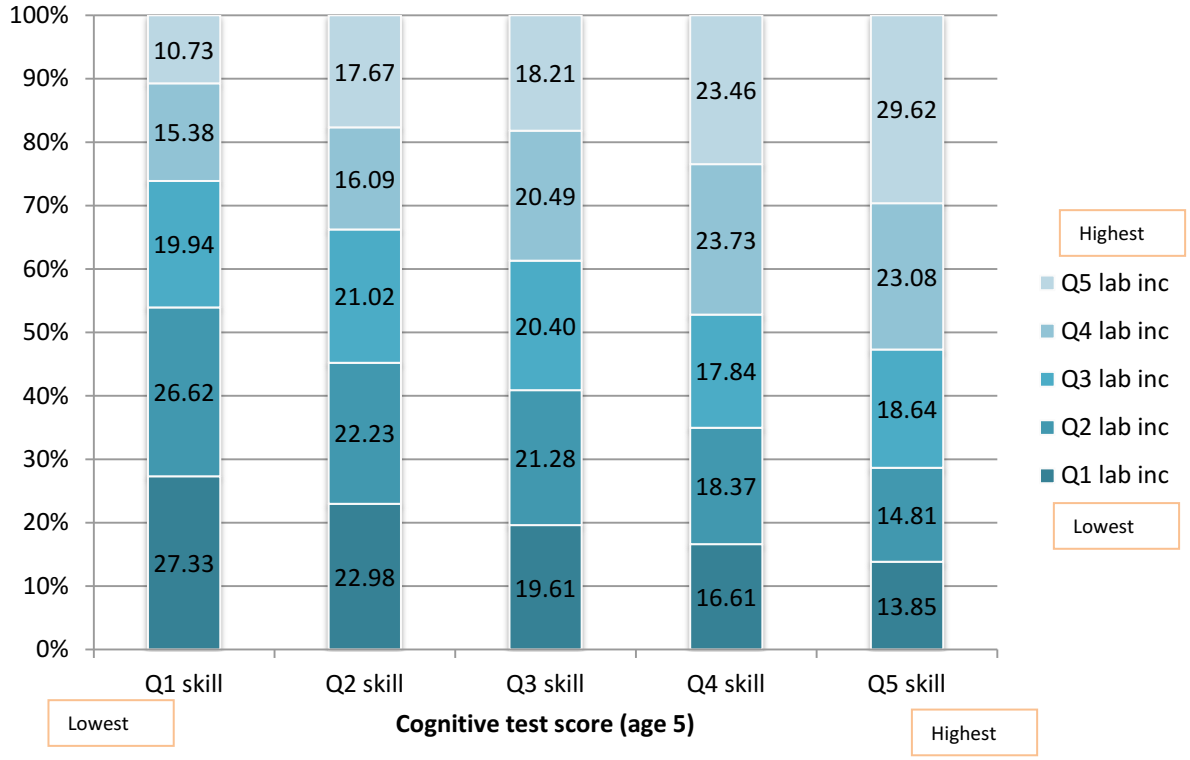


Source: Analysis of BCS70 data

Cognitive skill test scores in early childhood and labour market success in adulthood

Cognitive skill test scores at age 5 are related to success in the labour market at age 42. Very few individuals with the lowest test scores at age 5 make it into the top labour income group at age 42: 11% of individuals with the lowest test scores at age 5 are in the highest hourly labour income quintile at age 42. Similarly, only a minority of individuals with high cognitive test scores at age 5 fail to convert these skills into labour market success: 14% of individuals with the highest test scores at age 5 are in the lowest hourly labour income quintile at age 42 (Figure 3). However, 30% of children in the highest quintile for cognitive test scores have hourly labour income in the top quintile at age 42 (with over 50% in the highest two quintiles).

Figure 3 Composite cognitive test score quintile (age 5) by hourly labour income quintile (age 42)

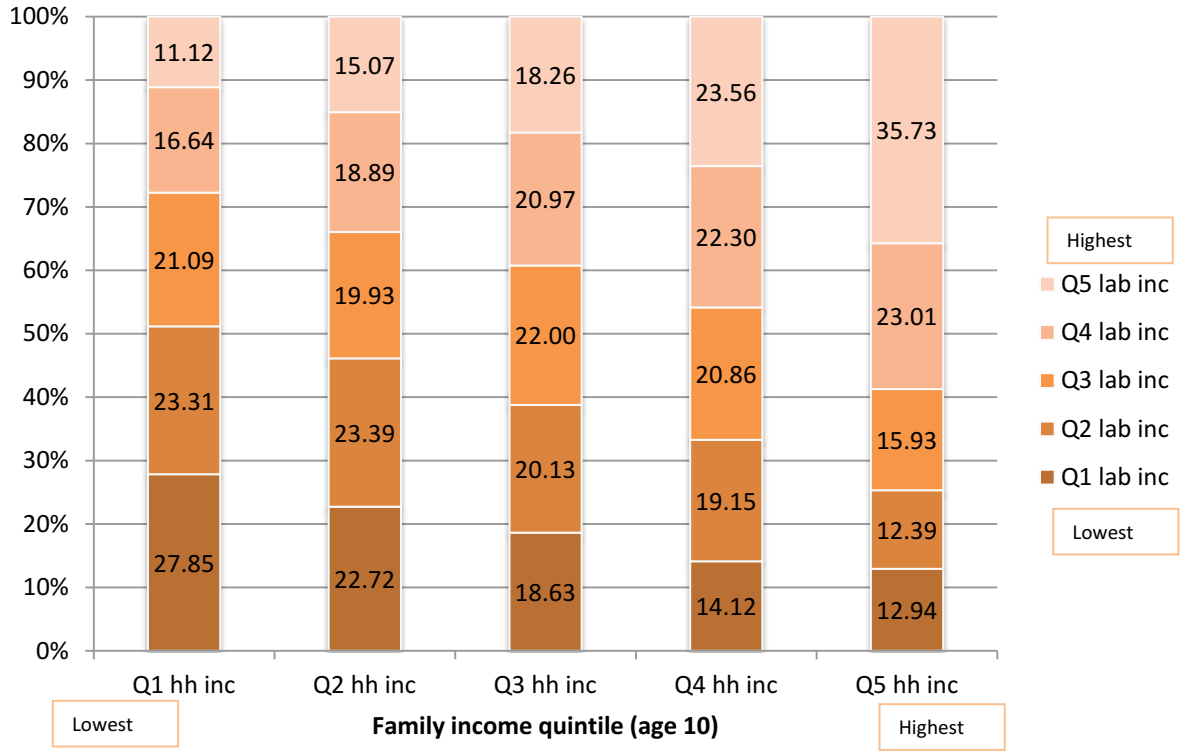


Source: Analysis of BCS70 data

Family background and labour market success at age 42

Children from higher family income groups at age 10 are more likely to have high hourly labour income at age 42; 36% of individuals from the highest family income quintile are in the top hourly labour income quintile at age 42. Children from lower family income groups are more likely to have low labour income at age 42 (28% of individuals from the lowest family income quintile are in the lowest hourly earning quintile at age 42).

