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

IFS Working Paper 10/15

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The role of attitudes and behaviours in explaining socio-economic differences in attainment at age 16¹

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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 thirds* of the socio-economic gap in attainment at age 16 can be accounted for by long-run family background characteristics and prior ability, suggesting that circumstances and investments made considerably earlier in the child's life explain the majority 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 the *majority* of the small increase in this gap between ages 11 and 16. On this basis, our results suggest that while 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

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1. Introduction

Children growing up in poor families tend to emerge from school with considerably lower qualifications than children from better off backgrounds. This paper complements others in this series, by seeking to explain differences in academic attainment between *teenagers* from different socio-economic backgrounds at age 16, the point at which compulsory schooling ends and formal qualifications are typically first obtained.

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 whether to 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 that emerge at a very early age and then persist throughout life (see Cunha & Heckman, 2007 for a review). Work by Dearden, Sibietta & Sylva in a companion paper in this series focuses on just these issues for a contemporary UK cohort of young children.

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. 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 use a simple 'decomposition' analysis to illustrate the extent to which these gaps can be explained by differences in long-run factors such as family background characteristics and prior ability (as reflected by achievement at ages 11 and 14); we then contrast the contribution of such longer-run factors with the contribution of more immediate circumstances, including school quality and composition, parental attitudes and young people's own attitudes and behaviours.

Our findings strongly accord with the work cited above (such as Cameron & Heckman, 2001), which emphasises the importance of long-run factors in explaining educational outcomes in the teenage years. We find that around *two thirds* of the very substantial gap between children from rich and poor backgrounds in educational attainment at age 16 is accounted for by family background and prior ability. This suggests that it is circumstances and investments made considerably earlier in young people's lives that are the primary drivers of differences in educational attainment during the teenage years. The main policy implication of this finding is that interventions before the end of primary school are more likely to reduce the gap between rich and poor children in terms of educational attainment and qualifications than interventions during the teenage years.

This main finding notwithstanding, we do find evidence that teenagers' attitudes and behaviours, and those of their parents, are strongly positively associated with educational attainment at age 16, even after taking such longer run factors into account. For example, we find that, even after controlling for family background and prior ability, young people are more likely to do well at GCSE if their *parents*: think it is likely that the young person will go on to higher education; spend time sharing family meals and outings, and do not often quarrel with their child; provide material resources that may help with education, such as computer and internet access at home. Similarly we find that teenagers are more likely to do well at GCSE if

the *young person*: has a greater belief in their own ability at school; believes that their own actions make a difference and that they can control events that affect them; finds school worthwhile; thinks it is likely that they will apply to, and get into, higher education; avoids risky behaviours such as frequent smoking, cannabis use, anti-social behaviour, truancy, suspension and exclusion; and does not experience bullying. Since young people growing up in poor families tend to do less well in all these respects compared to young people growing up in better off families, this provides some explanation for their lower educational attainment by the end of post-compulsory schooling. Indeed, we find that differences in these factors are able to explain just under a *quarter* of the socio-economic gap in educational attainment at age 16, and a *majority* of the small increase in the rich-poor attainment gap between ages 11 and 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.²

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, before 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 concludes.

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

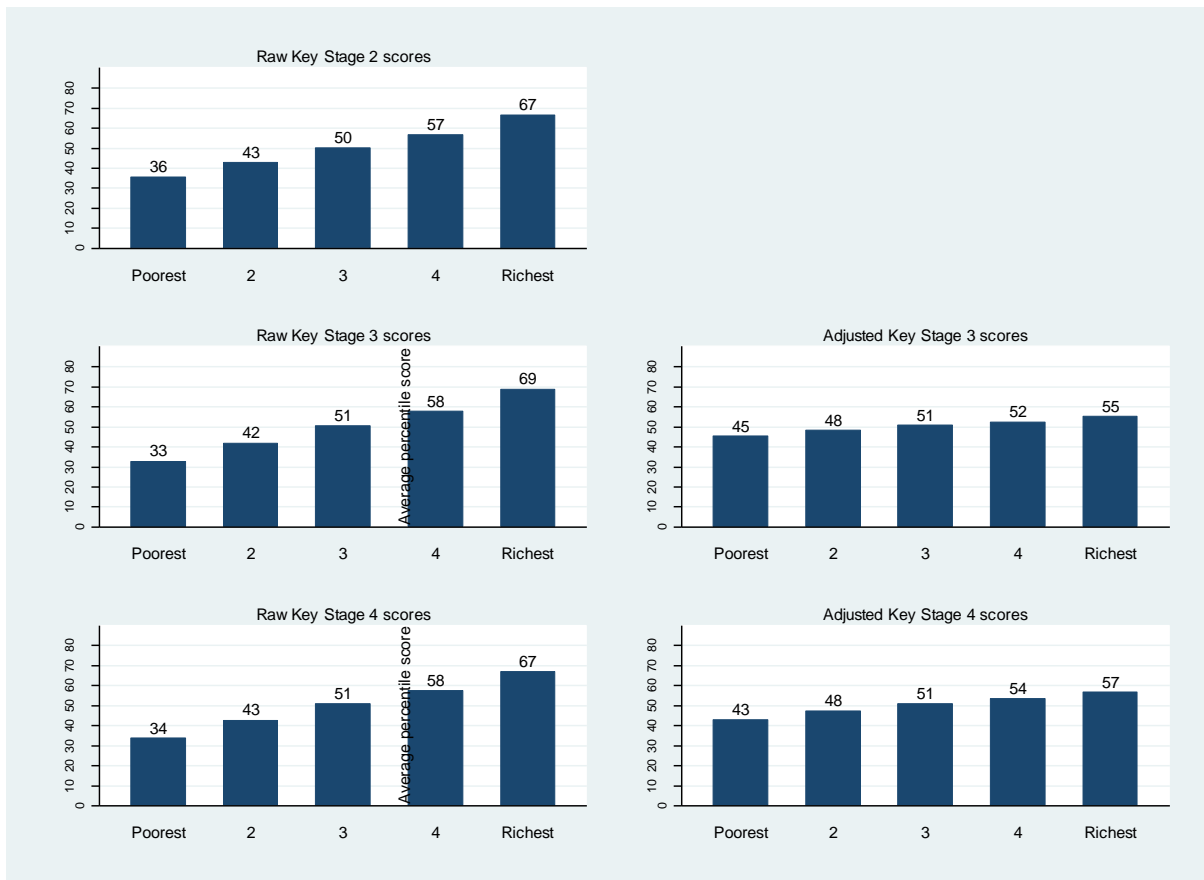
The degree of socio-economic inequality in educational attainment is highlighted in Figure 1, which is based on data from the Longitudinal Study of Young People in England (LSYPE). The left hand panel of Figure 1 shows the average percentile rank in the national achievement (Key Stage) test score distribution 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 figure 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 the children from the most advantaged backgrounds 31 percentiles higher than the average scores of children from the most disadvantaged backgrounds. These differences are more pronounced at age 14, and then

