The Role of Attitudes and Behaviours in Explaining Socio-Economic Differences in Attainment at Age 16

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It is well known that children growing up in poor families leave school with considerably lower qualifications than children from better off backgrounds. Using a simple decomposition analysis, we show that around *two fifths* of the socio-economic gap in attainment at age 16 can be accounted for by attainment at age 11, suggesting that circumstances and investments made considerably earlier in the child's life explain a sizable proportion of the gap in test scores between young people from rich and poor families. However, we also find that differences in the attitudes and behaviours of young people and their parents during the teenage years play a key role in explaining the rich-poor gap in GCSE attainment: together, they explain a further *quarter* of the gap at age 16, and *two fifths* of the small increase in this gap between ages 11 and 16. On this basis, our results suggest that while the notion that "skills beget skills" implies that the most effective policies in terms of raising the attainment of young people from poor families are likely to be those enacted before children reach secondary school, policies that aim to reduce differences in attitudes and behaviours between the poorest children and those from better-off backgrounds during the teenage years may also make a significant contribution towards lowering the gap in achievement between young people from the richest and poorest families at age 16.

JEL codes: I20, I32

Key words: socio-economic status, inequality, educational attainment, attitudes and behaviours

1. Introduction

Children growing up in poor families tend to emerge from school with considerably lower qualifications than children from better off backgrounds. As shown by the other papers in this volume, these gaps are evident from an early age – even before starting school – and tend to widen throughout childhood. This paper complements the others in this series, by seeking to explain socio-economic differences in attainment at age 16 – the point at which compulsory schooling ends and formal qualifications are typically first obtained – as well as the small increase in the socio-economic attainment gap between ages 11 and 16.

There is a large literature from many countries which shows that family income and schooling attainment are very strongly correlated (see Shavit & Blossfeld, 1993, for a review of 13 countries). Such differences in educational attainment are both an issue of policy concern in their own right, and are also critical for explaining the persistence of disadvantage across generations, an issue of particular concern in the UK where the degree of intergenerational income mobility has been shown to be low by international standards (see Blanden et al., 2005).

It is now widely accepted within the economics literature and elsewhere that an immediate lack of income, or access to other financial resources ('credit constraints') during the teenage years, is not largely responsible for the socio-economic gap in formal educational attainment, or in choices about whether to stay on in post-compulsory schooling or go to university (see Cameron & Taber, 2004, Cameron & Heckman, 1998 and 2001, and Carneiro & Heckman, 2002, for the US; and Dearden et al., 2004, and Chowdry et al., 2008 for evidence from the UK). Much recent work on this topic instead points to the importance of parental behaviours and decisions in the very earliest years of a child's life as potential explanations for the socio-economic gaps in educational attainment (see Cunha & Heckman, 2007 for a review). Dearden, Sibieta & Sylva in this volume focus on just these issues for a cohort of children born in the UK in 2000–01.

However, work focusing on the early years alone does not allow us to examine why the gap between rich and poor children persists so strongly throughout childhood, and indeed widens with progression through the schooling system (see Feinstein, 2003, and Goodman et al., 2009, both for the UK). Neither is it informative about what policy interventions might be effective in raising the attainment of young people from poor backgrounds once they have moved beyond early childhood.

The focus of this paper is on the extent to which differences between young people from rich and poor families in a range of parental and child attitudes and behaviours – such as educational aspirations, educational interactions in the home, family relationships, ability beliefs, and risky behaviours – during the *teenage* years might be important reasons why children from rich families outperform children from poor families at secondary school, and indeed why the gap between rich and poor continues to widen throughout secondary school.

In doing so, we follow a tradition pioneered by Sewell & Shah (1968) in the sociology literature, examining the role of a number of social-psychological factors in explaining the strong correlation between poverty and educational attainment. It also complements a growing economics literature which emphasises the importance of the development of social skills and positive behaviours both for cognitive development and for longer-term labour market and social outcomes (see Bowles et al., 2001, Heckman et al., 2006, and Carneiro et al., 2007). This

literature increasingly emphasises that if policymakers wish to intervene during adolescence, policies that aim to improve young people's social skills and behaviours are likely to be more effective (and indeed more cost-effective) than interventions that directly seek to improve cognitive development (Cunha & Heckman, 2007; Cunha, Heckman & Schennach, 2010).

Our work also aims to inform a policy debate in the UK which has increasingly pointed towards improving parents' and young people's aspirations and other attitudes and behaviours as a means of raising attainment at school among disadvantaged children (see Gutman & Akerman, 2008, for a review).

Our work is based on data from the first three waves of the Longitudinal Study of Young People in England (LYSPE), a new study following a cohort of approximately 15,000 young people in English secondary schools from the ages of 13 and 14 onwards. This data is the first nationally representative survey in many years to follow a contemporary group of teenagers in England through secondary school. The survey was designed to allow an in-depth study of the experiences, attitudes, aspirations and motivations of a large group of today's teenagers and their families, and has also been linked to administrative records of national achievement test results taken by study members at the ages of 11, 14 and 16. It therefore provides us with a unique opportunity to examine the factors associated with the gap in attainment between pupils from rich and poor families in secondary schools today.

Using this data, we set out the extent to which young people from rich and poor backgrounds differ in terms of their educational attainment at age 16 – and the change in their attainment between ages 11 and 16 – and use a simple 'decomposition' analysis to illustrate the extent to which these gaps can be explained by differences in other 'distal' factors (such as parental education and family structure) and a wide range of 'proximal' factors (or 'transmission mechanisms'), focusing mainly on parents' and young people's attitudes and behaviours around age 14. We also consider the quality and composition of the secondary schools they attend.

We find that around *two fifths* of the very substantial gap in educational attainment between young people from rich and poor backgrounds at the end of secondary school (age 16) is accounted for by their attainment at the start of secondary school (age 11). This suggests that while early investments to improve the attainment of children from poorer backgrounds may be more cost-effective and/or more productive than later investments, there is still significant scope for intervention after children have started secondary school.

We also find that our observed measures of attitudes and behaviours of young people and their parents seem to play a key role in explaining the socio-economic gap in attainment at age 16. We find that differences in these factors are able to explain just over a *quarter* of the socio-economic gap in attainment at age 16, and *two fifths* of the small increase in the rich-poor attainment gap between ages 11 and 16. While our work cannot shed light on the extent to which these transmission mechanisms might be responsive to public policy interventions, if they can be changed, then our results suggest that policies which reduce differences in attitudes and behaviours between richer and poorer children during the teenage years may contribute towards lowering the gap in achievement age 16.

As with virtually all other work in this area, however, we must emphasise that this is not a *causal* analysis: we cannot be sure that there is no *unobserved heterogeneity* (unobserved factors which might be correlated with both the attitudes and behaviours we observe and with

educational attainment) or *reverse causation* (that educational attainment might affect attitudes and behaviours rather than the other way round) which might plausibly account for some or all of the statistical associations we uncover. Whilst we acknowledge the shortcomings of our work in this regard, at the very least our findings can point to areas in which policy might be potentially effective, and where further investigation of a more experimental nature could be usefully deployed.[1]

This paper now proceeds as follows: Section 2 documents the inequalities in educational attainment between teenagers from different socio-economic backgrounds that we seek to explain. Section 3 describes in further detail our data and methods. Section 4 highlights the attitudes and behaviours that are associated with higher GCSE attainment. Section 5 discusses the extent to which these attitudes and behaviours differ by socio-economic status, and Section 6 quantifies the contribution of these factors to the gap in educational attainment at age 16 between young people from rich and poor backgrounds. Section 7 discusses the extent to which our results suggest that there is an aspirations deficit, and Section 8 concludes.

