Drivers and Barriers to Educational Success

Evidence from the Longitudinal Study of Young People in England

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Executive Summary

Introduction

1)   The aim of this report is to examine why young people from poor families are more likely to experience lower achievement in school, and more likely to participate in a range of risky behaviours as teenagers, than young people from richer families.

2)   The background to this research is the widespread concern about the relative lack of social mobility in the UK, compared to other countries, and by comparison with the recent past, and the key role that education policy may have to play in improving future social mobility.

3)   Our work is based on new data from the Longitudinal Study of Young People in England (LSYPE), following a single cohort of around 15,000 teenagers born in 1989 and 1990, from age 14 to age 17 (Year 9 to Year 12).

4)   This data allows us to consider how young people from different socio-economic backgrounds differ in terms of a wide range of education and behavioural outcomes. These outcomes include:

   a)   **Educational attainment**: test scores at Key Stage 3 (age 14) and Key Stage 4 (age 16), and progress between these two stages.

   b)   **Post-16 activity**: whether the young person is NEET (not in education, employment or training) at age 17.

   c)   **Behavioural outcomes**: risky or anti-social behaviours (including truancy, involvement in criminal activity, smoking, drinking and cannabis use) at ages 14 and 16, and participation in positive activities at age 14.

Our analysis proceeds as follows.

The link between parental socio-economic position and teenage outcomes

5)   We first examine the extent to which these education and behavioural outcomes differ between teenagers from different socio-economic backgrounds (Chapter 3).

6)   We find large socio-economic 'gaps' (that is, large differences between the richest and poorest children) for almost all of the outcomes we consider.

7)   For example:

   a)   Only one in five of the poorest fifth of our sample attain five or more GCSEs at grades A* to C including English and Maths, compared to almost three quarters of the richest fifth (a gap of over 50 percentage points).

   b)   Around 15% of young people from the poorest fifth of our sample are NEET at age 17, compared with just 2% of individuals from the richest fifth of our sample (a gap of 13 percentage points).

   c)   Just under a quarter (24%) of teenagers from the poorest fifth of our sample report playing truant at age 14 compared with 8% of the richest fifth (a gap of 16 percentage points).

Explaining the link between parental socio-economic position and teenage outcomes

8) We next set out some possible channels, or 'transmission mechanisms', through which parental socio-economic position and other aspects of family background (including parental education) may affect teenage education and behavioural outcomes. These are:

   a) **Schools and neighbourhoods**: socio-economic, ethnic and gender composition of schools and local neighbourhoods.

   b) **Main parent's attitudes and behaviours**: expectations and aspirations for further and higher education; parental involvement in the child's education; family interactions, such as having meals together.

   c) **Material resources**: educational resources in the home, such as private tuition, computer and internet access.

   d) **Young people's attitudes and behaviours**: expectations and aspirations for further and higher education; self concepts, such as ability beliefs and locus of control; risky behaviours and experiences of bullying.

9) Our main analysis assesses whether these factors help to explain why poor children tend to perform worse at school and engage in more risky behaviours than richer children. We do this in three stages.

   a) First, we set out whether children from different socio-economic backgrounds differ in these factors: that is, whether they differ in terms of family background characteristics, the composition of the schools they attend and the neighbourhoods in which they live, the attitudes and behaviours held by their parents, the availability of material resources in their household, and their own attitudes and behaviours (Chapter 4).

   b) Next, we examine the role that these factors play in explaining education and behavioural outcomes (Chapter 5).

   c) Finally, we consider how much of the gap in outcomes between the richest and poorest children disappears once we account for these differences in these factors (Chapter 6).

10) Summarising the results of these analyses as a whole, we find that:

   a) Differences in **parental education** between young people from different socio-economic backgrounds provide a major explanation for differences in their outcomes, particularly in terms of educational attainment.
   Moreover, we find this relationship to be causal (for mothers): that is, the higher educational qualifications of the mother *cause* the higher child test scores that we observe (Chapter 7). This suggests that interventions which raise women's education levels may yield an intergenerational pay-off in terms of their children's education, in addition to any benefits that may accrue to the individuals themselves.

   b) **Schools and neighbourhoods** seem less important than attributes of parents and young people themselves in explaining differences in outcomes between young people from rich and poor backgrounds. However, neighbourhood deprivation does appear to play a role in explaining who becomes NEET at age 17: our analysis suggests that deprived individuals living in deprived neighbourhoods are

significantly more likely to be NEET than deprived individuals living in non-deprived neighbourhoods.

c) The **main parent's attitudes and behaviours**: there are some specific factors that appear to be strongly related to young people's educational outcomes, including parental expectations and aspirations for the education of their children. However, taken as a whole, parental attitudes and behaviours do not seem to play as large a role in explaining outcome gaps as the attitudes and behaviours of the young person (see below).

d) **Material resources** in the home (such as computer and internet access) are important in explaining the gap in educational attainment between young people from rich and poor backgrounds, but less so in explaining differences in behavioural outcomes.

e) The **young person's own attitudes and behaviours** seem to play a particularly strong role in explaining differences in both education and behavioural outcomes between young people from different socio-economic backgrounds. For example:

   (i) At age 14, 77% of children from the richest families report that they are likely to apply to university and likely to get in, compared with 49% of children from amongst the poorest families (Chapter 4).

   (ii) Believing that you are likely to apply to university and likely to get in is associated with higher educational attainment and lower participation in risky behaviours. For example, a young person who reports (at age 14) that they are likely to apply to university and likely to get in scores, on average, 18 points higher at GCSE (after controlling for performance at Key Stage 3), and is 3 percentage points less likely to play truant between age 15 and 16 (Chapter 5).

   (iii) After taking into account differences in beliefs about future higher education, together with a range of other attitudes and behaviours of the young person, we find that the socio-economic gap in most outcomes is significantly reduced (Chapter 6).

f) *Changes* in attitudes and behaviours between ages 14 and 16 are strongly associated with changes in educational attainment over the same period. For example, a substantial number of young people, particularly those from amongst the poorest families, stop thinking it likely that they will go to university between age 14 and age 16. These individuals make considerably less progress between Key Stage 3 and Key Stage 4 than others whose expectations for higher education remain more stable.

Summary Table 1 summarises some of our key findings.

Summary Table 1: summary of some key factors which help reduce the socio-economic gap in education and behavioural outcomes

Possible channel	Socio-economic differences in possible channel	Outcomes with which possible channel is significantly associated*
Family background characteristics		
Mothers' education	Mother has no qualifications: 3% of richest fifth 46% of poorest fifth	KS4 score (+) Participation in positive activities (+)
Schools and neighbourhoods		
School quality	Attends a school rated as 'Outstanding' by Ofsted: 27% of richest fifth 16% of poorest fifth	KS4 score (+) KS3 to KS4 value-added (+)
Main parent's attitudes and behaviours		
Parents' expectations for higher education	Main parent thinks child is likely to go to university: 81% of richest fifth 53% of poorest fifth	KS4 score (+)
Close family-child interactions	Scale of family-child interactions** Above average (7% of a standard deviation) among the richest fifth Below average (6% of a standard deviation) among the poorest fifth	KS4 score (+) KS3 to KS4 value-added (+) Smoking (-) Drinking (-) Cannabis use (-) Anti-social behaviour (-) Truancy (-)
Material resources in the home		
Computer and internet access	Internet access at home: 97% of richest fifth 46% of poorest fifth	KS4 score (+) KS3 to KS4 value-added (+)
Young person's attitudes and behaviours		
Aspirations for higher education	Likely to apply to university and likely to get in 77% of richest fifth 49% of poorest fifth	KS4 score (+) KS3 to KS4 value-added (+) NEET (without KS4 control) (-) Smoking (-) Anti-social behaviour (-) Truancy (-) Participation in positive activities (+)

Notes:
* After controlling for all other factors; table reports relationships for education and behavioural outcomes at age 16/17, in expected direction only.
** This scale is constructed from responses to questions relating to the frequency with which parents report sharing with their teenager: regular family meals, evenings together at home as a family, going out together as a family and arguments; plus the main parent's general assessment of how well the parent and young person get on.

Policy implications

11) A major question arising from our work concerns the extent to which policies that are designed to improve the attitudes and behaviours of teenagers from poor backgrounds are likely to have a large pay-off in terms of improving educational attainment and other behavioural outcomes, and thus closing the very large socio-economic gaps that we observe, particularly as many of these gaps are already sizeable even before children enter secondary school.

12) In some senses our research seems promising in this respect, since we have found very strong correlations between many of the attitudes and behaviours of young people (and to a lesser extent, their parents) and a variety of teenage education and behavioural outcomes.

13) Of particular importance seem to be the young person's ability beliefs, whether they like school and find school worthwhile, and their future educational aspirations. Moreover, such positive correlations hold even after taking many other aspects of young people's homes, schools and neighbourhoods into account.

14) It would be tempting to conclude from these results that even if policy cannot always change the underlying contexts and characteristics of families, then perhaps as an alternative it can focus on transforming the attitudes and behaviours of young people and their parents, to positive effect. However, some important notes of caution need to be sounded.

15) Our evidence on the importance of the attitudes and behaviours of young people and their parents is based on observing strong *correlations* between those attitudes and teenage outcomes: but correlation does not imply causation. For example, there may be something unobserved causing young people from poorer families to have both lower aspirations and worse outcomes. In this case, a policy intervention that merely addressed the symptom of lower aspirations, rather than the underlying cause, might have a reduced or possibly no impact on outcomes.

16) While the richness of the LSYPE data - in describing the detailed attitudes, behaviours and circumstances of families - helps to reduce the risk of missing important, unobserved factors, this risk is by no means eliminated.

17) Additionally, some important nuances need to be considered before straightforward policy recommendations can be made. For example:

   a) Many more parents and children at ages 14 and 16 think that they will stay in full-time education at 16 and apply to university than ultimately do so (see Chapter 4). This suggests that policies which seek to raise aspirations amongst young people from poor backgrounds may be limited in their impact. (We note, however, that the socio-economic gap in aspirations widens between ages 14 and 16.)

   b) Although a young person's ability beliefs are strongly positively correlated with attainment at school at Key Stage 3 and Key Stage 4, it does not appear that poor children necessarily under-estimate how well they do at school. Once we take test scores at Key Stage 2 into account, young people from poor backgrounds are typically more likely to think that they are good at school than young people from better off backgrounds. Again, this finding throws a note of caution against simply suggesting that improving attitudes will solve the problems that young children from poor families face in school.

18) Further, there is currently relatively little evidence on the effectiveness of interventions designed to improve the attitudes and behaviours of teenagers, in contrast to a much larger body of evidence on the effectiveness of interventions designed to improve behaviour and social skills in early childhood.

19) An encouraging exception is the evaluation of Aimhigher: Excellence Challenge (Emmerson et al, 2005). Targeted at young people in urban, deprived schools, it was found that one school year's exposure to the programme in Year 11 (age 15-16) lead to pupils scoring 2.5 points higher at GCSE (equivalent to 2.5 grades improvement on the current scale) and being 3.9 percentage points more likely to report that they intended to participate in higher education.

20) A clear direction for future research and policymaking is thus to further establish both the role and scope for broader policy initiatives to improve young people's attitudes and behaviours and, consequently, their educational attainment.

1. Introduction

The aim of this report is to examine why young people from poor families are more likely to experience lower achievement in school, and more likely to engage in a range of risky behaviours as teenagers, than young people from richer families.

The background to this research is the widespread concern about the relative lack of social mobility in the UK by comparison with the recent past and compared to other countries. Such comparisons are highlighted in Figure 1.1, derived from Blanden et al. (2005). (Although the Cabinet Office's recent discussion paper on social mobility sets out some tentative evidence, based on the same data used for this report, that social mobility may be starting to rise among more recent cohorts - see Cabinet Office, 2008).

Figure 1.1 Social mobility in the UK, changes over time and across countries

Intergenerational Income Mobility Between Parents and Their Sons		Comparison of Parent and Son Income Correlations for Selected Developed Countries[1]		
Percentage of sons in lowest income quartile whose parents are also in lowest quartile	1958 Cohort: 31% 1970 Cohort: 38%	USA	0.289	Lower
		UK	0.271	
		West Germany	0.171	
Percentage of sons in highest income quartile whose parents are also in highest quartile	1958 Cohort: 35% 1970 Cohort: 42%	Finland	0.147	Social Mobility
		Canada	0.143	
		Denmark	0.143	
		Sweden	0.143	
		Norway	0.139	Higher

[1]   The correlation indicates the extent of the relationship between the income of parents and their sons. The closer the correlation is to zero, the less association between parental and son income, indicating higher social mobility. Note, the years when sons were born differs across countries.
Source: Blanden, Gregg and Machin (2005), *Intergenerational Mobility in Europe and North America*, Sutton Trust, LSE

Previous research has emphasised that differences in educational attainment are important drivers of the persistence of disadvantage across generations. Children born to parents amongst the lower social classes perform (on average) more poorly at all stages of education than children born to parents from higher social classes (DfES, 2006). Gaps in attainment start early, with socio-economic differences in developmental outcomes observed as early as 22 months in the British Cohort Study (see Feinstein, 1998) and three years in the Millennium Cohort Study (see Barreau et al., 2008). These gaps widen throughout the schooling years (Feinstein, 1998, 2003, and DfES, 2006). Furthermore, it has been estimated that such differences in educational attainment account for around 35% to 40% of the correlation between parents' and sons' incomes (a measure of the degree of intergenerational income mobility) (see Blanden et al., 2005).

This suggests a potentially key role for education policy in improving social mobility. This is well-recognised by government and policymakers. For example, one of the key targets of the Department for Children, Schools and Families (DCSF) is to "narrow the gap in educational achievement between children from low income and disadvantaged backgrounds and their peers" (PSA Target 11, CSR 2007).[1] Recent work by DCSF on breaking the link between deprivation and low attainment highlights the potential role for schools and communities in raising the attainment of low income children (DCSF, 2009). At the same time, a number of the government's major policies going forwards, such as raising the education participation age to 18 by 2015, are explicitly aimed at improving the skills and qualifications of young people from deprived backgrounds.

However, while the relationship between parental income and educational attainment has been well-documented, there is relatively less work trying to explain *why* these socio-economic gaps emerge, and *how* education policy may be used to help reduce these gaps. A growing literature is focusing on explaining the socio-economic gaps in outcomes amongst very young children. This work stresses the importance of the early home learning environment (see, for example, Sammons et al., 2007; CMPO, 2006), and highlights the potential role for policies aimed at improving parenting skills when their children are very young. However, less attention has been paid to the drivers of socio-economic differences in educational attainment and other outcomes amongst teenagers in the UK. While a sizeable proportion of the attainment gap between teenagers is already established long before secondary school starts, these gaps not only persist, but are generally found to widen throughout the teenage years (see Feinstein, 2003).

One reason why these is relatively little recent work looking at the attainment gap among contemporary groups of teenagers in this country is due to the lack of suitable data: the gap in the British birth cohort series between 1970 (British Cohort Study) and 2000-01 (Millennium Cohort Study) in particular has meant that there has hitherto been no detailed national record of a cohort of individuals born in the 1980s or 1990s.[2]

This report aims to fill this gap, by investigating which factors are most important in explaining why teenagers from poor families tend to experience worse education and behavioural outcomes than young people from rich families. Our work is based on exciting new data from the Longitudinal Study of Young People in England (LSYPE), following a single cohort of around 15,000 teenagers born in 1989 and 1990, from age 14 to age 17 (Year 9 to Year 12).

Our work builds on one element of some ongoing research commissioned by the Joseph Rowntree Foundation[3], which considers similar issues for children from birth through to adolescence (see Barreau et al., 2008, for some early findings from this research).

At the heart of our analysis is a simple model of how parents' socio-economic position might influence a range of education and behavioural outcomes amongst today's teenagers. This model postulates that it is not only financial resources per se that might help to explain why children from poor families tend to have worse outcomes than children from richer families, but also differences in the environments to which children from different socio-economic backgrounds have access (including homes, schools and neighbourhoods).

We use existing literature to define a set of five channels, or potential *transmission mechanisms*, through which an individual's socio-economic background and their

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[1] See http://www.hm-treasury.gov.uk/d/pbr_csr07_psa10_11.pdf for more details.
[2] The Avon Longitudinal Study of Parents and Children (ALSPAC) provides an excellent source of data on a cohort born in 1991 and 1992 in the Bristol area.
[3] See http://www.jrf.org.uk/work/workarea/education-and-poverty for more details.

educational attainment and behavioural outcomes might be linked. These transmission mechanisms encompass a wide variety of factors - from school and neighbourhood composition, through to the young person's attitudes towards education - and are described in detail in Chapter 2.

Our analysis provides evidence on the extent to which each of these channels can account for the socio-economic gaps in educational attainment and behavioural outcomes that we observe, and uses these relationships to suggest which avenues may be the most fruitful for future research and policy development.
Our report proceeds as follows:

- **Chapter 2** sets out the conceptual model underlying our analysis, alongside the data that we use and the methodologies that we adopt.

- **Chapter 3** documents the socio-economic gaps in education and behavioural outcomes that we are trying to explain.

- **Chapter 4** illustrates by how much young people from rich and poor families differ in terms of our five potential transmission mechanisms (discussed above).

- **Chapter 5** shows which of these potential transmission mechanisms help to explain education and behavioural outcomes.

- **Chapter 6** documents the extent to which each of these factors help to explain the socio-economic gaps in education and behavioural outcomes that we set out in Chapter 3.

- **Chapter 7** sets out our attempts to establish whether some of the factors we identified as important in explaining education and behavioural outcomes (in Chapter 5) can be thought of as *causing* the differences in outcomes that we observe.

- **Chapter 8** concludes.

2. Model, data and methods

Summary of Chapter 2

- This chapter sets out a **model** showing the routes through which a young person's socio-economic background might affect educational attainment and behavioural outcomes.

- This model links a young person's family background to their outcomes via the following *transmission mechanisms*: schools, neighbourhoods, parental attitudes and behaviours, material resources, and the attitudes and behaviours of the young person themselves.

- The **data** we use to estimate this model is Waves 1 to 4 of the Longitudinal Study of Young People in England (LSYPE), with linked records of results at Key Stages 2 to 4 from the National Pupil Database.

- Our main **methods** of analysis include:

  (i) Graphical documentation of the gaps between rich and poor children in terms of their education and behavioural outcomes (shown in Chapter 3), and in terms of the potential transmission mechanisms described above (shown in Chapter 4);

  (ii) A regression analysis showing the relationship between child outcomes and the very   rich set of variables in our model (shown in Chapter 5);

  (iii) A "pathways" analysis, showing how the gap in education and behavioural outcomes between rich and poor can be explained (shown in Chapter 6);

  (iv) First differences, instrumental variables and control function methods for analyses examining the relationship between maternal education and child outcomes, and peer composition and child outcomes (shown in Chapter 7).

2.1 A conceptual model

The aim of this report is to better understand the relationship between a child's socio-economic background and his or her education and behavioural outcomes at ages 14 and 16/17. We explore the role of a diverse range of factors that potentially mediate this relationship.

Underlying our approach is the understanding that it is not necessarily lack of income per se, but a whole host of possible reasons - some observable, and others unobservable to us as researchers - why children from poor socio-economic backgrounds may perform worse at school (and may be more likely to engage in a range of risky behaviours) than children from richer backgrounds.

At the heart of our analysis is a very simple model linking parents' socio-economic position to child outcomes at ages 14 and 16/17, set out in Figure 2.1. In this model, we link a young person's family background - which covers a set of characteristics including their parents' socio-economic position, education and other family background measures - to child outcomes at 14 and 16/17 via a set of potential *transmission mechanisms*.

Specifically, we suggest that there are five main routes through which family background might influence educational attainment and engagement in risky behaviours, other than as a result of genetics, namely:

(i)   **Schools**: young people from different family backgrounds may attend schools of different quality, with different peer group compositions, and this may be important for child outcomes;

(ii)   **Neighbourhoods**: the local neighbourhoods in which young people spend time are also likely to differ by family background;

(iii)   **Parents' attitudes and behaviours**: there may be differences in parenting behaviours, attitudes to education and aspirations that influence the child's education and behavioural outcomes;

(iv)   **Material resources**: differences in the availability of educational resources in the home (including private tuition and access to a computer or the internet) which support learning may also differ by family background.

Finally, each of these aspects of the young person's environment is likely to influence the last of our potential transmission mechanisms:

(v)   **Young person's attitudes and behaviours**: differences in young people's own attitudes towards schooling, such as beliefs about their own ability and the value they place on education, plus other behaviours, such as participation in positive activities, engagement in risky behaviours and experiences of bullying.

We focus on these five factors on the basis that previous literature has suggested that each plays a key role in determining educational attainment (see, for example, Wigfield & Eccles (2000) on the importance of young people's ability beliefs and educational values for determining motivation at school, Duckworth et al. (2009) on the importance of individual and school characteristics, Feinstein et al. (2004) on the role of home, school and neighbourhood environments, and Barreau et al. (2008) on the importance of parental behaviours and the home learning environment).

The data that we use (described in Section 2.2) allows us to consider both how these possible routes affect child outcomes at a particular point in time (age 14), but also how changes in these factors leads to changes in outcomes between the ages of 14 and 16/17. Our model also shows that there will be many influences on child outcomes that remain unobserved to us as researchers. These "unobservables" are likely to be correlated with both the explanatory factors in the model and child outcomes (as indicated by the dashed arrows in Figure 2.1). The possible existence of unobservable characteristics means that great care needs to be taken in drawing firm policy conclusions on the basis of results from this model alone. This issue is discussed in more detail in Section 2.3 below.

Figure 2.1   A simple model linking parental socio-economic position and child outcomes at ages 14 and 16/17

FAMILY BACKGROUND   "TRANSMISSION MECHANISMS"   OUTCOMES   CHANGES IN "TRANSMISSION MECHANISMS"   OUTCOMES (16/17)

Parental socio-economic status

Parental education

Other family background and demographics

Schools

Neighbourhoods

Parental attitudes, behaviours and beliefs ("As and Bs")

Material resources diverted to education

Young people's attitudes, behaviours and beliefs

("As and Bs")

Outcomes at 14

Key Stage 3 results

Smoking, drinking and cannabis use

Truancy

Anti-social behaviour

Changes in parents' characteristics:

- **Income**
- **"As and Bs"**
- **Material resources**

Changes in YP characteristics

- **"As and Bs"**

Outcomes at 16 or 17

Key Stage 4 results

NEET at 17

Smoking, drinking and cannabis use

Truancy

Unobservable characteristics

Notes: the arrows in this diagram are designed to illustrate the relationships that we try to model in our analysis. In reality, there may be many more inter-relationships between factors not highlighted in this diagram (for example, parental attitudes to education may influence the quality of the school that their child attends). This diagram is based on other models of human capital development in the literature, for example, Feinstein et al. (2004) based on Bronfenbrenner (1979).

2.2 Data

In this section we describe the data that we use to estimate our model, from the Longitudinal Study of Young People in England (LSYPE).[4] The LSYPE is a longitudinal survey (clustered at school level) following upwards of 15,000 young people in England who were aged 14 (Year 9) in 2003-04. Data is collected annually, with four waves (up to age 17) available so far.

The LSYPE provides a unique opportunity to study in depth the experiences, attitudes, aspirations and motivations of a large group of today's teenagers and their families. In addition to information collected annually as part of the LSYPE survey, personal characteristics and Key Stage test results have also been matched in to the sample from the National Pupil Database.

The full Wave 1 LSYPE 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.

Our analysis is mainly based on data from Waves 1, 2 and 3 (i.e. Years 9, 10, and 11 respectively). Selected information from Wave 4 (Year 12, age 17) was also used.[5] As stated in the introduction, the aim of this report is to understand why young people from poor families (those with low socio-economic position) tend to have poorer educational attainment and worse behavioural outcomes than young people from rich families (those with high socio-economic position).

This section discusses the education and behavioural outcomes that we use, the construction of our measure of socio-economic position, and the myriad other factors through which we might expect socio-economic position to affect education and behavioural outcomes. The way in which these factors are linked was set out in our model in Figure 2.1.

Outcomes

We focus on outcomes that are recorded in both Wave 1 (age 14) and Wave 3 (age 16), to take advantage of the panel element of the LSYPE. Specifically, we consider:

- Key Stage 3 and 4 test scores;

- Smoking, alcohol and cannabis use;

- Truancy;

- Involvement in anti-social behaviour (including vandalism and fighting).

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[4] See www.esds.ac.uk/longitudinal/access/lsype/L5545.asp for more information on the LSYPE.
[5] We used Wave 4 data to measure whether the young person was not in education, employment or training (NEET) at age 17, one of the key outcomes analysed in this report.

In addition, we use:

- Participation in positive activities at age 14[6];

- Whether the young person is not in education, employment or training (NEET) at age 17.

The construction of these variables is described in more detail in Appendix 1.

Socio-economic position

Our measure of parental socio-economic position (SEP) aims to capture the longer-term resources of the household in which the young person lives, and is constructed from the following information:

- Log equivalised household income (averaged across Waves 1, 2 and 3);

- Reported experience of financial difficulties (Wave 1);

- Mother's and father's occupational class (Wave 1);

- Housing tenure (Wave 1).

We use principal-components analysis to combine this information into a score, on the basis of which we can rank individuals from lowest to highest socio-economic position.[7] We group individuals into quintiles (fifths) of the sample using this measure, and include the richest four groups in our model. (This means that we can measure the effects of being in each of these groups relative to the poorest fifth of the sample.)

Parental education, and demographic and other family background characteristics

- **Parental education**: highest qualifications obtained by the young person's mother and father.

- **Characteristics of the young person**: gender, ethnicity, month of birth, birthweight and Special Educational Needs (SEN) status.

- **Characteristics of the young person's family**: mother's and father's employment status, mother's and father's health status, lone parent status, mother's age, and number of older and younger siblings.

These characteristics are based on information collected in Wave 1.

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[6] We use the DCSF definition of engagement in positive activities, whereby the young person is deemed to have participated in a positive activity if, in the last four weeks, they: a) took part in any kind of sport; b) went to the cinema, theatre or a concert; c) played a musical instrument; d) went to a political meeting or march; e) did community work; f) went to a youth club. To this definition, we added young people who reported playing sport at least once a week.