² 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.

appear to narrow slightly by age 16, when the test scores represent GCSE results, the first formal academic qualifications taken in English schools.

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 the previous test. 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: $KS_{it} = \alpha + \lambda SEP_i + \beta KS_{i11} + \varepsilon_i$, $t = 14, 16$.

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.

The right hand panel of Figure 1 shows how these socio-economic gaps change once prior ability (as reflected by 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 age 16 is already reflected in differences that are apparent by the end of primary school. 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.³

Table 1 Proportion reaching government’s 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.

In our work that follows, we examine the extent to which differences in educational attainment between young people from rich and poor families can be accounted for by long-run family background factors and prior ability, and contrast this to the relative contribution of more immediate circumstances during secondary school, including school characteristics, and parent and child attitudes and behaviours. First, we provide further details about the data that we use.

3. Data and methodology

This paper is based on data from the Longitudinal Study of Young People in England (LSYPE).⁴ The LSYPE is a longitudinal survey (administered at the school level) following around 15,000 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 are carried out annually; additionally, school characteristics and national achievement (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, Key Stage 3 and Key Stage 4 results for our analysis. This implies, amongst other things, that we keep only state school pupils in our sample, and thus that our sample is of slightly lower socio-economic position than if we had not imposed such restrictions.⁵ 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 to educational attainment at age 16 via a set of potential ‘transmission mechanisms’, including school quality and composition, and parent and child

³ This figure is obtained from a decomposition analysis similar to that described in Section 6, but with age 11 attainment as the only control.

⁴ See www.esds.ac.uk/longitudinal/access/lstype/L5545.asp for more information on the LSYPE.

⁵ Note, however, that this is a weighted average of individuals with missing test scores, who 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).

attitudes and behaviours.⁶ Importantly, the LSYPE data allows us to consider not only how attainment at age 16 is affected by the levels of these factors at age 14, but also it is affected by *changes* in attitudes and behaviours between ages 14 and 16 (terms are discussed below):

$$KS_{is16} = \alpha + \beta_1 SEP_{is} + \beta_2 FAM_{is} + \beta_3 K_{is14} + \beta_4 SCH_s + \beta_5 PAR_{is14} + \beta_6 YP_{is14} + \beta_7 KS_{is14} + \beta_8 1\{\Delta PAR_{is14-16} = -1\} + \beta_9 1\{\Delta PAR_{is14-16} = 1\} + \beta_{10} 1\{\Delta YP_{is14-16} = -1\} + \beta_{11} 1\{\Delta YP_{is14-16} = 1\} + e_{is}$$

While we cannot rule out the possibility that there may remain unobserved characteristics that are correlated both with the explanatory factors in our model and educational attainment, the ability to account for both the levels of attitudes and behaviours at age 14 and any *changes* in attitudes and behaviours between ages 14 and 16 allows us to move closer to a causal interpretation of our findings than if we had to rely on measures at a single age only.⁷

The equation above is also used as the basis for a simple decomposition analysis of the socio-economic gap in educational attainment at age 16. In this decomposition, the contribution of each variable to the SEP gap is given by the size of its conditional correlation with educational attainment (its coefficient in the equation 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).⁸ See Gregg & Washbrook in a companion paper in this volume for a more formal treatment of this approach.

We now move on to discuss the variables that we make use of in our model.

Our main outcome of interest is the percentile rank of the young person's average point score at age 16, based on their eight best GCSE (or vocational equivalent) exam results.

We account for prior ability by including measures of attainment at ages 11 and 14 (KS_{11} and KS_{14} respectively in the equation above): at each age, 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.

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 equivalised household income at 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 principal-components analysis to combine this information into an index, on the basis of which we can rank individuals from lowest to highest SEP.⁹ (The first principal component explains 53% of the variation in these factors.) We rank the children in our sample

⁶ Goodman & Gregg (2010) provide a visual representation of this basic underlying model.

⁷ Reverse causation may still be a problem; for example, if a young person's relative academic performance falls between ages 14 and 16, this may lead to a fall in their ability beliefs, rather than the other way around.