2. Socio-economic inequalities in educational attainment at age 16

The degree of socio-economic inequality in educational attainment is highlighted in Figure 1, which is based on data from the LSYPE. The left hand panel shows the average percentile rank in the national achievement (Key Stage) test score distribution of young people in our sample at ages 11, 14 and 16, by quintile of parental socio-economic position (SEP). We discuss the data, our sample and our measure of SEP in more detail in Section 3.

This panel shows that, by age 11, there are already significant differences in test scores among children from different socio-economic backgrounds, with a typical gap of around 7 percentiles between each SEP quintile, and with the average scores of children from the most advantaged backgrounds 31 percentiles higher than those of children from the most disadvantaged backgrounds. These differences are more pronounced at age 14 (with a rich-poor attainment gap of 36 percentiles), before narrowing slightly by age 16 (to 33 percentiles), when the test scores represent GCSE results, the first formal academic qualifications taken in English schools.[2]

Table 1 shows how these differences in test scores translate into differences in the proportion of children reaching the government's target (expected) level at each stage. For example, just one in five (21.4%) young people in the poorest SEP quintile attain five good GCSEs including English and Maths (a common benchmark of attainment at age 16), compared to three-quarters (74.3%) of young people from the richest SEP quintile, a gap of 52.9 percentage points.

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[1] Successful identification strategies are extremely hard to come by in this area, since attitudes and behaviours are not randomly allocated across individuals, and experimental variation in psychological and behavioural phenomena is generally extremely rare or non-existent. In other work (Chowdry et al., 2009) we unsuccessfully attempted to use policy interventions that might plausibly be thought to introduce exogenous variation in specific child attitudes and behaviours to achieve more rigorous identification.

[2] Note that these results are based on total Key Stage 4 points scored (including marks awarded for qualifications that are regarded as equivalent to GCSEs). The gap between age 14 and age 16 still narrows if we do not include GCSE equivalents in our total point score, but if we use a capped point score (representing the student's eight best exam results), the gap between 14 and 16 remains roughly constant.

The right hand panel of Figure 1 shows how these socio-economic gaps change once prior attainment at age 11 has been taken into account. It does so by estimating an 'adjusted' gap, showing what the average percentile score by SEP quintile would be if all children had scored the same in achievement tests at age 11. This figure shows that the 'adjusted' percentile scores are much more equally distributed than the 'raw' ones, highlighting that a large fraction of the inequality in test scores observed at ages 14 and 16 is already reflected in differences that are apparent by the end of primary school.[3] Indeed, we find that 56% of the gap in test scores at age 16 can be accounted for by differences in attainment that are apparent by the end of primary school.[4]

In our work that follows, we examine the extent to which these differences in educational attainment between young people from rich and poor families can be accounted for by a broad range of transmission mechanisms, which we describe in detail in the next section.

Figure 1   **Test scores at ages 11, 14 and 16, by parental SEP quintile**
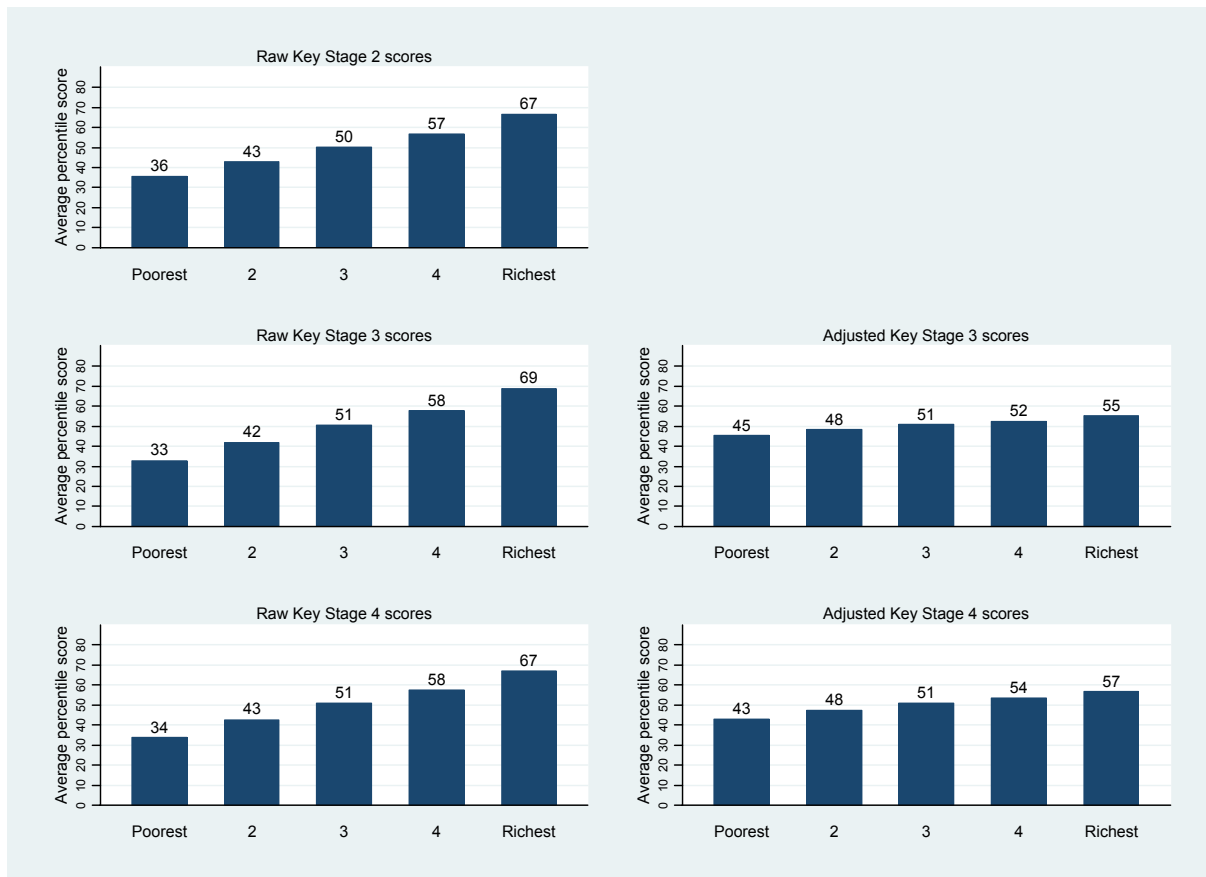
Note: the right hand panel presents an 'adjusted' gap, showing the average percentile score by SEP quintile, assuming all children scored the same at age 11. Such estimates are derived by predicting each individual's Key Stage 3 or 4 percentile in the situation where all pupils scored equally (i.e. at percentile 50.5) at Key Stage 2, based on a 'value-added' regression of the following form: $KS_{it} = \alpha + \lambda SEP_i + \beta KS_{i11} + \varepsilon_{it}$, t = 14,16.

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[3] The fact that the adjusted gap in Key Stage 3 scores (10 percentiles) is smaller than the adjusted gap in Key Stage 4 scores (14 percentiles) simply suggests that Key Stage 2 scores are more strongly correlated with attainment at age 14 than at age 16, which seems plausible.

[4] This figure is obtained from a decomposition analysis similar to that described in Section 6, but with age 11 attainment as the only control.