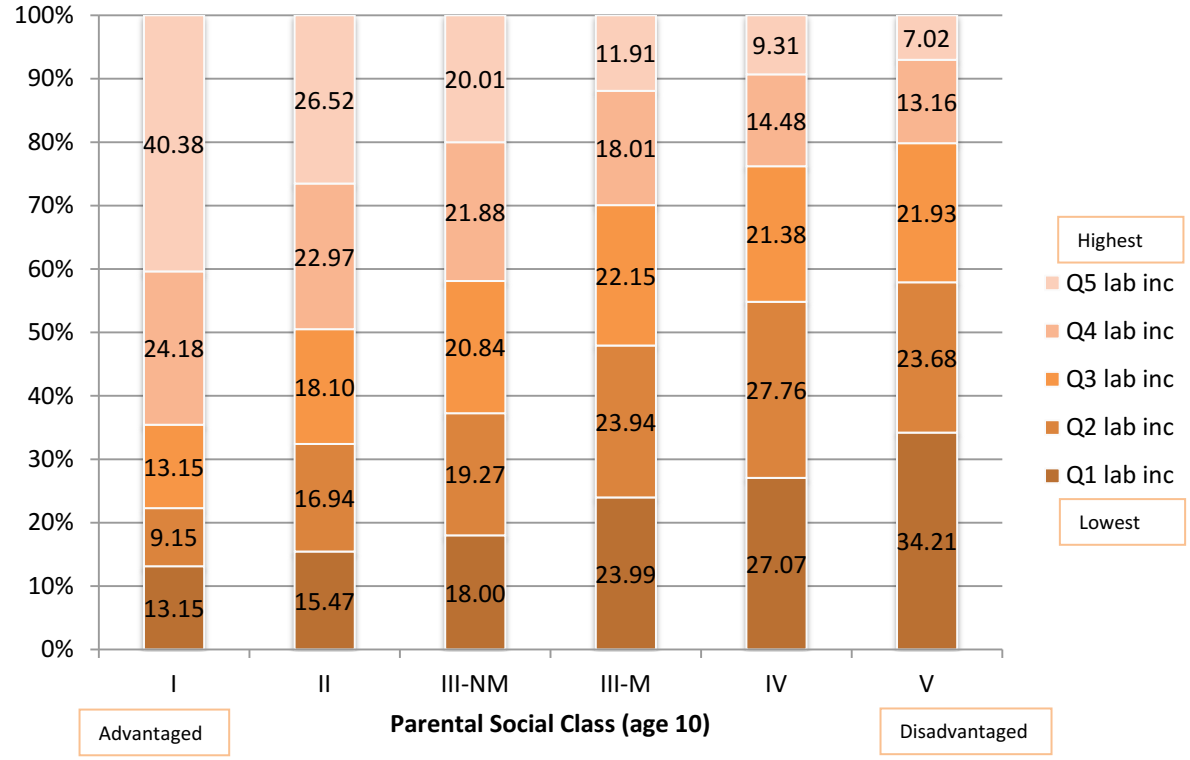
Figure 4 Family income background (age 10) by hourly labour income quintile (age 42)



Source: Analysis of BCS70 data

Similarly if we examine the relationship between parental social class background (age 10) and hourly labour income (age 42) we find a social gradient with children from more advantaged family backgrounds much more likely to be in the top labour income groups as adults (Figure 5). Around 40% of children from Social Class I (professional class) are in the top hourly labour income quintile at age 42 relative to only 7% of children from Social Class V (unskilled class).

Figure 5 Parental social class background (age 10) by hourly labour income quintile (age 42)



Source: Analysis of BCS70 data

The association between childhood advantage and disadvantage with adult labour market success for BCS70 cohort is summarised in Table 1 and Table 2, covering all the ages that information on parental social class and family income is available in the survey. Table 1 shows the association between advantaged family backgrounds (Social Class I or the top family income quintile) and high hourly labour income at age 42. Table 2 shows the association between disadvantaged family backgrounds (Social Class V or the bottom family income quintile) and high hourly labour income at age 42.

It is striking that the associations are very similar irrespective of which age parental social class or family income is measured. Children from advantaged social class backgrounds are four times more likely to be in a high hourly labour income group in adulthood than children from disadvantaged social class backgrounds. For family income background the difference between being in the top or bottom income quintile is around three-fold. There is also a correlation evident between children's grandfather's social class background and their success as adults in the labour market, although the relationship appears to be attenuated over generations for children from less advantaged backgrounds, with a higher share of children with grandfathers in the lowest social class making it into the top hourly labour income quintile age 42 than children with parents in the lowest social class.

Table 1 Percent of cohort members from Social Class I (professionals) or the highest family income quintile in the top hourly earnings quintile age 42

	Social Class			Income
	Parental	Father's father	Mother's father	Family
Birth*	44%			
Age 5	38%	41%	30%	
Age 10	40%			36%
Age 16	40%			38%

Source: Analysis of BCS70 data
Note: (*) It is not possible to distinguish between the full set of social classes for mothers at birth and therefore the birth information is father's social class

Table 2 Percent of cohort members from Social Class V (unskilled) or the lowest family income quintile in the top hourly earnings quintile age 42

	Social Class			Income
	Parental	Father's father	Mother's father	Family
Birth*	8%			
Age 5	9%	16%	15%	
Age 10	7%			11%
Age 16	10%			12%

Source: Analysis of BCS70 data
Note: (*) It is not possible to distinguish between the full set of social classes for mothers at birth and therefore the birth information is father's social class

In this section we have shown reinforcing patterns of advantage:

- Children from advantaged family backgrounds are more likely to perform well in cognitive skill assessments in early childhood;
- Children who perform well in cognitive skill assessments in early childhood are more likely to be high earners in adult life.
- Children from advantaged family backgrounds and children who perform well in cognitive skill assessments are more likely to be higher earners in adult life.

We have also shown reinforcing patterns of disadvantage

- Children from disadvantaged family backgrounds are more likely to perform poorly in cognitive skill assessments in early childhood;
- Children who perform poorly in cognitive skill assessments in early childhood are less likely to be high earners in adult life.
- Children from disadvantaged family backgrounds and children who perform poorly in cognitive skill assessments are less likely to be high earners in adult life.

9. Predicting success: Accounting for income and social gradients

The relationships between early cognitive skills, family background and later labour market success highlight patterns of advantage and disadvantage in the raw data. In this section we analyse those differences using regression analysis focusing on low attaining and high attaining groups and their chances of being in higher earning or 'top jobs'.

The first group comprises children who were low attaining in the early cognitive tests taken at age 5. Low attainment is defined as achieving test scores in the bottom 40 per cent of the composite cognitive skill distribution. The second group comprises children who were high attaining in the same tests. High attainment here is defined as achieving test scores in the top 40 per cent of the composite cognitive skill distribution. Statistical models (probit regression models) are estimated to identify if there are statistically significant differences in later labour market success (for hourly labour income and top ranking jobs) according to family income or parental social class backgrounds. Success is defined as hourly earnings (employees and self-employed) in the top quintile (top 20 percent) or working in a top ranking job at age 42. In Appendix B we discuss briefly the main differences between the findings from our preferred outcome measure of hourly earnings with the weekly earnings measure and with age 34 outcomes rather than age 42 outcomes.

A series of regression models are estimated for each outcome for the two groups, building up the number of potential explanatory variables to assess how much of the variation can be explained and to identify the key variables accounting for any family background variation. Three separate regression models have been estimated for each, building up from the basic model which only includes the family background variable and gender (Model 1), a model adding parental education and age 10 cognitive and non-cognitive skills (Model 2) to the full model containing all of the control variables (Model 3). The models estimate whether there are significant differences according to family background – family income and parental social class – and a selection of variables that help to explain any differences:

	Model 1	Model 2	Model 3
Family background	X	X	X
Gender	X	X	X
Parental education		X	X
Maths age 10		X	X
Reading age 10		X	X
Self-esteem age 10		X	X
Locus of control age 10		X	X
Behaviour problems age 10		X	X
Secondary school type			X
Educational attainment			X

Building up the models in this way allows us to identify the key factors that contribute to labour market success for different groups of individuals and to help explain the raw differentials by social class and family income background. The order in which

additional variables are entered in the sequence of models is in part designed to reflect outcomes and inputs as individuals' age[2].

Before we report on the regression results we examine how the two attainment groups vary according the characteristics which we use as explanatory variables in the statistical models. The composition of the high and low attaining groups (based on age 5 cognitive skill tests) differs in a number of important ways. The sample sizes vary across the outcomes analysed but the variable means (proportions) vary very little. The largest samples are for the top ranking occupation measure where earnings and hours worked information is not required. The two groups shown in Table 3(a) are the high attainers and low attainers where the outcome is whether or not individuals are in the highest quintile of the hourly labour income distribution at age 42.

The group with relatively low attainment in cognitive skill tests at age 5 are around half as likely to be in the top hourly labour income group compared to the higher attainers (14% relative to 27%).