⁸ 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.

⁹ Note that 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.

into quintiles on the basis of this measure, and include indicators for the richest four groups in our model.¹⁰

We also account for a range of demographic and other family background characteristics (FAM in the equation 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.

The potential transmission mechanisms between SEP and educational attainment that we consider are informed by a diverse literature on the determinants of attainment, which variously emphasise the importance of parental influences, schools, and the motivations and self-regulation of young people themselves. They are summarised as follows:

Parental attitudes and behaviours (PAR in the equation 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.

Schools (SCH in the equation above):

- **School type**: whether the young person attends a community technology college, or a community, voluntary aided, voluntary controlled, foundation or special school; whether the school has a sixth form; whether it is a grammar school;
- **School quality**: Key Stage 2 (age 11) to Key Stage 4 (age 16) value-added score; average Key Stage 2 scores of the young person's year group.
- **School composition**: gender mix of school, school size, percentage of pupils eligible for free school meals, whose first language is not English, who are non-white;
- **Peer influence**: what the young person believes their friends will do at age 16.

¹⁰ The indicator for being in the lowest SEP quintile is omitted from the model and serves as the reference category.

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.

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

In addition to these factors, which are typically measured at age 14, we also include, where possible, changes in attitudes and behaviours between ages 14 and 16. In each case, we allow positive and negative changes to differentially affect educational attainment: in the equation above, $1\{\Delta PAR_{is14-16}=1\}$ and $1\{\Delta YP_{is14-16}=1\}$ are indicator variables capturing downward movements in attitudes and behaviours (i.e. stopping something), while $1\{\Delta PAR_{is14-16}=-1\}$ and $1\{\Delta YP_{is14-16}=-1\}$ are indicator variables capturing upward movements (i.e. starting something). More specifically, we include changes in: ability beliefs; intrinsic and extrinsic value of schooling; aspirations for post-compulsory education (of the young person, their main parent and their friends); university expectations; experience of bullying; engagement in risky behaviours, including truancy, suspension, expulsion, cannabis use, frequent smoking, frequent drinking and anti-social behaviour; teacher-child relations; participation in positive behaviours, including playing sport and reading; frequency of arguments at home; and computer and internet access.

4. What influences GCSE attainment?

In this section, we discuss the results from a simple multivariate regression model (based on the equation in Section 3) which examines the correlates of GCSE attainment. Full results can be found in our online appendix.¹¹

We find that, even after controlling for long-run family background characteristics and prior attainment, young people are more likely to do well in their GCSEs if (at age 14):

The young people:

- Have a greater belief in their own ability at school;
- Have a more external locus of control (i.e. believe that your actions have consequences);

¹¹ See online appendix (<http://www.ifs.org.uk/publications/5267>).

- Find school worthwhile;
- Think it is likely that they will apply to, and get into, higher education;
- Avoid risky behaviours such as frequent smoking, cannabis use, anti-social behaviour, truancy, suspension and exclusion;
- Do not experience bullying.

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 material resources towards education, including computer and internet access.

For example, even after controlling for long-run family background characteristics and prior attainment, young people who think it likely that they will apply to, and get into, higher education score, on average, 3.7 percentiles higher at age 16 than young people who think it not at all likely that they will apply to university. Similarly, those who have access to a computer at home score, on average, 2.2 percentiles higher than those who do not. By contrast, young people who report that they smoke at least six cigarettes per week at age 14 score, on average, 4.8 percentiles lower at age 16 than young people who do not smoke so frequently.

We find that changes in attitudes and behaviours between ages 14 and 16, particularly negative changes, also affect GCSE attainment. In particular, young people tend to have poorer GCSE attainment if, between the ages of 14 and 16, they:

- Stop thinking they get good marks at school;
- Stop liking school or finding school valuable;
- Stop thinking it likely that they will apply to, and get into, university;
- Start playing truant or get suspended;
- Start using cannabis, smoking cigarettes frequently or engaging in criminal behaviour;
- Stop playing sport each week;
- Or if their friends stop wanting to stay in full-time education beyond age 16.

On the other hand, young people tend to have higher GCSE attainment if, between 14 and 16, they:

- Start thinking it likely that they will apply to, and get into, university;
- Start liking their teachers;
- Gain internet access at home.

For example, individuals who stop (start) thinking it likely that they will apply to university score, on average, 5.2 (3.7) percentiles lower (higher) than individuals who experience no change in their HE expectations between 14 and 16. Similarly, young people who start smoking frequently score, on average, 4.3 percentiles lower than young people who do not.