Table 1   Proportion reaching national expected level, by SEP quintile

	Average outcome by SEP quintile				
	Poorest	2	Middle	4	Richest
Key Stage 2 (age 11)					
% reaching expected level	64.3%	75.5%	84.2%	87.8%	94.3%
Key Stage 3 (age 14)					
% reaching expected level	51.9%	66.1%	77.4%	84.7%	92.7%
Key Stage 4 (age 16)					
% attaining 5+GCSEs A* - C	33.2%	46.4%	59.3%	70.6%	84.0%
% attaining 5+GCSEs A*-C including English and Maths	21.4%	33.6%	46.4%	57.9%	74.3%

Notes: authors' calculations using Key Stage test scores from the National Pupil Database for the LSYPE cohort. Our sample includes all individuals for whom we observe Key Stage 2, 3 and 4 test scores.

3.   Data and methodology

This paper is based on data from the Longitudinal Study of Young People in England (LSYPE).[5] The LSYPE is a longitudinal survey (administered at the school level) following around 16,000 young people in England who were aged 13 or 14 in the academic year 2003–04, and hence were born between September 1989 and August 1990. Interviews with both the young person and their main parent were carried out annually; additionally, school characteristics and Key Stage test results at ages 11, 14 and 16 have been matched in to the sample from administrative records held by the Department for Education. The full Wave 1 sample contains 15,770 individuals. We use the 13,343 young people with valid Key Stage 2, 3 and 4 results for our analysis. This implies, amongst other things, that we keep only state school pupils in our sample, and that our sample is of slightly lower socio-economic position than if we had not imposed such restrictions.[6] Our analysis is based on data from Waves 1, 2 and 3 (ages 14, 15 and 16), before young people left compulsory education.

Underlying our analysis is a model linking a young person's socio-economic status and other aspects of their family background – including the secondary school they attend – to educational attainment at age 16 via a set of potential 'transmission mechanisms', including parent and child attitudes and behaviours (see Goodman, Gregg & Washbrook in this volume for a more detailed account of this model). This model is estimated as per equation 1 below:

$$KS_{is16} = \alpha + \beta_1 SEP_{is} + \beta_2 FAM_{is} + \beta_3 SCH_s + \beta_4 PAR_{is} + \beta_5 YP_{is} + e_{is} \tag{1}$$

where KS_{16} represents attainment at age 16 for individual i in school s, SEP represents quintiles of our index of socio-economic position, FAM is a vector of demographic and family background characteristics, PAR is a vector of parental attitudes and behaviours, YP is a vector of the young person's attitudes and behaviours, and e is an individual error term. We describe each of these groups of factors in more detail below.

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[5] See www.esds.ac.uk/longitudinal/access/lsype/L5545.asp for more information on the LSYPE.
[6] Individuals with missing test scores tend to be from either very low SEP backgrounds (such as those who were not entered for the tests) or very high SEP backgrounds (such as those in private schools), with the former slightly outweighing the latter in this case.

When we consider the change in attainment between ages 11 and 16, we add an additional control for attainment at age 11 to equation 1, as follows:

$$KS_{is16} = \alpha + \beta_1 SEP_{is} + \beta_2 FAM_{is} + \beta_3 SCH_s + \beta_4 PAR_{is} + \beta_5 YP_{is} + \beta_6 KS_{11is} + e_{is} \qquad (2)$$

Equations 1 and 2 are used to assess the determinants of educational attainment at age 16, and of academic progress between ages 11 and 16, the results of which are discussed in Section 4. They are also used as the basis for a simple decomposition analysis of the gap in attainment at age 16 between young people from the top and bottom SEP quintiles (discussed in Section 6). In these decompositions, the contribution of each variable to the overall SEP gap is given by the size of its conditional correlation with educational attainment (its coefficient in equation 1 or 2 above), multiplied by the extent to which it varies with SEP (the difference between the mean values of the variable in the top and bottom SEP quintiles).[7] See Goodman, Gregg & Washbrook in this volume for a more formal treatment of this approach.

We now move on to discuss the outcomes and covariates in our model.

Our main outcome of interest is the percentile rank of the young person's total point score at age 16. When we consider changes in attainment during secondary school, we additionally control for attainment at age 11 (KS_{11} in equation 2 above). To do so, we rank children according to their average point score across tests in English, maths and science, and group them into quintiles (fifths) of the sample on the basis of this measure. We include the top four quintiles in our analysis (with the bottom quintile omitted as the reference category).

Our measure of parental socio-economic position (SEP in the equation above) aims to capture the long-term resources of the household in which the young person lives, and is constructed from: log average equivalised household income across ages 14, 15 and 16; reported experience of financial difficulties at age 14; mother's and father's occupational class at age 14; and housing tenure at age 14. We use polychoric principal-components analysis to combine this information into an index, on the basis of which we can rank individuals from lowest to highest SEP.[8] (Note that the first principal component explains 53% of the variation in these factors.) We group the young people in our sample into quintiles on the basis of this measure, and include indicators for the richest four in our model (such that the lowest SEP quintile is the reference category).

We account for a range of demographic and other family background characteristics (*FAM* in equations 1 and 2 above), including gender, ethnicity, month of birth, whether English is an additional language, birth weight, mother's and father's highest educational qualification, mother's and father's employment status, mother's and father's health status, lone parent status, mother's age, and the number of older and younger siblings.

We also account for a range of characteristics of the young person's secondary school (*SCH* in equations 1 and 2 above), including school type, whether the school has a sixth form, whether it is a grammar school, the school's Key Stage 2 to Key Stage 4 value-added score, the average Key Stage 2 scores of the young person's year group, the gender mix of school, school size,

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[7] Note that the 'contribution' of a variable to the SEP gap says nothing about statistical significance: it depends on the magnitude of estimated coefficients but not the precision with which they are estimated.

[8] We have also carried out our analysis using family income instead of socio-economic position. This makes little difference to our findings. Results are available from the authors on request.

percentage of pupils eligible for free school meals, whose first language is not English, who are non-white, and what the young person believes their friends will do at age 16.

The key potential transmission mechanisms between SEP and educational attainment that we consider are informed by a diverse literature on the determinants of attainment (see Goodman, Gregg & Washbrook in this volume for a discussion), which variously emphasise the importance of parental influences, and the motivations and self-regulation of young people themselves. They are summarised as follows:

Young people's own attitudes and behaviours (*YP* in the equation above):

- **Aspirations and expectations** for future education;

- **Self-concept:** ability beliefs; the intrinsic (enjoyment) and extrinsic (worth) value placed on education by the young person, and the young person's locus of control;

- **Job/career values:** whether having a job and/or a career is important to the young person;

- **Engagement in risky and positive behaviours**: relating to education (truancy, suspension, and exclusion); anti-social and criminal behaviour (shoplifting, fighting, vandalism, graffiti, trouble with the police); use of substances (alcohol, smoking, and drug use); and positive activities (sport, reading for pleasure, and cultural and religious participation);

- **Experiences of bullying**;

- **Teacher-child relations**: how much the child likes their teacher; and their perception of how they are treated relative to others in the class.

Parental attitudes and behaviours (*PAR* in equations 1 and 2 above):

- **Parental aspirations and expectations** for the child's future education, and the value placed on education by the parent;

- **Parental involvement in the child's education**, such as helping with homework, discussing school reports and subject choice in Year 10, and involvement in school life;

- **Parental closeness**: frequency of spending time together as a family, including sharing family meals and going out; frequency of conflict in the home;

- **Educational resources**: availability of material resources relating to education in the home, including provision of private tuition (in both school and non-school subjects), and access to a computer and the internet.