[7] We have also carried out our analysis using family occupational class (measured at Wave 1) instead of socio-economic position. This makes little difference to our findings. Results are available from the authors on request.

Transmission mechanisms

As outlined in Section 2.1 above, we define a set of five channels, or potential *transmission mechanisms*, through which an individual's socio-economic position and other family background measures might be linked to their educational attainment and behavioural outcomes.

These channels are: (i) schools; (ii) neighbourhoods; (iii) parental attitudes and behaviours; (iv) material resources, and (v) young people's attitudes and behaviours. Here, we discuss the measures that we include as part of each transmission mechanism.

(i) School type, composition and quality, plus information on friends

- **School type**: whether school has a sixth form and whether school is a grammar school.

- **School composition**: gender, ethnic, socio-economic and SEN information from the National Pupil Database, averaged across all pupils attending the same school as the young person in Wave 1.

- **School quality**: value-added information from the Schools Census, plus grade from most recent Ofsted inspection.

- **Friends' destinations**: what the young person believes their friends will do at age 16 (reported by the young person in Wave 1).

(ii) Neighbourhood composition and degree of deprivation:

- **Neighbourhood composition**: gender, ethnic and socio-economic information at the local area level, from the National Pupil Database, averaged across all secondary school pupils living in the same neighbourhood as the young person in Wave 1.[8]

- **Neighbourhood deprivation**: Index of Multiple Deprivation score for the young person's neighbourhood in Wave 1.[9]

(iii) Main parent's attitudes and behaviours:

We construct these measures using a number of different questions from the parent questionnaires, mostly from Wave 1.[10] For some factors, we are also able to look at changes between Wave 1 (age 14) and Wave 3 (age 16). Appendix 1 documents the specific questions used in each case.

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[8] We define local neighbourhood as the Super Output Area (SOA) in which you live. SOAs typically contain around 750 households.

[9] The Index of Multiple Deprivation (IMD) is compiled by the Department for Communities and Local Government and makes use of information from seven different domains: income; employment; health and disability; education, skills and training; barriers to housing and services; living environment; and crime (see http://www.neighbourhood.gov.uk/page.asp?id=1057 for more details).

[10] We standardise the response to each question across our sample and then take the average across groups of standardised variables to create a scale.

- **Educational values**: the main parent's beliefs about the value of education.

- **Education aspirations and expectations**: whether the main parent would like their child to stay in full-time education beyond age 16, plus whether they think the young person is likely to go to university.

- **Parent-child education interactions**: whether the main parent talks to the young person about their school reports, plus whether they discussed the young person's Year 10 subject choices.

- **Family-child interactions**: frequency of certain family activities, including having a meal together and going out as a family, plus general information about the main parent's relationship with the young person.

- **Parental involvement in school activities**: whether the main parent attends parents' evenings and gets involved in school activities, e.g. whether they are a member of the parent-teacher association.

(iv)   Material resources:

- Private tuition, plus home computer and internet access (as recorded in Wave 1, plus changes in resource availability between Waves 1 and 3).

(v) Young person's attitudes and behaviours:

These measures are designed to capture a number of aspects of the young person's self-concepts, motivations and behaviours, all of which have been linked to child outcomes (see, for example, Wigfield & Eccles, 2000). These are likely to be influenced by all of the parental, school and neighbourhood factors outlined above, and in turn affect child outcomes.

We construct these measures using a number of different questions from the parent and child questionnaires, mostly from Wave 1.[11] For some factors, we are able to look at changes between Wave 1 (age 14) and Wave 3 (age 16). Appendix 1 documents the specific questions used in each case.

- **Self-concept**: the young person's beliefs about their academic ability, plus measures of economic locus of control (the degree to which the young person believes their actions affect their economic destiny).

- **Education achievement values**: whether the young person enjoys school, and whether or not they find school worthwhile.

- **Education aspirations and expectations**: whether the young person would like to stay in full-time education beyond age 16, plus whether the young person thinks that they will apply to university (and, conditional on applying, whether they think they will be accepted).

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

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[11] We standardise the response to each question across our sample and then take the average across groups of standardised variables to create a scale.

- **Experience of bullying**: whether the young person has been subjected to threats, name calling, physical violence or other forms of bullying.

- **Education behavioural difficulties**[12]: whether the young person has ever played truant (reported by the young person), plus whether the young person has ever been suspended or excluded from school (reported by the young person's main parent).

- **Anti-social behaviour**[13]: whether the young person has ever been involved in graffiti, vandalism, shoplifting or fighting (reported by the young person), plus whether they have ever been in trouble with the police (reported by the young person's main parent).

- **Substance use**[14]: whether the young person is a frequent smoker (defined as smoking more than six cigarettes per week), whether they drink alcohol regularly (at least once a week) and whether they have ever tried cannabis.

- **Teacher-child relations**: various measures of the young person's perception of their teachers' performance, including how they are treated relative to others in their class.

- **Participation in positive and other leisure activities**[15]: whether the young person participates in positive activities, plus whether they read regularly and / or attend religious classes or courses.

More detailed information on the way in which we measure each of these factors – including the way in which scales have been constructed to capture many of these concepts - can be found in Appendix 1.

2.3 Methodology

As discussed above, this report examines the mechanisms through which parents' socio-economic position (SEP) may influence the education and behavioural outcomes of their children. In this section, we set out the methodologies we use to achieve this.

Painting a picture of how rich and poor children differ

We start our analysis by documenting the size of the gaps in education and behavioural outcomes between young people from rich and poor backgrounds that we are trying to explain. We do this using simple graphical analysis in Chapter 3.

Next, we report the extent to which there are differences between young people from rich and poor backgrounds in terms of the potential transmission mechanisms we have highlighted: namely, in terms of the schools they attend, the neighbourhoods in which they live, the attitudes and behaviours held by the young person and their main parent, and the material resources to which they have access for educational purposes. We do this using simple graphical analysis in Chapter 4.

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[12] Note: this factor is not included in our models of behavioural outcomes.
[13] Note: this factor is not included in our models of behavioural outcomes.
[14] Note: this factor is not included in our models of behavioural outcomes.
[15] Note: this factor is not included in our models of behavioural outcomes.

Estimating the model

(i)   A simple regression approach

We then move on to a simple multivariate analysis which links together the factors described in our conceptual model and the education and behavioural outcomes we are seeking to explain. This provides us with a rich picture of the inter-relationships between all of the factors in our model and teenage outcomes. This analysis can be found in Chapter 5.

We use simple regressions of the following form:

$$Y = \alpha + \beta_1 SEP + \beta_2 PED + \beta_3 FAM + \beta_4 SCH + \beta_5 NBHOOD + \beta_6 MPABS + \beta_7 MATRES + \beta_8 YPABS + \varepsilon$$

Where: *Y* represents a young person's outcome of interest;
SEP represents quintiles of parents' socio-economic position;
PED represents mother's and father's highest educational qualifications;
FAM is a set of demographic and other family background characteristics;
SCH is a set of school characteristics;
NBHOOD is a set of neighbourhood characteristics;
MPABS is a set of factors representing the attitudes and behaviours of the young person's main parent (including changes over time);
MATRES represents educational resources to which the young person has access (including changes over time);
YPABS is a set of factors representing the attitudes and behaviours of the young person (including changes over time);
α is a constant term and ε is a normally distributed error term.

The regression method employed is Ordinary Least Squares (OLS) for outcomes that take the form of a continuous variable (e.g. Key Stage test scores, which we standardise to have mean zero and standard deviation one) and probit analysis for dichotomous outcomes (such as whether or not the young person is NEET at age 17, or whether they have engaged in a particular risky behaviour).[16]

In the case of standardised Key Stage test scores, the coefficients from these regression models tell us the number of standard deviations change in a given Key Stage test result associated with a unit's change in each explanatory variable of interest. In the case of dichotomous outcomes, the regression coefficients we report (known as *marginal effects*) tell us the change in the probability of exhibiting a particular behaviour associated with a unit's change in each explanatory variable. The type of regression analysis described above allows us to estimate the *correlation* between certain factors (for example, the young person's attitudes and behaviours) and education and behavioural outcomes, *after taking differences in all other characteristics in our model into account*. This means that the correlations we observe represent the *partial* effects of each of these factors on education and behavioural outcomes.

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[16] In both cases, we cluster the standard errors in our model at sampling unit (school) level, to account for the fact that there may be correlation between the unobserved characteristics of individuals who attend the same school.

Such analysis might allow us to learn, for example, that close family-child interactions at home are strongly positively associated with performance at school, even after taking into account many other aspects of home and school life.

However, regression analysis alone does not necessarily allow us to say whether differences in these factors *cause* the differences in outcomes that we observe, for two main reasons:

- There may be unobserved differences between individuals which are correlated with both outcomes and other factors in the model;

- There may be issues to do with reverse causality.

Here is another example: imagine we find that young people who aspire towards higher education (HE) at age 14 have higher test scores at Key Stage 4 than young people who do not aspire towards HE at age 14. It might be tempting to conclude that driving up aspirations is the key to improving school results.

However, such a policy implication cannot be drawn directly from our results. First, it might be that more inherently able young people tend to both aspire towards HE and do better in exams. If we cannot observe such inherent ability, then the estimated relationship between our measure of aspirations and test scores could in fact be picking up the relationship between ability and test scores. Second, it might also be the case that doing well at school causes a young person to have more positive HE aspirations, not the other way round.[17]

In both cases, this might mean that driving up aspirations could make no difference at all to GCSE results, or to later HE attendance.

In an attempt to make more robust policy conclusions, Chapter 7 uses some alternative econometric techniques to try to establish whether some of the relationships we observe from our regression analysis can be regarded as causal.

These are described in (iii) below.

Before this, we discuss the final stage of our regression analysis, which focuses on the routes through which socio-economic position is related to education and behavioural outcomes.

(ii)   A "pathways" analysis

In the final stage of our regression analysis, we look more closely at the links between socio-economic disadvantage and teenage outcomes using a simple "pathways analysis", related to the model we set out in Section 2.1.

This analysis is designed to highlight the extent to which the socio-economic gaps in education and behavioural outcomes might be explained by each of the different transmission mechanisms (pathways) we set out - namely schools, neighbourhoods, the attitudes and behaviours of the main parent, material resources, and the attitudes and behaviours of the young person. We present the results of this analysis in Chapter 6.

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[17] The fact that, in this case, we measure test scores at ages 14 and 16, collected after the question on HE aspirations was asked, does not eliminate the issue of reverse causality. This is because both aspirations and achievement may be formed cumulatively over a child's lifetime, that is, influenced by past aspirations, achievement and unobserved factors.

It should be noted that making firm policy conclusions on the basis of this pathways analysis alone is difficult for the same reasons (i.e. unobserved variables and reverse causation) as discussed in (i) above.

Our starting point is the 'raw' socio-economic gaps in education and behavioural outcomes that are shown graphically in Chapter 3. These can also be estimated using regressions of the following type, in which β_1 represents the magnitude of the socio-economic gap in a particular outcome of interest (Y):

(1) $Y = \alpha + \beta_1 SEP + \varepsilon$

These socio-economic gaps (represented by β_1) are the main object of interest in our analysis: throughout, β_1 reflects the *direct* effect of socio-economic position on education and behavioural outcomes.

We then move on to consider how these socio-economic gaps are reduced when we add in successive sets of explanatory variables: the extent to which β_1 is reduced represents the extent to which socio-economic position influences education and behavioural outcomes *indirectly* through its relationship with other factors.

Our starting point is the other measures of family background, including parental education, set out in our conceptual model (Section 2.1), which we first add to our model, as shown below:

(2) $Y = \alpha + \beta_1 SEP + \beta_2 PED + \beta_3 FAM + \varepsilon$

Note that the reduction in β_1 achieved by moving from equation (1) to equation (2) informs us about the extent to which the effects of parental socio-economic position on a given outcome can be explained by differences in other family background characteristics. Of particular interest is the extent to which the formal education of parents can explain the differences in outcomes between rich and poor children.

The socio-economic gaps estimated using equation (2) form the base from which we compare the extent to which each of our potential transmission mechanisms helps to explain socio-economic differences in education and behavioural outcomes.

To estimate the extent to which socio-economic position affects outcomes *indirectly* through its influence on these other factors, we successively add in groups of variables (representing our potential transmission mechanisms) to equation (2), and observe by how much β_1 is reduced through the addition of these variables.

The basic intuition behind this approach is as follows: a reduction in the magnitude of β_1 that comes about as a result of the inclusion of a new group of variables in the model suggests that these variables may plausibly represent a *transmission mechanism* through which socio-economic position affects teenage outcomes. This is because if young people with similar values of such variables are compared, the direct socio-economic gap is reduced.[18]

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[18] It should be remembered that each group of factors that we add to our model is likely to be correlated with other, as yet omitted, groups of factors (for example, school composition, which we add first, is likely to be correlated with neighbourhood composition, which we add second), so the relative reductions of β_1 induced by adding each group of factors separately should be thought of as indicative of the underlying relationships, rather than causal.

We start by adding in variables relating to school composition and quality, and observe the extent to which β_1 falls through the addition of this set of variables, as shown below:

$$(3) \quad Y = \alpha + \beta_1 SEP + \beta_2 PED + \beta_3 FAM + \beta_4 SCH + \varepsilon$$

Thereafter, we repeat the same process for neighbourhood composition (4), the attitudes and behaviours of the main parent (including changes over time between ages 14 and 16) (5) and material resources (again including changes over time) (6), as shown below:

$$(4) \quad Y = \alpha + \beta_1 SEP + \beta_2 PED + \beta_3 FAM + \beta_5 NBHOOD + \varepsilon$$

$$(5) \quad Y = \alpha + \beta_1 SEP + \beta_2 PED + \beta_3 FAM + \beta_6 MPABS + \varepsilon$$

$$(6) \quad Y = \alpha + \beta_1 SEP + \beta_2 PED + \beta_3 FAM + \beta_7 MATRES + \varepsilon$$

The final group of variables we consider capture the young person's own attitudes and behaviours (including changes over time between ages 14 and 16). In our conceptual model (Section 2.1), we allow these both to be shaped by the other transmission mechanisms already considered (schools, neighbourhoods, parental attitudes and behaviours, and material resources), and in turn to directly affect child outcomes. For this pathways analysis, we simply add them to the model as follows:

$$(7) \quad Y = \alpha + \beta_1 SEP + \beta_2 PED + \beta_3 FAM + \beta_8 YPABS + \varepsilon$$

Finally, we consider the magnitude of the socio-economic gap in outcomes (represented by β_1) when we estimate the full model, which includes all of the factors of interest together, as shown below:

$$(8) \quad Y = \alpha + \beta_1 SEP + \beta_2 PED + \beta_3 FAM + \beta_4 SCH + \beta_5 NBHOOD + \beta_6 MPABS + \beta_7 MATRES + \beta_8 YPABS + \varepsilon$$

The magnitude of β_1 after adding in all other factors to our model provides us with an estimate of the gap in outcomes between teenagers from rich and poor families which is not explained by the transmission mechanisms we have explored. (Note that this final specification set out in equation (8) is the same model as we estimated for our initial regression analysis described in (ii) above, the results of which are shown in Chapter 5).

(iii)   Other methodologies we use

The regression models on which we base our main analysis (set out in (i) and (ii) above) explore the statistical relationships between teenage outcomes and individual, family, school and neighbourhood characteristics. As already discussed, there are a number of reasons - related to the possibilities of unobserved factors and reverse causality - why these relationships may not represent the causal impact of these characteristics on teenage outcomes.

To try to combat these issues, we make use of a number of different econometric techniques:

- First difference models (taking changes over time in both characteristics and outcomes);
- Instrumental variables (IV) methods;
- Control function methods.

We cannot use these methods in a fully comprehensive way to estimate the causal impact of every factor of interest in our model. Instead we have selectively employed these methods in specific instances where it has been possible to do so.

Here, we outline the main application of these methods in this report. We discuss the findings from each of these applications in Chapter 7.

First, we have used a first difference model to try to identify the causal impact of peer group characteristics on children's educational attainment and behavioural outcomes: instead of linking peer group characteristics (for example, the ethnic composition of a young person's school) at a point in time to teenage outcomes at that time (or shortly afterwards), we assess the links between *changes* in peer group characteristics and *changes* in outcomes.

This strategy is valid if the unobserved factors that might confound the analysis are stable over time. Under this assumption, focusing on changes in outcomes and comparing them with changes in peer group composition will strip out the confounding influence of any unobserved factors, giving us the causal impact of peer group characteristics on child outcomes.[19]

Second, we have used instrumental variables (IV) analysis in two different applications, namely to further investigate the influence of peer groups on teenage outcomes, and to attempt to recover the causal impact of maternal education on various education and behavioural outcomes.

The IV method is a common one used in empirical economics, to circumvent the problem of 'endogeneity' due to confounding unobserved factors or reverse causation. The IV method exploits sources of variation in explanatory variables of interest that we believe are not likely to be correlated with any of the unobserved characteristics that we are worried about. Such sources, known as instruments, could arise if there is an external event - such as a policy change - that causes some variation in characteristics over which an individual has no control. By isolating the variation in characteristics (here, peer groups, attitudes or parental education) that arises as a result of the instrument and relating these differences to young people's outcomes, we can obtain estimates that are more likely to reflect the causal impact of those characteristics on outcomes.

Finally, the control function method is used as an additional strategy for identifying the causal impact of parental education on child outcomes. It is similar to the IV method in that it relies on the availability of an appropriate instrument. However, one risk when using a policy change as an instrument for a particular characteristic is that the estimated effect can be regarded as the causal impact of that characteristic only

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[19] Note that in future analysis, we are hoping to apply a similar methodology to changes over time in the attitudes, behaviours and beliefs of the young person and their main parent. Unfortunately, it was not possible for us to carry out this analysis during the timeframe of this project.

for those who were affected by the reform. If these individuals are not representative of the wider population, then the causal impact (while valid for this group) may not be applicable more generally.[20]

The control function avoids this problem by running regression models similar to those used in our main analysis, but with additional terms designed to capture the influence of unobserved factors. By controlling for the unobserved characteristics in this way, the estimated impact of observed characteristics is more likely to be causal.[21]

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[20] See Imbens & Angrist (1994) for a discussion of this issue.
[21] More details on the implementation and interpretation of IV and control function approaches can be found in Blundell et al. (2005) and Blundell & Costa-Dias (2008).

3. How do young people differ according to their parents' socio-economic position? Differences in child outcomes

Summary of Chapter 3

This chapter sets the scene for our analysis by documenting the size of the gaps in education and behavioural outcomes that have emerged between young people from different socio-economic backgrounds by ages 14 and 16.

We find very large differences between children from rich and poor backgrounds in terms of:

- **Attainment at Key Stages 3 and 4**: for example, only one in five of the poorest fifth of our sample attain five or more GCSEs at grades A* to C including English and Maths, compared to almost three quarters of the richest fifth.

- The probability of being **'Not in Education Employment or Training' (NEET) at age 17**: for example, around 15% of individuals from the poorest fifth of our sample are NEET at age 17 compared with just 2% of individuals from the richest fifth.

- **Behavioural outcomes at ages 14 and 16** such as smoking, cannabis use, truancy and anti-social behaviour (including fighting, shoplifting, vandalism): for example, around 24% of teenagers from the poorest fifth of our sample report playing truant at age 14 compared with 8% of the richest fifth.

This chapter sets the scene for our analysis by documenting the size of the gaps in education and behavioural outcomes that have emerged between young people from different socio-economic backgrounds by the ages of 14 and 16.

The outcomes we consider are those set out in Chapter 2, namely:

- *Education outcomes*: Key Stage 3 and 4 test scores, plus whether the young person is not in education, employment or training (NEET) at age 17;

- *Behavioural outcomes*: smoking, alcohol and cannabis use; truancy; involvement in anti-social behaviour, and participation in positive activities (age 14 only).

We use simple graphical analysis to document these differences. To do so, we divide our sample into five equally sized groups (quintiles) ranked according to socio-economic position (SEP), and then plot the average outcome for each group. Figures 3.1 and 3.2 show these differences for outcomes at ages 14 and 16/17 respectively. We discuss differences in education outcomes first, before moving on to consider differences in behavioural outcomes in the latter part of this chapter.

Figure 3.1   Socio-economic gradients in outcomes at age 14
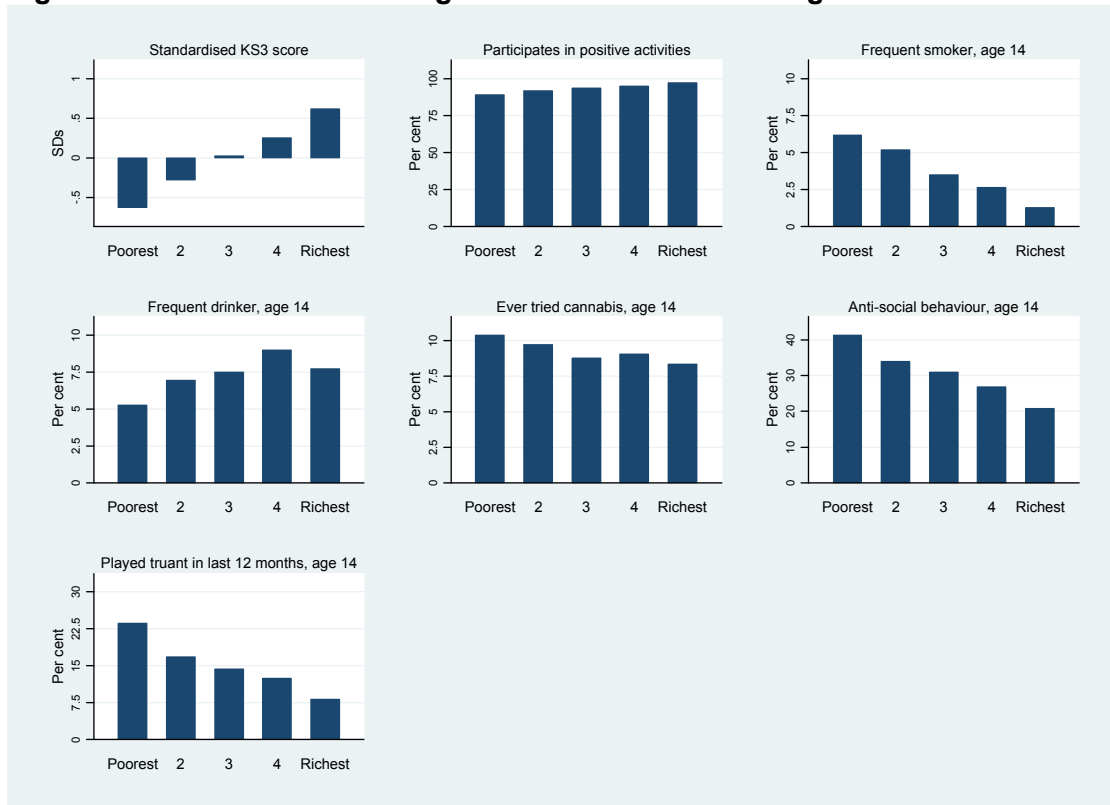
Notes: details of the figures underlying these graphs can be found in Table A2.1 of Appendix 2.

Figure 3.2   Socio-economic gradients in outcomes at age 16/17
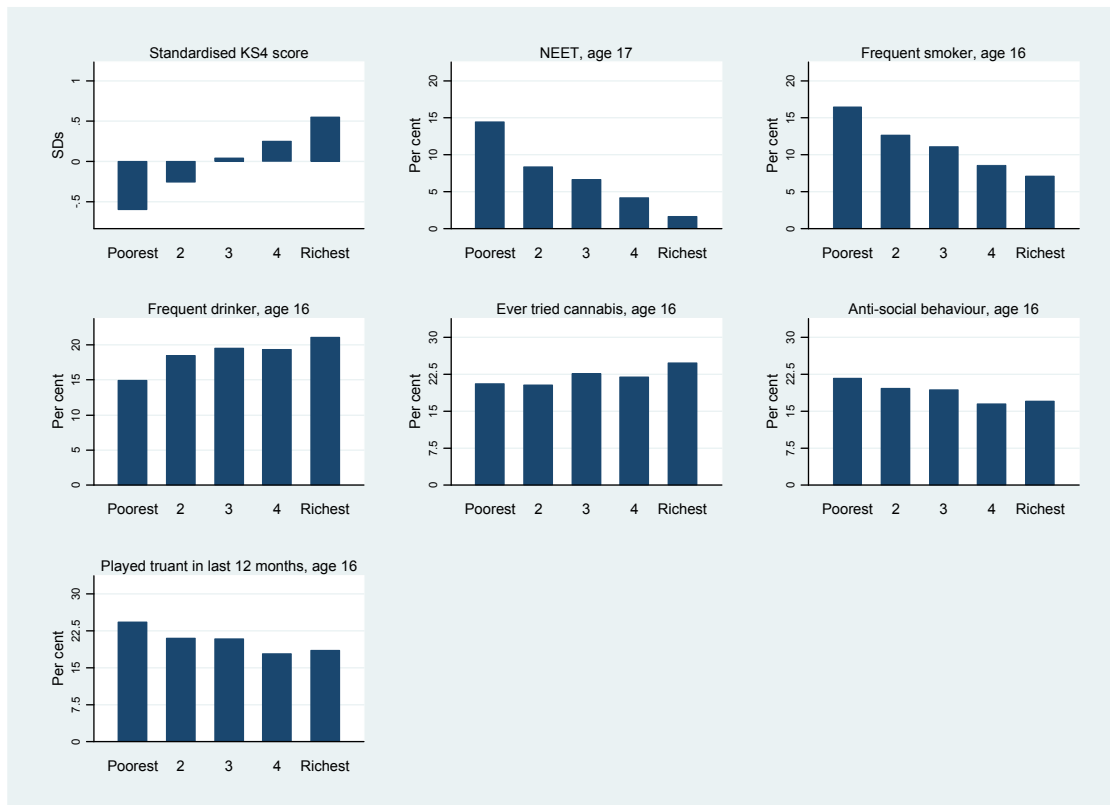
Notes: details of the figures underlying these graphs can be found in Table A2.1 of Appendix 2.