The low attainers are more likely to be disadvantaged across the whole range of variables considered. They are more likely to be in a low income family (age 10); their parents are much more likely to have no qualifications (43% compared to 23%) and much less likely to be graduates (9% compared to 23%). They are found to perform less well in reading and maths assessments at age 10. In terms of social and emotional skills, early low attainers are found to have lower self-esteem and are less likely to have a sense that they are in control of their own destiny at age 10 (locus of control). These early low attainers are also more likely to have moderate or severe behavioural problems (measured at age 10). They are considerably more likely to attend a secondary modern school (22% relative to 12%) at age 16 and less likely to attend a private (2% compared to 8%) or a Grammar (3% compared to 7%) secondary school. Ultimately they are more likely to leave school without any qualifications (11% relative to 6%) or with low levels of qualifications and considerably less likely to gain a degree qualification (13% relative to 34%).

Table 3(b) shows the parental social class shares for the same attainment groups and outcome variables. The share of both groups (high attainers and low attainers) in SC III-NM is similar (around one-fifth) but this is the point of departure as a smaller share of low-attainers have parents in more advantaged social classes and a higher share with parents in less advantaged social classes.

[2] The tables containing the complete sets of regression results can be downloaded from the Social Mobility and Child Poverty Commission website

Table 3(a) Characteristics of high attainer and low attainer samples (age 42 outcome)

	Variable	High	Low
Outcome variable	Q5 hourly labour income	0.27	0.14
Family income age 10	Q1 lowest (ref)	0.12	0.24
	Q2	0.25	0.31
	Q3	0.19	0.17
	Q4	0.22	0.17
	Q5 highest	0.22	0.11
Gender	Male (ref)	0.50	0.48
	Female	0.50	0.52
Parental education (highest)	No qualification (ref)	0.23	0.43
	Vocational ed	0.12	0.14
	O levels	0.24	0.22
	A levels	0.12	0.07
	SRN	0.02	0.02
	Cert ed	0.03	0.01
	Degree +	0.23	0.09
	Other	0.01	0.01
Reading aptitude age	Q1 lowest (ref)	0.07	0.27
	Q2	0.11	0.20
	Q3	0.21	0.20
	Q4	0.18	0.11
	Q5 highest 10	0.28	0.09
	Read missing	0.14	0.13
Maths aptitude age 10	Q1 lowest (ref)	0.07	0.27
	Q2	0.12	0.21
	Q3	0.18	0.15
	Q4	0.22	0.14
	Q5 highest	0.26	0.09
	Math missing	0.14	0.13
Self-esteem age 10	Q1 lowest (ref)	0.14	0.20
	Q2	0.20	0.25
	Q3	0.15	0.13
	Q4	0.23	0.19
	Q5 highest	0.14	0.11
	SE missing	0.13	0.12
Locus of control age 10 (autonomy)	Q1 lowest (ref)	0.16	0.29
	Q2	0.19	0.22
	Q3	0.11	0.11
	Q4	0.21	0.16
	Q5 highest	0.19	0.08
	LoC missing	0.14	0.13
Behaviour age 10	Rutter (normal) (ref)	0.82	0.75
	Rutter (mod problems)	0.12	0.15
	Rutter (severe problems)	0.02	0.04
	Rutter missing	0.04	0.06
Type of secondary	Comprehensive (ref)	0.72	0.73
	Grammar	0.07	0.03
	Secondary modern	0.12	0.22
	Private	0.07	0.02
	Other	0.01	0.01
Highest qual level	None (ref)	0.11	0.06
	GCSE or less	0.38	0.23
	A Level	0.16	0.16
	FE or HE (vocational)	0.22	0.22
	Degree + (academic)	0.13	0.34
Sample size	n	1894	1678

Notes: Attainment is defined in terms of performance in cognitive tests taken at age 5. (ref) denotes the reference group used in the statistical models.

Table 3(b) Characteristics of high attainer and low attainer samples (age 42 outcome)

	Variable	High	Low
Outcome variable	Q5 hourly labour	0.26	0.14
Social Class age 10 (parental)	SC I	0.10	0.04
	SC II	0.37	0.25
	SC III-NM	0.22	0.21
	SC III-M (ref)	0.22	0.32
	SC IV	0.06	0.11
	SC V	0.01	0.02
	SC Other	0.03	0.04
Sample size	n	2092	1837

Notes: Attainment is defined in terms of performance in cognitive tests taken at age 5. (ref) denotes the reference group used in the statistical models.

We now report on the results from the models of labour market success for the high and low attaining groups which estimate the extent to which differences in characteristics between children from different parental social classes or family income groups account for observed social and income gradients in family background.

We report the estimated average marginal effects (where marginal effects have been computed at sample means). As these are estimates from probit regressions (the binary dependent variable is equal to 1 if an individual is in a top job or in the top quintile of the hourly earnings distribution and 0 otherwise) the marginal effects show the percentage point increase/decrease in the conditional probability of labour market success associated with the variable. As the variables we consider are categorical variables the marginal effects are relative to a reference category (ref). For example, an average marginal effect of 0.10 indicates that this variable, on average, is associated with a 10 percentage point higher chance of labour market success relative to the relevant reference category.

9.1 Predicting labour market success for low attaining children in early cognitive skill tests

Low attaining children at age 5 from high income backgrounds are more likely to be high earners at age 42 than their less advantaged peers. This advantage can be accounted for by a number of factors (Table 4). There is a greater likelihood of their parents having higher levels of qualifications, particularly Degree level qualifications, and they are also more likely to perform better in Maths aptitude assessments made at age 10: both these factors are associated with a greater probability of being in the top earnings group at age 42. The estimated conditional probability is 13 percentage points higher for children who had a parent with a degree relative to their peers whose parents had no qualifications. Part of this association is related to the fact that children with graduate parents are more likely to be highly qualified themselves so in the model which controls for children's own education (Model 3) the average marginal effect of parental degree qualification falls from 13 percentage points to 6 percentage points. Children who score in the top quintile in the age 10 maths assessment have an estimated 17 percentage point higher conditional probability of being in the top earnings group at age 42 relative to children with scores in the lowest quintile. The fact that these children are more likely to attain higher levels of education (and attend a Grammar secondary school) means that the average marginal effect falls to 11 percentage points; 6 percentage points are explained by level of education and secondary school type.

Higher locus of control also accounts for some of the variation by family income background. Self-esteem is not found to have an independent marginal effect.

Severe behavioural problems (age 10) are shown to be negatively associated with the conditional probability of being a high earner in adult life for this group of early low attainers, and more advantaged children are less likely to present these types of behaviour.

In the full model (Model 3) we see that attending a Grammar or a private secondary school is associated with a greater likelihood of being a higher earner at age 42 (9 and 11 percentage points higher, respectively) relative to those who attend a comprehensive secondary school. The estimated conditional probability of high earnings at age 42 is 17 percentage points higher for initially low attaining children who go on to attain a Degree than for children with low levels of qualifications.

When we use parental social class rather than family income at age 10 to describe family background we find that some social class variation exists even after controlling for parental education, reading and maths aptitude at age 10, and social and emotional skills at age 10 (Table 5, Model 2); in particular, the advantage of SC I (8 percentage points higher in the estimated conditional probability) and the disadvantage of SC IV (6 percentage point lower in the estimated conditional probability) relative to children from SC III-NM. The disadvantage of SC IV (estimated 6 percentage points lower) remains after additional controls are added for secondary school type and highest level of educational qualification achieved (Model 2).

In terms of the explanatory variables that account for the social class gradient, they are largely the same in size and significance as those in the models which included family income as a measure of children's socio-economic background.

The second labour market success variable we analyse is employment in a high-ranking occupation at age 42. Again we find family income and parental social class gradients with more advantaged early low attaining children, defined by either measure, more likely to be working in a top ranking occupation at age 42 (Table 6 and Table 7).

This gradient can be accounted for by differences between children in social class or family income groups in terms of their parents' educational qualifications, how well they perform in maths aptitude assessments at age 10 and locus of control, and the extent to which they exhibit severe behavioural problems at age 10. More advantaged children in terms of these explanatory variables are also more likely to attend a Grammar secondary school and more likely to gain a higher level qualification, particularly a Degree, which are both associated with a higher likelihood of working in a job ranking occupation at age 42.