See Chowdry et al. (2009) for full details of how these measures are constructed.

4.   What influences GCSE attainment?

In this section, we discuss the results from two simple multivariate regression models (based on equations 1 and 2 in Section 3) which examine the correlates of GCSE attainment without and with controls for attainment at age 11 respectively.

Tables 2 and 3 present coefficients from our measures of parental and young people's attitudes and behaviours respectively. (All other coefficients can be found in our online appendix.[9]) Column 1 presents the results of our "levels" analysis (i.e. without controls for prior attainment) and Column 2 presents the results of our "value-added" analysis (including controls for attainment at age 11). Each coefficient represents the average change in Key Stage 4 percentile rank associated with a unit change in the variable in question.

Column 1 of Tables 2 and 3 suggests that, conditional on family background and school characteristics, a range of parental and young person attitudes and behaviours seem to be strongly positively associated with attainment at age 16.

Table 2   Influences on GCSE attainment: parental attitudes and material resources

	Age 16 attainment (percentiles	Value-added between age 11 and age 16 (percentiles)
Parent education value (scale)	0.099 [0.42]	0.387 [1.84]
Parent wants young person (YP) to stay in FTE at 16	2.089 [1.42]	0.818 [0.58]
Parent wants young person to learn a trade or go into training or an apprenticeship at 16	-0.907 [0.60]	-0.641 [0.45]
Parent has other aspirations for young person at 16	5.177* [2.21]	2.789 [1.34]
Parent thinks YP very/fairly likely to go to university	9.861** [16.60]	4.270** [7.87]
Parent-child education interactions (scale)	0.544 [1.92]	0.222 [0.89]
Family-child interactions (scale)	1.241** [3.42]	1.671** [5.00]
Parental involvement in school activities (scale)	0.511 [0.95]	0.68 [1.38]
Young person has private tuition	1.219* [2.47]	1.402** [3.16]
Young person has computer at home	3.053** [3.94]	2.821** [4.03]
Young person has internet access at home	2.432** [4.07]	1.575** [2.92]

Notes: table contains selected coefficients from two OLS regression models of the determinants of Key Stage 4 (age 16) percentile score. Missing dummies are included, where appropriate, but their coefficient estimates are not shown. Both models also include controls for demographic and family background characteristics, secondary school characteristics, and young person's attitudes and behaviours. The second model (shown on the right) additionally controls for attainment at Key Stage 2 (age 11). Coefficient estimates for young person's attitudes and behaviours can be found in Table 3. All other coefficient estimates can be found in our online appendix. Standard errors are robust, corrected for clustering at the school level and shown in parentheses. ** indicates significance at the 1% level; * indicates significance at the 5% level.

[9] See http://www.ifs.org.uk/publications/5267.

Table 3   Influences on GCSE attainment: young people's attitudes and behaviours

	Age 16 attainment (percentiles	Value-added between age 11 and age 16 (percentiles)
Young person's attitudes and behaviours		
Ability beliefs (scale)	8.559**	3.633**
	[21.04]	[9.67]
Enjoyment of school (intrinsic value scale)	-2.498**	-1.033**
	[7.23]	[3.33]
Usefulness of school (extrinsic value scale)	2.758**	2.410**
	[7.87]	[7.57]
Locus of control (scale)	3.629**	2.570**
	[8.21]	[6.62]
Wants to stay on in full-time education (FTE) at 16	2.811**	1.186
	[2.68]	[1.27]
Wants to leave FTE at 16 but return later	-0.171	-0.641
	[0.10]	[0.44]
Wants to learn a trade/go into training	1.371	-0.283
	[1.14]	[0.26]
Other intentions at 16	0.433	0.601
	[0.22]	[0.33]
Likely to apply to HE, and likely to get in	3.779**	2.283**
	[4.66]	[3.19]
Likely to apply to HE, but not likely to get in	2.075*	1.549*
	[2.34]	[1.98]
Not very likely to apply to HE, but likely would get in	3.660**	1.427
	[3.81]	[1.63]
Not very likely to apply to HE, and not likely to get in	1.653*	1.342
	[2.03]	[1.89]
Job aspirations (scale)	-0.056	0.314
	[0.18]	[1.16]
Experience of bullying (scale)	-4.353**	-2.467**
	[13.00]	[8.10]
Education behavioural difficulties (scale)	-3.201**	-2.634**
	[6.71]	[7.48]
Anti-social behaviour (scale)	-1.901**	-1.994**
	[4.51]	[5.50]
Smokes cigarettes frequently	-6.557**	-6.408**
	[6.14]	[6.08]
Drinks alcohol frequently	-0.31	-1.074
	[0.38]	[1.45]
Has smoked cannabis	-0.481	-2.119**
	[0.64]	[2.91]
Teacher-child relations (scale)	2.169**	3.050**
	[4.95]	[7.32]
Plays sport weekly	0.434	0.324
	[0.80]	[0.65]
Reads every week	1.920**	0.898*
	[4.17]	[2.14]
Plays a musical instrument	2.682**	1.132**
	[5.55]	[2.64]
Engages in other positive activities	1.070*	0.462
	[2.48]	[1.21]
Observations	13,343	13,343
R-squared	0.54	0.63

Notes: table contains selected coefficients from two simple OLS regression models of the determinants of Key Stage 4 (age 16) percentile score. Missing dummies are included, where appropriate, but their coefficient estimates are not shown. Both models also include controls for demographic and family background characteristics, secondary school characteristics,

Aspirations and expectations for future education seem to be of particular importance: for example, young people whose parents think that they are very or fairly likely to go to university score, on average, nearly 10 percentiles higher in their GCSEs than young people whose parents do not hold such views. Similarly, young people who think it likely that they will apply to, and get into, higher education score, on average, nearly 4 percentiles higher at age 16 than young people who think it not at all likely that they will apply to university.

A young person's beliefs in their own ability are also strongly positively correlated with their attainment at age 16. For example, a 1 standard deviation increase in our ability beliefs scale (which comprises measures of how good young people think they are at Mathematics, English, Science and ICT, as well as school work overall at age 14) is associated with an 8.6 percentile increase in GCSE scores. By contrast, engagement in a range of risky behaviours is strongly negatively associated with attainment at age 16. For example, young people who smoke regularly (at least six cigarettes per week at age 14) score 6.6 percentiles lower, on average, than young people who do not. Similarly, a 1 standard deviation increase in our educational behavioural difficulties scale (which encompasses measures of truancy, suspension and expulsion from school) is associated with a 3.2 percentile fall in attainment at age 16.

Young people whose parents are able to provide them with material resources for educational purposes at home also tend to score more highly at age 16 than those whose parents are not. For example, young people with access to both a computer and the internet at home score, on average, 5.5 percentiles higher than those who do not. The provision of private tuition is also associated with a small increase in attainment (of around 1.2 percentiles).

Column 2 of Tables 2 and 3 shows how these relationships change once we add controls for attainment at age 11 to our model. If the coefficients in Column 2 are smaller than those in Column 1, then we can interpret this difference as the extent to which the effects of these attitudes and behaviours (and their unobserved correlates) have already been crystallised in test scores at the end of primary school, with any significant differences remaining in Column 2 attributed to the effect they have during the secondary school years (between ages 11 and 16).