Education outcomes

There are very stark differences in education outcomes between children from different socio-economic backgrounds. For example, young people from the poorest fifth of our sample score more than half a standard deviation below average at both Key Stage 3 and Key Stage 4, young people from the middle fifth perform around the average, while young people from the richest fifth of our sample score more than half a standard deviation above average in these tests. This is shown in the top left-hand graphs in Figures 3.1 and 3.2.

To aid interpretation, we have translated these standardised gaps into a number of different measures of educational attainment, including a percentile ranking in the distribution of Key Stage 3 and 4 test scores, the proportion of young people achieving some well-defined benchmarks, and GCSE points. These are shown in Table 3.1.

Table 3.1   Education outcomes, by SEP quintile

	Average outcome by SEP quintile					Gaps between quintiles	
	Poorest	2	Middle	4	Richest	Richest-poorest	Middle-poorest
Key Stage 3 (age 14)							
Standardised score	-0.62	-0.28	0.03	0.26	0.62	1.24	0.65
Percentile	33	42	51	58	69	36	18
% reaching expected level	51.9%	66.1%	77.4%	84.7%	92.7%	40.8ppts	25.5ppts
Key Stage 4 (age 16)							
Standardised score	-0.60	-0.25	0.04	0.25	0.55	1.15	0.64
Percentile	34	43	51	58	67	33	17
GCSE point score	281	334	380	413	460	179	80
% attaining 5 or more GCSEs Grades A* to C	33.2%	46.4%	59.3%	70.6%	84.0%	50.8ppts	26.1ppts
% attaining 5 or more GCSEs Grades A* to C including English and Maths	21.4%	33.6%	46.4%	57.9%	74.3%	52.8ppts	24.9ppts

For example, we find that:

- The poorest fifth of our sample is to be found, on average, at the 33rd percentile of the distribution of Key Stage 3 scores, while the richest fifth is to be found, on average, at the 69th percentile. These differences are of similar magnitude at Key Stage 4.

- Just over half of young people in the lowest SEP quintile achieve the expected level (Level 5) at Key Stage 3, compared to just over three quarters in the middle quintile and over 90% in the top SEP quintile (a gap of over 40 percentage points between top and bottom).

- Only one in five of the poorest fifth of our sample attain five or more GCSEs at grades A* to C including English and Maths, compared to almost three quarters of the richest fifth (a gap of over 50 percentage points).

- Students in the bottom SEP group score, on average, 281 points at Key Stage 4 (roughly equivalent to 8 GCSEs at Grade D), compared with 380 points amongst students in the middle SEP group (roughly equivalent to 8 GCSEs at Grade B) and 460 points amongst students in the top SEP group (roughly equivalent to 8 GCSEs at Grade A*), a gap of 179 points between students in the top and bottom SEP groups.

Underlying these calculations is the fact that 1 standard deviation in Key Stage 4 scores is equivalent to 155 GCSE points. (Appendix 3 shows how GCSE points can be translated into GCSE grades and Key Stage 4 standardised scores.)

These differences in attainment are also reflected in post-compulsory schooling outcomes. Specifically, we consider the proportion of young people who are recorded as not in education, employment or training (NEET) at age 17 (shown in the top middle graph of Figure 3.2). We find that 14.5% of individuals from the poorest fifth of our sample are NEET at age 17 compared with just 1.7% of individuals from the richest fifth (a difference of 12.8 percentage points).

Behavioural outcomes

There are also some striking socio-economic differences in behavioural outcomes at ages 14 and 16:

- Young people from poor families are much more likely to report smoking frequently than young people from better off families at both ages 14 and age 16. At age 14, around 6% of young people from the poorest fifth of our sample report smoking frequently compared with around 1% of young people from the richest fifth (a gap of around 5 percentage points) (see top right graph of Figure 3.1).

  By age 16, more children from all SEP quintiles report smoking frequently, with just under 17% of young people from the bottom SEP quintile now reporting smoking frequently, compared with around 7% of young people from the top SEP quintile (see top right graph of Figure 3.2).

- By contrast, the likelihood of frequent drinking is *positively* associated with socio-economic position. For example, 8% of teenagers from the richest families are frequent drinkers by age 14, rising to 21% by age 16. The corresponding figure for teenagers from the poorest families is 5% by age 14, rising to 15% by age 16 (see middle left graphs of Figures 3.1 and 3.2).

- Interestingly, while teenagers from the poorest backgrounds are slightly more likely to report having tried cannabis by age 14 than teenagers from the richest backgrounds (10% in the bottom SEP quintile compared to 8% in the top SEP quintile), by age 16, this relationship has reversed, with young people from richer backgrounds now more likely to report having tried cannabis than young people from poorer backgrounds (20% in the bottom SEP quintile compared to 24% in the top SEP quintile) (see central graphs in Figures 3.1 and 3.2).

- Young people from poorer families are significantly more likely to play truant than young people from richer families at both age 14 and age 16. For example, around 24% of teenagers from the bottom SEP quintile report playing truant at age 14 compared with 8% of the top SEP quintile (a gap of 15 percentage points) (see bottom left graph of Figure 3.1).

   By age 16, truancy rates amongst young people from better off backgrounds appear to have risen (to around 19%), while reported truancy rates amongst young people from the poorest backgrounds remain fairly constant. This means that the gap between richest and poorest in terms of truancy rates narrows somewhat over time (see bottom left graph of Figure 3.2).

- A large minority of young people from the poorest SEP quintile report engaging in some form of anti-social behaviour at age 14 (41%), compared with a much smaller fraction of young people from the richest SEP quintile (21%) (a gap of 20 percentage points). The incidence of such behaviours appears to have fallen across the board by age 16, with the gap between richest and poorest also narrowing considerably (to just under 5 percentage points) (see middle right graphs in Figures 3.1 and 3.2).

- Finally, the vast majority of teenagers report participating in positive activities at age 14, although those from the poorest families are slightly less likely to do so (89%) than those from the richest families (98%) (see top middle graph of Figure 3.1).

To recap, this chapter has shown some pronounced differences in education and behavioural outcomes between teenagers from different socio-economic backgrounds at ages 14 and 16. We return to these gaps in Chapter 6, when we try to understand which characteristics of the young person, their family, and their school and neighbourhood environments, might be driving the differences in outcomes that we observe.

Before that, the next chapter shows how these different characteristics (which we refer to as possible transmission mechanisms) vary by socio-economic position.

4.   How do young people differ according to their parents' socio-economic position? Differences in transmission mechanisms

Summary of Chapter 4

This chapter highlights some large socio-economic differences across a wide range of factors which may help to explain why children from poor families tend to perform more poorly at school and are more likely to engage in a range of risky behaviours than children from richer families.

In particular, we have shown that young people from poorer backgrounds, *on average*:

- Have lower educated parents than children from richer backgrounds, and are more likely to grow up in a lone parent household;

- Go to schools of lower quality, with more children from poor and ethnic minority backgrounds, and live in poorer neighbourhoods than richer children;

- Have parents whose educational aspirations for their child are, on average, lower than the educational aspirations of better-off parents, engage less in both school and family life, and divert fewer material resources towards education in the home;

- Are typically less likely to think that they are good at school, find school worthwhile and enjoy school than young people from richer backgrounds (although the large majority of young people from all socio-economic groups are positive about these aspects of schooling).

- They also have somewhat lower aspirations and expectations for their own future education, less positive relations with their teachers, and lower participation in positive activities, such as sport or reading.

In the last chapter we described some of the gaps in education and behavioural outcomes that exist between young people from different socio-economic backgrounds. We now start to explore some of the possible reasons for these gaps, by examining how young people from different socio-economic backgrounds differ in other ways as well.

The conceptual model outlined in Chapter 2 set out a number of possible routes through which socio-economic position (SEP) might affect education and behavioural outcomes (other than directly through income). These factors included demographic and other family background characteristics, schools, neighbourhoods, the attitudes and behaviours of the main parent, material resources, and the attitudes and behaviours of the young person.

In this chapter, we paint a detailed picture of how young people differ in these factors according to their socio-economic background, using simple graphical analysis similar to that adopted in Chapter 3.[22]

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[22] Tables setting out the mean values of all of the variables in our models by socio-economic quintile can be found in Appendix 2.

Family background

Figure 4.1 documents some of the differences between young people from different socio-economic backgrounds in terms of a range of demographic and family background characteristics.

Figure 4.1   Socio-economic gradients in parental education, and other family background and demographic characteristics
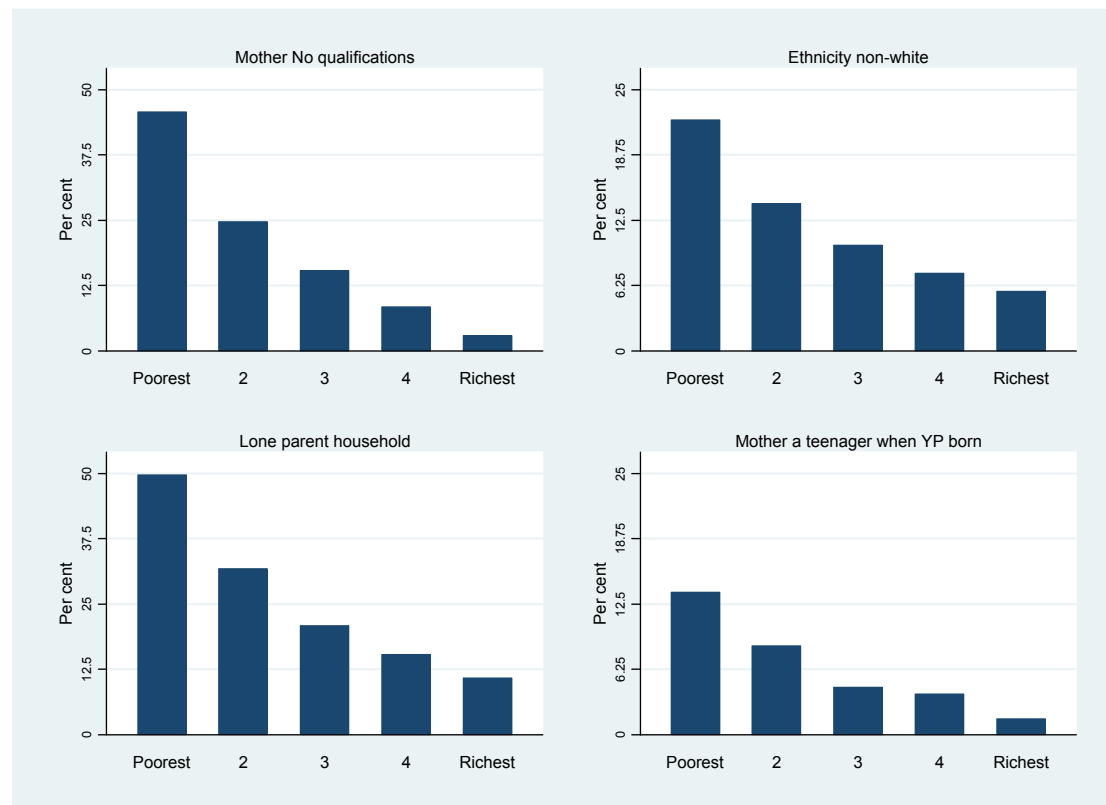
Notes: details of the figures underlying these graphs can be found in Table A2.2 of Appendix 2.

Figure 4.1 reveals that:

- Young people from poor families are much more likely to have parents with no or low educational qualifications than young people from richer families. For example, 45% of the mothers of young people in the poorest fifth of our sample have no educational qualifications, compared to just 3% of those from the richest fifth of our sample.

- There are relatively more ethnic minorities amongst the poorest families in our sample. For example, around 22% of the lowest SEP group are from a non-white ethnic background, compared to around 6% of the highest SEP group.

- Family structure also differs substantially between the richest and poorest families in our sample. For example, as many as half of all young people from the poorest fifth of our sample live in lone parent households (at the age of 14), compared to just one in ten of the richest fifth of our sample.

- Similarly, around 13% of the lowest SEP group were born to a teenage mother, compared to less than 2% of the richest SEP group.

Schools, neighbourhoods and peers

Figure 4.2 shows the relationship between socio-economic position and selected school, neighbourhood and peer characteristics (measured at age 14).

Figure 4.2   Socio-economic gradients in neighbourhood, school and peer characteristics
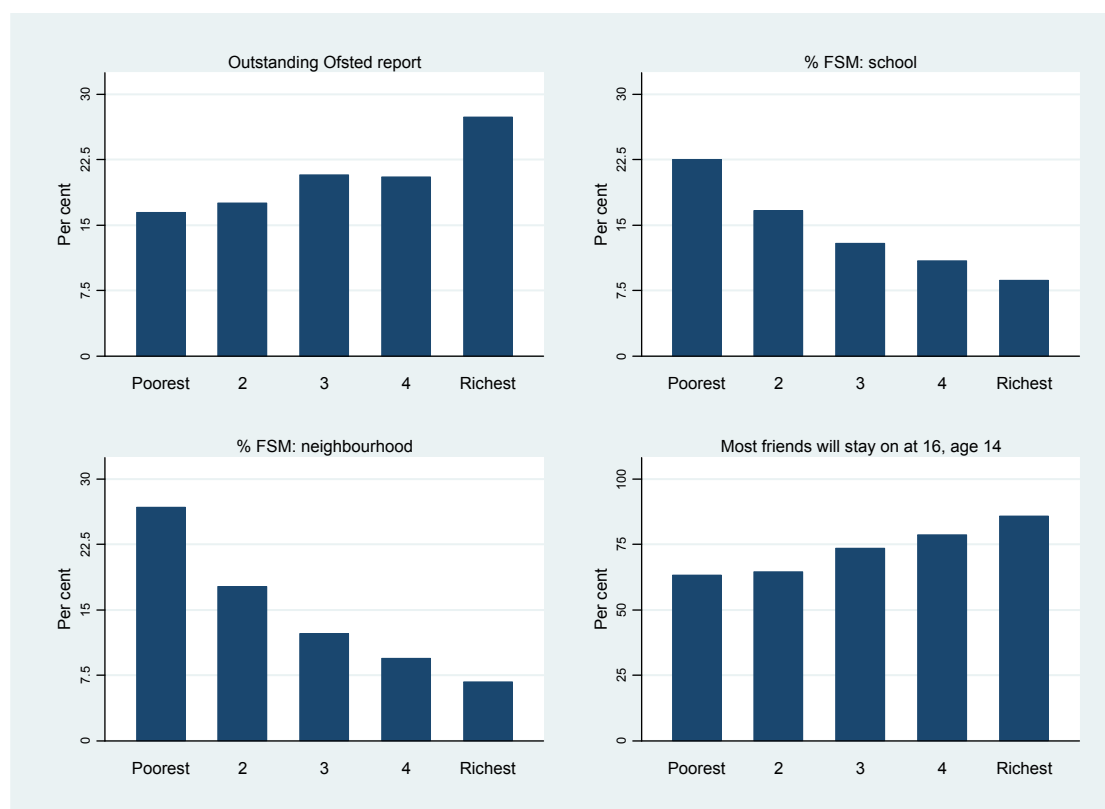
Notes: details of the figures underlying these graphs can be found in Table A2.3 of Appendix 2.

Figure 4.2 shows that:

- Young people from the poorest socio-economic backgrounds tend to attend schools of lower 'quality' than young people from better off backgrounds. For example, 16% of teenagers from the poorest fifth of our sample attend schools whose last Ofsted inspection rated them 'outstanding', compared with 21% of teenagers from the middle fifth of our sample and 27% of teenagers from the richest fifth.

- Furthermore, teenagers from the poorest socio-economic backgrounds are more likely to attend schools and live in neighbourhoods with greater concentrations of poor children (as measured by the percentage of children claiming Free School Meals in their school, and in their very local neighbourhood) than teenagers from the richest socio-economic backgrounds. On average, teenagers from the bottom SEP quintile attend schools in which 23% of pupils claim Free School Meals (FSM) and live in neighbourhoods in which 27% of secondary school pupils claim FSM, while teenagers from the top SEP quintile attend schools in which 9% of pupils claim FSM and live in neighbourhoods in which 7% of secondary school pupils claim FSM.

- Interestingly, teenagers from the poorest backgrounds are less likely to believe that their friends will stay in full time education beyond age 16 than young people from richer backgrounds. For example, the poorest fifth of our sample are, on average, 23 percentage points less likely to believe that their friends will stay on than teenagers from the richest fifth of our sample. These beliefs are strongly positively correlated with whether the young person thinks that they will stay in full-time education themselves (see Figure 4.5 below).

Parents' attitudes and behaviours

Figure 4.3 illustrates the relationship between socio-economic position and some of the main parent's attitudes and behaviours.

Figure 4.3   Socio-economic gradients in the main parent's attitudes and behaviours

Notes: details of the figures underlying these graphs can be found in Table A2.4 of Appendix 2.

Figure 4.3 shows that:

- There are strong socio-economic gradients in parents' educational aspirations for their child (recorded at age 14). For example, 76% of parents in the bottom SEP quintile would like their child to stay in full-time education beyond age 16 compared with 91% of parents in the top SEP quintile. Similarly, 53% of parents in the bottom SEP quintile think it likely that their child will go to university compared with 81% of parents in the top SEP quintile. (Note that this means that more parents in all socio-economic groups want their children to progress to post-compulsory schooling and expect them to go on to higher education than will ultimately do so.)

This gap in parents' aspirations for their child's education grows quite considerably between the ages of 14 and 16. For example, 28% of parents from the poorest families stop wanting their child to stay in full-time education between ages 14 and 16, compared with just 10% of parents from the richest families, a difference of 18 percentage points.

- While a large majority of parents are involved in their child's educational life, parents from the poorest families appear to be somewhat less involved than parents from the richest families. In particular, parents from the lowest SEP quintile are 14 percentage points (99%-85%) less likely to have talked to the young person about their Year 10 subject choices than parents from the highest SEP quintile, and 19 percentage points (98%-79%) less likely to have attended a parents' evening at their child's school in the previous 12 months.

- There are also some important differences in the nature of family interactions at home between young people from rich and poor backgrounds. For example, parents from the poorest fifth of our sample are slightly more likely to report arguing frequently with their child than parents from the richest fifth of our sample. The prevalence of frequent arguing is higher amongst all families at age 14 compared to age 16.

Material resources devoted to education

Figure 4.4 highlights the relationship between socio-economic position and educational material resources, focusing on the provision of private tuition, plus home computer and internet access.

Figure 4.4   Socio-economic gradients in material resources at age 14, and changes between 14 and 16
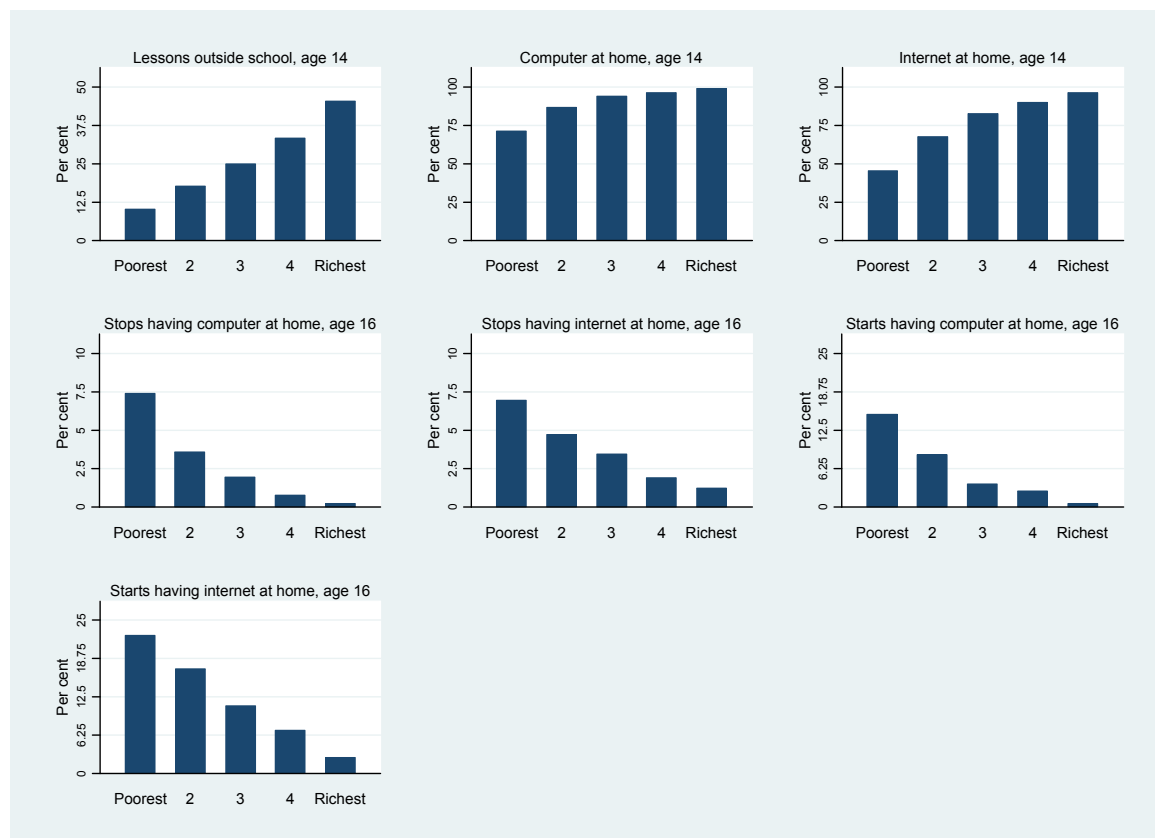
Notes: details of the figures underlying these graphs can be found in Table A2.4 of Appendix 2.

Figure 4.4 reveals that:

- As we might expect, there are very strong relationships between socio-economic position and material resources available at age 14. For example, teenagers from the poorest families in our sample are, on average, 35 percentage points (45%-10%) less likely to have lessons outside school, 28 percentage points (99%-71%) less likely to have a computer at home and 51 percentage points (97%-46%) less likely to have internet access at home than teenagers from the richest families in our sample.

- It is also clear that there is somewhat less stability in the provision of these educational resources amongst the poorest households over time: they are both more likely to gain and more likely to lose computer and internet access between ages 14 and 16 than richer households.

Young people's attitudes and behaviours

Finally, Figures 4.5 and 4.6 illustrate the socio-economic gradients in young people's attitudes and behaviours. Figure 4.5 focuses on those recorded at age 14, while Figure 4.6 highlights changes between ages 14 and 16.

Figure 4.5   Socio-economic gradients in the young person's attitudes, expectations and behaviours at age 14

Notes: details of the figures underlying these graphs can be found in Table A2.5 of Appendix 2.
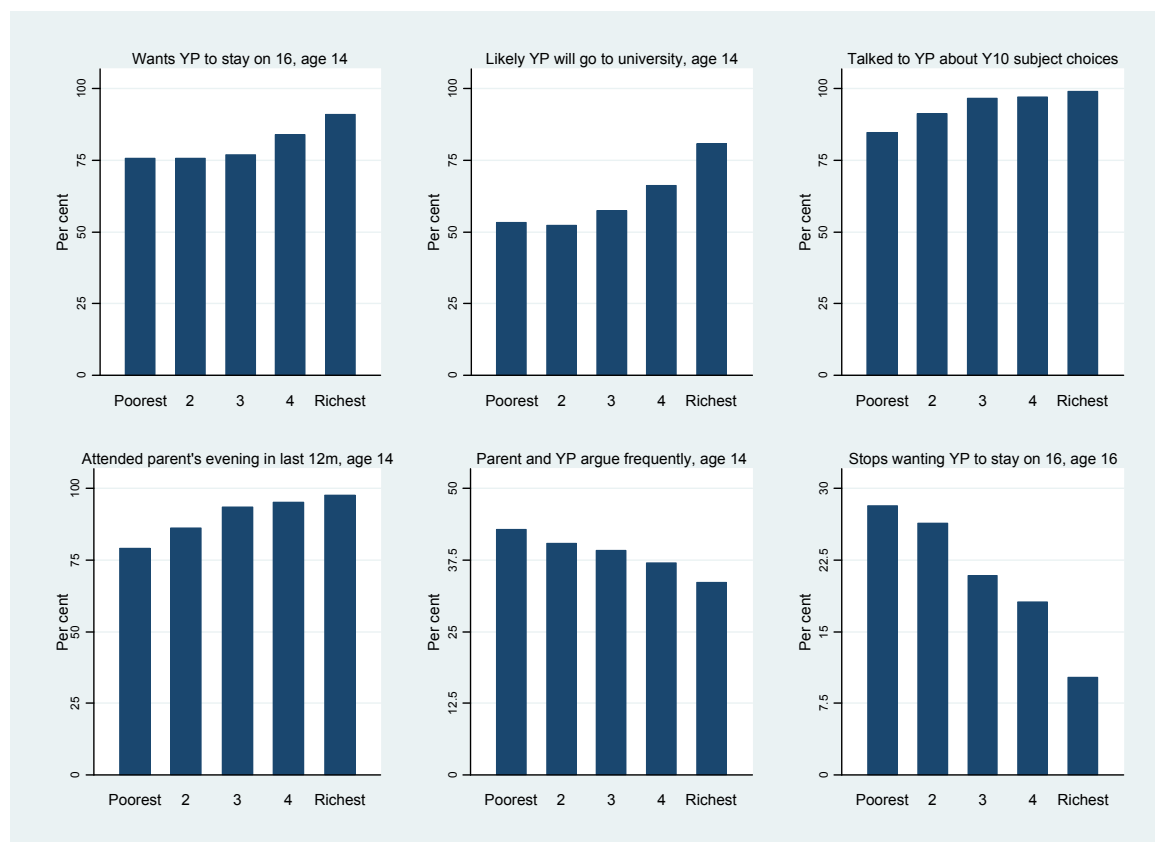
Figure 4.5 shows that:

- Most young people report that they like school and think it is worthwhile, although there are some differences by socio-economic position: young people from the poorest families are around 6 percentage points (89%-84%) less likely to feel happy at school and around 9 percentage points (89%-80%) less likely to find school valuable than young people from the richest families.