When we describe family background in terms of position in the income distribution rather than parental social class background we find that parental education and attendance at a private secondary school are not statistically significant predictors of likelihood of being employed in a top job at age 42 among this group of early low attainers. However, they are significant in the model which uses parental social class to describe family background (Table 7). This suggests that there is a greater correlation between these variables and position in the family income distribution than there is with parental social class.

Table 4 Marginal effects from probit models of probability of being in top quintile of hourly earnings age 42 (family income) – low attainers

		Model 1		Model 2		Model 3	
Family income age 10	Q1 low (ref)						
	Q2	0.032		0.012		0.006	
	Q3	0.041		0.011		0.006	
	Q4	0.076	***	0.021		0.016	
	Q5 high	0.127	***	0.031		0.011	
Gender	Male (ref)						
	Female	-0.098	***	-0.088	***	-0.088	***
Highest parental qualification	No qual (ref)						
	Voc ed			0.005		0.004	
	O levels			0.069	***	0.042	**
	A levels			0.040		0.008	
	SRN			-0.023		-0.056	
	Cert ed			-0.020		0.016	
	Degree +			0.127	***	0.062	**
	Other			0.106		0.094	
Reading aptitude age 10	Q1 low (ref)						
	Q2			-0.030		-0.029	
	Q3			0.014		0.009	
	Q4			-0.004		-0.021	
	Q5 high			0.028		0.003	
Maths aptitude age 10	Q1 low (ref)						
	Q2			0.071	***	0.064	**
	Q3			0.094	***	0.076	***
	Q4			0.126	***	0.097	***
	Q5 high			0.167	***	0.108	***
Self-esteem age 10	Q1 low (ref)						
	Q2			-0.026		-0.020	
	Q3			-0.017		-0.009	
	Q4			-0.004		-0.004	
	Q5 high			-0.025		-0.022	
Locus of control age 10	Q1 low (ref)						
	Q2			0.007		-0.006	
	Q3			0.066	**	0.048	*
	Q4			0.048	*	0.031	
	Q5 high			0.042		0.021	
Behaviour age 10	Rutter (normal) (ref)						
	Rutter (mod probs)			0.018		0.008	
	Rutter (severe probs)			-0.115		-0.103	*
Secondary school type	Comprehensive (ref)						
	Grammar					0.092	**
	Secondary modern					-0.008	
	Private					0.112	***
	Other						
Highest qual level	None (ref)						
	GCSE or less					-0.029	
	A Level					0.001	
	FE or HE (vocational)					0.061	**
	Degree+ (academic)					0.165	***
N		1721		1696		1678	
Pseudo R^2		0.0418		0.1347		0.199	

Notes: (1) Statistical significance ***p<0.01, **p<0.05, *p<0.10. (2) Average marginal effects are evaluated at sample means. (3) (ref) denotes the reference category for a categorical variable.

Table 5 Marginal effects from probit models of probability of being in top quintile of hourly earnings age 42 (parental social class) – low attainers

		Model 1		Model 2		Model 3	
Parental social class age 10	SC I	0.213	***	0.082	**	0.039	
	SC II	0.079	***	0.029		0.019	
	SC III-NM	0.048	**	0.025		0.015	
	SC III-M (ref)						
	SC IV	-0.071	**	-0.062	*	-0.061	**
	SC V	-0.017		0.025		0.030	
Gender	Male (ref)						
	Female	-0.103	***	-0.090	***	-0.092	***
Highest parental qualification	No qual (ref)						
	Voc ed			-0.006		-0.008	
	O levels			0.050	**	0.024	
	A levels			0.027		-0.004	
	SRN			-0.061		-0.088	
	Cert ed			0.000		-0.003	
	Degree +			0.101	***	0.047	*
	Other			0.123	**	0.103	*
Reading aptitude age 10	Q1 low (ref)						
	Q2			-0.027		-0.023	
	Q3			0.006		0.005	
	Q4			-0.008		-0.021	
	Q5 high			0.030		0.005	
Maths aptitude age 10	Q1 low (ref)						
	Q2			0.069	***	0.057	**
	Q3			0.088	***	0.068	*
	Q4			0.121	***	0.084	***
	Q5 high			0.166	***	0.107	***
Self-esteem age 10	Q1 low (ref)						
	Q2			-0.029		-0.025	
	Q3			-0.012		-0.006	
	Q4			-0.009		-0.009	
	Q5 high			-0.019		-0.014	
Locus of control age 10	Q1 low (ref)						
	Q2			-0.003		-0.013	
	Q3			0.063	**	0.044	*
	Q4			0.042	*	0.028	
	Q5 high			0.041		0.019	
Behaviour age 10	Rutter (normal) (ref)						
	Rutter (mod probs)			0.006		0.013	
	Rutter (severe probs)			-0.130	**	-0.119	*
Secondary school type	Comprehensive (ref)						
	Grammar					0.082	**
	Secondary modern					-0.000	
	Private					0.103	***
	Other					omitted	
Highest qual level	None (ref)						
	GCSE or less					-0.017	
	A Level					0.014	
	FE or HE (vocational)					0.072	**
	Degree+ (academic)					0.169	***
N		1886		1858		1837	
Pseudo R^2		0.0697		0.1500		0.2110	

Notes: (1) Statistical significance ***p<0.01, **p<0.05, *p<0.10. (2) Average marginal effects are evaluated at sample means. (3) (ref) denotes the reference category for a categorical variable.

Table 6 Marginal effects from probit models of probability of being in top ranked occupation (family income) – low attainers

		Model 1		Model 2		Model 3	
Family income age 10	Q1 low (ref)						
	Q2	0.011		-0.004		-0.007	
	Q3	0.016		-0.005		-0.003	
	Q4	0.056	***	0.016		0.012	
	Q5 high	0.083	***	0.027		0.014	
Gender	Male (ref)						
	Female	-0.082	***	-0.077	***	-0.077	***
Highest parental qualification	No qual (ref)						
	Voc ed			0.030		0.031	
	O levels			0.024		0.002	
	A levels			0.012		-0.014	
	SRN			0.026		0.003	
	Cert ed			0.021		0.004	
	Degree +			0.069	***	0.019	
	Other			0.066		0.063	
Reading aptitude age 10	Q1 low (ref)						
	Q2			-0.023		-0.024	
	Q3			-0.009		-0.016	
	Q4			0.027		0.008	
	Q5 high			0.041		0.016	
Maths aptitude age 10	Q1 low (ref)						
	Q2			0.062	***	0.052	**
	Q3			0.059	**	0.048	*
	Q4			0.058	**	0.037	
	Q5 high			0.099	***	0.056	*
Self-esteem age 10	Q1 low (ref)						
	Q2			0.021		0.025	
	Q3			-0.013		-0.002	
	Q4			0.022		0.025	
	Q5 high			-0.022		-0.017	
Locus of control age 10	Q1 low (ref)						
	Q2			-0.002		-0.015	
	Q3			0.048	**	0.028	
	Q4			0.050	**	0.031	
	Q5 high			0.054	*	0.030	
Behaviour age 10	Rutter (normal) (ref)						
	Rutter (mod probs)			-0.003		-0.002	
	Rutter (severe probs)			-0.109	**	-0.091	*
Secondary school type	Comprehensive (ref)						
	Grammar					0.064	*
	Secondary modern					-0.025	
	Private					0.056	
	Other					-0.011	
Highest qual level	None (ref)						
	GCSE or less					0.010	
	A Level					0.011	
	FE or HE (vocational)					0.081	***
	Degree+ (academic)					0.163	***
N		1847		1821		1813	
Pseudo R^2		0.0384		0.1023		0.1647	

Notes: (1) Statistical significance ***p<0.01, **p<0.05, *p<0.10. (2) Average marginal effects are evaluated at sample means. (3) (ref) denotes the reference category for a categorical variable.