For example, young people whose parents think that they are fairly or very likely to go to university score just over 4 percentiles higher at age 16 than those who do not, even after controlling for attainment at age 11. This compares with a performance advantage of nearly 10 percentiles when we did not account for attainment at age 11. This suggests that parents who think their child is likely to go to university at age 14 will probably have developed this view earlier in the child's life, such that it may already have had some effect on the young person's attainment by the end of primary school.

By contrast, it is interesting to note that the magnitude of the effects of engagement in risky behaviours on attainment do not appear to be affected by the inclusion of controls for attainment at age 11. For example, young people who smoke regularly still score 6.5 percentiles lower, on average, than those who do not, and a 1 standard deviation increase in our criminal behaviour scale (which comprises measures of involvement in graffiti, vandalism, shoplifting

and fighting) is associated with a 1.9 percentile reduction in GCSE scores, both before and after controlling for attainment at age 11. Given how unlikely it is for primary school children to have engaged in these types of behaviour, this is a plausible result, suggesting that the effects of these behaviours on attainment occur solely during the secondary school years.

In summary, we find that, even after controlling for a wide range of family background and school characteristics, as well as attainment at age 11, young people are more likely to do well in their GCSEs if:

The **young people**:

- Have a greater belief in their own ability at school;
- Find school worthwhile;
- Have a more external locus of control (i.e. believe that their actions have consequences);
- Think it is likely that they will apply to, and get into, higher education;
- Do not experience bullying;
- Avoid risky behaviours such as smoking, taking cannabis, anti-social behaviour and truancy;
- Has a good relationship with their teachers;
- Engages in positive activities, such as reading and playing a musical instrument.

Their **parents**:

- Think it is likely that the young person will go on to higher education;
- Spend time sharing family meals and outings, and quarrel relatively infrequently;
- Devote resources towards education, such as private tuition, computer and internet access.

5.   Socio-economic differences in attitudes and behaviours

We have shown (in Section 2) that young people from rich and poor families differ in terms of how well they perform in national exams. We have also established (in Section 4) that, even after controlling for a wide range of family background and school characteristics, as well as attainment at age 11, a variety of attitudes and behaviours are still significantly associated with attainment at age 16. In this section, we move on to document whether these factors also differ by socio-economic status, and thus whether we might expect differences in such characteristics to help explain why young people from poor families score so much lower in their GCSEs than young people from rich families.

Tables 4 and 5 present differences in parental attitudes and material resources, and young people's attitudes and behaviours, by socio-economic position (SEP) quintile. SEP differences in family background and school characteristics can be found in our online appendix.[10]

These tables show that there are large and significant differences between young people from the richest and poorest fifths of our sample in terms of the majority of these characteristics, including many of those that we found to be strongly associated with attainment at age 16 in the previous section.

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[10] See http://www.ifs.org.uk/publications/5267.

Table 4 Parental attitudes and material resources, by SEP quintile

	Poorest SEP quintile (Q1)	2nd SEP quintile (Q2)	Middle SEP quintile (Q3)	4th SEP quintile (Q4)	Richest SEP quintile (Q5)	Q5-Q1
Parent education value (scale, SDs)	0.106	-0.024	-0.024	-0.030	-0.014	-0.120**
Parent wants YP to stay in FTE at 16	75.8%	75.8%	76.8%	84.0%	91.0%	15.2ppts**
Parent wants YP to learn a trade or go into training or an apprenticeship at 16	19.1%	20.9%	20.2%	13.7%	7.2%	-11.9ppts**
Parent has other aspirations for YP at 16	1.2%	1.3%	1.6%	1.6%	1.5%	0.3ppts
Parent thinks YP very/fairly likely to go to university	53.4%	52.3%	57.4%	66.3%	80.7%	27.4ppts**
Parent-child education interactions (scale, SDs)	-0.312	-0.076	0.077	0.120	0.191	0.503**
Family-child interactions (scale, SDs)	-0.063	-0.022	-0.003	0.021	0.069	0.132**
Parental involvement in school activities (scale, SDs)	-0.079	-0.037	0.001	0.026	0.088	0.167**
Young person has private tuition	10.3%	17.9%	25.3%	33.6%	45.6%	35.4ppts**
Young person has computer at home	71.4%	86.8%	94.4%	96.5%	99.4%	28.0ppts**
Young person has internet access at home	45.5%	67.9%	82.9%	90.0%	96.7%	51.1ppts**

Notes: ** indicates significance at the 1% level; * at the 5% level.

Table 5 Young people's attitudes and behaviours, by SEP quintile

	Poorest SEP quintile (Q1)	2nd SEP quintile (Q2)	Middle SEP quintile (Q3)	4th SEP quintile (Q4)	Richest SEP quintile (Q5)	Q5-Q1
Ability beliefs (scale, SDs)	-0.091	-0.063	-0.018	0.028	0.125	0.217**
Enjoyment of school (scale, SDs)	-0.073	-0.057	0.003	0.023	0.068	0.141**
Usefulness of school (scale, SDs)	-0.090	-0.058	0.022	0.062	0.145	0.235**
Locus of control (scale, SDs)	-0.098	-0.051	0.010	0.013	0.070	0.168**
Wants to stay on in full-time education (FTE) at 16	78.7%	80.1%	82.9%	88.2%	93.0%	14.4ppts**
Wants to leave FTE at 16 but return later	2.3%	2.0%	2.2%	1.7%	1.3%	-0.9ppts*
Wants to learn a trade/go into training	8.6%	9.3%	8.9%	5.5%	3.4%	-5.3ppts**
Wants to enter FT work at 16, w1	8.6%	6.6%	4.6%	3.4%	1.5%	-7.1ppts**
Other intentions at 16	1.8%	1.8%	1.3%	1.1%	0.7%	-1.0ppts**
Likely to apply to HE, and likely to get in	49.2%	49.9%	56.9%	63.2%	76.8%	27.6ppts**
Likely to apply but not likely to get in	9.6%	10.7%	7.1%	8.3%	7.0%	-2.6ppts*
Not very likely to apply to HE, but likely would get in	6.4%	8.6%	7.8%	8.3%	5.2%	-1.1ppts
Not very likely to apply to HE, and not likely to get in	15.5%	14.9%	15.2%	9.8%	6.3%	-9.3ppts**
Job aspirations (scale, SDs)	-0.041	-0.001	0.016	0.039	-0.003	0.037
Experience of bullying (scale, SDs)	0.103	0.039	-0.011	-0.037	-0.081	-0.184**
Education behaviour difficulties (scale)	0.146	0.039	-0.043	-0.062	-0.119	-0.265**
Anti-social behaviour (scale, SDs)	0.149	0.035	-0.002	-0.043	-0.119	-0.268**
Smokes cigarettes frequently	6.2%	5.2%	3.5%	2.6%	1.3%	-4.9ppts**
Drinks alcohol frequently	5.3%	7.0%	7.5%	9.0%	7.8%	2.5ppts**
Has smoked cannabis	10.3%	9.7%	8.8%	9.1%	8.3%	-2.0ppts
Teacher-child relations (scale)	-0.089	-0.064	-0.024	0.021	0.095	0.184**
Plays sport weekly	75.8%	77.7%	81.4%	80.9%	85.8%	9.9ppts**
Reads every week	69.7%	71.0%	75.2%	76.6%	81.4%	11.7ppts**
Plays a musical instrument	12.4%	17.5%	20.8%	24.9%	35.4%	23.1ppts**
Engages in other positive activities	53.2%	56.3%	59.4%	64.1%	69.6%	16.5ppts**

Notes: ** indicates significance at the 1% level; * at the 5% level.