- There are also some small socio-economic gaps in young people's self-concept - that is, beliefs about their academic ability, plus the degree to which they believe that their actions affect their economic destiny. Specifically, young people from the bottom SEP quintile are around 4 percentage points (95%-91%) less likely to think that they get good marks for their work, and have a score slightly below average in terms of economic locus of control (suggesting that they believe they are less in control of their economic destiny than young people from richer backgrounds).

  However, it should be noted that it does not appear that poor children necessarily under-estimate how well they do at school. Once we take test scores at Key Stage 2 into account, young people from poor backgrounds are typically *more* likely to think that they are good at school than young people from better off backgrounds. (This is not shown in these Figures.)

- There are more marked socio-economic differences in terms of the expectations that young people hold about their future education: teenagers from the poorest families are 10 percentage points (66%-56%) less likely to want to stay in full-time education beyond age 16 and 28 percentage points (77%-49%) less likely to say that they are likely to apply to university (and likely to get in) than teenagers from the richest families. It should be noted that many more children (and parents) at both ages 14 and 16 from *all* socio-economic backgrounds think that they will stay on at 16 and apply to university than ultimately do so.

- There is also a strong negative relationship between socio-economic position and the likelihood of being frequently bullied at age 14: young people from the poorest fifth of our sample are, on average, around 6 percentage points (16%-10%) more likely to report being frequently bullied than young people from the richest fifth of our sample.

Figure 4.6 shows the relationship between socio-economic position and *changes* in the young person's attitudes and behaviours between age 14 and age 16.

Figure 4.6 shows that:

- Between age 14 and age 16, young people (on average) tend to become more negative about their own ability and their future educational aspirations; they also engage more frequently in a range of risky behaviours (see Table A2.6 in Appendix 2). (This decline in attitudes over time has also been documented in other studies - see, for example, Wigfield & Eccles, 2000). However, these changes are larger among children from the poorest socio-economic backgrounds: for example, 11% of young people in the bottom SEP quintile stop feeling happy at school between age 14 and 16 compared with 7% of young people in the top SEP quintile; similarly, 19% of the poorest children stop thinking it likely that they will apply to university (and get in)

compared to 10% of the richest children. (Changes in attitudes in a positive direction, not shown in Figure 4.6, are generally less widespread, and also less socially graded).

- On a somewhat more positive note, children from the poorest backgrounds are much more likely to have stopped being frequently bullied between age 14 and 16 than children from the richest backgrounds (albeit from a much higher base - see Figure 4.5 above).

Figure 4.6   Socio-economic gradients in changes in the young person's attitudes and behaviours between 14 and 16

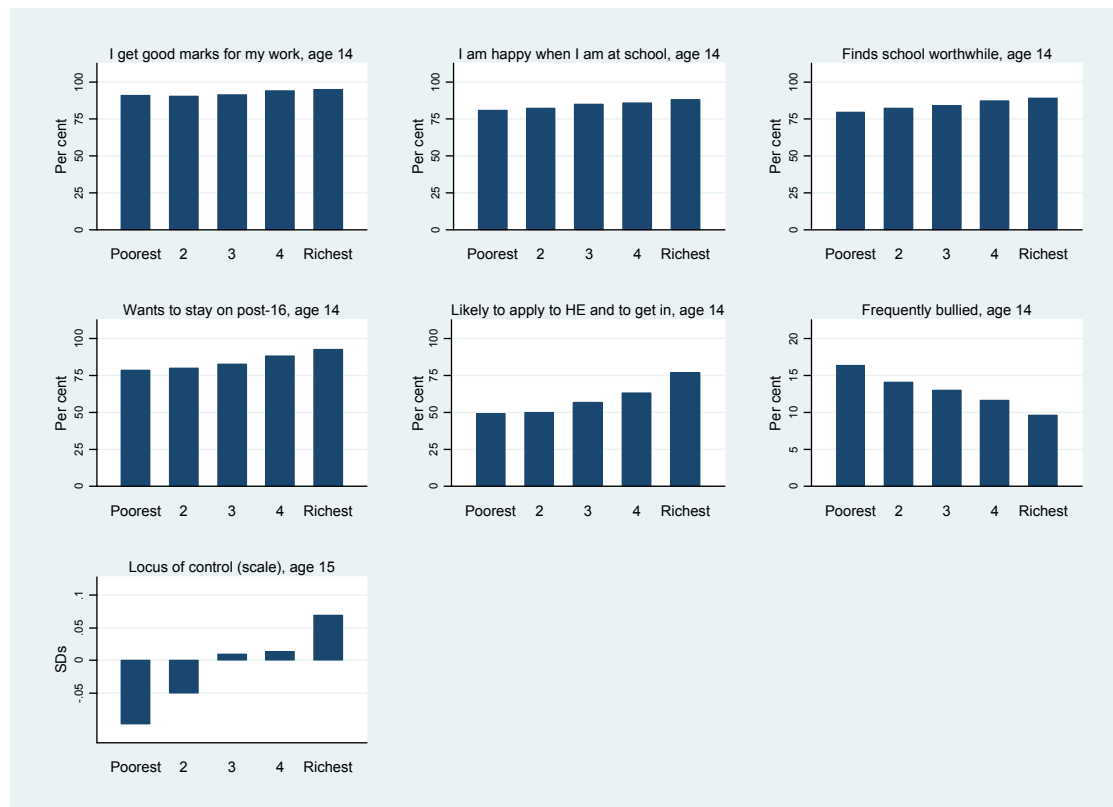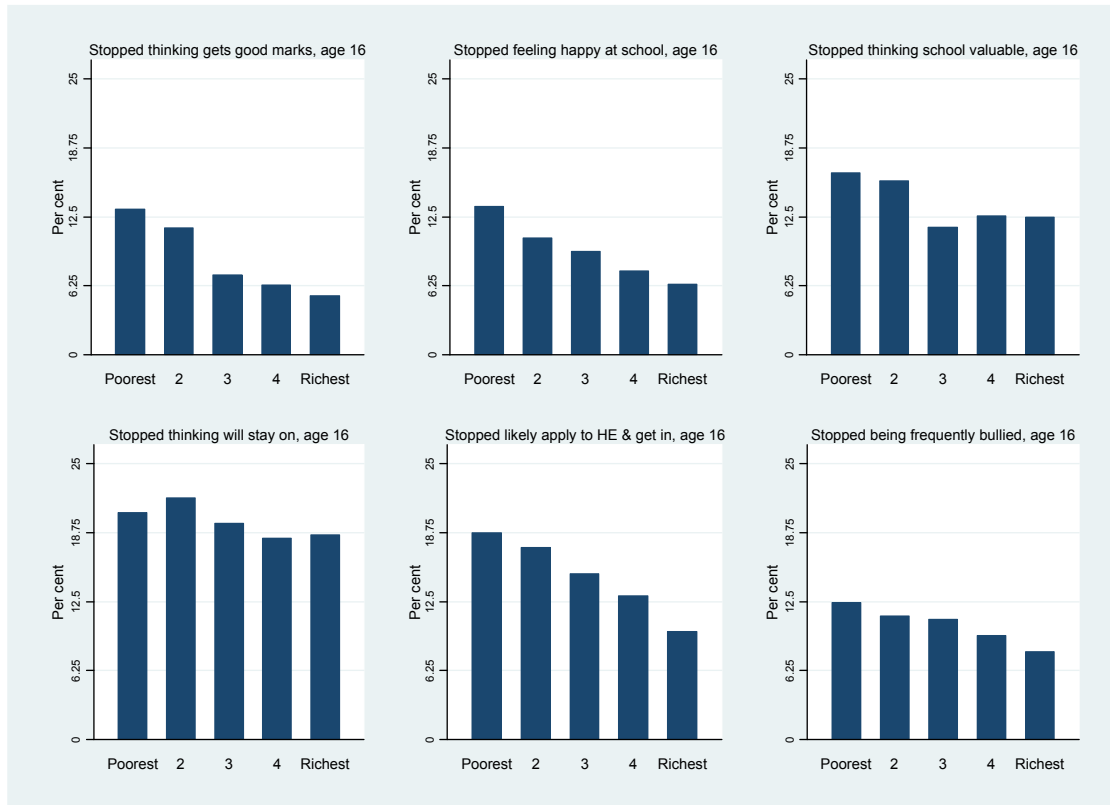Notes: details of the figures underlying these graphs can be found in Table A2.6 of Appendix 2.

To conclude, the results discussed in this chapter have highlighted some large and significant socio-economic differences across a wide range of factors which may help to explain why children from poor families tend to perform more poorly at school and are more likely to engage in a range of risky behaviours than children from richer families. In the next chapter, we consider how these factors are related to children's education and behavioural outcomes.

5. Explaining teenage education and behavioural outcomes

Summary of Chapter 5

This chapter describes in detail the wide range of factors that contribute to young people's education and behavioural outcomes at age 16.

The factors we identify as being of particular importance are:

- **Parental education**: young people whose parents have high educational qualifications tend to perform better at Key Stage 4 than young people whose parents have low or no educational qualifications. However, the gains to having a more educated parent appear to have already been fully captured by age 14, since there is no advantage to having a highly educated mother or father in terms of progress between Key Stage 3 and Key Stage 4.

- **School quality**: young people who attend grammar schools or schools that have been graded 'outstanding' in their most recent Ofsted inspection tend to have higher Key Stage 4 scores than young people who do not attend such schools.

- **Neighbourhood deprivation**: young people who live in deprived neighbourhoods are more likely to be not in education, employment or training (NEET) at age 17 than young people who live in less deprived neighbourhoods, even after accounting for their own socio-economic position. This suggests that deprived individuals living in deprived neighbourhoods are more likely to be NEET at age 17 than deprived individuals living in non-deprived neighbourhoods.

- **Family-child interactions**: interactions between the young person and their family (including having dinner together, going out together or having frequent arguments) at age 14 are particularly strongly associated with behavioural outcomes (including smoking, drinking, cannabis use, anti-social behaviour and truancy) at age 16.

- **Material resources**: having access to a computer or the internet at home (at age 14) appears to be strongly positively associated with educational attainment at age 16. Changes in the availability of computer and internet access at home between ages 14 and 16 are also highly correlated with Key Stage 4 test scores, in the expected directions (i.e. gaining access is good and losing access is bad).

- **Ability beliefs**: young people who think that they get good marks at school (at age 14) tend to score more highly in their Key Stage tests and also make greater progress between Key Stages than young people who lack this belief. Those who stop thinking that they get good marks for their work between ages 14 and 16 also tend to score lower at Key Stage 4 and make less progress between Key Stages 3 and 4.

- **Education values**: young people who like school and who find school worthwhile (at age 14) tend to make more progress between Key Stage 3 and Key Stage 4 than young people who do not; they are also, on average, less likely to play truant, and those who like school are less likely to be NEET at age 17. Young people who stop liking school or stop finding it worthwhile between ages 14 and 16 also tend to score lower at Key Stage 4 and make less progress between Key Stages 3 and 4, and those who start liking school are less likely to become NEET.

- **Young person's aspirations**: young people who want to stay in full-time education beyond age 16 and those who think it likely that they will apply to university (and are likely to get in) tend to have significantly higher Key Stage test scores than young people who want to work full-time at age 16 or who think it highly unlikely that they will apply to university. Changing higher education aspirations between ages 14 and 16 are also associated with educational attainment in the expected directions: young people who start thinking it likely that they will apply to university score higher at Key Stage 4 and make more progress between Key Stages, while young people who stop thinking it likely that they will apply tend to score lower, make less progress and are more likely to be NEET at age 17.

- **Key Stage 4 attainment**: ability beliefs and aspirations for higher education appear to affect the probability of being NEET only indirectly through differences in educational attainment at GCSE. (We base this conclusion on the fact that the initially significant relationships we find between these factors and the probability of being NEET disappear once we take Key Stage 4 scores into account.)

In this chapter, we examine the extent to which teenagers' education and behavioural outcomes can be explained by the rich set of factors (or "transmission mechanisms") we set out in Chapter 2 as possible pathways through which parents' socio-economic background might be linked to child outcomes.

These factors include parental education, school and neighbourhood characteristics, parental attitudes and behaviours, material resources devoted towards education, and the young person's own attitudes and behaviours.

We do this using simple multivariate regression analysis. As explained in Chapter 2, our regression analysis allows us to estimate the *correlation* between certain factors (for example, the young person's attitudes and behaviours) and education and behavioural outcomes, after taking differences in all other characteristics in our model into account. This means that the correlations we observe represent the *partial* effects of each of these factors on education and behavioural outcomes. Such analysis might allow us to learn, for example, that close family-child interactions at home are strongly positively related to performance at school, even after taking into account many other aspects of home and school life.

Note that this regression analysis does not yet tell us how much these factors might explain socio-economic differences in education and behavioural outcomes between young people from rich and poor backgrounds: Chapter 6 summarises our work in this area. Furthermore, regression analysis alone does not necessarily allow us to say whether differences in these factors *cause* the differences in outcomes that we observe: see Chapter 7 for some further work which attempts to establish more robust causal relationships.

In our analysis below, we show coefficient estimates from ten different regressions, covering ten different outcomes of interest (each of which is shown in a different column in our tables). The majority of these outcomes are measured at age 16.[23] Four of the outcomes we consider are education outcomes, and six are behavioural outcomes, as follows:

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[23] Additional tables showing the relationship between our potential transmission mechanisms and education and behavioural outcomes at age 14 can be found in Appendix 4.

Education outcomes:

- Key Stage 4 standardised (normalised) scores;

- Key Stage 4 "value-added" (that is, Key Stage 4 standardised scores conditional on Key Stage 3 scores);

- NEET (not in education, employment or training) at age 17;

- NEET at age 17, conditional on Key Stage 4 results.

Behavioural outcomes:

- Frequent smoking (usually smoking at least six cigarettes per week);

- Frequent drinking (usually drinking at least one alcoholic drink per week);

- Ever tried cannabis;

- Anti-social behaviour in the last year;

- Played truant in the last year;

- Participated in positive activities in the last four weeks (at age 14).[24]

The set of explanatory factors used in each regression is basically the same[25], and is set out fully in Chapter 2 and Appendix 1.

To allow the results from these ten regressions to be absorbed more easily, we display the coefficients of interest across six different tables (Tables 5.1 to 5.6), with each table showing the coefficients relating to a different group of explanatory factors. We start (in Table 5.1) by showing the relationship between parental education and the four education and six behavioural outcomes set out above, before moving through each of our potential transmission mechanisms (schools, neighbourhoods, material resources, and attitudes and behaviours), ending with the relationship between the young person's own attitudes and behaviours and our ten outcomes of interest (in Table 5.6). These tables can be found together at the end of this chapter.

To aid interpretation, it should be remembered that the Key Stage test results we consider in this section have been standardised (normalised) to allow comparability across different tests and so are measured in units of standard deviations. *The regression coefficients therefore tell us the number of standard deviations change in a given Key Stage test result associated with a unit's change in each explanatory variable of interest.* All other outcomes are binary, meaning the individual has either exhibited the behaviour in question or not. In this case, the regression coefficients we report (known as *marginal effects*) tell us the change in the probability of exhibiting a particular behaviour associated with a unit's change in each explanatory variable.

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[24] Note that participation in positive activities is not recorded at age 16.
[25] One major exception is that the models of education outcomes at age 16 include the young person's behaviours at age 14, and changes in these behaviours between ages 14 and 16, but these variables are not included in the models of behavioural outcomes at age 16 (see Table 5.6 for details).

We now go through each set of explanatory factors in our model in turn.[26]

Parental education

Table 5.1 presents the coefficients on parental education from our multivariate regression analysis.

The first column of Table 5.1 shows that parents' formal educational qualifications are strongly positively correlated with teenagers' GCSE results, with mother's education playing a slightly larger role than father's education.[27] For example[28]:

- A young person whose mother has a degree (NVQ Level 4/5) scores, on average, 0.127 standard deviations (around 20 GCSE points) higher at Key Stage 4 than someone whose mother has no educational qualifications.

- A young person whose father has a degree scores, on average, 0.074 standard deviations (around 11 GCSE points) higher at Key Stage 4 than someone whose father has no educational qualifications.

However, parental education is not strongly associated with progression from Key Stage 3 to Key Stage 4 (based on the value-added model, shown in Column 2 of Table 5.1), suggesting that the gains (in terms of test scores) to having a more educated parent have already been fully captured by age 14.[29]

There are also no clear relationships between parental education and the probability of being NEET at age 17 (Columns 3 and 4), or between parental education and the probability of engaging in risky behaviours at age 16. However, there is some evidence that mother's education is positively associated with the probability of participating in positive activities at age 14 (see Column 10 of Table 5.1).

Note that these are the relationships after conditioning on all other factors in our model, many of which might be thought of as channels through which parental education may indirectly affect education and behavioural outcomes. These coefficients might thus be thought of as the *direct* effects of parental education, once all the other channels represented in our model have been taken into account. Chapter 7 describes some additional analysis we have undertaken, focusing on uncovering the causal impact of mother's education on a variety of teenage outcomes.

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[26] Note that we do not discuss the coefficients associated with demographic and other family background characteristics in this section. These results are available from the authors on request.
[27] These relationships also hold for Key Stage 3 results, shown in Table A4.1 of Appendix 4.
[28] Remember that 1 standard deviation in Key Stage 4 scores is equivalent to 155 GCSE points (see Appendix 3 for more details).
[29] Parental education is positively associated with progress from Key Stage 2 to Key Stage 3 (shown in Table A4.1 of Appendix 4), however, suggesting that it is not until age 14 that the benefits of having more highly educated parents are fully captured.

School and neighbourhood characteristics

We now consider the relationships between school and neighbourhood characteristics and education and behavioural outcomes at age 16/17, as shown in Tables 5.2 and 5.3. These tables show that:

- **School quality**: pupils attending schools that might be identified as 'good quality' schools perform better at GCSE and make more progress between Key Stage 3 and Key Stage 4 than young people who do not attend such 'good quality' schools. For example, young people attending schools that receive an outstanding Ofsted report score 0.137 standard deviations (around 21 GCSE points) higher at Key Stage 4 than young people attending schools that receive a satisfactory Ofsted report (Column 1 of Table 5.2).

  Not surprisingly, attending a school with higher Key Stage 3 to 4 value-added is also associated with marginally better GCSE scores and greater progress for individuals within those schools.[30] However, attending a 'good quality' school does not appear to affect the probability of being NEET at age 17, nor the likelihood of engaging in risky behaviours at age 14 or age 16.

- **Composition of the school:**

  o **Key Stage 2 intake**: young people who attend schools with a higher achieving intake (in terms of Key Stage 2 scores) tend to perform better, on average, at Key Stage 4 than young people from schools with a lower achieving intake. However, they typically also make slower *progress* from one stage to the next. This can be seen from the fact that the average Key Stage 2 score of the school's most recent intake is positively associated with Key Stage 4 scores (Column 1 of Table 5.2), but negatively associated with Key Stage 3 to 4 value-added measures (Column 2 of Table 5.2). (We find similar relationships for Key Stage 3 scores and Key Stage 2 to 3 value-added measures, as shown in Table A4.2 of Appendix 4).

  o **Socio-economic and ethnic composition**: the socio-economic and ethnic compositions of the schools that young people attend appear to matter very little for any of the education or behavioural outcomes we consider, once we take all the other factors in our model into account. This is true for both age 14 and age 16/17 outcomes.

  o **Special educational needs composition**: young people who attend schools with a higher proportion of pupils classified as having special educational needs tend to score less highly at Key Stage 4 and make less progress between Key Stage 3 and Key Stage 4 than young people who attend schools with a lower proportion of such pupils.[31] They are also less likely to participate in positive activities at age 14.

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[30] Table A4.2 in Appendix 4 shows that attending a school with higher Key Stage 2 to 3 value-added is associated with higher Key Stage 3 scores and greater progress between Key Stage 2 and Key Stage 3.

[31] This is also true to a lesser extent for Key Stage 3 scores and Key Stage 2 to 3 value-added (see Table A4.2 in Appendix 4).

- **School type**: while attending a grammar school is associated with significantly higher Key Stage 3 and Key Stage 4 scores, there is no particular advantage in terms of *progress* between Key Stage 2 and Key Stage 3, or between Key Stage 3 and Key Stage 4. For example, young people who attend grammar schools score, on average, 0.462 standard deviations higher at Key Stage 2 and 0.3 standard deviations higher at Key Stage 4 (around 47 GCSE points, or the equivalent of sitting an extra GCSE and gaining a Grade B) than young people who do not attend grammar schools (Column 1).

  Attending a grammar school also appears to be associated with a significant reduction in the likelihood of being involved in anti-social behaviour, both at age 14 and age 16. For example, young people who attend grammar schools are, on average, 8.6 percentage points less likely to have been involved in anti-social behaviour by age 14 and 3.2 percentage points less likely to have been involved in anti-social behaviour by age 16 than young people who do not attend grammar schools (Column 8). However, attending a grammar school does not appear to affect the likelihood of becoming NEET at age 17.

- **Friends' expectations for education:** while the overall composition of the school does not seem to matter very much for child outcomes, there does seem to be a close relationship between the composition of one's friends and child outcomes. We consider here the relationship between what a young person thinks that their friends will do post-16 and his or her own education and behavioural outcomes.

  Table 5.2 shows that believing your friends will stay on in full-time education post-16 is associated with significantly higher test scores at Key Stage 4 (both with and without controls for prior attainment), a significantly lower chance of being NEET at age 17 (both with and without controls for Key Stage 4 attainment) and a significantly lower chance of being a frequent smoker (defined here as usually smoking more than six cigarettes per week) at age 16.[32]

  It is worth remembering that these are the relationships after controlling for the young person's own expectations for their future education, as well as all the other variables in our model. However, it is still not possible to say conclusively on the basis of this analysis whether this means that friends really do matter (i.e. that what your friends do has a significant effect on what you do) or whether individuals who want to stay in full-time education (and hence work hard to get good grades, and so on) tend to choose friends who want the same things.

- **Deprivation level of the neighbourhood:** we find strong evidence that living in a deprived neighbourhood matters for whether or not a young person becomes NEET at age 17. For example, living in one of the 20% least deprived neighbourhoods (where deprivation is defined using the area's Index of Multiple Deprivation score[33]) is associated with a 1.7-1.8 percentage point reduction in the probability of being NEET compared to living in one of the 20% most deprived neighbourhoods. This relationship holds even after controlling for the individual's own socio-economic position (and all other factors in our model), suggesting that deprived individuals living in deprived

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[32] These relationships also hold for Key Stage 3 scores (both with and without controls for Key Stage 2 attainment) and the likelihood of being a frequent smoker at age 14 (see Appendix 3 for details).
[33] See Chapter 2 for more details.

areas are more likely to be NEET at age 17 than deprived individuals living in non-deprived areas.

However, we find no evidence that neighbourhood deprivation consistently affects Key Stage 4 scores or any behavioural outcomes at age 16 (nor does it affect the probability of participating in positive activities at age 14).[34]

- **Composition of the neighbourhood**: there is very little consistent evidence to report on the association between neighbourhood composition and child outcomes (once we have accounted for differences in neighbourhood deprivation - described above).

Chapter 7 describes some further work we have done which tries to estimate the causal relationship between an individual's school and neighbourhood composition and their education and behavioural outcomes.

Main parent's attitudes and behaviours

This section considers the relationships between the attitudes and behaviours of the main parent and the outcomes of their child at age 16 (Table 5.4).

Table 5.4 shows that:

- **Parents' education aspirations and expectations** are strongly associated with higher test scores for their children at age 14 and age 16. For example, having a main parent who wants their child to stay in full-time education beyond age 16 is associated with a 0.142 standard deviation increase in Key Stage 4 scores (around 22 GCSE points) compared to having a main parent who would like their child to go into full-time work at age 16. Similarly, having a main parent who thinks that it is fairly or very likely that their child will go to university is associated with a 0.232 standard deviation increase in Key Stage 4 test scores (around 36 GCSE points) compared to having a main parent who thinks it is not likely that their child will go to university. (These relationships are even stronger at Key Stage 3 - see Appendix 4.)

  Changes to parents' aspirations for their child between ages 14 and 16 also seem to influence children's educational attainment: Column 1 of Table 5.4 suggests that having a main parent who *starts* wanting their child to stay in full-time education beyond age 16 is associated with a 0.089 standard deviation increase (around 14 GCSE points) in Key Stage 4 test scores. By contrast, having a main parent who *stops* wanting their child to stay on is associated with decrease in Key Stage 4 scores of similar magnitude.

  Interestingly, higher parental aspirations and expectations are not associated with greater progress between Key Stage 3 and Key Stage 4 (although they are associated with greater progress between Key Stage 2 and Key Stage 3 – see Appendix 4), suggesting that any positive effect of parental aspirations and expectations is already captured in educational attainment at age 14.

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[34] Table A4.3 in Appendix 4 suggests that neighbourhood deprivation is associated with a higher probability of being involved in anti-social behaviour at age 14. For example, young people living in the 20% least deprived neighbourhoods are 7.7 percentage points less likely to have been involved in anti-social behaviour by age 14 than young people living in the 20% most deprived neighbourhoods. It also suggests that young people living in less deprived areas tend to make more progress between Key Stage 2 and Key Stage 3 than young people living in more deprived areas.

Parents' education aspirations and expectations are, perhaps unsurprisingly, unrelated to their child's likelihood of engaging in risky behaviours. They are also unrelated to the young person's chances of being NEET at age 17.

- **Education interactions between the main parent and their child** (including discussing school reports and Year 10 subject choices) appear to affect educational attainment, being significantly positively associated with Key Stage 3 and 4 test scores (but unrelated to progress between Key Stage 3 and Key Stage 4). Education interactions between parent and child do not seem to affect teenage behavioural outcomes in any consistent way.

- **Parental involvement in school activities** (including attending parents' evenings) are positively related to educational attainment at Key Stage 4 (Column 1), progress between Key Stage 3 and Key Stage 4 (Column 2), and the likelihood of participating in positive activities at age 14 (Column 10). For example, a 1 standard deviation increase in our scale of parental involvement in school activities is associated with a 2.7 percentage point increase in the likelihood of participating in positive activities at age 14. Parental involvement in school activities is also negatively associated with the probability that the young person smokes frequently at age 16.