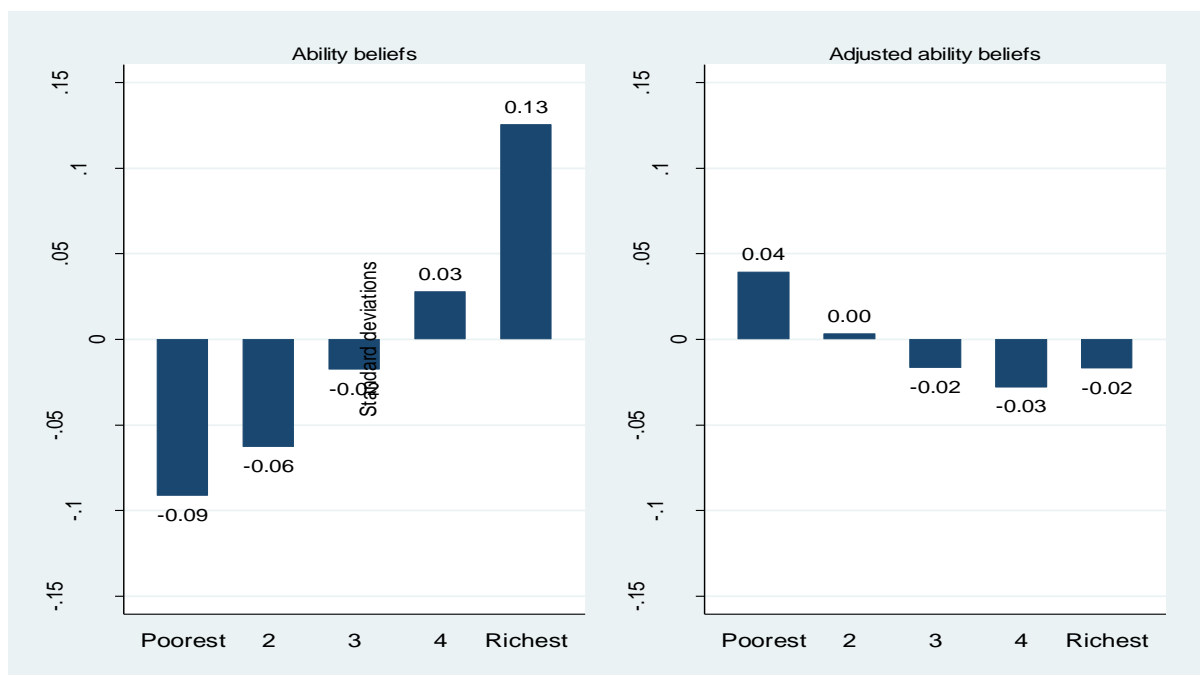
5. Socio-economic differences in attitudes and behaviours

We have shown (in Section 2) that young people from rich and poor families differ in terms of how well they perform in exams. We have also established (in Section 4) that, even after controlling for long-run family background characteristics and prior attainment, a variety of attitudes and behaviours are 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.

We start by considering differences in young people's attitudes and behaviours at age 14.

The left hand panel of Figure 2 shows that young people from poor families tend to have lower **ability beliefs** than young people from richer families. Poor children do not necessarily underestimate how well they do at school, however, as once we account for test scores at Key Stage 2 (in the right hand panel), young people from poor backgrounds 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.

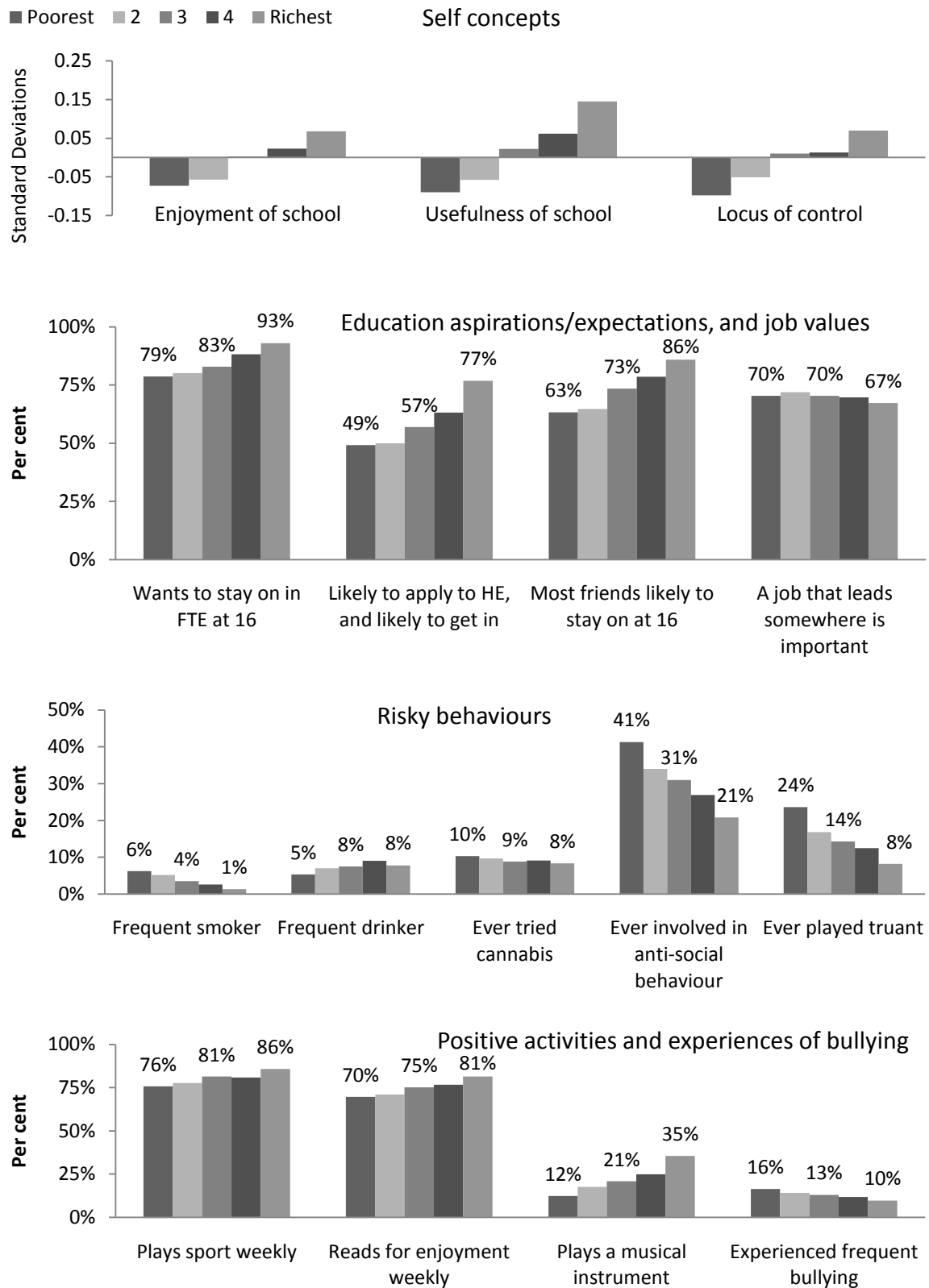
Figure 2 Young person's ability beliefs, by SEP quintile (age 14)