Table 4 shows that:

- **Education aspirations and expectations**: richer parents tend to have higher aspirations and expectations for their children's education than poorer parents. For example, four out of five parents in the top SEP quintile think that their child is likely to apply to university, compared to just over half of parents in the bottom SEP quintile at age 14.

- **Family interactions**: parents in the top SEP quintile are more likely to help their children with their homework (education interactions scale), more likely to get involved in school activities, and more likely to share family meals or argue less frequently with their children (family-child interactions scale) than parents in the bottom SEP quintile.

- **Computer and internet at home**: almost all young people from the richest families have access to a computer and the internet at home, compared with just over 70 per cent of young people from the poorest families with access to a computer, and under half with access to the internet.

Table 5 shows that:

- **Intrinsic/extrinsic value of schooling and locus of control**: young people from poorer families are less likely to enjoy school, less likely to find school valuable, and less likely to believe that their own actions make a difference (have an 'external locus of control') than young people from richer families.

- **Education aspirations and expectations**: young people from richer families tend to have higher educational aspirations and expectations than young people from poorer families, with nearly four-fifths of teenagers in the top SEP quintile thinking it is likely that they will apply to university (and get in), compared to less than half of teenagers in the bottom SEP quintile, a gap of almost 30 percentage points.

- **Risky behaviours and positive activities:** young people from poorer families are more likely to engage in a range of risky behaviours (such as smoking, taking cannabis, playing truant and other anti-social activities) at age 14 than young people from richer families, while they are less likely to engage in positive activities such as playing sports, reading for pleasure, and playing a musical instrument.

- **Experiences of bullying:** Young people from poorer backgrounds are also more likely to experience frequent bullying at age 14 than young people from richer backgrounds.

To summarise, this section has shown that there are substantial differences between young people from rich and poor families in terms of their attitudes to education, and their propensity to engage in a range of risky behaviours as teenagers. In the next section, we consider whether these differences can help to explain the socio-economic gaps in educational attainment that we highlighted in Section 2.

6. Can differences in attitudes and behaviours help to explain the socio-economic gap in educational attainment at age 16?

Section 2 documented the very large gaps in educational attainment between young people from rich and poor families. In this section, we try to explain why these differences arise. Of particular interest to us is the importance of attitudes and behaviours of young people and their parents during the teenage years, which Section 4 showed to be strongly associated with GCSE attainment and Section 5 showed differ markedly by socio-economic background.

We use a simple decomposition analysis to investigate the extent to which attitudes and behaviours during the teenage years play an important role in explaining why children from poor families end up with worse GCSE results than children from rich families.

We decompose the very large gap in educational attainment at age 16 (33.3 percentile points) between young people from the top and bottom SEP quintiles into the contribution made by each characteristic in our model. As set out in Section 3, these relative contributions are calculated by multiplying the difference between the proportions of rich and poor children with each characteristic by their coefficient estimates from a regression model including all characteristics simultaneously. We do this separately without (as per equation 1) and with (as per equation 2) controls for attainment at age 11.

Figure 2 presents the results of our "levels" decomposition (without controls for attainment at age 11). It shows that our observed measures of parental and young people's attitudes and behaviours together account for just over 40% of the gap in attainment at age 16 between young people from the richest and poorest families. More detailed analysis (not shown) suggests that differences in attitudes and expectations towards further and higher education (of both parents and children) are responsible for nearly two fifths (16%) of this contribution, with a further fifth (8%) arising from differences in the provision of material resources for educational purposes and one seventh (6%) arising from differences in the ability beliefs of young people from rich and poor families.

Figure 2 also suggests that differences in the secondary schools attended by young people from rich and poor backgrounds explain a sizeable proportion (16%) of the difference in GCSE test scores. A more detailed breakdown of this contribution suggests that it is differences in the average Key Stage 2 scores of the young person's year group, and the school's Key Stage 2 to Key Stage 4 value-added score, which are driving this effect.

However, the remaining direct contributions of differences in demographic and other family background characteristics – as well as the sizeable 'residual' gap (which can be regarded as the direct effect of SEP on attainment) – suggests that our observed measures of attitudes and behaviours are not capturing all of the mechanisms through which differences in socio-economic background give rise to differences in educational attainment.

Figure 2 **Explaining the socio-economic gap in attainment at age 16 (without controls for attainment at age 11): decomposition analysis**
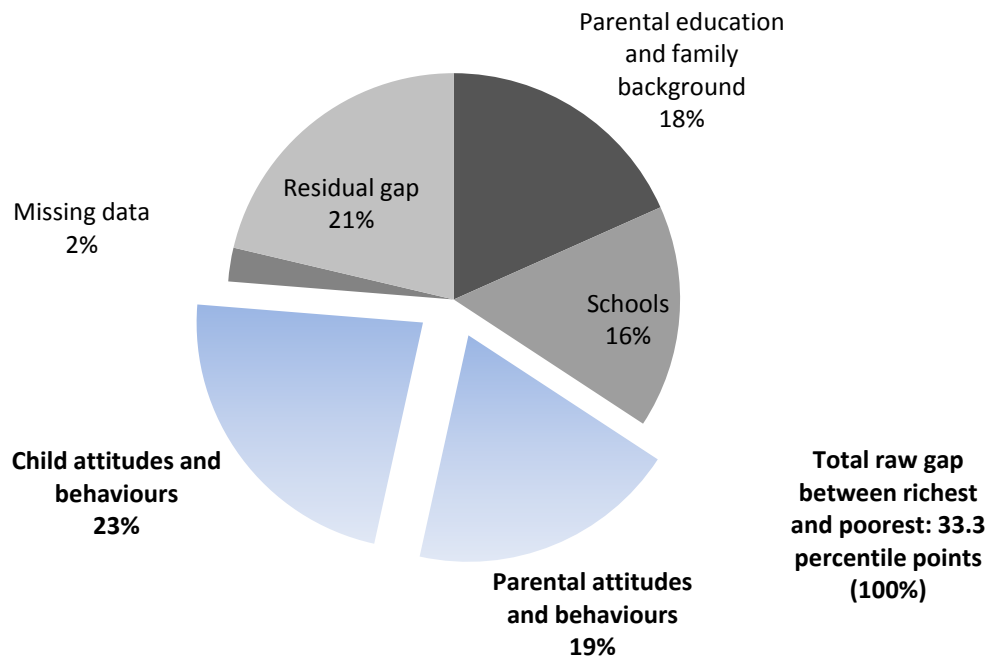
Notes: the relative contribution of each set of factors is calculated by multiplying the difference in the proportions of rich and poor with each characteristic (shown in our online appendix) by the coefficient estimates from a regression model including all characteristics simultaneously (shown in Tables 2, 3 and in our online appendix).