- **Non-education family interactions**, including having meals together, going out together as a family and frequent arguments between the main parent and child appear to have strong effects on both education and behavioural outcomes at age 16. For example, a 1 standard deviation increase in our family-child interaction scale at age 14 is associated with around a 0.04 standard deviation improvement in Key Stage 4 scores (Columns 1 and 2), a 2.1 percentage point reduction in the likelihood of being a frequent smoker (Column 5), a 1.4 percentage point reduction in the likelihood of drinking alcohol frequently (Column 6), a 5.0 percentage point reduction in the likelihood of ever having tried cannabis by age 16 (Column 7), a 2.4 percentage point reduction in the probability of being involved in anti-social behaviour at age 16 (Column 8), and a 3.5 percentage point reduction in the likelihood of ever playing truant by age 16 (Column 9).[35] However, non-education family interactions do not appear to affect the probability of a young person becoming NEET at age 17.

  Moreover, the main parent reporting that they stop frequently arguing with the young person between age 14 and age 16 is associated with a significant improvement in the young person's behaviour over the same period. For example, the cessation of frequent arguments is associated with a 2.1 percentage point reduction in the likelihood of ever having tried cannabis, a 2.0 percentage point reduction in the likelihood of being involved in anti-social behaviour and a 2.0 percentage point reduction in the likelihood of having played truant at age 16.

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[35] Family-child interactions also positively affect progress between Key Stage 2 and Key Stage 3, and negatively affect the likelihood of engaging in a range of risky behaviours (see Table A4.4 of Appendix 4 for details).

We have also carried out some additional analysis examining the relationship between the educational aspirations of the main parent for their child, and the educational aspirations of the young person for themselves. These results can be found in Appendix 5. As we might have expected, the aspirations of the young person and their main parent are strongly positively correlated, even after controlling for a wide range of other family, school and neighbourhood characteristics.

Material resources

Table 5.5 illustrates the relationships between material resources (comprising payment for private tuition, computer access and internet access) and teenage education and behavioural outcomes, after controlling for a wide range of other characteristics. It also considers the effects of changes in the availability of material resources over time.

Table 5.5 shows that:

- **The availability of resources for educational purposes** appears to be significantly positively associated with Key Stage 4 test scores, and some of these relationships continue to hold even after controlling for prior attainment. For example, having access to a computer at home is associated with a 0.090 standard deviation increase (around 14 GCSE points) in Key Stage 4 test scores even after controlling for Key Stage 3 results.

    Young people who have access to a computer at home are less likely to play truant at school at ages 14 and 16 compared to those without computer access. For example, Column 9 of Table 5.5 suggests that having access to a computer at home is associated with a 5.8 percentage point reduction in the likelihood of playing truant at age 16. On the other hand, private tuition is positively correlated with participation in positive activities (conditional on all other factors in our model). For example, young people who receive private tuition at age 14 are 3.4 percentage points more likely to participate in positive activities at the same age (Column 10).

- **Changes in the availability of educational resources over time** also significantly affect Key Stage 4 test scores, even after controlling for prior attainment. For example, losing access to a computer is associated with a 0.127 standard deviation reduction (around 20 GCSE points) in Key Stage 4 test scores, while gaining access to the internet is associated with a 0.062 standard deviation increase (around 10 GCSE points) in Key Stage 4 test scores, even after taking account of achievement at Key Stage 3.

    Interestingly, changes in computer access over time are also associated with behavioural outcomes at age 16. For example, gaining access to a computer between ages 14 and 16 is associated with a 1.4 percentage point reduction in the probability of being a frequent smoker at age 16 and a 2.5 percentage point reduction in the probability of being a frequent drinker at age 16.

    Similarly, while gaining access to a computer is associated with a 4.3 percentage point reduction in the probability of playing truant at age 16, *losing* computer access is associated with a 5.3 percentage point *increase* in the probability of playing truant at age 16.

- **Changes in family income**: by contrast, even very large changes in overall family income do not appear to affect educational attainment, once the changes in material resources described above have been taken into account; a reduction in family income between ages 14 and 16 appears to have a small but significant effect on some behavioural outcomes – including the likelihood of being a frequent smoker and the likelihood of being involved in anti-social behaviour at age 16.

Young person's attitudes and behaviours

We now move on to consider the relationships between the young person's attitudes and behaviours at age 14 and a selection of their education and behavioural outcomes (mostly measured at age 16). We also consider changes to the young person's attitudes and behaviours between age 14 and age 16.

Table 5.6 shows that:

- **Ability beliefs**: we find some very strong correlations between young people's ability beliefs at age 14 and educational attainment at ages 14 and 16, both before and after accounting for prior attainment. For example, a 1 standard deviation increase in a young person's belief in their own ability at age 14 is associated with a 0.244 standard deviation increase in Key Stage 4 test scores (equivalent to around 38 GCSE points). (The magnitude of this effect is somewhat smaller after controlling for Key Stage 3 scores.) However, if the young person loses belief in their ability between age 14 and age 16 ("stops getting good marks"), then their Key Stage 4 scores are, on average, reduced by a similar amount.

  Young people who lose belief in their ability between ages 14 and 16 are also more likely to engage in a range of risky behaviours at age 16. For example, they are 1.2 percentage points more likely to smoke frequently (Column 5), 2.9 percentage points more likely to drink frequently (Column 6), 2.9 percentage points more likely to have tried cannabis (Column 7) and 3.0 percentage points more likely to have been involved in anti-social behaviour (Column 8).

  A young person's belief in their own ability also appears to reduce the likelihood that they will be NEET at age 17 - but only *before* controlling for Key Stage 4 scores. Once prior attainment is included in our model, ability beliefs no longer seem to affect the likelihood of a young person becoming NEET. This suggests that ability beliefs affect NEET status only indirectly through attainment at Key Stage 4, rather than directly.

- **Education values**:

  - **Extrinsic**: our results show that finding school worthwhile (a measure of the extrinsic value of schooling) at age 14 is significantly positively associated with Key Stage 3 and 4 test scores (both before and after controlling for prior attainment) and significantly negatively associated with the likelihood of being a frequent drinker, the likelihood of being involved in anti-social behaviour and the likelihood of playing truant. For example, a 1 standard deviation increase in our extrinsic value scale at age 14 is associated with a 1.7 percentage point reduction in the probability of playing truant at age 16 (Column 9 of Table 5.6).

If young people stop finding school worthwhile between age 14 and age 16, however, then they tend to experience a reduction in test scores and are more likely to engage in a range of risky behaviours at age 16, including smoking, cannabis use, anti-social behaviour and truancy. For example, young people who stop finding school worthwhile between ages 14 and 16 are 2.0 percentage points more likely to play truant at age 16 than those who do not.

o **Intrinsic**: on the other hand, reporting that you enjoy school at age 14 (a measure of the intrinsic value placed on schooling) appears to be significantly negatively associated with the probability of being NEET at age 17 and a range of risky behaviours at ages 14 and 16, but is also - somewhat paradoxically - significantly *negatively* associated with Key Stage 3 and 4 test scores. For example, a 1 standard deviation increase in our intrinsic value scale at age 14 is associated with a 0.8 percentage point reduction in the probability of being NEET at age 17, as well as a 0.045 standard deviation reduction in Key Stage 4 test scores (around 7 GCSE points).[36]

If young people stop enjoying school between age 14 and age 16, however, then they tend to have lower Key Stage 4 scores and are also more likely to engage in a range of risky behaviours at age 16. For example, stopping liking school between ages 14 and 16 is associated with a 7.9 percentage point increase in the probability of playing truant and a 4.8 percentage point increase in the likelihood of smoking cannabis at age 16.

By contrast, starting to like school over the same period is associated with around a 1.0 percentage point reduction in the probability of being not in education, employment or training (NEET) at age 17, even after controlling for Key Stage 4 results, but stopping liking school has no effect on the probability of being NEET.

- **Locus of control**: we find a strong positive relationship between a young person's locus of control and educational attainment, such that young people with a more internal locus of control (who believe that they have greater control over their own economic destiny) perform significantly better at Key Stage 4 and make more progress between Key Stage 3 and Key Stage 4 (the value-added model) than young people with a more external locus of control (who believe that they have less control over their own economic destiny).

- **Educational aspirations**: we find that young people's educational aspirations are strongly positively correlated with educational attainment. This is in line with much recent research in this area (see Duckworth et al. (2009) for a review). For example, young people who want to stay in full-time education beyond age 16 tend to have higher test scores at Key Stage 3 and Key Stage 4, but do not seem to make significantly more progress between the two Key Stages, than young people who want to go into full-time work at age 16.

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[36] Barreau et al. (2008) report a positive association between enjoyment of school and Key Stage 2 test scores for children in the ALSPAC (Avon Longitudinal Study of Parents and Children) cohort. While this is at odds with our findings, it may be that the relationship between the intrinsic value of schooling and test scores is different for children in primary and secondary schools (i.e. it may simply differ by age).

Young people who think it likely that they will apply to university (and likely that they will get in) not only tend to have significantly higher educational attainment, but are also less likely to engage in a range of risky behaviours at age 16 and are more likely to participate in positive activities at age 14. For example, they tend to score 0.117 standard deviations higher at Key Stage 4 (even after controlling for prior attainment) (equivalent to around 18 GCSE points), they are 3.0 percentage points less likely to play truant at age 16 and they are 2.2 percentage points more likely to participate in positive activities than young people who are not at all likely to apply to university.

Interestingly, while the young person's aspirations towards higher education (HE) appear to significantly reduce the probability that they will be NEET at age 17 *before* controlling for attainment at Key Stage 4, they appear to have no additional effect thereafter. This suggests that, as with ability beliefs (discussed above), young people's HE aspirations appear to affect the likelihood of becoming NEET only indirectly via educational attainment.

Changes in educational aspirations between age 14 and age 16 also seem to be strongly correlated with education outcomes. For example, young people who start thinking it likely that they will apply to university tend to make better progress between Key Stage 3 and Key Stage 4 (Column 2 of Table 5.6). On the other hand, young people who stop thinking it likely that they will apply to university tend to fall further behind in terms of Key Stage test scores, and are 2.3 percentage points more likely to be NEET at age 17, even after accounting for Key Stage 4 attainment.

Of course, it is extremely important to remember that the direction of causality (if any) is not at all clear here, since it is extremely plausible that changing performance at school would cause these changes in attitudes, rather than the other way round (see, for example, Bond & Saunders, 1999, and Gutman & Akerman, 2008).

Also, as we pointed out in Chapter 4, many more parents and children at both ages 14 and 16 think that they will stay in full-time education beyond age 16 and apply to university than ultimately do so. This suggests that simply working to improve HE aspirations amongst young people from poor backgrounds is unlikely to resolve the large socio-economic gap in further and higher education participation rates that we observe.[37]

- **Experience of bullying at age 14**: Table 5.6 shows that the young person's experience of bullying at age 14 is strongly negatively correlated with Key Stage test results and strongly positively correlated with a range of risky behaviours - in particular the probability of engaging in anti-social behaviour. For example, a 1 standard deviation increase in our bullying scale at age 14 is associated with a 0.132 standard deviation reduction in Key Stage 4 test scores (around 20 GCSE points), and a 1.6 percentage point increase in the probability of being involved in anti-social behaviour at age 16.

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[37] For example, see Chowdry et al. (2008) for a discussion of the factors underlying differences in HE participations rates by socio-economic status.

Encouragingly, if the young person stops being frequently bullied between age 14 and age 16, then their rate of progress between Key Stage 3 and Key Stage 4 is likely to improve (Column 2), and the probability that they will engage in anti-social behaviour at age 16 is likely to fall (Column 8).

- **Education behavioural difficulties**[38]: unsurprisingly, perhaps, Table 5.6 shows that there is a strong negative relationship between educational behavioural difficulties (encompassing truancy, suspension and expulsion from school) at age 14 and educational attainment at Key Stage 4, both with and without controlling for prior achievement. (The same is also true for attainment at Key Stage 3 - see Table A3.6 in Appendix 3 for details.)

  There is also a small positive relationship between education behavioural difficulties and the likelihood of being NEET at age 17, but only before controlling for Key Stage 4 test scores. Once differences in attainment are taken into account, there is no significant relationship between truancy, suspension or expulsion and the probability of becoming NEET.

  Furthermore, starting to play truant, or to be suspended or expelled from school, between ages 14 and 16 is associated with a significant reduction in Key Stage 4 test scores, with the magnitude of the reduction increasing, as might be expected, with the severity of the behaviour exhibited. So, for example, starting to play truant is associated with a 0.063 standard deviation reduction in Key Stage 4 test scores (around 10 GCSE points), while if you are suspended from school, the corresponding reduction in test scores is 0.168 standard deviations (around 26 GCSE points).

- **Substance use**[39]: young people who report that they smoke more than six cigarettes per week at age 14 tend to have significantly lower test scores (and make significantly less progress between Key Stages) than young people who do not smoke more than six cigarettes per week. Furthermore, young people who start smoking frequently between ages 14 and 16 incur a somewhat smaller - but still significant - penalty in terms of both Key Stage 4 test scores and progress between Key Stages 3 and 4.

- **Teacher-child relations**: encouragingly, good teacher-child relations at age 14 are positively associated with progress between Key Stage 3 and Key Stage 4, and are consistently negatively associated with engagement in a range of risky behaviours (including truancy) at ages 14 and 16. For example, a 1 standard deviation increase in our teacher-child relations scale at age 14 is associated with a 0.059 standard deviation reduction in Key Stage 4 test scores (having controlled for Key Stage 3 attainment) (equivalent to around 9 GCSE points) and an 8.6 percentage point decrease in the probability of having played truant by age 16. Young people who start to like their teachers between age 14 and age 16 also score significantly higher at Key Stage 4, both before and after including controls for prior attainment.

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[38] Note that we only include controls for the young person's behaviours at age 14 in our models of education outcomes at age 16, so our discussion here is restricted to the relationship between behavioural difficulties and education outcomes.
[39] Note that we only include controls for the young person's behaviours at age 14 in our models of education outcomes at age 16, so our discussion here is restricted to the relationship between substance use and education outcomes.

- **Participation in positive activities**[40]: young people who participate in positive activities at age 14 tend to have higher test scores at Key Stage 3 and Key Stage 4, and are significantly less likely to be NEET at age 17, than young people who do not participate in positive activities. For example, even after controlling for attainment at Key Stage 4, young people who participate in positive activities are 3.2 percentage points less likely to be NEET at age 17 than young people who do not participate in positive activities. Furthermore, young people who stop reading or playing sport between ages 14 and 16 tend to have lower Key Stage test results than young people whose behaviour does not change.

  It should be pointed out, however, that due to the large numbers of individuals who report participating in some form of positive activity at age 14 (over 93%), these findings may perhaps be better interpreted the other way round: that is to say, *not* participating in positive activities at age 14 is significantly *negatively* associated with educational attainment at 16, and significantly *positively* associated with being NEET at age 17.

To conclude, this chapter has described in detail the wide range of factors that contribute to young people's education and behavioural outcomes at age 16. In the next chapter, we examine the extent to which differences in these factors are able to explain the socio-economic differences in education and behavioural outcomes that we set out in Chapter 3.

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[40] Note that we only include controls for the young person's behaviours at age 14 in our models of education outcomes at age 16, so our discussion here is restricted to the relationship between participation in positive activities and education outcomes.

Table 5.1   Relationship between parental education and selected teenage education and behavioural outcomes

	Education outcomes				Behavioural outcomes					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	KS4 normalised score	KS4 value-added	NEET (age 17)		Frequent smoker (age 16)	Frequent drinker (age 16)	Ever tried cannabis (age 16)	Involved in anti-social behaviour in last year (age 16)	Played truant in last year (age 16)	Participate in positive activities (age 14)
			Without KS4	With KS4						
Parental education										
Mother's highest qualification NVQ Level 1	0.008	-0.008	-0.008	-0.007	-0.004	-0.008	0.009	0.013	0.012	0.003
Mother's highest qualification NVQ Level 2	0.058*	0.007	0.003	0.006	0.002	-0.017*	0.012	0.002	0.012	0.013**
Mother's highest qualification NVQ Level 3	0.101**	0.03	-0.009	-0.006	0.005	-0.007	0.028	0.012	0.02	0.020**
Mother's highest qualification NVQ Level 4/5	0.127**	0.037	-0.002	0.002	0.01	-0.003	0.038*	0.003	0.030*	0.014*
Mother's highest qualification other	0.03	0.037	0.026	0.03	0.005	-0.029*	0	0.008	0.004	0.013
Father's highest qualification NVQ Level 1	0.061*	0.028	0.006	0.006	0.004	0.016	-0.026	-0.006	-0.019	0
Father's highest qualification NVQ Level 2	0.045*	0.018	-0.003	-0.003	0.002	0.017*	0.007	0.017	0.013	-0.006
Father's highest qualification NVQ Level 3	0.061*	0.014	0	0.001	0.005	0.024*	0.014	0.019	0.016	-0.007
Father's highest qualification NVQ Level 4/5	0.074**	0.011	0.004	0.004	-0.011*	0.01	0.009	0.015	0.021	-0.002
Father's highest qualification other	-0.006	-0.02	-0.012	-0.011	-0.015	0.017	-0.009	0.005	0.023	-0.007

Notes: these regressions also control for demographic and other family background characteristics (described in detail in Chapter 2), plus all of our potential transmission mechanisms (i.e. school and neighbourhood characteristics, material resources, and the attitudes and behaviours of the young person and their main parent), as set out in Tables 5.2 to 5.6. * indicates significance at 5% level; ** at the 1% level.

Table 5.2 Relationship between school/peer characteristics and selected teenage education and behavioural outcomes

	Education outcomes				Behavioural outcomes					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	KS4 normalised score	KS4 value-added	NEET (age 17)		Frequent smoker (age 16)	Frequent drinker (age 16)	Ever tried cannabis (age 16)	Involved in anti-social behaviour in last year (age 16)	Played truant in last year (age 16)	Participate in positive activities (age 14)
			Without KS4	With KS4						
School quality										
KS2-KS3 value-added measure	-0.002	-0.060**	-0.001	-0.001	-0.001	0.000	0.002	0.002	-0.002	0.001
KS3-KS4 value-added measure	0.006**	0.006**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Outstanding Ofsted report	0.137**	0.132**	0.003	0.006	-0.005	-0.001	0.006	0.007	-0.013	0.009
Good Ofsted report	0.070*	0.076**	0.002	0.004	0.010*	0.005	0.018	0.020**	0.001	0.014**
Inadequate Ofsted report	0.032	0.025	-0.003	-0.003	0.003	-0.016	0.002	-0.001	0.008	0.004
School composition										
KS2 average point score	0.018**	-0.014**	-0.002	-0.002	0.000	0.003	0.004	0.001	-0.003	0.000
% pupils with SEN statement	-0.024**	-0.018*	0.000	-0.001	0.002	0.002	0.005*	0.003	0.002	-0.004**
% pupils eligible for FSM	0.224	0.288	0.023	0.023	-0.035	-0.055	-0.035	0.029	-0.028	-0.011
% EAL pupils	-0.549*	-0.321	-0.039	-0.053	0.019	0.021	0.004	0.011	0.18	0.040
% White boys	0.084	0.207	0.004	0.003	0.015	-0.039	0.017	-0.039	-0.033	-0.015
% White girls	-0.120	-0.002	-0.020	-0.025	-0.013	-0.079	-0.014	-0.029	-0.075	-0.007
% Asian boys	0.085	0.029	0.046	0.049	0.048	-0.167	0.033	-0.026	-0.18	-0.006
% Asian girls	0.198	0.129	0.039	0.043	-0.007	-0.077	-0.033	-0.065	-0.315**	-0.065
% Black boys	0.245	0.441	-0.031	-0.021	-0.117	-0.129	0.076	-0.096	-0.269*	0.051
% Black girls	-0.197	-0.186	0.095	0.094	-0.003	-0.059	0.075	-0.061	-0.267*	-0.074
School type										
School has a sixth form	0.029	0.027	0.000	0.000	0.003	-0.007	-0.002	0.019**	0.019*	-0.003
Grammar school	0.300**	0.045	0.003	0.009	-0.017*	0.010	-0.023	-0.032*	-0.035	-0.008
Friends' expectations for education										
YP thinks most friends will stay on post 16	0.111**	0.044**	-0.014**	-0.012**	-0.012**	-0.010	0.009	-0.010	-0.009	0.008
YP thinks most friends will do something else	-0.030	-0.046	0.013	0.014	-0.008	-0.023*	0.002	0.012	0.007	0.003

Notes: omitted categories are bottom IMD quintile. These regressions also control for parental education, demographic and other family background characteristics (described in detail in Chapter 2), plus all of our other potential transmission mechanisms (i.e. neighbourhood characteristics, material resources, and the attitudes and behaviours of the young person and their main parent), as set out in Tables 5.3 to 5.6. * indicates significance at the 5% level; ** at the 1% level.

Table 5.3   Relationship between neighbourhood characteristics and selected teenage education and behavioural outcomes

	Education outcomes				Behavioural outcomes					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	KS4 normalised score	KS4 value-added	NEET (age 17)		Frequent smoker (age 16)	Frequent drinker (age 16)	Ever tried cannabis (age 16)	Involved in anti-social behaviour in last year (age 16)	Played truant in last year (age 16)	Participate in positive activities (age 14)
			Without KS4	With KS4						
Neighbourhood composition										
SOA % eligible for FSM	-0.161	-0.224*	-0.059**	-0.058**	-0.002	0.023	0.047	0.060	0.033	0.012
SOA % EAL	0.132	0.030	0.04	0.034	0.037	-0.061	-0.054	0.013	-0.040	0.016
SOA % White boys	0.145	-0.041	0.058	0.055	-0.009	0.087	-0.025	0.044	0.039	0.018
SOA % Asian boys	-0.556	-0.374	0.033	0.015	-0.103	0.135	0.144	-0.027	0.074	-0.031
SOA % Black boys	0.077	-0.104	-0.038	-0.027	-0.172	-0.219	-0.267	0.085	-0.268	0.088
SOA % White girls	-0.086	-0.166	0.037	0.033	0.010	0.033	-0.051	0.018	-0.042	0.037
SOA % Asian girls	0.258	0.089	0.036	0.051	0.023	0.120	0.008	0.023	0.022	0.059
SOA % Black girls	-0.552	-0.391	0.186*	0.149	0.170	-0.049	-0.033	0.010	0.445*	-0.072
Neighbourhood deprivation										
2nd IMD quintile	-0.039	-0.037	-0.011**	-0.011**	0.000	0.018	0.013	0.006	0.010	-0.001
3rd IMD quintile	-0.036	-0.052	-0.019**	-0.018**	0.003	0.022	0.021	0.000	-0.001	0.010
4th IMD quintile	-0.043	-0.042	-0.023**	-0.022**	0.005	0.010	0.024	0.005	-0.026	0.009
Top IMD quintile	-0.042	-0.042	-0.018**	-0.017**	-0.004	0.007	0.005	-0.012	-0.016	0.015

Notes: omitted categories are bottom IMD quintile. These regressions also control for parental education, demographic and other family background characteristics (described in detail in Chapter 2), plus all of our other potential transmission mechanisms (i.e. school/peer characteristics, material resources and the attitudes and behaviours of the young person and their main parent), as set out in Tables 5.2 and 5.4 to 5.6. * indicates significance at the 5% level; ** at the 1% level.

Table 5.4   Relationship between main parent attitudes and behaviours and selected teenage education and behavioural outcomes

	Education outcomes				Behavioural outcomes					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	KS4 normalised score	KS4 value-added	NEET (age 17)		Frequent smoker (age 16)	Frequent drinker (age 16)	Ever tried cannabis (age 16)	Involved in anti-social behaviour in last year (age 16)	Played truant in last year (age 16)	Participate in positive activities (age 14)
			Without KS4	With KS4						
Wave 1 levels										
Education values										
Parent education value (scale)	0.004	0.012	-0.002	-0.002	0.004*	-0.006*	-0.003	0.001	-0.004	0.002
Education aspirations and expectations										
Parent wants YP to stay in FTE at 16	0.142*	-0.031	0.001	0.005	-0.002	-0.004	0.024	0.017	-0.003	0.005
Parent wants YP to learn a trade/training/apprenticeship	-0.014	-0.034	0.004	0.004	0.003	0.003	0.009	0.005	-0.02	0.009
Parent has other aspirations for YP at 16	0.153	0.013	0.017	0.027	0.012	0.006	0.002	0.009	-0.057**	0.013
Parent thinks v/fairly likely YP will go to uni	0.232**	0.029	0.001	0.005	0.005	-0.004	0.023*	0.000	0.016	0.009
Parent-child interactions and activities										
Parent child interactions: education (scale)	0.025*	0.000	-0.002	-0.002	0.000	-0.002	0.011*	0.003	0.002	-0.002
Family child interactions (scale)	0.037**	0.041**	0.002	0.003	-0.021**	-0.014**	-0.050**	-0.024**	-0.035**	0.002
Parental involvement in school activities (scale)	0.042*	0.038*	-0.002	0.000	-0.011*	-0.005	-0.002	0.004	0.002	0.027**
Change between Wave 1 and Wave 3										
Starts wanting YP to stay in FTE beyond 16	0.089*	-0.005	0.007	0.009	-0.001	-0.006	0.017	0.004	0.02	
Stops wanting YP to stay in FTE beyond 16	-0.086**	-0.028	0.003	0.001	0.011	0.006	0.030*	0.006	-0.003	
Starts frequently arguing with YP	-0.044	-0.023	0.009	0.006	0.002	0.017	0.015	0.029**	0.028*	
Stops frequently arguing with YP	-0.024	-0.002	0.000	0.000	0.004	-0.011	-0.021**	-0.020**	-0.020**	

Notes: omitted categories are parent wants YP to go into f/t work at 16; parent thinks fairly/very unlikely YP will go to university. These regressions also control for parental education, demographic and other family background characteristics (described in detail in Chapter 2), plus all of our other potential transmission mechanisms (i.e. school and neighbourhood characteristics, material resources, and the attitudes and behaviours of the young person), as set out in Tables 5.2, 5.3, 5.5 and 5.6. * indicates significance at the 5% level; ** at the 1% level.