Table 7 Marginal effects from probit models of probability of being in top ranked occupation (parental social class) – low attainers

		Model 1		Model 2		Model 3	
Parental social class age 10	SC I	0.106	***	0.005		-0.036	
	SC II	0.057	***	0.018		0.010	
	SC III-NM	0.035	*	0.020		0.011	
	SC III-M (ref)						
	SC IV	-0.032		-0.007		-0.012	
	SC V	-0.038		-0.005		0.002	
Gender	Male (ref)						
	Female	-0.081	***	-0.074	***	-0.074	***
Highest parental qualification	No qual (ref)						
	Voc ed			0.035	*	0.034	*
	O levels			0.036	**	0.014	
	A levels			0.027		-0.001	
	SRN			0.012		-0.009	
	Cert ed			0.031		0.018	
	Degree +			0.100	***	0.051	**
	Other			0.056		0.047	
Reading aptitude age 10	Q1 low (ref)						
	Q2			-0.029		-0.027	
	Q3			-0.033		-0.037	
	Q4			0.012		-0.004	
	Q5 high			0.035		0.015	
Maths aptitude age 10	Q1 low (ref)						
	Q2			0.060	***	0.049	**
	Q3			0.074	***	0.063	***
	Q4			0.066	**	0.039	
	Q5 high			0.105	***	0.057	*
Self-esteem age 10	Q1 low (ref)						
	Q2			0.007		0.013	
	Q3			-0.025		-0.014	
	Q4			0.006		0.011	
	Q5 high			-0.039		-0.032	
Locus of control age 10	Q1 low (ref)						
	Q2			-0.004		-0.016	
	Q3			0.040	*	0.017	
	Q4			0.055	***	0.040	*
	Q5 high			0.048	*	0.020	
Behaviour age 10	Rutter (normal) (ref)						
	Rutter (mod probs)			-0.019		-0.014	
	Rutter (severe probs)			-0.125	**	-0.102	**
Secondary school type	Comprehensive (ref)						
	Grammar					0.073	**
	Secondary modern					-0.030	*
	Private					0.097	***
	Other					-0.020	
Highest qual level	None (ref)						
	GCSE or less					0.003	
	A Level					0.010	
	FE or HE (vocational)					0.081	***
	Degree+ (academic)					0.158	***
N		2030		2000		1991	
Pseudo R^2		0.0423		0.1074		0.1742	

Notes: (1) Statistical significance ***p<0.01, **p<0.05, *p<0.10. (2) Average marginal effects are evaluated at sample means. (3) (ref) denotes the reference category for a categorical variable.

9.2 Predicting labour market success for high attaining children in early cognitive skill tests

The second group of children we focus on are high attainers in early cognitive skill tests at age 5.

Again we find strong parental social class and family income gradients in the likelihood that these high attaining children are able to convert these skills into high earnings at age 42 (Tables 8 and 9, Model 1). However, the socio-economic gradients are much steeper than we found among low attainers. The average marginal effect on the conditional probability of being in the top earnings group at age 42 is 22 percentage points higher for children in the top family income quintile at age 10 relative to those in the bottom quintile (Table 8, Model 1). For SC I backgrounds the average marginal effect is 22 percentage points higher relative to SCIII-M and 46 percentage points higher relative to SC V backgrounds.

Although we find the same factors are associated with a higher or lower likelihood of being a high earner at age 42 as we found among the early low attainers, we observe that to a greater extent family income and social class gradients remain unaccounted for by these variables. This suggests that children from less advantaged backgrounds who are initially high attainers do not manage to convert this early potential into high earnings at age 42 with the same degree of success as children from more advantaged family backgrounds.

For our second outcome, which is the probability of being in a high-ranking occupation at age 42, we find that children from lower family income backgrounds are less likely to convert this early high attainment into employment in a top-ranking occupation at age 42 than children from more privileged family backgrounds. We find the lowest conversion rates among children with family income in the lowest income quintile at age 10 and the highest conversion rates among children with family income in the highest income quintile. These differences cannot be fully accounted for by the full set of explanatory variables included in the models. The percentage point advantage of family income in the top quintile relative to the bottom quintile falls from 21 percentage point advantage (Model 1) to a 9 percentage point advantage (Model 3).

When parental social class is used as a measure of family background we find a particular advantage for SC I (an increase in the estimated conditional probability of 7 percentage points) which cannot be accounted for by parental education, maths aptitude at age 10, locus of control at age 10, but it is explained by a greater likelihood of these children gaining a Degree qualification, which is strongly associated with being in a high ranking occupation at age 42 (an increase in the estimated conditional probability of 20 percentage points relative to lower levels of education). The finding that severe behavioural problems are associated with an increased likelihood of high attainers being in a top job (Table 9) is likely to be spurious as few high attainers have severe behavioural problems at age 10 (2 percent – see Table 3a) which explains why the coefficient is only marginally significant.

Table 8 Marginal effects from probit models of probability of being in top quintile of hourly earnings age 42 (family income) – high attainers

		Model 1		Model 2		Model 3	
Family income age 10	Q1 low (ref)						
	Q2	0.016		0.005		-0.001	
	Q3	0.074	**	0.038		0.020	
	Q4	0.130	***	0.077	**	0.071	**
	Q5 high	0.217	***	0.115	***	0.080	**
Gender	Male (ref)						
	Female	-0.127	***	-0.112	***	-0.129	***
Highest parental qualification	No qual (ref)						
	Voc ed			0.105	***	0.081	**
	O levels			0.065	**	0.037	
	A levels			0.087	**	0.054	
	SRN			0.027		-0.038	
	Cert ed			0.039		-0.050	
	Degree +			0.114	***	0.024	
	Other			0.062		0.081	
Reading aptitude age 10	Q1 low (ref)						
	Q2			-0.047		-0.045	
	Q3			0.044		0.040	
	Q4			0.042		0.024	
	Q5 high			0.064		0.030	
Maths aptitude age 10	Q1 low (ref)						
	Q2			0.125	**	0.097	
	Q3			0.190	***	0.149	***
	Q4			0.203	***	0.154	***
	Q5 high			0.305	***	0.218	***
Self-esteem age 10	Q1 low (ref)						
	Q2			-0.010		-0.019	
	Q3			0.003		-0.017	
	Q4			-0.007		-0.021	
	Q5 high			0.015		-0.004	
Locus of control age 10	Q1 low (ref)						
	Q2			0.039		0.021	
	Q3			0.088	**	0.065	*
	Q4			0.098	***	0.047	
	Q5 high			0.079	**	0.035	
Behaviour age 10	Rutter (normal) (ref)						
	Rutter (mod probs)			-0.083	***	-0.073	**
	Rutter (severe probs)			0.050		0.075	
Secondary school type	Comprehensive (ref)						
	Grammar					-0.002	
	Secondary modern					0.040	
	Private					0.107	***
	Other					-0.149	
Highest qual level	None (ref)						
	GCSE or less					-0.052	
	A Level					0.015	
	FE or HE (vocational)					0.054	
	Degree+ (academic)					0.239	***
N		1922		1902		1894	
Pseudo R^2		0.0481		0.1227		0.2016	

Notes: (1) Statistical significance ***p<0.01, **p<0.05, *p<0.10. (2) Average marginal effects are evaluated at sample means. (3) (ref) denotes the reference category for a categorical variable.

Table 9 Marginal effects from probit models of probability of being in top quintile of hourly earnings age 42 (parental social class) – high attainers

		Model 1		Model 2		Model 3	
		dy/dx		dy/dx		dy/dx	
Parental social class age 10	SC I	0.221	***	0.080	**	0.047	
	SC II	0.158	***	0.077	***	0.062	**
	SC III-NM	0.076	***	0.024		0.023	
	SC III-M (ref)						
	SC IV	-0.059		-0.058		-0.047	
	SC V	-0.238	*	-0.128		-0.098	
Gender	Male (ref)						
	Female	-0.131	***	-0.122	***	-0.136	***
Highest parental qualification	No qual (ref)						
	Voc ed			0.106	***	0.082	***
	O levels			0.073	***	0.042	
	A levels			0.083	**	0.057	*
	SRN			0.038		-0.024	
	Cert ed			0.039		-0.047	
	Degree +			0.114	***	0.033	
	Other			0.012		-0.006	
Reading aptitude age 10	Q1 low (ref)						
	Q2			-0.032		-0.021	
	Q3			0.047		0.048	
	Q4			0.044		0.032	
	Q5 high			0.083	*	0.049	
Maths aptitude age 10	Q1 low (ref)						
	Q2			0.129	**	0.099	*
	Q3			0.190	***	0.154	***
	Q4			0.194	***	0.150	***
	Q5 high			0.293	***	0.215	***
Self-esteem age 10	Q1 low (ref)						
	Q2			-0.014		-0.024	
	Q3			-0.010		-0.028	
	Q4			-0.008		-0.021	
	Q5 high			0.010		-0.004	
Locus of control age 10	Q1 low (ref)						
	Q2			0.057	*	0.035	
	Q3			0.093	**	0.068	*
	Q4			0.107	***	0.056	*
	Q5 high			0.086	***	0.039	
Behaviour age 10	Rutter (normal) (ref)						
	Rutter (mod probs)			-0.079	***	-0.071	***
	Rutter (severe probs)			0.074		0.099	*
Secondary school type	Comprehensive (ref)						
	Grammar					-0.009	
	Secondary modern					0.029	
	Private					0.105	***
	Other					-0.167	
Highest qual level	None (ref)						
	GCSE or less					-0.056	
	A Level					0.000	
	FE or HE (vocational)					0.039	
	Degree+ (academic)					0.218	***
N		2123		2102		2092	
Pseudo R^2		0.0531		0.1215		0.1935	