Figure 3 **Explaining the socio-economic gap in attainment at age 16 (with controls for attainment at age 11): decomposition analysis**
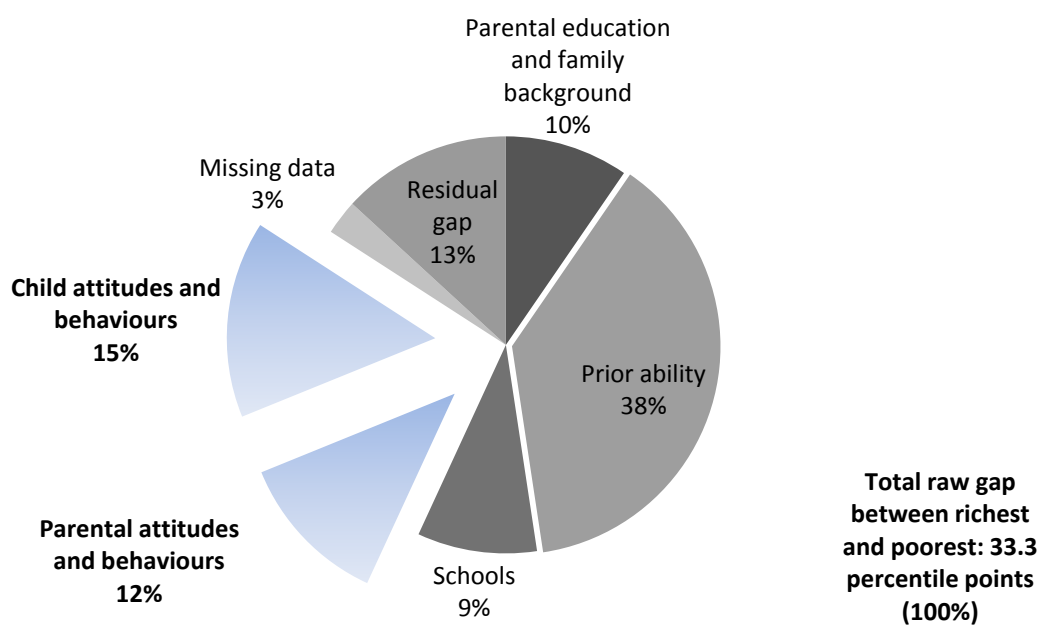
See notes to Figure 2.

Figure 3 examines the extent to which these conclusions still hold once we control for prior attainment at age 11. The inclusion of this measure switches the interpretation of our results to contributions to *academic progress during secondary school* (between ages 11 and 16). In this way, it allows us to capture any observed and unobserved differences between children from rich and poor backgrounds that have already had an effect on attainment by the end of primary school. As a result, we might expect the magnitude of the residual gap – as well as the contributions of other observed factors in our model – to fall once we include controls for prior attainment.

This is indeed what we see. Figure 3 shows that differences in attainment at age 11 explain nearly 40% of the gap in GCSE scores between young people from rich and poor families.[11] Of the remainder, just over *two fifths* (27% of the overall gap) is accounted for by our observed measures of parental and young person's attitudes and behaviours. Just under *one third* (19% of the overall gap) is accounted for by the direct effects of family background and secondary school characteristics, leaving around *one fifth* (13% of the overall gap) unexplained.

As expected, the contribution of each of these sets of characteristics is smaller here than in Figure 2, when we did not include controls for prior attainment. There are at least two possible explanations for this finding: 1) at least some of our observed measures of attitudes and behaviours are correlated with earlier measures of similar concepts, which in turn affect primary school attainment; 2) we are now taking into account unobserved characteristics that are correlated both with our observed measures of attitudes and behaviours and attainment. In reality, both mechanisms may be present.

What can we conclude from these results? While the notion that "skills beget skills" (e.g. Cunha & Heckman, 2007) suggests that it remains important to invest as early as possible in a child's life in order to reap the greatest benefits of later investments, the fact that only 40% of the gap in attainment at age 16 can be explained by what has happened up to the end of primary school suggests that, even during secondary schooling, it is not too late to intervene to try to close the socio-economic gap. And while our results certainly cannot be regarded as causal, it is interesting to note that a sizeable proportion of the gap in progress between ages 11 and 16 seems to be explained by our observed measures of parental and child attitudes and behaviours.

The extent to which attitudes and behaviours may truly represent a route through which the socio-economic gap in attainment at age 16 can be reduced hinges crucially on the extent to which attitudes and behaviours during the secondary school years are malleable and responsive to public policy interventions. While we cannot address this issue directly in our work, others (e.g. Cunha & Heckman, 2007) have suggested that non-cognitive skills (including attitudes and behaviours) are considerably less malleable at later than earlier ages, meaning that it would be considerably more expensive to achieve the same degree of change in the teenage years as it would in the pre-school or primary school years. Nonetheless, our interpretation of these results is one of hope for policymakers seeking to reduce the gap in GCSE qualifications between young people from rich and poor families: secondary school is not too late, and it appears that attitudes and behaviours might be one possible route through which such gaps can be reduced.

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[11] Note that this contribution increases to 61% if we also include controls for attainment at age 14 (see results in our online appendix: http://www.ifs.org.uk/publications/5267).

7.   Is there an aspirations deficit?

In the last section, we concluded that there may be a sizeable role for attitudes and behaviours to play in reducing the gap in GCSE attainment between young people from rich and poor families. However, in this section we sound a note of caution in drawing such a conclusion.

We saw in Sections 4 to 6 that ability beliefs may help to explain the socio-economic gap in attainment at age 16 (as they are both highly correlated with GCSE scores and strongly socially graded). The socio-economic gradient in our ability beliefs scale is shown in the left hand panel of Figure 2. On this evidence, one might be tempted to conclude that if young people from poorer backgrounds can be encouraged to have more confidence in their own ability, then the socio-economic gap in test scores at age 16 may be somewhat reduced.

However, this is not necessarily true. The right hand panel of Figure 4 illustrates what happens to the socio-economic gradient in ability beliefs if we take account of test scores at age 11. It shows that poor children do not necessarily under-estimate how well they do at school, because once we take into account their earlier performance, they are typically *more* likely to think that they are good at school than young people from richer backgrounds.[12] This is consistent with a story in which young people compare themselves to peers from similar backgrounds.

Figure 4   Young person's ability beliefs, by SEP quintile (age 14)
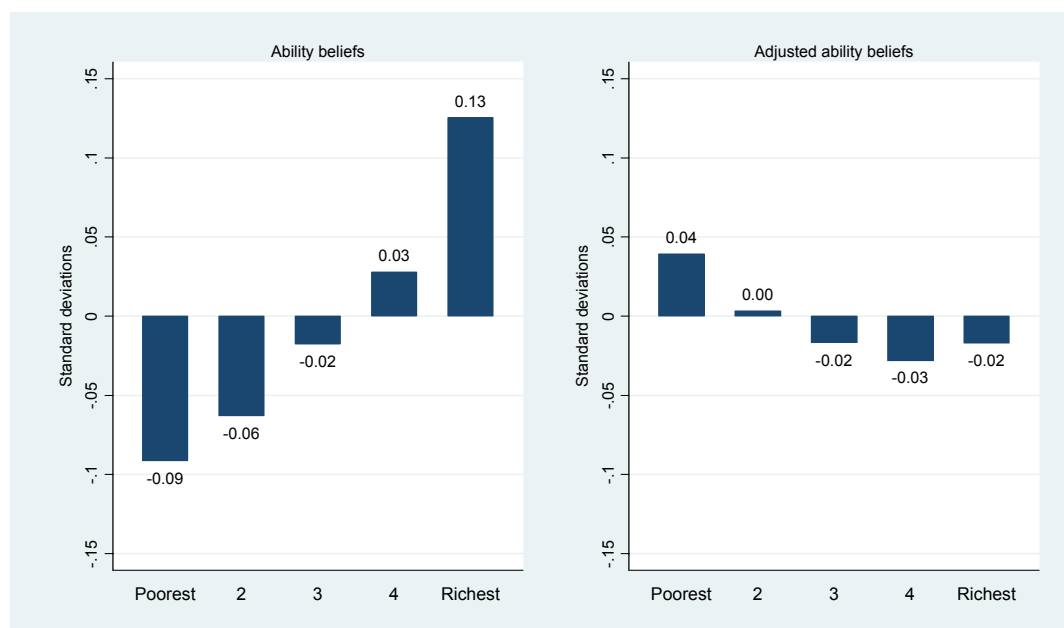
Note: the right hand panel presents average ability beliefs by SEP quintile, assuming all children had the same attainment at age 11. These estimates are derived in the same way as those in Figure 1.