Table 5.5 Relationship between material resources and selected teenage education and behavioural outcomes

	Education outcomes				Behavioural outcomes					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	KS4 normalised score	KS4 value-added	NEET		Frequent smoker (age 16)	Frequent drinker (age 16)	Ever tried cannabis (age 16)	Involved in anti-social behaviour in last year (age 16)	Played truant in last year (age 16)	Participate in positive activities (age 14)
			Without KS4	With KS4						
Material resources										
Wave 1 levels										
Private tuition	0.044**	0.021	-0.006	-0.005	0	0.003	0.002	0.004	0.003	0.034**
Computer access	0.132**	0.090**	-0.01	-0.008	-0.023*	-0.027	-0.044	-0.019	-0.058*	-0.006
Internet access	0.146**	0.062**	-0.002	0.001	-0.004	-0.003	0.01	-0.018	0.002	0.001
Change between Wave 1 and Wave 3										
Gets computer access	0.032	0.01	0.004	0.002	-0.014*	-0.025*	-0.02	-0.025	-0.043**	
Loses computer access	-0.106*	-0.127**	0.007	0.004	0.021	0.041	0.090**	0.031	0.053*	
Gets internet access	0.112**	0.062*	-0.001	0.001	-0.003	0.01	0.003	-0.002	-0.002	
Loses internet access	-0.025	0.052	0	-0.001	0.02	0.02	0.003	0.019	0.022	
Family income drops more than 20ppts of equivalised income scale	-0.013	-0.011	0.001	0	0.011*	0.009	0.015	0.018*	0.014	
Family income rises more than 20ppts of equivalised income scale	-0.005	0.019	0.006	0.005	0.006	0.003	0	0.012	0.011	

Notes: these regressions also control for parental education, demographic and other family background characteristics (described in detail in Chapter 2), plus all of our other potential transmission mechanisms (i.e. school and neighbourhood characteristics, and the attitudes and behaviours of the young person and their main parent), as set out in Tables 5.2 to 5.4 and 5.6. * indicates significance at the 5% level; ** at the 1% level.

Notes to Table 5.6 (see below): omitted categories are YP wants to go into f/t work at 16; YP thinks not at all likely will apply to HE. These regressions also control for parental education, demographic and other family background characteristics (described in detail in Chapter 2), plus all of our other potential transmission mechanisms (i.e. school and neighbourhood characteristics, material resources, and the attitudes, expectations and behaviours of the young person's main parent), as set out in Tables 5.2 to 5.5. Note that we do not include controls for educational behavioural difficulties, anti-social behaviour, being a heavy smoker, drinking regularly, ever having smoked cannabis, reading regularly, attending religious classes and participating in positive activities (or changes in these variables) in our models for behavioural outcomes. * indicates significance at the 5% level; ** at the 1% level.

Table 5.6 **Relationship between young person attitudes and behaviours and selected teenage education and behavioural outcomes**

	Education outcomes				Behavioural outcomes					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	KS4 normalised score	KS4 value-added	NEET (age 17)		Frequent smoker (age 16)	Frequent drinker (age 16)	Ever tried cannabis (age 16)	Involved in anti-social behaviour in last year (age 16)	Played truant in last year (age 16)	Participate in positive activities (age 14)
			Without KS4	With KS4						
Wave 1 levels										
Self-concept and education values										
Ability beliefs (scale)	0.244**	0.030*	-0.008*	-0.004	-0.002	-0.001	0.001	-0.004	-0.004	0.006
Enjoyment of school (intrinsic value scale)	-0.045**	0.023*	-0.009**	-0.008**	-0.011**	-0.025**	-0.024**	-0.016**	-0.044**	0.008*
Usefulness of school (extrinsic value scale)	0.054**	0.033**	-0.001	0.000	-0.006*	-0.015**	-0.018**	-0.010*	-0.017**	0.002
Locus of control (scale)	0.084**	0.035**	-0.004	-0.002	-0.001	-0.001	0.002	-0.005	-0.015*	0.002
Education/job aspirations and expectations										
Wants to stay on in FTE at 16	0.123**	0.055	-0.014	-0.010	-0.011	-0.008	-0.003	-0.01	-0.010	-0.002
Wants to leave FTE at 16 but return later	0.044	-0.009	0.013	0.014	0.006	-0.009	0.013	0.001	-0.011	-0.012
Wants to learn a trade/training	0.042	-0.022	-0.004	-0.004	-0.004	0.000	0.006	0.013	-0.011	0.017*
Other intentions at 16	0.034	-0.004	0.000	0.001	0.000	0.000	-0.013	-0.036	-0.002	-0.019
Likely to apply to HE, and likely to get in	0.273**	0.117**	-0.018*	-0.009	-0.024**	0.004	-0.007	-0.029*	-0.030*	0.022**
Likely to apply to HE, but not likely to get in	0.064	0.016	-0.004	-0.003	-0.002	0.011	0.007	0.011	0.008	0.014*
Not very likely to apply to HE, but likely would get in	0.132**	0.028	-0.002	0.000	-0.010*	-0.008	-0.015	0.000	-0.010	0.021**
Not very likely to apply to HE, and not likely to get in	0.089**	0.048*	0.002	0.004	-0.004	-0.013	-0.004	-0.001	0.001	0.012*
Job aspirations (scale)	0.012	0.018*	-0.004	-0.003	0.004	0.007	0.010*	0.000	0.009*	0.005
Behavioural difficulties and bullying										
Experience of bullying (scale)	-0.132**	-0.058**	0.004	0.001	0.007**	-0.010*	0.001	0.016**	0.007	-0.010**
Education behavioural difficulties (scale)	-0.123**	-0.073**	0.006**	0.003						
Anti-social behaviour (scale)	-0.057**	-0.045**	0.000	-0.001						
Frequent smoker	-0.292**	-0.233**	0.026	0.017						
Drinks regularly	0.013	-0.011	0.005	0.005						
Ever tried cannabis	0.007	-0.071**	0.004	0.005						

	Education outcomes				Behavioural outcomes					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	KS4 normalised score	KS4 value-added	NEET (age 17)		Frequent smoker (age 16)	Frequent drinker (age 16)	Ever tried cannabis (age 16)	Involved in anti-social behaviour in last year (age 16)	Played truant in last year (age 16)	Participate in positive activities (age 14)
			Without KS4	With KS4						
'Good citizen' behaviours and attitudes										
Teacher-child relations (scale)	0.027	0.059**	0.004	0.003	-0.025**	-0.036**	-0.102**	-0.080	-0.086**	0.004
Reads regularly in spare time	0.082**	0.020	-0.007	-0.006						
Attends religious classes or courses	0.024	-0.006	-0.008	-0.007						
Participates in positive activities	0.067*	0.007	-0.037**	-0.032**						
Change between Wave 1 and Wave 3										
Starts getting good marks	-0.027	-0.018	0.005	0.003	-0.004	-0.003	0.031	-0.004	-0.003	
Stops getting good marks	-0.217**	-0.109**	0.015*	0.01	0.012*	0.029**	0.029*	0.030**	0.016	
Starts liking school	-0.002	0.028	-0.010*	-0.009*	-0.006	-0.020**	-0.003	-0.004	-0.008	
Stops liking school	-0.057**	-0.052**	0.008	0.005	0.019**	0.021**	0.048**	0.062	0.079**	
Starts finding school valuable	-0.042	0.001	0.015*	0.015*	-0.001	-0.001	-0.012	0.007	-0.015	
Stops finding school valuable	-0.083**	-0.050**	0.011*	0.008	0.010*	0.012	0.028**	0.028**	0.020*	
Starts wanting to stay in school beyond age 16	-0.013	0.043	-0.004	-0.003	-0.009	-0.013	-0.002	-0.009	-0.027	
Stops wanting to stay in school beyond age 16	-0.037	-0.022	0.009	0.008	0.008	0.019*	0.027**	0.020**	0.022*	
Starts thinking it likely that they will apply to HE	0.216**	0.103**	-0.009	-0.004	-0.015**	0.01	-0.019	-0.016	-0.021	
Stops thinking it likely that they will apply to HE	-0.302**	-0.161**	0.036**	0.023**	0.030**	0.007	0.013	0.039**	0.029*	
Starts being bullied frequently	-0.047	-0.022	0.017	0.011	0.009	0.013	0.005	0.042*	0.062**	
Stops being bullied frequently	0.03	0.051*	0.003	0.003	0.005	-0.001	-0.012	-0.024**	-0.001	
Starts playing truant	-0.063**	-0.057**	0.004	0.003						
Starts being suspended from school	-0.168**	-0.122**	0.006	0.002						
Starts being expelled from school	-0.274**	-0.320**	-0.021**	-0.021**						
Starts smoking cannabis	-0.045*	-0.093**	0.005	0.003						
Stops smoking cannabis	0.063	0.086	-0.005	-0.005						
Starts smoking cigarettes frequently	-0.169**	-0.146**	0.012	0.007						
Stops smoking cigarettes frequently	-0.025	0.163	-0.013	-0.013						
Starts drinking regularly	0.053*	0.051**	0.003	0.004						
Stops drinking regularly	0.006	-0.01	0.004	0.002						
Starts getting involved in anti-social behaviour	-0.043	-0.034	0.012	0.009						
Stops getting involved in anti-social behaviour	0.001	0.027	-0.002	-0.002						
Starts liking their teachers	0.071*	0.066**	-0.004	-0.002	0.005	0.005	0.014	0.005	-0.002	

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	Education outcomes				Behavioural outcomes					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	KS4 normalised score	KS4 value-added	NEET (age 17)		Frequent smoker (age 16)	Frequent drinker (age 16)	Ever tried cannabis (age 16)	Involved in anti-social behaviour in last year (age 16)	Played truant in last year (age 16)	Participate in positive activities (age 14)
			Without KS4	With KS4						
Stops liking their teachers	-0.044	-0.039	0.009	0.01	0.009	0.016	0.012	0.019	0.018	
Starts playing sport in their spare time	-0.007	0.013	-0.010*	-0.009*						
Stops playing sport in their spare time	-0.052*	-0.053**	-0.001	-0.003						
Starts reading in their spare time	0.017	0.036	-0.002	-0.003						
Stops reading in their spare time	-0.057**	0.001	-0.001	-0.001						

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6. Explaining the socio-economic gaps in teenage education and behavioural outcomes

Summary of Chapter 6

This chapter examines the extent to which the socio-economic gaps in education and behavioural outcomes that we set out in Chapter 3 can be explained by a range of different factors (or "transmission mechanism"). Our key findings are:

- **Parental education**: differences in parental education seem to play a key role in explaining why teenagers from poor families tend to have worse educational attainment than teenagers from richer families. Parental education also seems to play a somewhat smaller role in explaining why young people from poor backgrounds are more likely to engage in a range of risky behaviours than young people from richer backgrounds.

- **Other family background characteristics**: the other family background characteristics which seem to be particularly important in explaining socio-economic gaps in education and behavioural outcomes are lone parent status and parents' health status at age 14.

- **Attitudes and behaviours**: the young person's attitudes and behaviours seem to play a key role in explaining the socio-economic gaps in education and behavioural outcomes that we observe. In general, they help us to explain differences between young people from the richest and poorest backgrounds more than they help us to explain differences between young people from the middle and poorest backgrounds. The attitudes and behaviours of the young person's main parent play a somewhat smaller role in explaining both education and behavioural outcomes.

- **Material resources**: like differences in parental education, differences in the availability of material resources for educational purposes seem to explain a significant proportion of the variation in educational attainment amongst individuals from different socio-economic backgrounds, but play a much smaller role in explaining socio-economic differences in behavioural outcomes.

- **School quality and composition**: differences in school quality and composition seem to play some role in explaining why young people from poor backgrounds tend to have worse education and behavioural outcomes than young people from rich backgrounds, particularly when we are considering differences between the richest and poorest fifths of our sample.

- **Neighbourhood composition and deprivation**: by contrast, differences in neighbourhood composition and deprivation levels do not help to explain why teenagers from poor families tend to have worse educational attainment than teenagers from rich families, although they play some role in explaining socio-economic differences in some behavioural outcomes.

In this chapter, we examine the extent to which the socio-economic gaps in education and behavioural outcomes that we set out in Chapter 3 can be explained by a range of different factors (or "transmission mechanisms"). These factors are intended to capture differences in the home, school and local environments to which young people from different socio-economic backgrounds have been exposed, as well as differences in the attitudes and behaviours of young people themselves. (Differences between young people from different socio-economic backgrounds in terms of these factors were set out in Chapter 4.)

We do this using a simple "pathways analysis" (described in detail in Chapter 2). Our starting point is the raw relationship between socio-economic position (SEP) and education and behavioural outcomes. Such SEP 'gaps' were shown graphically in Chapter 3, and can also be estimated using the following equation, in which β_1 can be thought of as the *direct* effect of socio-economic position on education and behavioural outcomes:

(1) $Y = \alpha + \beta_1 SEP + \varepsilon$

To this simple model, we successively add other groups of explanatory factors and observe the extent to which the socio-economic gaps (represented by β_1) are reduced. The extent to which β_1 is reduced following the inclusion of each of these groups represents the extent to which socio-economic position influences education and behavioural outcomes *indirectly* through its relationship with these other factors.

The basic intuition behind this approach is as follows: if the magnitude of β_1 is reduced when we include a new group of variables in the model, this suggests that these variables may plausibly represent a *transmission mechanism* through which socio-economic position indirectly affects teenage outcomes. This is because if young people with similar values of such variables are compared, the direct socio-economic gap is reduced. For example, our analysis shows that after adding controls for school quality and composition, the gap in Key Stage 4 test scores between the richest and poorest pupils is reduced by 21% (compared to when we only control for parental education and demographic and other family background characteristics) (see Column 4 of Table 6.2 below).

Interpreting the tables

The regression specifications we use to implement this approach are illustrated in a look-up table (Table 6.1) below.

In each of our tables of results, we show the effect of being in the fourth, third, second and top SEP quintiles relative to being in the bottom SEP quintile (the "omitted category").

We start by showing the 'raw' socio-economic gap in outcomes in Column 1. We then show the revised SEP gradients, *as a percentage of the 'raw' gaps*, after successively adding parental education (Column 2) and demographic and other family background characteristics (Column 3) to our model.[41]

The specification shown in Column 3 then becomes the 'base' specification, onto which we add various groups of explanatory variables, shown in Columns 4 to 8. Each column shows the gap in outcomes between the top, second, third and fourth SEP quintiles relative to the bottom SEP quintile when a different set of explanatory factors is added to the model. The explanatory factors that we consider each represent a different possible transmission mechanism through which "family background"[42] might affect child outcomes. These are:

    (i)   schools;

    (ii)   neighbourhoods;

    (iii) parental attitudes and behaviours;

    (iv) material resources, and

    (v)   young people's attitudes and behaviours.

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[41] In some cases, these percentages may exceed 100%, where the coefficient after adding in other controls exceeds the raw coefficient. This suggests that if all young people were the same in terms of these additional controls, then the SEP gradient would be larger than its original value suggested. In practice, this has been particularly likely to occur where the raw coefficients are small and insignificant.

[42] We use the term "family background" to refer to socio-economic position, parental education, and demographic and other family background characteristics together, as suggested by our conceptual model outlined in Chapter 2.

In each of our tables of results, we show the SEP gradients in Columns 4 to 8 in two different ways:

- First, we show them *as a percentage of the 'raw' SEP gradients* (i.e. as a percentage of Column 1);

- Second, we show them *as a percentage of the SEP gradient after controlling for differences in parental education, demographic and other family background characteristics* (i.e. as a percentage of Column 3).

Both of these methods allows us to examine, in slightly different ways, the extent to which each transmission mechanism mediates the raw relationship between socio-economic position and education and behavioural outcomes, after fully accounting for differences in family background between young people from rich and poor families.
Column 9 shows the SEP gradient that remains after including all of our explanatory variables in the model together.

Finally, Column 10, which is only relevant when we are considering socio-economic differences in the likelihood of being not in education, employment or training (NEET) at age 17, shows the SEP gradient that remains after controlling for all explanatory variables together, plus Key Stage 4 standardised test scores. The idea here is to examine the extent to which differences in the probability of becoming NEET between young people from rich and poor backgrounds operate through attainment at Key Stage 4.

We also show the 'R-squared' associated with each specification: this is a way of summarising the proportion of the variance in outcomes that is explained by the factors we include in our model.

Table 6.1   Regression specifications used in this analysis

	Controls									
	None	P Edu	Fam	Sch	Nei	MP	M Res	YP	All	KS4
Parental education		√	√	√	√	√	√	√	√	√
Family background characteristics			√	√	√	√	√	√	√	√
School characteristics				√					√	√
Neighbourhood characteristics					√				√	√
Main parent attitudes and behaviours						√			√	√
Material resources							√		√	√
Young person attitudes and behaviours								√	√	√
Key Stage 4 standardised test scores										√
Equations shown in Chapter 2	*(1)*		*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	

Notes: the variables included in each of these groups of explanatory factors are summarised in Chapter 2 (and described in detail in Appendix 1). The addition of Key Stage 4 standardised test scores is only relevant when we are modelling the relationship between socio-economic position and the probability of being NEET at age 17.

A worked example

Here, we take the reader through a worked example, choosing Table 6.2 for this purpose.

The first column of Table 6.2 shows that teenagers in the top SEP quintile score 1.151 standard deviations higher in Key Stage 4 tests than those in the bottom SEP quintile. Similarly, teenagers in the middle (3rd) SEP quintile score 0.636 standard deviations higher in Key Stage 4 tests than those in the bottom SEP quintile. The R-squared statistic shows that the SEP quintiles alone explain 16% of the variation in Key Stage 4 test scores.

After accounting for differences in parental education, the gap in Key Stage 4 test scores between the richest and poorest fifths of our sample is reduced to 75% of its raw value (Column 2), and to 55% of its value after additionally controlling for other family background and demographic factors (Column 3).

After additionally controlling for differences in the attitudes and behaviours of the young person, the gap in Key Stage 4 test scores falls to 27% of its raw value, or 48% of its value after controlling for parental education, and demographic and other family background characteristics only (Column 8). The R-squared statistic shows that, using these variables, we are now explaining 53% of the variation in Key Stage 4 test scores.

Controlling for all of the possible transmission mechanisms in our model together reduces the gap in Key Stage test scores between the richest and poorest fifths of our sample to 13% of its original level (or 24% of its value after controlling for parental education, and demographic and other family background characteristics) (Column 9). The R-squared statistic shows that we are able to explain 58% of the variation in Key Stage 4 test scores using all of these explanatory factors.

Results

Here, we focus on explaining the differences in education outcomes at ages 16/17 between teenagers from rich and poor backgrounds, specifically:

- Attainment at Key Stage 4;

- Progress between Key Stage 3 and Key Stage 4;

- Not in education, employment or training (NEET) at age 17.

The results for education outcomes at age 14 and behavioural outcomes at ages 14 and 16 can be found in Appendix 6.

Explaining differences in attainment at Key Stage 4

Table 6.2 shows the results from our "pathways analysis" considering the relationship between socio-economic position and Key Stage 4 standardised test scores.

Table 6.2   Explaining the socio-economic gradient in Key Stage 4 standardised test scores

	Standardised Key Stage 4 Score								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	0.344**	83%**	55%**	56%**	52%**	49%**	33%**	38%**	26%**
3rd SEP quintile	0.636**	82%**	57%**	50%**	54%**	47%**	38%**	34%**	21%**
4th SEP quintile	0.848**	79%**	55%**	46%**	50%**	40%**	37%**	30%**	17%**
Top SEP quintile	1.151**	75%**	55%**	44%**	51%**	36%**	38%**	27%**	13%**
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			0.189**	102%**	95%**	88%**	60%**	67%**	46%**
3rd SEP quintile			0.363**	88%**	94%**	83%**	66%**	59%**	36%**
4th SEP quintile			0.465**	83%**	92%**	73%**	67%**	54%**	30%**
Top SEP quintile			0.635**	79%**	92%**	65%**	70%**	48%**	24%**
R-squared	0.16	0.19	0.28	0.36	0.28	0.42	0.31	0.53	0.58
	Controls								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
Parental education		√	√	√	√	√	√	√	√
Family background			√	√	√	√	√	√	√
Schools				√					√
Neighbourhoods					√				√
MP As & Bs						√			√
Material resources							√		√
YP As & Bs								√	√

Notes: * indicates that the underlying coefficient is significantly different from zero at the 5% level; ** indicates it is significant at the 1% level.

Table 6.2 reveals that:

- **Raw gaps**: as shown in Chapter 3, there are very large raw socio-economic gaps in Key Stage 4 test scores (Column 1). For example, students in the top SEP quintile score, on average, 1.151 standard deviations higher at Key Stage 4 than students in the bottom SEP quintile. This difference equates to around 180 GCSE points, which is approximately equivalent to the difference between getting 8 GCSEs at Grade A* (for individuals in the top quintile) and 8 GCSEs at Grade D (for individuals in the bottom quintile) (see Chapter 3 and Appendix 3).

- **Parental education** has a key role to play in explaining why teenagers from poor families tend to perform worse at Key Stage 4 than teenagers from richer families. Column 2 shows that the relationship between socio-economic position and Key Stage 4 scores is substantially reduced once we add parental education to our model. For example, the gap in standardised Key Stage 4 scores between teenagers in the top and bottom SEP quintiles is reduced to 75% of its original value (that is, it is reduced by 0.284 standard deviations to 0.867 standard deviations) once we include controls for parental education. This reduction is equivalent to around 44 GCSE points, or the difference between getting 8 GCSEs at Grade A* and 8 GCSEs at Grade A.

- **Attitudes and behaviours**: amongst our potential transmission mechanisms, the young person's attitudes and behaviours (Column 8) seem to play the greatest role in explaining why children from poor families tend to score lower at Key Stage 4 than children from richer families. (This is closely followed by the role of the attitudes and behaviours of the young person's main parent, which we know to be highly correlated with the attitudes and behaviours of the young person themselves - see Appendix 4 for details.)

  For example, the inclusion of these characteristics reduces the gap in Key Stage 4 test scores between teenagers in the top and bottom SEP quintiles to 48% of its value after controlling for parental education and demographic and other family background characteristics (Column 8). This is a reduction of 0.330 standard deviations (or 51 GCSE points), slightly more than the reduction observed following the addition of parental education to our model (described above).

  Similarly, the R-squared increases from 28% (after controlling for parental education and demographic and other family background characteristics in Column 3) to 53% (after additionally controlling for the attitudes and behaviours of the young person in Column 8), suggesting that the young person's attitudes and behaviours explain a substantial proportion of the variation in Key Stage 4 test scores.

  The young person's attitudes and behaviours also appear to be more important in explaining the difference in test scores between students at the top and bottom of the SEP distribution than they are at explaining the difference between students at the middle and bottom of the SEP distribution. For example, while the inclusion of these characteristics reduces the gap in Key Stage 4 test scores between students in the top and bottom SEP quintiles to 48% of its value after controlling for parental education and demographic and other family background characteristics (discussed above), it only reduces the gap in Key Stage 4 test scores between students in the middle and bottom SEP quintiles to 59% of its value after controlling for parental education and demographic and other family background characteristics.

  The most likely explanation for this is because there are much larger differences in attitudes and behaviours between young people in the top and bottom SEP quintiles than there are between young people in the fourth and bottom SEP quintiles. This is supported by some of the results highlighted in Figure 4.5 in Chapter 4, which shows (for example) that there is a much greater difference in the probability of the young person reporting that they are likely to apply to higher education (and likely to get in) between the richest two fifths of our sample than there is between the poorest three fifths.

- **Schools**: school quality and composition (Column 4) also help to explain the gap in Key Stage 4 test scores between teenagers in the richest and poorest fifths of our sample, but are less important in explaining differences in attainment between the poorest children and those in the middle of the SEP distribution.

- **Material resources**: the availability of material resources for educational purposes (Column 7) helps to explain why teenagers from poor backgrounds tend to score lower at Key Stage 4 than teenagers from richer backgrounds. In this case, the availability of material resources appears to play a greater role in explaining socio-economic gaps in Key Stage 4 test scores between teenagers in the middle and poorest fifths of our sample, than in explaining gaps between teenagers in the richest and poorest fifths of our sample.

- **Neighbourhoods**: by contrast, neighbourhood composition and deprivation do not appear to be relevant in explaining why teenagers from poor families tend to perform worse at Key Stage 4 than teenagers from rich families (Column 5).

- **Overall**: the final column of Table 6.2 includes all of these factors in the same model. First, it is important to note that the reduction in the socio-economic gradient between Columns 1 and 9 is smaller than the cumulative reduction in the socio-economic gradient implied by the differences shown in each of Columns 3 to 8. This is likely to be because there are some strong correlations between our potential transmission mechanisms (for example, between whether the young person thinks that they will apply to university and whether their main parent thinks that they will go to university - see Appendix 4 for details).

  The final column of Table 6.2 does show, however, that the rich set of factors in our model explain a large proportion of the difference in Key Stage 4 test scores between teenagers from different socio-economic backgrounds. For example, the gap in test scores between students from the richest and poorest fifths of our sample is reduced to 13% of its raw value (and the gap in test scores between students from the middle and poorest fifths of our sample reduced to 21% of its raw value) once differences in all of these factors are taken into account.

Explaining differences in progress between Key Stage 3 and Key Stage 4

Table 6.3 shows the relationship between socio-economic position and Key Stage 4 standardised scores, having controlled for attainment at Key Stage 3. This can be thought of as a "value-added" model, which allows us to explain differences between children from rich and poor families in terms of academic progress between Key Stage 3 and Key Stage 4.