Notes: (1) Statistical significance ***p<0.01, **p<0.05, *p<0.10. (2) Average marginal effects are evaluated at sample means. (3) (ref) denotes the reference category for a categorical variable.

Table 10 Marginal effects from probit models of probability of being in top ranked occupation (family income) – high attainers

		Model 1		Model 2		Model 3	
Family income age 10	Q1 low (ref)						
	Q2	0.077	**	0.067	**	0.070	**
	Q3	0.103	***	0.070	**	0.063	*
	Q4	0.115	***	0.065	*	0.065	*
	Q5 high	0.206	***	0.108	***	0.090	***
Gender	Male (ref)						
	Female	-0.120	***	-0.104	***	-0.115	***
Highest parental qualification	No qual (ref)						
	Voc ed			0.026		0.013	
	O levels			0.048	*	0.034	
	A levels			0.049		0.022	
	SRN			0.039		0.002	
	Cert ed			-0.053		-0.117	**
	Degree +			0.122	***	0.064	**
	Other			-0.089		-0.080	
Reading aptitude age 10	Q1 low (ref)						
	Q2			0.029		0.023	
	Q3			0.068		0.061	
	Q4			0.060		0.042	
	Q5 high			0.072		0.037	
Maths aptitude age 10	Q1 low (ref)						
	Q2			0.092	*	0.075	
	Q3			0.115	**	0.088	*
	Q4			0.150	***	0.108	**
	Q5 high			0.233	***	0.169	***
Self-esteem age 10	Q1 low (ref)						
	Q2			-0.085	***	-0.088	***
	Q3			-0.013		-0.022	
	Q4			-0.036		-0.042	
	Q5 high			-0.019		-0.028	
Locus of control age 10	Q1 low (ref)						
	Q2			0.047		0.040	
	Q3			-0.008		-0.013	
	Q4			0.039		0.014	
	Q5 high			0.071	**	0.047	
Behaviour age 10	Rutter (normal) (ref)						
	Rutter (mod probs)			0.010		0.013	
	Rutter (severe probs)			-0.084		-0.059	
Secondary school type	Comprehensive (ref)						
	Grammar					0.036	
	Secondary modern					0.025	
	Private					0.005	
	Other					0.109	
Highest qual level	None (ref)						
	GCSE or less					-0.020	
	A Level					0.006	
	FE or HE (vocational)					0.034	
	Degree+ (academic)					0.201	***
N		2032		2011		2002	
Pseudo R^2		0.0401		0.1118		0.1653	

Notes: (1) Statistical significance ***p<0.01, **p<0.05, *p<0.10. (2) Average marginal effects are evaluated at sample means. (3) (ref) denotes the reference category for a categorical variable.

Table 11 Marginal effects from probit models of probability of being in top ranked occupation (parental social class) – high attainers

		Model 1		Model 2		Model 3	
Parental social class age 10	SC I	0.211	***	0.070	*	0.050	
	SC II	0.095	***	0.023		0.013	
	SC III-NM	0.062	**	0.026		0.034	
	SC III-M (ref)						
	SC IV	-0.033		-0.036		-0.021	
	SC V	-0.204		-0.130		-0.103	
Gender	Male (ref)						
	Female	-0.119	***	-0.109	***	-0.119	***
Highest parental qualification	No qual (ref)						
	Voc ed			0.038		0.025	
	O levels			0.048	*	0.029	
	A levels			0.050		0.026	
	SRN			0.057		0.018	
	Cert ed			-0.059		-0.122	**
	Degree +			0.117	***	0.065	**
	Other			-0.112		-0.113	
Reading aptitude age 10	Q1 low (ref)						
	Q2			-0.028		-0.026	
	Q3			0.011		0.008	
	Q4			0.011		-0.004	
	Q5 high			0.028		-0.005	
Maths aptitude age 10	Q1 low (ref)						
	Q2			0.098	*	0.075	
	Q3			0.124	**	0.096	**
	Q4			0.152	***	0.112	**
	Q5 high			0.235	***	0.173	***
Self-esteem age 10	Q1 low (ref)						
	Q2			-0.058	*	-0.061	**
	Q3			-0.004		-0.014	
	Q4			-0.034		-0.042	
	Q5 high			-0.012		-0.018	
Locus of control age 10	Q1 low (ref)						
	Q2			0.057	*	0.048	
	Q3			0.009		0.001	
	Q4			0.054	*	0.025	
	Q5 high			0.073	**	0.046	
Behaviour age 10	Rutter (normal) (ref)						
	Rutter (mod probs)			0.010		0.012	
	Rutter (severe probs)			-0.063		-0.044	
Secondary school type	Comprehensive (ref)						
	Grammar					0.020	
	Secondary modern					0.024	
	Private					0.001	
	Other					0.113	
Highest qual level	None (ref)						
	GCSE or less					-0.022	
	A Level					0.012	
	FE or HE (vocational)					0.039	
	Degree+ (academic)					0.202	***
N		2246		2224		2213	
Pseudo R^2		0.0466		0.1061		0.1601	

Notes: (1) Statistical significance ***p<0.01, **p<0.05, *p<0.10. (2) Average marginal effects are evaluated at sample means. (3) (ref) denotes the reference category for a categorical variable.

We can use the results from the statistical models to predict the probability that a high or low attaining individual is successful in the labour market at age 42 for a given set of characteristics. These estimates isolate the predicted probability of being in the high earning group associated with a given characteristic evaluated at sample means for all other variables. The predicted probabilities from the full models containing all of the explanatory variables, for a selection of characteristics are shown in Table 12. These predictions have been estimated for men and women separately as all of the models show that women have a lower likelihood of being in the top earnings group than men. The predicted probabilities from the simple models (Model 1) are shown in parenthesis for comparison.

The results demonstrate the higher predicted probabilities for being a high earner for men than women. In the full models we saw that most of the variation between family income groups can be accounted for among low attainers but this is not the case among high attainers. Holding other factors constant (at sample means) we see that among high attaining males 25% are predicted to be high earners from the lowest family income quintile compared to 35% of males from the highest income quintile (down from 48% in the simple model). We see the advantage of higher qualified parents for low attainers and the advantage of high and low attainers attending a private secondary school. There is a large difference in the predicted probabilities for men and women both high and low attaining between those leaving school with no qualifications and those going on to attain a Degree (the predicted probability of being a top earner is three to four times greater for those with a Degree).

Table 12 Predicted probability of being in top quintile of hourly earnings at age 42 associated with key characteristics (estimated from full probit model at sample means)

		Low attainers		High attainers	
		Male	Female	Male	Female
Family income	Income Q1	14%(14%)	6%(6%)	25%(23%)	12%(12%)
	Income Q5	16%(31%)	7%(17%)	35%(48%)	19%(32%)
Parents' highest qualification	No qualification	13%	5%	26%	12%
	Degree	22%	10%	29%	14%
Secondary school	Comprehensive	15%	6%	28%	14%
	Private	33%	18%	43%	25%
Highest qualification	No qualification	12%	5%	19%	9%
	Degree	40%	23%	52%	33%

Note: the numbers in parentheses show the predicted probabilities in the simple model for the two income groups.