There is also a steep socio-economic gradient in young people's expectations for higher education: we saw in Section 4 that there is a gap of almost 30 percentage points between the proportion of young people from the richest and poorest families who think that they will apply to university and get in. On this evidence, it is tempting to conclude that if we can encourage

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[12] The right hand panel of Figure 2 presents average ability beliefs by SEP quintile, assuming all children had the same attainment at age 11. These estimates are derived in the same way as those in Figure 1.

more young people from poorer backgrounds to aspire to go to university, then we may be able to reduce the socio-economic gap in test scores at age 16.

However, aspirations for higher education are *high across the board*: many more young people, from *all* socio-economic backgrounds, think that they will apply to and get into university than are likely to do so in practice. This is borne out by comparing HE expectations amongst the LSYPE cohort at age 14 with administrative data on actual HE participation by age 19 for a slightly older cohort. For example, while almost half (49%) of young people from the poorest fifth of the LSYPE sample report that they are likely to go to university, only one in eight (13%) of the poorest fifth among the slightly older cohort actually did so. Similarly, almost four fifths (78%) of young people from the richest quintile of the LSYPE think that they are likely to go to university, compared with just over half (52%) of the older cohort who actually did go.

Figure 5   Comparing HE expectations at age 14 with HE participation at age 18/19
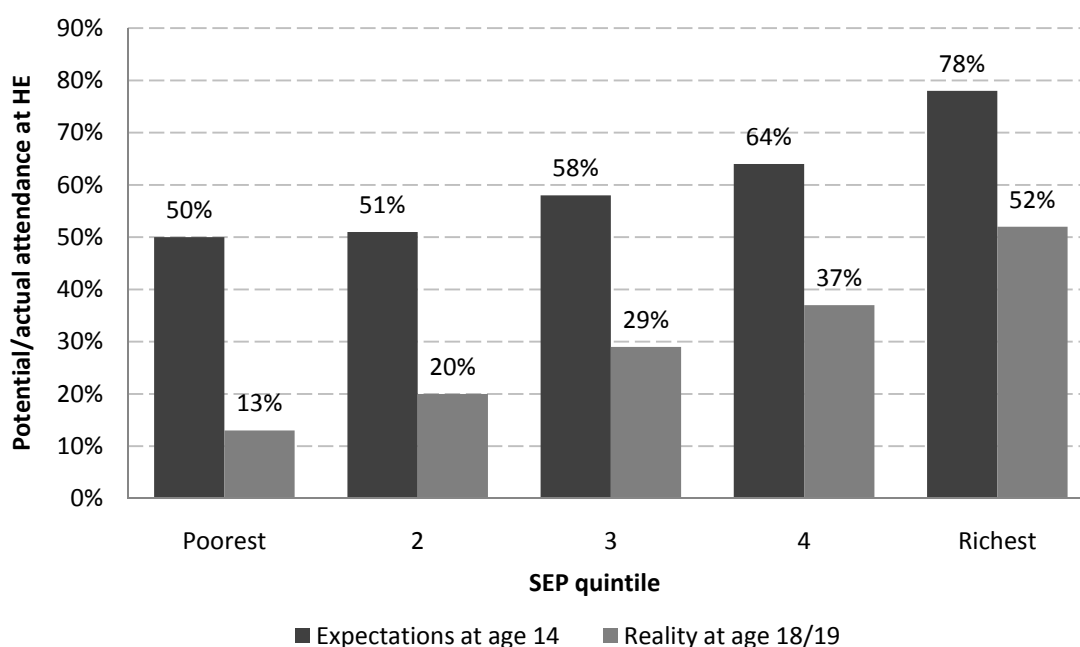
Notes: we do not observe actual HE participation among the LSYPE cohort yet; the comparison instead use figures on HE participation derived from linked administrative data combining individuals' school, further and higher education records for two cohorts who sat their GCSEs in 2001–02 and 2002–03. This means that they are slightly older than the LSYPE cohort, who sat their GCSEs in 2005–06. It should also be noted that the deprivation quintiles are also defined in a slightly different way in the two datasets.

These results highlight a potentially less than straightforward role for attitudes and behaviours in helping to close the socio-economic attainment gap.

8.   Conclusions

It is well known that children growing up in poor families tend to emerge from school with considerably lower qualifications than children from better off backgrounds. This paper has examined the determinants of the socio-economic gap in GCSE results using a simple decomposition analysis. Of particular interest has been the role of attitudes and behaviours.

Our work shows that around *two fifths* of the gap in educational attainment at age 16 between young people from rich and poor families can be accounted for by attainment at age 11. This suggests that circumstances and investments made considerably earlier in the child's life are an important driver of the socio-economic gap in test scores at the end of compulsory schooling.

However, we also find a potentially significant role for our observed measures of attitudes and behaviours of young people and their parents: together, they explain a further *quarter* of the socio-economic gap in GCSE attainment, and *two fifths* of the small increase in the rich-poor attainment gap between ages 11 and 16.

We must interpret these findings with caution, however, for at least two reasons.

First, as with virtually all work in this area, we must emphasise that this is not a *causal* analysis: we cannot be sure that there is no *unobserved heterogeneity* or *reverse causation* which might plausibly account for some or all of the statistical associations we uncover. However, whilst we acknowledge the potential shortcomings of our work in this regard, the richness of the LSYPE data, coupled with the results of Crawford, Goodman & Joyce in this volume, suggest that our findings regarding the relative importance of our observed measures of attitudes and behaviours are unlikely to be seriously biased by the omission of detailed measures of parental ability and social skills (which we might have regarded as the most important potential sources of omitted variables bias).

Second, our work has highlighted some important nuances that should be borne in mind when making policy recommendations on the basis of such results. For example, we find that many more young people think that they will apply to university (and be accepted) than are ultimately likely to do so. This suggests that simply improving HE aspirations and expectations amongst teenagers from poor backgrounds is unlikely to eliminate the large socio-economic gap in HE participation that exists in the UK. Similarly, while we find substantial socio-economic differences in ability beliefs, this does not necessarily suggest that young people from poor families under-estimate how well they do at school; indeed, once we account for prior attainment at age 11, teenagers in the lowest SEP group are actually *more* likely to think they are good at school than young people from the highest SEP group.

Even with these caveats in mind, however, our results still suggest that, while the notion that "skills beget skills" implies that the most effective policies in terms of raising the attainment of young people from poor families are likely to be those enacted before children reach secondary school, policies that aim to reduce differences in attitudes and behaviours between the poorest children and those from better-off backgrounds during the teenage years may also make a significant contribution towards lowering the gap in achievement between young people from the richest and poorest families at age 16.

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