Table 6.3 shows that:

- **Raw gaps**: young people from poorer backgrounds continue to fall further behind young people from richer backgrounds as they progress from Key Stage 3 to Key Stage 4. However, as might be expected, there is a much smaller socio-economic gradient in test scores after accounting for prior attainment than there is in the raw scores (shown in Table 6.2). For example, the gap in Key Stage 4 test scores between teenagers from the richest and poorest fifths of our sample *after controlling for attainment at Key Stage 3* is only 0.221 standard deviations, compared with 1.151 standard deviations without controlling for Key Stage 3 attainment.[43]

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[43] Comparing the R-squared in Column 1 of Table 6.2 (16%) with the R-squared in Column 1 of Table 6.3 (61%) provides an indication of the additional explanatory power from the inclusion of controls for Key Stage 3 attainment.

Table 6.3   Explaining the socio-economic gradient in Key Stage 4 standardised test scores (controlling for prior attainment)

	Standardised Key Stage 4 Score (with Key Stage 3 control)								
	(1) *None*	(2) *P Edu*	(3) *Fam*	(4) *Sch*	(5) *Nei*	(6) *MP*	(7) *M Res*	(8) *YP*	(9) *All*
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	0.088**	109%**	78%**	100%**	83%**	78%**	48%	66%**	52%*
3rd SEP quintile	0.150**	105%**	82%**	91%**	85%**	78%**	53%**	60%**	42%**
4th SEP quintile	0.189**	104%**	77%**	86%**	80%**	68%**	50%**	51%**	37%**
Top SEP quintile	0.221**	101%**	78%**	85%**	80%**	59%**	49%**	43%**	29%*
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			0.069**	128%**	106%**	100%**	61%	83%**	64%*
3rd SEP quintile			0.123**	111%**	104%**	95%**	65%**	72%**	50%**
4th SEP quintile			0.146**	112%**	103%**	88%**	64%**	64%**	45%**
Top SEP quintile			0.172**	109%**	103%**	76%**	63%**	54%**	36%*
R-squared	0.61	0.61	0.63	0.65	0.63	0.65	0.64	0.69	0.71
	Controls								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
Parental education		√	√	√	√	√	√	√	√
Family background			√	√	√	√	√	√	√
Schools				√					√
Neighbourhoods					√				√
MP As & Bs						√			√
Material resources							√		√
YP As & Bs								√	√

Notes: * indicates that the underlying coefficient is significantly different from zero at the 5% level; ** indicates it is significant at the 1% level.

- **Parental education**: while parental education seemed to play a key role in explaining socio-economic differences in Key Stage 4 test scores, it does not help to explain why teenagers from rich families make more progress between Key Stage 3 and Key Stage 4 than teenagers from poor families. This is shown by the fact that relationships between socio-economic position and Key Stage 4 test scores actually *increase* once we add parental education to our model (Column 2).

- **Demographic and other family background characteristics**: by contrast, the inclusion of demographic and other family background characteristics does help to explain why young people from poor families tend to make less progress between Key Stage 3 and Key Stage 4 than young people from rich families. For example, the gap in test scores between teenagers from the richest and poorest fifths of our sample is reduced to 78% of its raw value after controls for parental education, and demographic and other family background characteristics have been added (Column 3). Of particular importance in explaining the SEP gaps in Key Stage 4 test scores seem to be differences in family structure (including lone parent status, and number of older and younger siblings) and parents' health status at age 14.

- **Attitudes and behaviours**: as was the case for Key Stage 4 test scores without controlling for prior attainment (shown in Table 6.2), the young person's attitudes and behaviours appear to play the greatest role in explaining why young people from poor families tend to make less progress between Key Stage 3 and Key Stage 4 than young people from richer families (Column 8). By contrast, the attitudes and behaviours of the young person's main parent appear somewhat less important (Column 6).

  For example, the addition of controls for the young person's attitudes and behaviours reduces the gap in Key Stage 4 test scores between teenagers in the top and bottom SEP quintiles by 46% (compared to its value after controlling for parental education, and demographic and other family background characteristics). This is equivalent to a reduction of 0.079 standard deviations (or around 12 GCSE points).

- **Material resources**: differences in the availability of material resources for educational purposes also seem to play a key role in explaining why teenagers from poor families tend to make less progress between Key Stage 3 and Key Stage 4 than teenagers from rich families. For example, Column 7 shows that, after accounting for differences in material resources, the gap in Key Stage 4 test scores between young people from the richest and poorest fifths of our sample falls by 37% (0.064 standard deviations) compared to its value after controlling for parental education, and demographic and other family background characteristics.

- **Schools and neighbourhoods**: by contrast, neither school quality and composition nor neighbourhood composition and deprivation help to explain why teenagers from poor families make less progress between Key Stage 3 and Key Stage 4 than teenagers from rich families. This is at odds with our findings for schools when we did not control for prior attainment (discussed above), which suggests that while children from different backgrounds tend to attend different schools, those schools do not make a significant difference to the rates of progress of their pupils between the ages of 14 and 16.

- **Overall**: the final column of Table 6.3 shows that, taken together, the rich set of factors described above explain less of the variation in Key Stage 4 standardised test scores having controlled for prior attainment than they do without such controls (see Table 6.2). For example, the gap in test scores between teenagers from the top and bottom SEP quintiles is reduced to 29% of its raw value when we control for prior attainment compared to 13% when we do not. Furthermore, these factors seem to be more successful at explaining the socio-economic gaps in Key Stage 4 test scores between individuals in the top and bottom SEP quintiles than they are at explaining the socio-economic gaps in Key Stage 4 test scores between individuals in the third and bottom SEP quintiles.

Explaining differences in the probability of being NEET at age 17

Table 6.4 shows how the relationship between socio-economic position and the probability of being NEET (not in education, employment or training) at age 17 changes once we add other factors to our model.

Table 6.4   Explaining the socio-economic gradient in the probability of being NEET at age 17

	Not in education, employment or training (NEET)									
	(1) *None*	(2) *P Edu*	(3) *Fam*	(4) *Sch*	(5) *Nei*	(6) *MP*	(7) *M Res*	(8) *YP*	(9) *All*	(10) *KS4*
	Gap as a % of raw SEP gradient (none)									
2nd SEP quintile	-0.031**	90%**	71%**	68%**	68%**	65%**	58%**	52%**	45%**	39%**
3rd SEP quintile	-0.040**	88%**	63%**	53%**	58%**	53%**	50%**	38%**	30%**	25%*
4th SEP quintile	-0.056**	86%**	66%**	54%**	61%**	57%**	54%**	38%**	30%**	25%**
Top SEP quintile	-0.081**	89%**	75%**	62%**	69%**	62%**	64%**	44%**	36%**	32%**
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)									
2nd SEP quintile			-0.022**	95%**	95%**	91%**	82%**	68%**	64%**	55%**
3rd SEP quintile			-0.025**	84%**	92%**	84%**	80%**	60%**	48%**	40%*
4th SEP quintile			-0.037**	81%**	92%**	86%**	81%**	57%**	46%**	38%**
Top SEP quintile			-0.061**	82%**	92%**	82%**	85%**	59%**	48%**	43%**
Pseudo R-squared	0.06	0.07	0.11	0.14	0.12	0.14	0.12	0.22	0.25	0.27
	Controls									
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*	*KS4*
Parental education		√	√	√	√	√	√	√	√	√
Family background			√	√	√	√	√	√	√	√
Schools				√					√	√
Neighbourhoods					√				√	√
MP As & Bs						√			√	√
Material resources							√		√	√
YP As & Bs								√	√	√
Key Stage 4 scores										√

Notes: * indicates that the underlying coefficient is significantly different from zero at the 5% level; ** indicates it is significant at the 1% level.

Table 6.4 reveals that:

- **Raw gaps**: there are large raw socio-economic gaps in the likelihood of being NEET at age 17. For example, teenagers in the richest fifth of our sample are 8.1 percentage points less likely to be NEET at age 17 than teenagers in the poorest fifth of our sample.[44] Nonetheless, socio-economic position explains a lower proportion of the variance in the probability of being NEET (6%) than in standardised Key Stage 4 test scores (16%) (see Table 6.2).

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[44] This gap differs somewhat to that shown in Figure 3.2 in Chapter 3. The apparent discrepancy arises because Figure 3.2 plots the average level of various outcomes for different SEP quintiles (which match the raw gaps that an Ordinary Least Squares model would show), while Table 6.4 presents estimates of the marginal effects from a probit model, estimated at the mean value of the explanatory variables. The different estimates thus arise due to differences in the assumed underlying functional form of the two models.

- **Family background**: differences in parental education and demographic and other family background characteristics between young people from rich and poor backgrounds seem to be less important in explaining socio-economic differences in the probability of being NEET at age 17 than they are in explaining socio-economic differences in standardised Key Stage 4 test scores (without controlling for prior achievement). For example, the addition of parental education and demographic and other family background characteristics (Column 3) reduces the gap in the probability of being NEET at age 17 between teenagers from the richest and poorest fifths of our sample by 25% (to 6.1 percentage points), compared to a 45% reduction in terms of standardised Key Stage 4 test scores (see Column 3 of Table 6.2).

- **Young people's attitudes and behaviours**: as was the case for Key Stage 4 test scores, the young person's attitudes and behaviours appear to play a key role in explaining why teenagers from rich backgrounds are significantly less likely to be NEET at age 17 than teenagers from poorer backgrounds. For example, the addition of such characteristics to our model reduces the gap in the probability of being NEET between individuals in the top and bottom SEP quintiles by 41% (to 3.6 percentage points) compared to the gap after including parental education and demographic and other family background characteristics (Column 8).

- **Material resources**: as might be expected, the availability of material resources for educational purposes play a somewhat less important role in terms of explaining socio-economic differences in the likelihood of being NEET at age 17 than they do in explaining socio-economic differences in Key Stage 4 test scores. For example, Column 7 of Table 6.3 shows that adding controls for material resources to our model reduces the relationship between socio-economic position and the probability of being NEET for individuals in the top and bottom SEP quintiles by 15% (to 5.2 percentage points), while it reduces the relationship between socio-economic position and Key Stage 4 test scores (having controlled for prior attainment) by 37% (see Column 7 of Table 6.3).

- **Overall**: Column 9 of Table 6.3 illustrates the proportions of the socio-economic gaps in the probability of being NEET that cannot be explained by differences between teenagers from richer and poorer families in terms of all the factors in our model taken together. In general, these gaps remain larger than for Key Stage 4 test scores, particularly without controls for prior attainment (shown in Table 6.2).

  For example, the proportion of the socio-economic gap in the probability of being NEET between teenagers in the richest and poorest fifths of our sample that cannot be explained by other factors in our model is 36% (compared with 13% for standardised Key Stage 4 scores). We are also able to explain a lower proportion of the variation in the probability of being NEET (25%) than in standardised Key Stage 4 test scores (58%).

- **Plus Key Stage 4**: moreover, these figures are not substantially altered by the addition of controls for attainment at Key Stage 4: the gap between the top and bottom SEP quintiles is reduced by only a further 4 percentage points (to 32%) and the R-squared only rises to 27%. This suggests that, *once we have taken into account all of the factors described above*, attainment at Key Stage 4 does not help to explain much *more* of the *gap* in outcomes between young people from rich and poor backgrounds (Column 10).[45]

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[45] It should be noted that this does not contradict our finding in Chapter 5 that many of the young person's attitudes and behaviours appear to affect the probability of being NEET only indirectly through differences in educational attainment at GCSE.

Explaining differences in behavioural outcomes at age 16

In this section, we briefly summarise the extent to which the different transmission mechanisms we consider can explain socio-economic gaps in a range of behavioural outcomes at age 16. Full results can be found in Appendix 5.

- **Parental education** generally plays a smaller role in explaining socio-economic differences in behavioural outcomes than it does in explaining socio-economic differences in education outcomes. For example, the 'raw' SEP gaps suggest that young people from the richest fifth of our sample are 7.6 percentage points less likely to smoke frequently than young people from the poorest fifth of our sample. This gap is reduced by just 9% (to 6.9 percentage points) following the addition of parental education to our model (compared with 25% for Key Stage 4 test scores).

- **Demographic and other family background characteristics**: in most cases, demographic and other family background characteristics tend to play a relatively large role in explaining why young people from poor backgrounds are, on average, more likely to engage in a range of risky behaviours than young people from rich backgrounds. For example, following the addition of these characteristics to our model of the probability of being a frequent smoker (described above), the SEP gradients fall to just 66% of their raw value, such that young people from the richest fifth of our sample are now 5.0 percentage points less likely to smoke frequently than young people from the poorest fifth of our sample. Interestingly, the same characteristics that seemed to be particularly important in explaining socio-economic gaps in education outcomes - namely lone parent status and parents' health status - also play a key role in explaining socio-economic gaps in the likelihood of being a frequent smoker.

- **Schools**: as was the case for education outcomes, school quality and composition help to explain differences in behavioural outcomes between individuals at the top and bottom of the SEP distribution, but do not help to explain differences between individuals at the middle and bottom of the SEP distribution. For example, young people from the richest (middle) fifth of our sample are 6.4 (3.6) percentage points less likely to play truant at age 16 than young people from the poorest fifth of our sample after controlling for differences in parental education and demographic and other family background characteristics. After adding controls for school quality and composition to our model, the gap between the top and bottom SEP quintiles is reduced by 19% (to 5.2 percentage points), while the gap between the middle and bottom SEP quintiles is only reduced by 9% (to 3.3 percentage points).

- **Neighbourhoods**: in contrast to the results for education outcomes, we find that differences in neighbourhood composition and deprivation are about as effective as differences in school quality and composition at explaining why young people from poor backgrounds are more likely to engage in a range of risky behaviours than young people from rich backgrounds. This suggests that, in the case of behavioural outcomes at least, the peers with which young people associate may be an important factor in determining their own behaviour. (This issue will be discussed in more detail in Chapter 7.)

- **Material resources**: it is perhaps unsurprising that the availability of material resources for educational purposes does not seem to play much of a role in explaining why young people from poor backgrounds are more likely to engage in a range of risky behaviours than young people from rich backgrounds.

- **Parents' attitudes and behaviours**: similarly, while the attitudes and behaviours of the young person's main parent were almost as important as the young person's own attitudes and behaviours in explaining socio-economic differences in educational attainment, they seem to be much less important in explaining behavioural outcomes.

- **Young people's attitudes and behaviours**: by contrast, the young person's attitudes and behaviours seem to play a key role in explaining socio-economic gaps in behavioural outcomes, just as they did for education outcomes. For example, 16 year olds from poor backgrounds are 5.0 percentage points less likely to smoke frequently than 16 year olds from rich backgrounds (after controlling for family background), while this gap has fallen 62% (to 1.9 percentage points) once we add controls for differences in the young person's attitudes and behaviours. In contrast to the results for education outcomes, these characteristics seem to reduce the gap between the middle and bottom of the SEP distribution almost as much as they reduce the gap between the top and bottom of the SEP distribution.

- **Overall**: in many cases, the difference in behavioural outcomes between 16 year olds from rich families and 16 year olds from poor families are small and insignificant after we include controls for all of the rich set of variables in our model. This contrasts with our findings for education outcomes, for which significant socio-economic gaps remain after allowing for differences in all of these characteristics.

To conclude, this chapter has identified a number of factors – particularly parental education, and young people's attitudes and behaviours – as being important in explaining why teenagers from rich backgrounds tend to have higher educational attainment and are less likely to engage in a range of risky behaviours than teenagers from poor backgrounds. In the next chapter, we seek to estimate some more robust causal relationships between some of these factors and young people's education and behavioural outcomes.

7.   Measuring causal impacts of some key transmission mechanisms: parental education and peer composition

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Summary of Chapter 7

This chapter describes our work seeking to uncover the causal impact of parental education and peer group composition on teenage education and behavioural outcomes.
Using instrumental variables, control function and first differences methods, we find that:

- **Parental education**: the children of mothers with at least GCSE-level (or equivalent) qualifications have significantly higher Key Stage test scores than the children of mothers with no qualifications. Furthermore, we can be confident in asserting that there is a causal relationship between maternal education levels and children's test scores. This suggests that interventions which raise women's education levels may yield an intergenerational pay-off in terms of their children's education, in addition to any benefits that may accrue to the individuals themselves.

- **Peer group composition**: we find no impact of changes in school and neighbourhood socio-economic and ethnic composition on Key Stage test scores, although there appears to be some impact of school-level deprivation on certain behavioural outcomes. This suggests that policies which place children among more affluent peers - for example, school vouchers targeted at poorer pupils - may result in an improvement in their behaviour.

The results described in Chapters 5 and 6 used simple linear regression analysis to document the relationships between socio-economic position and teenage education and behavioural outcomes, and showed how these relationships can be mediated by a range of other factors, including parental education, school and neighbourhood peer group characteristics and the young person's attitudes and behaviours.

As discussed in Chapter 2, however, there are a number of reasons - particularly related to the possibilities of unobserved factors and reverse causality - why this type of regression analysis alone does not allow us to say whether differences in these factors *cause* the differences in outcomes that we observe. This is an important point, because one would not necessarily wish to base policy conclusions on the evidence of correlations alone.

In this chapter, we make use of a range of other econometric techniques (described in detail in Chapter 2) to try to uncover the causal impact of selected factors on teenage education and behavioural outcomes. The factors we consider are:

- Mother's education (Section 7.1);

- School and neighbourhood peer group composition (Section 7.2).

Appendix 7 describes some less successful analysis we carried out in an attempt to establish a causal relationship between young people's attitudes and behaviours and Key Stage test scores.

7.1 Estimating the causal impact of mother's education on child outcomes

Education plays a pivotal role in the transmission of advantage and disadvantage from one generation to the next. Our main analysis suggests that differences in parental education account for a large proportion of the attainment gap between young people from different socio-economic backgrounds (see Chapter 6).
This section describes some additional work we have done, which seeks to examine more closely the role of parental education in determining child outcomes. We have undertaken this work because the simple correlations between parental education and child outcomes that we have estimated in our main analysis do not tell us whether these relationships are causal; in other words, they do not tell us whether increasing the education level of parents would lead to better attainment for their children.

The work we describe here represents an attempt to estimate the impact of additional parental education on children's educational attainment and behavioural outcomes. It does so by exploiting the fact that a large proportion of the parents of LSYPE cohort members were affected by the raising of the school-leaving age (RoSLA) from age 15 to age 16, which was introduced in September 1972.

Changes to (or differences in) the age at which children leave school have been used quite widely elsewhere as an instrument for their education level when estimating a number of important relationships, including the returns to education/years of schooling (see Harmon & Walker (1995) for the UK, and Angrist & Krueger (1991) for the US), and the effect of parental education on child attainment and post-compulsory schooling decisions (see Chevalier et al. (2005) for the UK and Black et al. (2005) for Norwegian evidence).

Our own analysis follows this literature, taking an instrumental variables (IV) approach (see Chapter 2 for details). The basic intuition behind this approach is that some of the parents who were exposed to the RoSLA reform would have been 'forced' to stay in school for another year rather than attend as a matter of choice. For these parents, therefore, it is unlikely that the extra education they received as a result of the change in the law will be correlated with unobserved factors (e.g. their own intelligence or determination) that may also affect their child's future outcomes. We can thus use the variation in parental education generated by the RoSLA policy change to identify the causal impact of parental education on child outcomes.

We also use control function analysis (see Chapter 2 for details) to produce estimates of the causal impact of parental education on child outcomes that are applicable to the population as a whole (rather than just those affected by the reform, as with the IV approach).

Our analysis focuses on a sub-sample of parents within the LSYPE who are most likely to have been affected by the change in the law (and those slightly older who were not affected by it), namely those:

(i)   Of White British ethnicity (ideally we would choose those who went to school in England and Wales, but since we cannot observe this, we must use ethnicity as a proxy);

(ii)   Whose post-compulsory schooling decisions occurred within 10 years either side of RoSLA;

(iii)   Whose highest qualification is equivalent to A-Level or below.

Similar sample restrictions are employed in Black et al. (2005), Chevalier (2004) and Chevalier et al. (2005).[46]

Furthermore, we restrict our attention to mothers only, for two reasons: firstly, maternal education is traditionally thought to be more important for child outcomes (Leibowitz, 1974; Heckman & Hotz, 1986; Haveman & Wolfe, 1995), and the work in Black et al. (2005) supports this finding; secondly, the 1972 reform to the school leaving age has been found to be a better instrument for mother's education than father's education (Chevalier et al., 2005). Preliminary analysis that we conducted using the LSYPE confirmed this finding.

The first stage of this analysis was to ascertain that the change in the law had a discernible impact on the education levels of mothers who were affected by it, compared to mothers who were just a little bit older and therefore not affected. Rather than focus on years of schooling, which is imprecisely measured among parents in the LSYPE, we focus our analysis on qualification levels attained. Encouragingly, we find that among our chosen sample, mothers who were exposed to the reform were roughly 11 percentage points more likely to have GCSE-equivalent qualifications (or higher) than mothers who were not exposed to it.

The next stage is to estimate the impact of maternal qualifications on child outcomes, using the change in the law as an instrument for these qualifications. Here, we focus on recovering the causal impact of the mother having GCSE qualifications or above (in other words, the equivalent of NVQ Level 2 or higher) compared to no qualifications, since this is where the effect of our instrument appears to be strongest.

Table 7.1 presents our estimates of the impact of the mother having GCSE qualifications or above (relative to no qualifications) on a number of child outcomes, including Key Stage test scores and engagement in risky behaviours, as well as on maternal aspirations and expectations for her child's future education (which may be one potential channel through which mother's education affects child attainment).

This table compares results from a simple Ordinary Least Squares (OLS) regression model (Column 1) to the IV estimates derived using the change in the school leaving age as an instrument for mother's qualifications (Column 2) and the control function results using the same instrument (Column 3). The fourth column provides an indication of whether the IV or control function estimates differ significantly from those produced using OLS models.

The OLS estimates presented in Column 1 suggest that there is a statistically significant association between the mother having GCSE-equivalent qualifications or above and a range of child outcomes. For example, children whose mothers have GCSE-equivalent qualifications or above score 16 percentiles higher at Key Stage 4 than children whose mothers have no educational qualifications. This is roughly equivalent to 54 GCSE points, which can be thought of as the effect of sitting an additional GCSE and receiving a Grade A (see Appendix 3 for more details).

The OLS estimates also suggest that there are statistically significant relationships between mother's education and (i) the child's probability of being NEET (not in education, employment or training) at age 17; (ii) the child's probability of playing truant at age 16 or having smoked by age 16, and (iii) the likelihood that the mother wants their child to stay in full-time education beyond age 16 and the likelihood that the mother thinks their child will go to university.

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[46] We experimented with other variants of restrictions (ii) and (iii), but found that exposure to the RoSLA reform was most likely to affect the education levels of this group of parents.

Table 7.1   Estimated impacts of mother having GCSEs or above

Outcome	OLS	IV	Control function (CF)	IV or CF significantly different to OLS?
Child outcomes				
Key Stage 2 percentile score	15.052** (0.851)	30.864** (11.791)	27.787* (12.721)	No
Key Stage 3 percentile score	17.398** (0.825)	36.621** (11.844)	38.626** (13.303)	No
Key Stage 4 percentile score	15.834** (0.880)	31.398* (12.222)	29.198* (13.247)	No
NEET at age 17	-0.072** (0.011)	-0.125 (0.131)	-0.167 (0.168)	No
Played truant in last year (age 16)	-0.029* (0.012)	-0.013 (0.180)	0.034 (0.182)	No
Ever smoked (age 16)	-0.032* (0.012)	-0.106 (0.182)	-0.113 (0.194)	No
Involved in crime in last year (age 16)	-0.023 (0.012)	0.033 (0.178)	0.146 (0.181)	No
Mother outcomes				
Wants child to stay in FTE at 16	0.119** (0.013)	-0.332 (0.202)	-0.353 (0.230)	Yes
Thinks child will go to university	0.176** (0.015)	0.063 (0.260)	-0.003 (0.272)	No

Notes: to recover the causal impact of mother's education on later outcomes, we must restrict our model to factors determined prior to educational choices being made. As such, this model only controls for the mother's age and month of birth. Standard errors are presented in parentheses. * indicates significance at the 5% level; ** at the 1% level.

The estimates from the IV and control function models (shown in Columns 2 and 3 respectively) are typically larger than the OLS estimates, but are much less precisely estimated, such that the IV and control function estimates only suggest a statistically significant relationship between mother's education and Key Stage test scores (not between mother's education and the other outcomes considered).[47] For example, the IV estimates suggest that children whose mothers have GCSE-equivalent qualifications or above score 31 percentiles higher at Key Stage 4 than children whose mothers have no educational qualifications. This is roughly equivalent to sitting two additional GCSEs and receiving Grade A on both of them.

However, the lack of precision in the IV and control function estimates also means that they are typically not significantly different from the OLS estimates shown in Column 1. For example, we cannot reject the possibility that the OLS and IV/control function estimates of the relationship between mother's education and Key Stage 4 test scores are identical (despite the large differences in percentile scores suggested by the different methods).

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[47] Note that the IV and control function estimates never differ significantly from one another. This provides some reassurance that the IV impacts are sufficiently representative - that is, they are applicable to the wider population, not just those whose education level was affected by the reform.

In fact, the only outcome for which the IV and control function estimates suggest a significantly different relationship to that implied by the OLS analysis is the mother's desire for the child to stay in full-time education beyond age 16, for which the IV and control function models suggest that simple regression analysis overestimates the effect. This may be plausible if the unobserved attributes of mothers (that are correlated with their educational attainment) are more highly correlated with attitudes to education than with the other outcomes we have considered.

Overall, this analysis has shown that increases in parental education have a causal impact on children's academic attainment, but not necessarily on other child outcomes. This is supported by similar work elsewhere - see, for example, Black et al. (2005) or Chevalier (2004) - and suggests that interventions which raise people's education levels can yield an intergenerational pay-off in terms of their children's education, in addition to any benefits that may accrue to the individuals themselves.

7.2 Measuring the causal impact of peer group characteristics on children's academic and behavioural outcomes

Peer groups at both school and neighbourhood levels are another one of the factors we have considered as part of our main analysis in order to better understand why children from lower socio-economic backgrounds tend to have poorer academic and behavioural outcomes than children from higher socio-economic backgrounds. In this section, we describe some additional work we have done, which looks more closely at the role of peer groups in determining child outcomes.