The independent effect of different variables is important but of course individuals have combinations of characteristics and circumstances. We can also use the predicted probabilities to build up a picture for individuals with different combinations of characteristics.

The following fictional pen-portraits describe four very different children who were all low attaining in the age 5 cognitive skill assessments. The model estimates are used to predict the probability that children with these characteristics will make it into the top earnings group at age 42. The probability of being in the top earnings group

at age 42 ranges from 7% to 73% for these four fictional children and provides a useful reminder that different combinations of circumstance and characteristics can result in very different outcomes.

In this section we have shown how low and high attaining groups differ in terms of average characteristics. We have used regression techniques to estimate which variables can account for the strong social class and family income gradients in the likelihood of initially high and low attaining individuals being high earners or working in a top ranking occupation at age 42. We have identified a number of key variables that largely account for these gradients in low attaining children:

- The level of parents' education;
- Maths aptitude at age 10;
- Locus of control (age 10);
- Behavioural problems (age 10);
- The type of secondary school attended;
- The highest level of qualification attained.

Children from higher income or more advantaged social class backgrounds are also advantaged in terms of these characteristics and this gives them a better chance of overcoming early low cognitive skills and succeeding in the labour market in later life.

We have shown that a similar set of variables are important for predicting high earnings or employment in a high ranking occupation among children who were high attaining in early cognitive skill tests. However, these factors didn't typically account for the full advantage enjoyed by children from high income or advantaged social class backgrounds. This suggests that less advantaged high attainers in early cognitive skills are less able to convert this potential into success in the labour market in later life.

We have used the regression results to predict the probability of being in a high earning group at age 42 for different characteristics. We have also used the models to show how different combinations of characteristics can result in a wide variety of predicted probabilities within the initially low attaining group.

10. Conclusion and policy discussion

The empirical evidence presented here shows that there are unequal chances among children who perform relatively poorly in cognitive tests taken at age 5 and those who perform relatively well. Within high and low attainment groups, children from families with higher incomes or more advantaged social class backgrounds have a greater chance of being highly successful in the labour market than their less advantaged peers.

Children showing early signs of low ability from better-off families largely avoid downward mobility. The factors that appear to limit this possibility are: higher parental education, high maths aptitude by age 10, enrolment in a Grammar or Private secondary school, attainment of a degree. Social and emotional skills also play a role. Initially low attaining children with a relatively high sense of control over their own destiny are more likely to be highly successful in the labour market. Childhood behavioural problems are also negatively associated with good outcomes and such problems are less likely to be observed among children from more advantaged backgrounds. These findings are consistent with the conclusion of Joshi's evidence review: "non-cognitive skills play a positive, but not overwhelming, part in predicting a person's future success, over and above the impact on their education" (Joshi, 2014).

Children with relatively high levels of ability, measured in cognitive tests taken at age 5, also have an unequal chance of later labour market success and this too is shaped by the socio-economic position of their parents. High attaining children from less advantaged family backgrounds (income or social class) are less likely to be in a high earning or top job as an adult. The social gradient cannot be fully accounted for by the full range of explanatory variables considered (parental education, attainment in reading and maths (age 10), social and emotional skills (age 10), type of secondary school attended and highest level of education attained). This suggests that high attaining children from less advantaged family backgrounds are less able to, or at least less successful, at converting this early high potential into later labour market success. Parents with relatively high income or social class position are more successful at ensuring that their early high attaining children in cognitive tests translate these cognitive skills into labour market success; at least they have more of the resources at their disposal that are linked to later labour market success.

Women in both the attainment groups are considerably less likely to be in high paid work or a "top job" than their male peers. The same set of variables predict success for men and women, high attaining and low attaining women are just less likely to be top earners or working in 'top jobs' than men.

Two factors that contribute to the family income and parental social class gradients in adult career success are parents' education, particularly degree level qualifications, and the type of secondary school attended. For the remainder it is possible that the broad groups covered by our control variables don't distinguish between gradients that exist within sub-groups. For example, we control for degree attainment but not university attended, subject studied or degree performance, all of which have been shown to have an independent effect on graduates' earnings (Smith et al., 2000). Values, aspirations and cultural differences may also be

important explanatory factors which we are unable to control for but could be correlated with parental education or school type.

Why should parental education contribute to children's chances of career success? Parents' education can indirectly affect this likelihood through the extent to which education equips parents to: help their children develop cognitive and non-cognitive skills, choose the best primary and secondary schools for their children, assist them with their homework, help them with exam preparation, help guide them through the process of making further and higher education choices, assist them with career choices and interviews. It is natural for parents to want to do the best they can to help their children do well and this should not be discouraged.

If parental education is directly related to children's skills, affecting social mobility, then policy should be directed at trying to redress educational inequality among adults in the UK. Many attempts have been made and they have been largely unsuccessful but this does not mean that a solution should not be sought. Other areas that should be explored more fully are policies that attempt to compensate children who are deprived of the benefits that children with educated parents receive. Careful consideration should be given to the setting of homework, fostering and nurturing aspiration, high quality and age appropriate education and careers advice, inspirational high calibre teachers (not teaching assistants) deployed where they can have the greatest impact, encouraging successful alumni to return and talk about their experiences, avoiding practices that damage non-cognitive skill development – such as allowing over use of 'popular' children to pick teams in PE lessons where the same children are left until last.

Some of the correlation between parental education and children's career success could be driven by unmeritocratic factors. If highly educated parents are using their connections to help their children find good jobs. This amounts to opportunity hoarding and results in fewer opportunities available for equally able but less connected children.

Parents' education could also be giving children an unfair advantage in the selection of primary and secondary schools. Focusing on increasing choice can simply result in parents who are in a better position to make informed choices and able to exercise that choice sending their children to the best performing schools, thereby hoarding these school places at the expense of less-advantaged children. Could reducing choice actually increase outcomes if instead these parents are limited to working with schools to drive up standards? The question remains unanswered. A possible response is an increase in the number of parents who choose to educate their children in the private school sector.

This links us to school type. We find a clear advantage for children who attend a Grammar or a private secondary school. The private school wage-premium could legitimately reflect higher cognitive and non-cognitive skills gained by pupils who attend these schools not fully captured by our controls. Equally, there could be an unmeritocratic element to this premium. In a previous piece of work, we found that a wage-premium existed for private school educated graduates. Although we found that for given A-level grades, private school educated graduates perform less well in their degrees they went on to earn a wage premium against their peers who had

attended schools in the state sector, even after controlling for university attended and subject studied (Naylor et al., 2002).

There are a number of ways that an unmeritocratic private school wage premium could come about; for example, if recruitment into high earning occupations is biased towards people educated in private schools. This could occur as a result of shared interests, hobbies, accent, cultural norms, through networks, social circles and personal recommendations, to name but a few.

The Grammar school system was not the norm even for this cohort born in 1970 who entered secondary school in 1981 but certain areas of England still operate such a system (e.g. Kent, Buckinghamshire, Rugby, Reading and Medway) and in total there are 164 Grammar schools in England. The fact that initially low attaining children from better-off families are found to be more likely to attend a Grammar school could lead one to question the way in which the 11+ entry examination is being used to select pupils. While Grammar school head teachers actively discourage parents from paying for extensive tutoring to help their children pass the 11+ examination it is not surprising that parents who have the means make this investment as the wage-premium suggest that they are right to do so, even for children with low early cognitive skills. The result is that opportunities are hoarded if wealthier parents are able to secure these places at the expense of children from less advantaged backgrounds. As Grammar schools are publicly funded it is legitimate to question the selection procedure and push for change if able children from less advantaged background find it more difficult to get in.

It is not simply that children from advantaged family backgrounds are more likely to attend Grammar and private schools that is driving socio-economic inequalities as a large gap in attainment by family background exists within the State school system. Not only are less advantaged children more likely to attend poorer performing schools but, on average, they are found to perform well below their advantaged peers in schools rated by Ofsted as outstanding (Clifton and Cook, 2012). A recent report by the House of Commons Education Committee on underachievement in education by white working class children stressed the need for getting the best teachers to the schools that need them most and deploying the best teachers within schools where they can make the most difference (HoC Education Committee, 2014). The same report highlighted the finding that the impact of socio-economic background on education performance is significantly higher in England than the OECD average, demonstrating that the findings from this paper which has focused on a cohort born 45 years ago are just as relevant for today's school children.