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.

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.

Figure 3 Young person attitudes and behaviours, by SEP quintile (age 14)



Notes: measures constructed using information from Wave 1 of the LSYPE (age 14), except for locus of control which is based on information from Wave 2 (age 15). See Chowdry et al. (2009) for full details.

Figure 3 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.

It is worth noting, however, that 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.¹³ 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 (12.5%) of the poorest fifth among the slightly older cohort actually did so. Similarly, almost four fifths (77%) 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.

- **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.

Figure 4 considers socio-economic differences in parent attitudes and behaviours. It shows that:

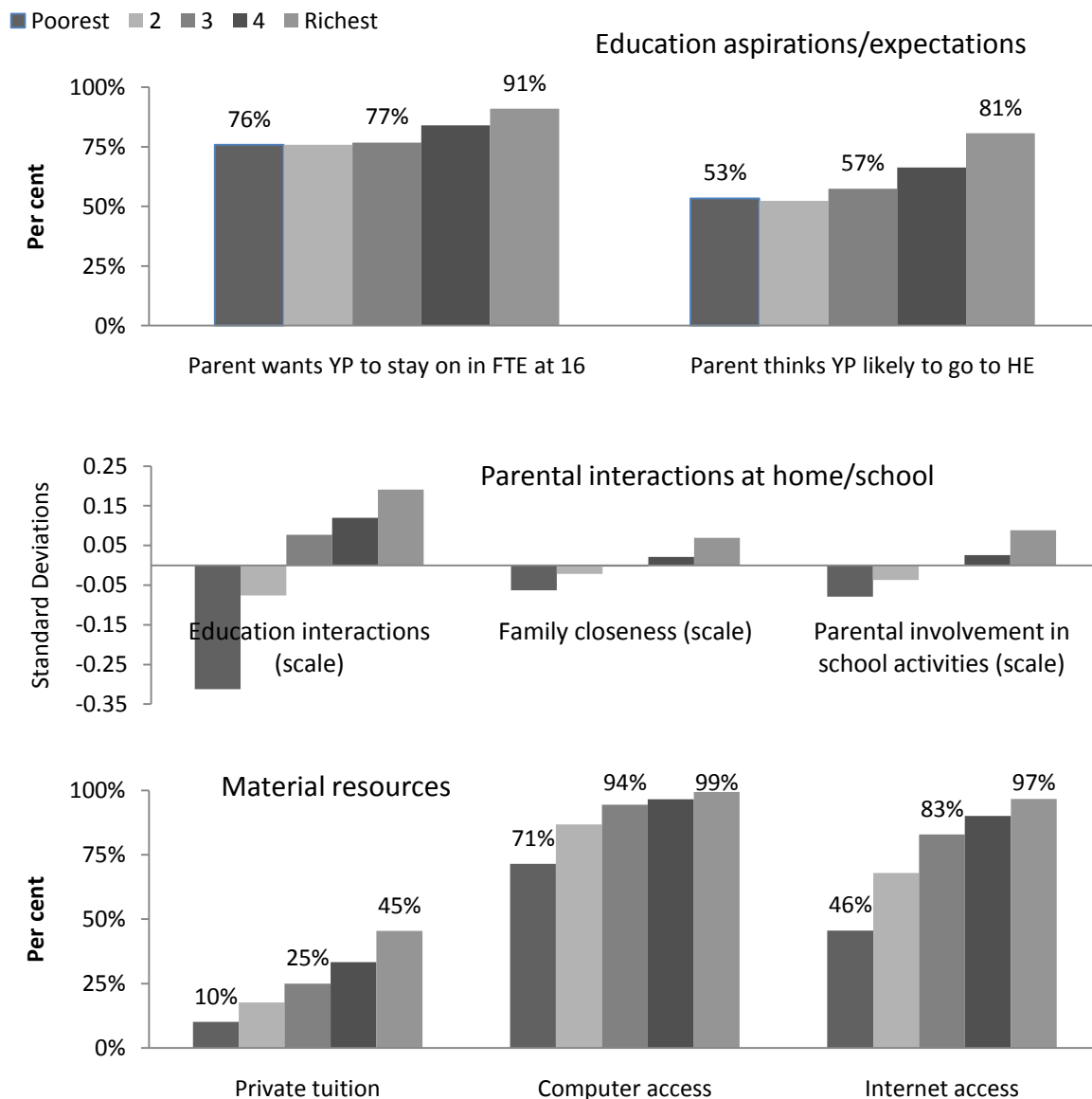
- **Education aspirations and expectations:** richer parents tend to have higher aspirations and expectations for their children's education than poorer parents. For example, four out of five parents in the top SEP quintile think that their child is likely to apply to university, compared to just over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

¹³ 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 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 defined in a slightly different way in the two datasets.

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.

Figure 4 Parental attitudes and behaviours, by SEP quintile (age 14)



Notes: measures constructed using information from Wave 1 of LSYPE. See Chowdry et al. (2009) for details.

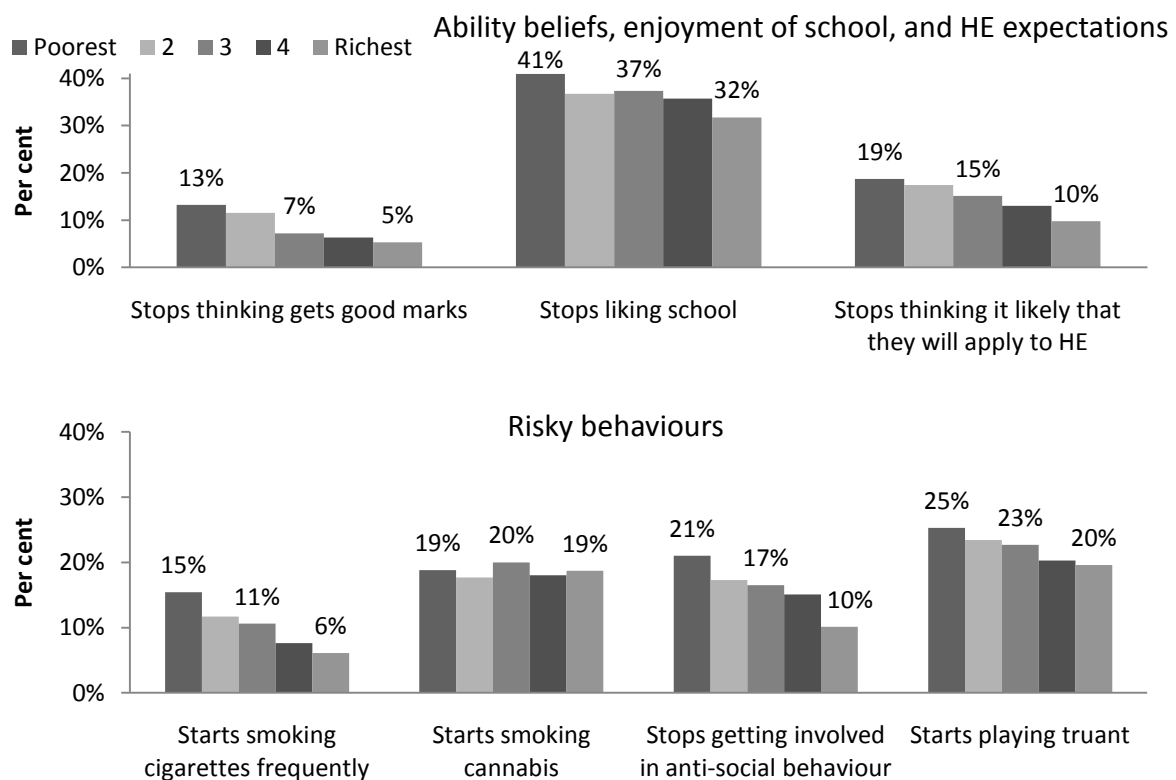
Figure 5 shows how young people's attitudes and behaviours *change* between ages 14 and 16.

On average, young people are more likely to experience negative than positive changes in their attitudes and behaviours over this period: this means that there is a *marked decline* in attitudes and behaviours between ages 14 and 16 across all socio-economic groups. However, young

people from poorer families are more likely to experience negative changes than young people from richer families, such that the socio-economic gap in attitudes and behaviours *widens markedly* over this period. For example, young people from poorer families are more likely to stop thinking that they get good marks and more likely to stop liking school than young people from richer families. They are also more likely to stop thinking it likely that they will apply to university, as more realistic expectations about their likely prospects for HE participation appear to set in.

Figure 5 shows that young people from poorer families are also more likely to start engaging in a range of risky behaviours (including frequent smoking and truancy) between ages 14 and 16 than young people from richer families, suggesting that the gap in terms of participation in risky behaviours also increases over time. One exception is in the incidence of anti-social behaviour, which typically falls between these ages, particularly among children from poorer families.

Figure 5 Changes in attitudes and behaviours between 14 and 16, by SEP quintile



Notes: measures constructed using information from Waves 1 and 3 of the LSYPE (ages 14 and 16). See Chowdry et al. (2009) for full details.

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 whether 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, or instead whether the root causes of these differences lie in the environments experienced by children from different socio-economic backgrounds much earlier in life.

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 (as per equation 1).