It is difficult to legislate against discrimination on socio-economic grounds. The Equality Act (2010) included a provision for a public sector duty regarding socio-economic inequalities but this has not been brought into force. Reeves and Howard (2013) question whether affirmative action for college admissions in the US should be re-tasked to favour lower income applicants. Ruling out certain practices such as informal and unpaid internships helps a bit as, while these practices exist, opportunities are hoarded by those from more privileged backgrounds.

In this paper we have shown evidence consistent with opportunity hoarding and identified limited downward mobility among advantaged children irrespective of their early cognitive ability. We have discussed ways in which parents act to increase the

chance of their children achieving well in their education and succeeding in the labour market but of course it is not simply what parents do that matter as certain recruitment practices, some aspects of school systems and processes, and higher education practices have all been shown to exacerbate socio-economic inequalities. If politicians are serious about their expressed desire to increase social mobility in the UK they will need to address barriers that are preventing less advantaged children from reaching their full potential and remove barriers that block downward mobility.

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Appendix A

Table A1 BCS70 main survey dates and achieved sample sizes

Year of survey	Age of cohort	Respondents
1970	Birth	17,198
1975	Age 5	13,135
1980	Age 10	14,875
1986	Age 16	11,622
1996 (postal)	Age 26	9,003
2000	Age 30	11,261
2004	Age 34	9,665
2008 (telephone)	Age 38	8,874
2010	Age 42	9,841

Table A2 BCS70 Cohort members present in birth survey and age 42 survey

Year of survey	Age of cohort	Respondents	Missing
1970	Birth	9,075	
1975	Age 5		1,280
1980	Age 10		589
1986	Age 16		1,977
1996	Age 26		2,896
2000	Age 30		1,268
2004	Age 34		1,783
2008	Age 38		1,786
2010	Age 42	9,075	

Note: Cohort members who are present in a particular sweep have not necessarily responded to all of the survey questions (item non-response).

Non-cognitive skill scales in BCS70

Table A3 Self-Esteem

LAWSEQ Self-Esteem Scale	
1	Do you think that your parent usually likes to hear about your ideas?
2	Do you often feel lonely at school?
3	Do other children often break friends or fall out with you?
4*	Do you like team games?
5	Do you think that other children often say nasty things about you?
6	When you have to say things in front of teachers, do you usually feel shy?
7*	Do you like writing stories or doing creative writing?
8	Do you often feel sad because you have nobody to play with at school?
9*	Are you good at mathematics?
10	Are there lots of things about yourself you would like to change?
11	When you have to say things in front of other children, do you usually feel foolish?
12*	Do you find it difficult to do things like woodwork or knitting?
13	When you want to tell a teacher something do you usually feel foolish?
14	Do you often have to find new friends because you old friends are playing with somebody else?
15	Do you usually feel foolish when you talk to your parents?
16	Do other people often think that you tell lies?

Notes: * Items 4, 7, 9 and 12 are distractor questions and do not count. A score of 2 is assigned to all items answered "no" except for item 1 where answering "yes" scores 2. Scores are summed to create a scale where high scores indicate higher self-esteem.

Table A4 Locus of Control

CARALOC Locus of Control Scale	
1	Do you feel that most of the time it is not worth trying hard because things never turn out right anyway?
2	Do you feel that wishing can make good things happen?
3	Are people good to you no matter how you act towards them?
4*	Do you like taking part in plays or concerts?
5	Do you usually feel that it is almost useless to try in school because most children are cleverer than you?
6	Is a high mark just a matter of luck for you?
7*	Are you good at spelling?
8	Are tests just a lot of guess work for you?
9	Are you often blamed for things which just aren't your fault?
10	Are you the kind of person who believes that planning ahead makes things turn out better?
11*	Do you find it easy to get up in the morning?
12	When bad things happen to you, is it usually someone else's fault?
13	When someone is very angry with you, is it impossible to make him your friend again?
14	When nice things happen to you is it only good luck?
15*	Do you feel sad when it is time to leave school each day?
16	When you get into an argument is it usually the other person's fault?
17	Are you surprised when your teacher says you've done well?
18	Do you usually get low marks, even when you study hard?
19*	Do you like to read books?
20	Do you think studying for tests is a waste of time?

Notes: * Items 4, 7, 11, 15 and 19 are distractor questions and do not count. Each "no" response counts as one point, except item 10 where "yes" equals one point. Scores are summed to create a scale where high scores indicate higher locus of control.

Table A5 Rutter Behaviour Disorder

	Rutter Parental 'A' Scale of Behaviour Disorder
1	Very restless, often running about or jumping up and down
2	Is squirmy or fidgety
3	Often destroys own or others property
4	Frequently fights with other children
5	Not much liked by other children
6	Often worried, worries about many things
7	Tends to do things on own - rather solitary
8	Irritable, is quick to fly off the handle
9	Often appears miserable, unhappy, tearful or distressed
10	Sometimes takes things belonging to others
11	Has twitches, mannerisms or tics of the face or body
12	Frequently sucks thumb or fingers
13	Frequently bites nails or fingers
14	Is often disobedient
15	Cannot settle to anything for more than a few moments
16	Tends to be fearful or afraid of new things or new situations
17	Is fussy or over-particular
18	Often tells lies
19	Bullies other children

Notes: Scores are summed and ranked. 0-80th centile = normal behaviour; 81st-95th centile = moderate behaviour problems; 95+ centile = severe behaviour problems. Analysis in this paper uses supplied derived variable 'bd3mrutg' (1980:(CM's parent) total Rutter behaviour score - grouped).

Appendix B

Weekly earnings and age 34 outcomes

We have presented the model estimates for our preferred outcome measure but as outlined in the paper we also examined other measures of pay (weekly earnings and earnings for employees only) and outcomes at age 34. Here we briefly summarise where we find differences between our preferred outcome measure and the weekly measure of earnings (employees and self-employed) and age 34 outcomes.

B.1 Age 34 outcomes

Low attainers
At age 34, unlike age 42, we do not find significant parental degree marginal effects on the conditional probability of being in the top hourly earnings quintile. Maths aptitude at age 10 is either reduced in significance or not significant at age 34. Attending a Grammar secondary school is not significant.

This suggests that some of the factors that predict top earnings at age 42 are not as significant or less significant at age 34. We know from lifetime earnings profiles that the gaps between socio-economic groups do not peak until after age 34 and this is the likely explanation for why parental education, maths aptitude and school type are significant and important predictors at age 42 – i.e. they predict the higher earnings profiles among early low attainers for these groups.

High attainers
For early high attainers at age 34 we find that parental degree education is positive and significant (insignificant at age 42 for this group). Maths aptitude at age 10 is not significant. There is greater significance for the social and emotional skills among early high attainers in terms of predicting high earnings at age 34 than at age 42 both for locus of control and self-esteem. Attending a private secondary school is not found to have an independent significant marginal effect on predicting high earnings at age 34 (significant at age 42).

B.2 Weekly earnings measure – age 42

Unsurprisingly the likelihood of women being in the top quintile of the weekly earnings distribution is even lower than for the hourly earnings due to the shorter average weekly hours worked by women. This holds among the high and low attainers.

Low attainers
Parental education background is not significant for the weekly earnings measure which means that children with non-graduate parents are working longer weekly hours and this equalises their chances of being in the top earnings quintile. Social and emotional skills are also not significant in the weekly earnings measure again reflecting differences in weekly hours worked. The average marginal effects for higher level qualifications are greater for the weekly earnings measure which means that those with lower qualifications are working shorter hours (on average).

High attainers

Parental education background is significant for the weekly earnings measure particularly whether or not parents have degree level qualifications. The type of school attended is not statistically significant suggesting that among the high attainers those who attend comprehensive secondary schools are working longer hours than their peers who attended a private secondary school and this equalises their chances of being in the top weekly earnings quintile even though Private school educated individuals have a greater chance of being in the top quintile of the hourly earnings distribution.

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