We group the characteristics in our model according to those which are likely to reflect early life influences on attainment, and others which relate directly to circumstances during the teenage years, as follows:

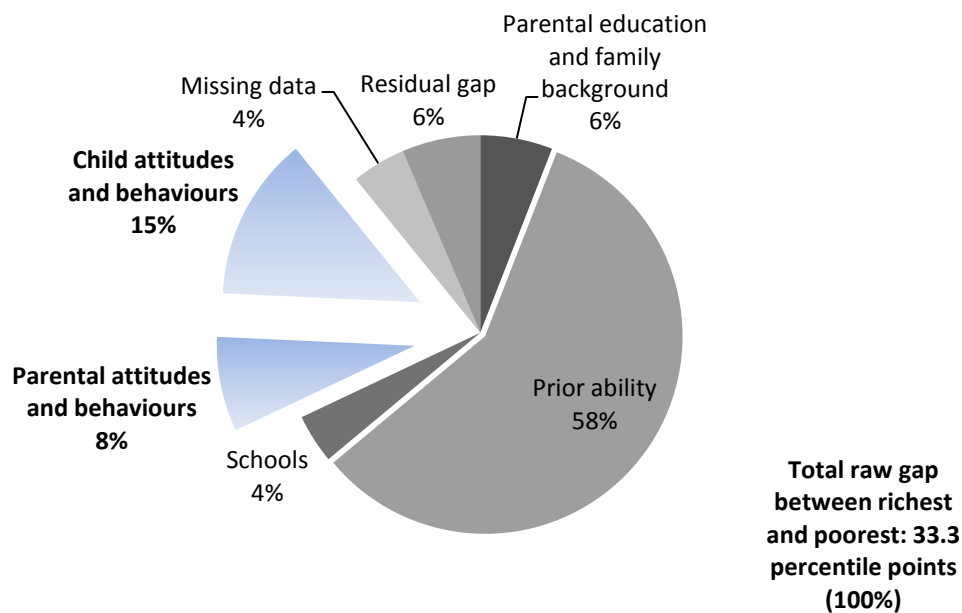
- Parental background and demographics
 - Prior ability (reflected in attainment at ages 11 and 14)
 - Parental attitudes and behaviours during the teenage years
 - Secondary school characteristics
 - Young people’s attitudes and behaviours during the teenage years
-
- } Capturing earlier influences
- } Pathways during the teenage years

Figure 6 presents the results of our decomposition analysis. It shows that differences in prior ability (reflected by attainment at ages 11 and 14) explain just under 60% of the gap in test scores between young people from rich and poor families at age 16, while differences in long-run family background factors (including parental education) account for just 6% of this gap. This suggests that, in total, around *two thirds* of the gap in educational attainment at age 16 between young people from rich and poor backgrounds can be accounted for by parental circumstances and investments made earlier in life. The main policy implication of this finding is that interventions before age 14 are likely to be more effective at reducing the gap between rich and poor children in educational attainment than interventions later in the teenage years.

Notwithstanding this result, we also find evidence that teenage attitudes and behaviours may affect GCSE attainment. Figure 6 shows that differences in parental (8 per cent) and young people’s (15 per cent) attitudes and behaviours together explain roughly *one quarter* of the gap

in GCSE results between young people from rich and poor families, and the majority of the small increase in this gap between ages 11 and 16. Indeed, our calculations suggest that if all young people from the poorest fifth of the sample had the same attitudes and behaviours (from age 14 onwards) as young people from the richest fifth, this *might*¹⁴ increase the proportion of the poorest children getting five good GCSEs from around *one third* to just under *one half*.¹⁵

Figure 6 Explaining the socio-economic gap at age 16: decomposition analysis



Notes: the relative contributions of each set of factors are calculated by multiplying the difference in the proportions of rich and poor with each characteristic by the coefficient estimates from a regression model including all characteristics simultaneously.

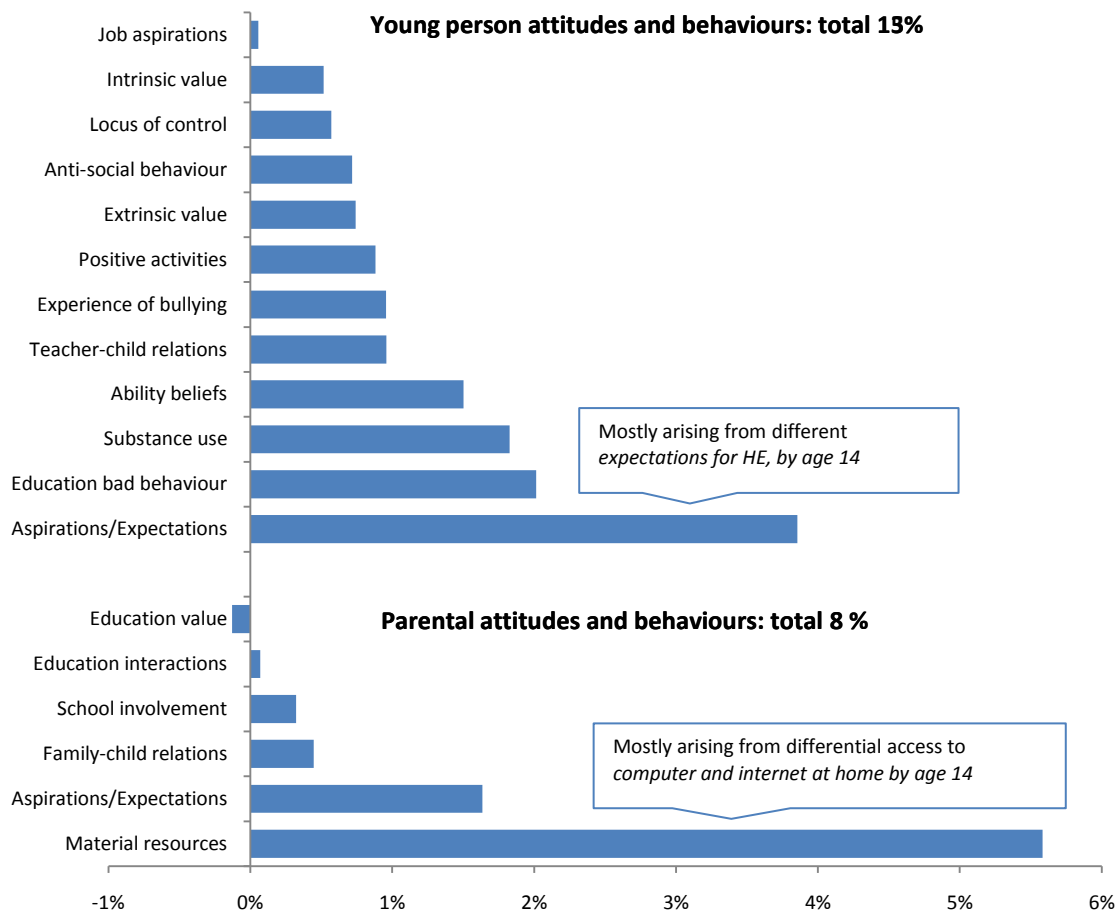
On the other hand, differences in the types of secondary schools attended by young people from rich and poor backgrounds appear to make only a relatively small contribution (around 4%) to the socio-economic gap in test scores at age 16, *over and above* any effect they may have on attainment at age 14. This is consistent with other work which shows that schools typically explain only a small proportion of the variation in both cognitive and non-cognitive outcomes (see, for example, Thomas et al., 1997, and Feinstein & Gutman, 2008).

Figure 7 explores the contribution of attitudes and behaviours of parents and young people in more detail, and tells us *which* attitudes and behaviours are most important for explaining why young people from poor families have lower GCSE attainment than those from richer families.

¹⁴ Of course, this assumes that improvements in attitudes and behaviours *cause* improvements in educational attainment. However, our analysis cannot rule out the possibility that improvements in educational attainment cause improvements in attitudes and behaviours, or that there is no causal relationship between the two.

¹⁵ We arrived at this figure by observing that eliminating one quarter of the gap between the richest and poorest in terms of GCSE scores at age 16 would amount to an improvement in the relative ranking of children from poor backgrounds by around 8 percentile points. This is about equivalent to moving the GCSE scores of the poorest fifth up to those of the second quintile, which in Table 1 we showed to be the same as increasing the proportion of the group achieving 5 GCSEs at grades A*-C from approximately 33% to 46%.

Figure 7 Further decomposition: parent and child attitudes and behaviours



Notes: the relative contributions of each set of factors are calculated by multiplying the difference in the proportions of rich and poor with each characteristic by the coefficient estimates from a regression model including all characteristics simultaneously. For more details, see Chowdry et al (2010).

Among the young persons' attitudes and behaviours that we capture in our study, it is **expectations for higher education** formed by age 14 that make the greatest contribution to the gap in test scores between young people from rich and poor backgrounds (explaining around 2.9%); the large decline in poor children's HE expectations between ages 14 and 16 (which is negatively associated with educational attainment) also makes a contribution.

Engagement in risky behaviours, including playing truant, frequent smoking, drinking and cannabis use, also represents an important part of the story (explaining around 2.3% of the socio-economic gap in test scores at age 16). Differences in reported career values and aspirations, on the other hand, have very little role to play in explaining the gap in GCSE attainment between young people from rich and poor families.

Figure 7 also shows that there is an important additional role for **parental expectations and aspirations**, particularly in terms of HE participation, explaining around 1.9% of the gap. Moreover, access to a **computer** and to the **internet** in the home explains around 4.5% of the socio-economic gap in test scores at age 16.

After accounting for all of the characteristics available to us, we find that a fairly small proportion (around 6%) of the socio-economic gap in test scores at age 16 does not appear to be mediated through other factors in our model, and hence remains unexplained (the 'residual gap' in Figure 5). This is small compared to the 'raw' gap that we set out to explain, and suggests that the factors we are able to control for in our model explain the vast majority of the difference in GCSE results between young people from rich and poor families.

7. Conclusions

This paper has shown that children growing up in poor families emerge from school with considerably lower GCSE results than children from better off backgrounds. We analyse the determinants of this socio-economic inequality using a simple decomposition analysis, which allows us to compare the contributions of long-run factors (such as family background characteristics and prior ability) with the contributions of factors reflecting more immediate circumstances, such as the secondary school attended, and the attitudes and behaviours of parents and children measured during the teenage years.

Our work shows that around *two thirds* of the gap in educational attainment at age 16 between young people from rich and poor families can be accounted for by long-run family background characteristics and prior ability (reflected in attainment at ages 11 and 14). This suggests that circumstances and investments made considerably earlier in the child's life explain the majority of the socio-economic gap in test scores at the end of compulsory schooling.

On top of this, however, we find that differences in the attitudes and behaviours of parents and young people together explain a further *quarter* of the socio-economic gap in GCSE attainment, and the *majority* of the small increase in the gap between ages 11 and 16, with HE expectations and computer and internet access among the most important contributors. By contrast, differences in the types of secondary school attended by children from different socio-economic backgrounds appear to make very little contribution to the gap in test scores at age 16, over and above any effect that they may have on attainment at age 14.

Overall, our results suggest that if the poorest fifth of young people had the same attitudes and behaviours as the richest fifth of young people, this *might* increase the proportion of the poorest children getting five good GCSEs from around *one third* to just under *one half*. However, we must interpret these findings with caution, 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 each potential transmission mechanism are unlikely to be seriously biased by the omission of detailed measures of parental ability, social skills and attitudes and behaviours observed during the parent's childhood (which we might have regarded as one of the most important potential sources of omitted variables bias in our work).

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 get in) 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 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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