In our main analysis, we tended to find only weak statistical associations between the ethnic and socio-economic composition of schools and neighbourhoods and child outcomes (see Chapter 5).[48] It was thus relatively unsurprising that our work in Chapter 6 suggested that peer groups are not a particularly important channel through which parental socio-economic position influences teenage education and behavioural outcomes. However, there are several reasons why these estimates are not necessarily good measures of the true impact of peers on child outcomes.

The main reason is that a child's surrounding environment and peer group may not occur randomly, but might instead arise as a result of choice: families may move to areas and choose schools in order to select their children's peers. Importantly, the families that exercise these choices - those with a greater ability or willingness to obtain a desirable peer group - may differ in other unobservable ways that may also affect their children's outcomes. It is also difficult to separate out the effects of one's peers from other aspects of schools and neighbourhoods which vary - for example, differences in unobserved school quality.[49]

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[48] Our main analysis does, however, highlight some very strong statistical associations between a young person's education and behavioural outcomes and what they report their friends want to do at age 16.

[49] A further reason why the estimates shown in Tables 5.2 and 5.3 are not good measures of the causal impact of peer groups on child outcomes is because they are obtained from regressions in which we control for lots of factors simultaneously, many of which are possible channels through which peer groups may operate. To isolate the effect of peer groups on child outcomes, one would need to ensure that only factors that are not affected by one's peers are included in the analysis.

There is an extensive literature in both economics and sociology on the effects of peer group characteristics on academic achievement and engagement in risky behaviours.[50] Much of this literature is concerned with trying to employ appropriate methodologies to estimate the impacts of peer groups on child outcomes, taking into account the problems described above.

In light of this literature, we have attempted to use some more sophisticated methodologies to estimate the impact of school and neighbourhood peer groups on academic and behavioural outcomes. Following a methodology devised in Hoxby (2000), we look at how changes in an individual's peer groups are related to changes in their academic attainment and changes in their risky behaviours. Furthermore, in case such changes can be anticipated, or indeed have been chosen, we also look at how unexpected changes in peer groups are related to changes in outcomes. We measure such unexpected changes by taking deviations from a time trend, and consider the effect of these using an instrumental variables (IV) approach (see Chapter 2 for details).

Table 7.2 reports the relationship between school and neighbourhood peer group characteristics and Key Stage 4 percentile scores ("levels" column), as well as the estimated impact of changes in school and neighbourhood peer group characteristics on progression between Key Stage 3 and Key Stage 4, both potentially chosen or anticipated ("changes" column) and unanticipated ("IV" column).

Before taking into account other observed or unobserved factors that might be driving these relationships, we find some strong statistical associations between school and neighbourhood peer groups (particularly in terms of socio-economic composition) and a child's own academic outcomes. However, these associations tend to disappear once we allow for unobserved differences by considering the relationship between *changes* in peer groups and *changes* in outcomes. Our findings thus suggest that, on the whole, school and neighbourhood peer groups (as we have been able to define them) are not an important determinant of academic outcomes.

Table 7.3 reports the estimated impacts of (potentially chosen or anticipated) changes in school and neighbourhood peer group characteristics (equivalent to the "changes" column in Table 7.2) on changes in selected risky behaviours between ages 14 and 16.[51]

Our analysis of risky behaviours suggests that there are strong initial associations between measures of school and neighbourhood composition, and engagement in risky behaviours by young people.[52] However, when we focus on the relationship between changes in peer groups and changes in risky behaviours, we find much less evidence that peer groups directly influence behaviour.

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[50] For example, Mayer (1991) and Evans et al. (1992) study the relationship between school composition and the chances of graduation or teenage pregnancy, while Crane (1991) conducts a similar exercise with neighbourhood socio-economic composition. Hoxby (1998) and Lavy & Schlosser (2007) consider the importance of gender composition in the classroom for academic results, the latter also looking at the impact on reported behavioural problems. Hanushek et al. (2002), Angrist & Lang (2004), and Gould et al. (2004) examine the implications of school racial composition for test scores, while Card & Rothstein (2007) consider school and neighbourhoods jointly to answer this question. Finally, Ginther et al. (2000) and Kling et al. (2007) focus on the impact of neighbourhood characteristics on academic outcomes and crime respectively.

[51] The results using the IV approach (with instruments for the changes in peer group composition over time) never significantly differ from the results in Table 7.3 based on simple changes over time. Results are available from the authors on request.

[52] Results are available from the authors on request.

Table 7.2 **Estimated impacts of school and neighbourhood peer group characteristics on Key Stage 4 percentile scores**

	Levels	Changes	IV
School peer groups			
School proportion FSM	-37.248**	-26.628	-0.493
	(4.783)	(16.157)	(22.133)
School proportion White boys	-15.735*	7.710	-21.330
	(6.864)	(14.918)	(20.298)
School proportion White girls	-22.705**	-17.812	27.198
	(6.940)	(17.553)	(25.419)
School proportion Asian boys	-15.285	-11.294	-18.460
	(9.032)	(29.583)	(33.725)
School proportion Asian girls	2.797	-43.550	-57.770
	(7.974)	(47.630)	(90.991)
School proportion Black boys	-10.795	64.805	-157.497
	(13.952)	(64.029)	(134.103)
School proportion Black girls	5.590	-17.461	-219.745*
	(10.805)	(58.775)	(105.753)
Neighbourhood peer groups			
SOA proportion FSM	-19.574**	-4.317	2.932
	(2.996)	(4.640)	(6.413)
SOA proportion White boys	8.473	-1.032	6.690
	(5.321)	(6.013)	(9.580)
SOA proportion White girls	8.917	-1.093	0.202
	(5.713)	(6.792)	(9.944)
SOA proportion Asian boys	-19.472*	24.459	15.988
	(8.792)	(12.860)	(17.792)
SOA proportion Asian girls	45.946**	2.229	-6.981
	(9.545)	(10.146)	(17.508)
SOA proportion Black boys	25.327*	-10.963	-23.719
	(12.420)	(12.764)	(19.347)
SOA proportion Black girls	13.090	1.500	-35.281
	(11.523)	(13.761)	(21.498)

Notes: other factors included in these models are whether the young person is eligible for Free School Meals, whether they are being brought up in a lone parent household and whether either of their parents are in work (all measured at ages 14 and 16); for the final two columns, we control for changes in these factors between ages 14 and 16. Standard errors appear in parentheses. * indicates significance at the 5% level, ** at the 1% level.

One consistent finding is that an increase in school-level deprivation increases the chances that a young person will play truant, drink alcohol and smoke cannabis. For example, a 10 percentage point increase in the proportion of one's school peers who are eligible for Free School Meals (a proxy for low family income) translates into a 2.6 percentage point increase in the probability of playing truant, a 2.9 percentage point increase in the probability of ever having tried alcohol, and a 2.0 percentage point increase in the likelihood of every having smoked cannabis. The proportion of white males in the school also has a positive and significant effect on the likelihood of ever having smoked cannabis.[53]

However, for the other outcomes we have considered relating to anti-social behaviour, peer groups are less important: no dimension of peer composition has a significant effect on the chances of shoplifting, while only the proportion of black females in the neighbourhood has a significant impact on the likelihood of getting into trouble with the police (and this impact is negative).

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[53] This is consistent with the finding that reported cannabis usage in the LSYPE is higher among white males than among other demographic groups.

Table 7.3   Estimated impacts of changes in school and neighbourhood peer group characteristics on changes in risky behaviours

	Truancy	Drinking	Cannabis	Shoplifting	Police
School peer groups					
School proportion FSM	0.258 (0.115)*	0.294 (0.110)**	0.204 (0.090)*	0.057 (0.087)	0.138 (0.092)
School proportion White boys	0.150 (0.159)	0.121 (0.164)	0.268 (0.125)*	-0.058 (0.111)	-0.013 (0.098)
School proportion White girls	0.098 (0.185)	0.044 (0.204)	-0.077 (0.135)	0.009 (0.120)	0.013 (0.108)
School proportion Asian boys	-0.124 (0.375)	-0.494 (0.475)	-0.272 (0.173)	0.180 (0.184)	-0.096 (0.156)
School proportion Asian girls	-0.381 (0.443)	0.301 (0.504)	0.210 (0.317)	-0.079 (0.310)	0.035 (0.253)
School proportion Black boys	1.055 (0.716)	-0.121 (0.582)	-0.307 (0.323)	-0.467 (0.406)	0.007 (0.370)
School proportion Black girls	-0.292 (0.631)	-0.125 (0.638)	-0.025 (0.367)	0.523 (0.362)	-0.204 (0.292)
Neighbourhood peer groups					
SOA proportion FSM	0.016 (0.085)	0.029 (0.071)	-0.017 (0.061)	-0.050 (0.060)	-0.086 (0.056)
SOA proportion White boys	-0.081 (0.115)	-0.180 (0.115)	0.112 (0.087)	-0.004 (0.075)	0.031 (0.077)
SOA proportion White girls	0.006 (0.113)	0.019 (0.116)	0.123 (0.078)	0.029 (0.073)	-0.104 (0.072)
SOA proportion Asian boys	0.263 (0.203)	0.034 (0.164)	0.126 (0.134)	-0.085 (0.146)	-0.008 (0.132)
SOA proportion Asian girls	-0.342 (0.216)	-0.215 (0.184)	0.187 (0.148)	0.064 (0.137)	-0.030 (0.135)
SOA proportion Black boys	-0.113 (0.265)	0.169 (0.218)	0.226 (0.185)	0.266 (0.197)	0.090 (0.152)
SOA proportion Black girls	-0.038 (0.271)	-0.245 (0.267)	0.011 (0.185)	-0.051 (0.202)	-0.333 (0.142)*

Notes: other factors included in these models are changes in whether the young person is eligible for Free School Meals, whether they are being brought up in a lone parent household and whether their parents are in work (all measured at ages 14 and 16); for the final two columns, we consider changes in these characteristics between ages 14 and 16. Standard errors appear in parentheses. * indicates significance at the 5% level, ** at the 1% level.

Drawing these various analyses together, we generally find that peer groups (as we measure them here) have little causal impact on the child outcomes we consider - the only exception being the relationship between school-level disadvantage and certain behavioural outcomes. The finding that peer groups have at most a small role to play in determining child outcomes is in line with many other papers in this area, which suggest that once potentially confounding influences have been addressed, the resulting impact of peer composition on attainment and behaviour is relatively small.[54]

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[54] For example, Angrist & Lang (2004) and Gould et al. (2004) find modest and insignificant effects of school racial composition on test scores; Lavy & Schlosser (2007) find no effect of gender composition at school on individual academic performance or classroom disruption. Evans et al. (1992) find no significant impact of school composition on the risk of teenage pregnancy or dropping out from school, while Ginther et al. (2000) reach the same conclusion about neighbourhood composition.

However, it must be noted that we are only able to consider two very broad measures of a young person's peer groups - that of the socio-economic and ethnic composition of the young person's school and local neighbourhood.[55] It is entirely possible that, were we able to better measure changes in the characteristics of the group of people with whom a young person spends their time, the results might be very different.

Nevertheless, these findings, along with others in the literature, have a role to play in informing policy design in a number of areas in education.[56] While we find little scope for policies affecting one's peer group to have an impact on test scores (at least using the measures of the young person's peer group that we have available), policies that place children among more affluent peers - for example, school vouchers targeted at poor pupils - could result in an improvement in their behaviour. These findings further suggest that reducing child poverty might also play a role in improving behaviour at school.

More details about our methodology and findings can be found in Chowdry (2008).

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[55] For this analysis we can only use measures of the young person's peer group where we believe we can identify exogenous sources of variation.

[56] These findings are relevant to any policies that are likely to alter a young person's school or local peer group. Examples might include ability-streaming in classrooms, single sex schools, or policies that affect the degree of parental school choice (e.g. voucher systems).

8.   Conclusions

The aim of this report has been to examine why young people from poor families are more likely to experience lower achievement in school, and more likely to participate in a range of risky behaviours as teenagers, than young people from richer families. The motivation for this research is the widespread concern about the relative lack of social mobility in the UK, compared to other countries, and by comparison with the recent past, in which educational attainment seems to play a key role.

We have looked at this question using new data from the Longitudinal Study of Young People in England. This data allows us to build up a very detailed picture of the home, school and neighbourhood environments which teenagers from different socio-economic backgrounds have experienced. It also allows us to consider how differences in attitudes and behaviours among young people themselves develop over the teenage years, and how all of these are related to education and behavioural outcomes at ages 14 and 16.

Central to our findings are the following:

Differences in outcomes between the poorest children and the rest of society
Education outcomes: there are very large gaps in education outcomes between the poorest children and the rest of society, both by comparison to children from the middle of the distribution of socio-economic position (SEP) and children from the top of the SEP distribution. These gaps are large at age 14 and persist to age 16.

For example, only one in five of the poorest fifth of our sample attain five or more GCSEs at grades A* to C including English and Maths, compared to almost three quarters of the richest fifth (a gap of over 50 percentage points). Similarly, around 15% of individuals from the poorest fifth of our sample are NEET (not in education, employment or training) at age 17 compared with just 2% of individuals from the richest fifth (a difference of around 13 percentage points).

Behavioural outcomes: there are also very large gaps in many behavioural outcomes, such as smoking, cannabis use, truancy and anti-social behaviour (including fighting, shoplifting, vandalism) between the poorest children and the rest of society by age 14. For example, a large minority of young people from the poorest fifth of our sample report engaging in some form of anti-social activity at age 14 (41%), compared with a much smaller fraction of young people from the richest fifth of our sample (21%) (a gap of 20 percentage points).

Some of these gaps in behavioural outcomes do narrow, or even disappear, by the time young people reach age 16. For some outcomes, such as cannabis use, this is because richer children 'catch-up' with poor children in terms of their likelihood of engaging in these bad behaviours. For other outcomes, such as shoplifting and vandalism, this is because the prevalence of such behaviours tends to decline as young people get older, and these declines are biggest amongst the poorest children.
(These differences were described in more detail in Chapter 3.)

Explaining these differences

Why do young children from the poorest families tend to have worse education and behavioural outcomes than other children?

Our research has highlighted a number of important differences in the **home lives**, and to a lesser extent the **school environments**, and to an even lesser extent the **neighbourhoods**, which young people have experienced that seem to be important drivers of these socio-economic gaps in education and behavioural outcomes.
(These differences were discussed in detail in Chapter 4.)

For example, we find that young people from poor families:

- Have lower educated parents than children from richer backgrounds, and are more likely to grow up in a lone parent household;

- Go to schools of lower quality, with more children from poor and ethnic minority backgrounds, make friends with lower educational aspirations, and live in poorer neighbourhoods than richer children;

- Have access to fewer educational resources at home such as private tuition, or computer and/or internet access;

- Have parents whose educational aspirations for their child are, on average, lower than the educational aspirations of better-off parents, and engage less in both school and family life.

A central finding of our work is the importance of very large differences in young people's own **attitudes and behaviours** (for example, their aspirations for future education and participation in various activities) in explaining socio-economic gaps in teenage education and behavioural outcomes. Of course, many of these will have been shaped by differences in the home, school and neighbourhood environments which young people have experienced, as highlighted above.

For example, we find that young people from poor families:

- Are typically less likely to think that they are good at school work than young people from richer backgrounds.[57]

- Are less likely to feel that their future economic destiny is under their own control (i.e. have a more external economic locus of control).

- Are less likely to find school worthwhile and enjoy school than young people from richer backgrounds (although the large majority of young people from all socio-economic groups are positive about these aspects of schooling).

- Have somewhat lower aspirations and expectations for their own future education at age 14 (including their post-16 and higher education outcomes), and considerably lower aspirations and expectations by age 16.[58]

- Are more likely to experience bullying at school, especially at age 14.

- Have less positive relations with their teachers, and slightly lower participation rates in positive activities, such as sport or reading.

(These differences were also discussed in Chapter 4).

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[57] However, it is important to remember that it does not appear that poor children necessarily under-estimate how well they do at school. As discussed in Chapter 4, once we take test scores at Key Stage 2 into account, young people from poor backgrounds are typically *more* likely to think that they are good at school than young people from better off backgrounds.

[58] However, it is important to note that across all income backgrounds, more parents and children at both ages 14 and 16 think that they will stay on at 16 and apply to university than ultimately do so. This suggests that simply working to improve higher education (HE) aspirations amongst young people from poor backgrounds is unlikely to resolve the large socio-economic gaps in HE participation that exist in the UK.

Many of these findings are in line with other recent research in this area, which is reviewed in detail in a parallel report (see Duckworth et al., 2009).

What is particularly striking about our findings is that the majority of the factors described above are found to be important determinants of education and behavioural outcomes, even after accounting for the very detailed set of information we have about the home, school and neighbourhood environments to which young people have been exposed.

Five factors that stand out as important for some education or behavioural outcomes (among many others that we have also found to be important) are:

Maternal education: having a highly educated mother conveys a significant advantage in terms of a young person's academic outcomes.[59] We find this relationship to be causal (that is, the higher education of the mother *causes* the higher test scores that we observe) (see Chapter 7). This suggests that interventions which raise women's education levels may yield an intergenerational pay-off in terms of their children's education, in addition to any benefits that may accrue to the individuals themselves.

Parents' and young people's educational aspirations: we find a strong association between parents' and young people's expectations for future higher education and educational attainment. For example, young people who think (at age 14) that they will apply to higher education are significantly more likely to do well at Key Stage 4 than those who do not. This relationship holds even after taking into account prior attainment (at Key Stage 3), and many other aspects of the young person's attitudes and beliefs (including how good they think they are at school, how much they like school, how much they think school is worthwhile, and their locus of control).

Family child interactions: interactions between the young person and their family (such as sharing meals, going out together and the frequency of arguments) are strongly related to both education outcomes (Key Stage 4 test scores) and behavioural outcomes (such as truancy, smoking and cannabis use) at age 16.

Computer and internet access in the home: computer and internet access at home are significantly positively associated with Key Stage 3 and 4 results, and with progress between the two Key Stages.

Neighbourhood deprivation: there appears to be a strong relationship between neighbourhood deprivation and the likelihood that a young person will be NEET at age 17, even after accounting for the individual's own socio-economic position. This suggests that deprived individuals living in deprived neighbourhoods are more likely to be NEET than deprived individuals living in non-deprived neighbourhoods.
(These findings were discussed in detail in Chapter 5).

Our work shows that, taking all of these factors into account, we are able to explain a very large proportion of the differences in education and behavioural outcomes between teenagers from rich and poor backgrounds that we observe. For example, the gap in Key Stage 4 scores between the richest and poorest fifths of our sample is reduced by 87% once we take into account the range of factors described above. This suggests that, to a large extent, the effects of socio-economic background act *indirectly* through these other factors, particularly through differences in young people's attitudes and behaviours rather than *directly* through income.
(These results were discussed in detail in Chapter 6.)

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[59] This is in line with other research which shows that education has a key role to play in explaining the transmission of disadvantage across generations (see, for example, Blanden et al., 2006).

Policy implications

The big question arising from our work concerns the extent to which policies that are designed to improve the attitudes and behaviours of young people from poor backgrounds are likely to have a large pay-off in terms of improving educational attainment and other behavioural outcomes, and thus closing the very large socio-economic gaps that we observe. In some senses our research seems promising in this respect. We have found very strong correlations between many of the attitudes and behaviours of young people (and to a lesser extent, their parents) and a variety of education and behavioural outcomes. Of particular importance seem to be the young person's ability beliefs, whether they like school and find school worthwhile, and their future educational aspirations. Moreover, such positive correlations hold even after taking many other aspects of young people's homes, schools and neighbourhoods into account.

Based on this evidence, it would be tempting to conclude that even if policy cannot always change the underlying contexts and characteristics of families, then perhaps as an alternative it can focus on transforming the attitudes and behaviours of young people and their parents, to equal effect.

However, some very important notes of caution need to be sounded. First, correlation does not imply causation, and throughout our work we have been keen to emphasise that the very real possibilities of correlated unobservable factors and reverse causation limit the strength of the policy conclusions that can safely been drawn from regression analysis alone. (See Chapters 2 and 7 for more discussion of these issues.)

Moreover, our own attempts to establish clear evidence on the effectiveness of policies that have sought to improve teenagers' attainment by changing their attitudes and behaviours were ultimately unsuccessful (as described in Appendix 6). The evidence base on what works in this area, particularly amongst teenagers, appears to be quite thin, the evaluation of the Aimhigher: Excellence Challenge being a notable exception.[60] (This is in contrast to a much larger body of evidence on the effectiveness of interventions designed to improve behaviour and social skills in early childhood.)

There are also some important nuances brought out by our own research that need to be considered before straightforward policy recommendations can be made. For example, we found that many more parents and children at ages 14 and 16 think that they will stay in full-time education at age 16 and apply to university than ultimately do so (see Chapter 4). This suggests that simply working to improve higher education (HE) aspirations amongst young people from poor backgrounds is unlikely to resolve the large socio-economic gap in HE participation that exists in the UK.

We also found that although a young person's ability beliefs are strongly positively correlated with attainment at school at Key Stage 3 and Key Stage 4, it does not appear that poor children necessarily under-estimate how well they do at school. Once we take test scores at Key Stage 2 into account, young people from poor backgrounds are typically *more* likely to think that they are good at school than young people from better off backgrounds. Again, this finding throws a note of caution against simply suggesting that improving attitudes will solve the problems that children from poor families face in school.

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[60] This evaluation found that being exposed to the Aimhigher: Excellence Challenge intervention led to an increase in the proportion of young people intending to participate in higher education of 3.9 percentage points, and an increase in attainment at Key Stage 4 by an average of 2.5 GCSE points (equivalent to between two and three grades using the old points system). See Emmerson et al. (2005) for more details.

Finally, whether changing attitudes and behaviours is any easier than changing the other contexts in which a young person spends time, or their other characteristics, requires further research.

Despite these strong words of caution, we end this report on a positive note. The work we have done highlights the complex myriad of factors that contribute to the under-achievement of young people at school. Given our findings regarding the apparent importance of young people's attitudes and behaviours in explaining socio-economic gaps in teenage education and behavioural outcomes, it suggests a clear direction for future research and policymaking, to establish more clearly whether there is a role for successful policy initiatives in this direction.

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Appendix 1   Detailed description of outcomes and transmission mechanisms

Outcomes	

Education	

Standardised Key Stage 3 and 4 test scores

Not in education, employment or training (Wave 4)

Behaviours	
Ever tried smoking	Have you ever smoked a cigarette? (Waves 1 & 3)
Frequent smoker	Do you usually smoke more than six cigarettes per week? (Waves 1 & 3)
Ever tried alcohol	Have you ever tried alcohol? (Waves 1 & 3)
Frequent drinker	Do you usually drink at least once a week? (Waves 1 & 3)
Ever tried cannabis	Have you ever tried cannabis (Waves 1 & 3)
Ever involved in anti-social behaviour	Have you ever written on walls with spray cans? Have you ever smashed, slashed or damaged public property or something in a public place? Have you ever taken something from a shop, supermarket, or department store without paying? Have you ever taken part in fighting or some sort of disturbance in public for example, at a football ground, a railway station, music festival, riot, demonstration or just in the street? Main parent: have the police ever got in touch with you because of something the young person had done? (Waves 1 & 3)
Ever played truant	In the last 12 months, have you ever played truant? (Waves 1 & 3)
Participate in positive activities	In the last four weeks, have you: taken part in any kind of sport; been to the cinema, theatre or a concert; played a musical instrument; been to a political meeting or march; done community work; been to a youth club. Do you play sport at least once a week? (Wave 1)

Young person attitudes and behaviours	
Self concept	
Ability beliefs (scale)	How good do you think you are at school work? How good would you say you are at: maths, English, science, ICT? **I get good marks for my work.** (Wave 1)
Economic locus of control (scale)	If someone is not a success in life, it is usually their own fault. Even if I do well at school, I'll have a hard time getting the right kind of job. Working hard at school now will help me get on later on in life. People like me don't have much of a chance in life. I can pretty much decide what will happen in my life. How well you get on in this world is mostly a matter of luck. If you work hard at something you'll usually succeed. (Wave 2)
Education achievement values	
Intrinsic value (scale)	**I am happy when I am at school. The work I do in lessons is interesting to me. On the whole I like being at school. Most of the time I don't want to go to school. In a lesson, I often count the minutes till it ends. I am bored in lessons.** (Wave 1)
Extrinsic value (scale)	Doing well at school means a lot to me. **School is a waste of time for me. The work I do in lessons is a waste of time.** (Wave 2)
Education aspirations / expectations	
Aspirations for age 16 (%)	**Stay on in full-time education. Leave at 16 but return to FTE. Enter full-time work. Learn a trade/training. Other.** (Wave 1)
Expectations for HE (%)	**How likely do you think it is that you will ever apply to go to university to do a degree? How likely do you think it is that if you do apply to go to university you will get in?** (Wave 1)
Job / career values (scale)	
Having a job is better than being unemployed, having a job that leads somewhere is important, having a job or career in the future is important to me. (Wave 1)	
Experience of bullying (scale)	
YP and Parental reports: **In the last 12 months: have you ever been upset by being called hurtful names by other students, including getting text messages or emails from them? have you ever been excluded from a group of friends or from joining in activities? have other students at your school ever made you give them money or personal possessions? have other students ever threatened to hit you, kick you or use any other form of violence against you? have other students ever actually hit you, kicked you or used any other form of violence against you?** (plus parents: any other sort of bullying). **If yes, how often.** (Wave 1)	

Education behavioural difficulties (scale)

YP: **In the last 12 months, have you ever played truant, that is missed school without permission, even if it was only for a half day or a single lesson? (how often)** (Wave 1)

Parent: How often in last 3 years: has YP been temporarily excluded, that is suspended, from a school for a time? Has YP been permanently excluded, that is expelled from school for good?

Anti-social behaviour (scale)

YP: **Have you ever written on walls with spray cans? Have you ever smashed, slashed or damaged public property or something in a public place? Have you ever taken something from a shop, supermarket, or department store without paying? Have you ever taken part in fighting or some sort of disturbance in public for example, at a football ground, a railway station, music festival, riot, demonstration or just in the street?** (Wave 1)

Parent: **Have the police got in touch with you because of something YP had done?** (Wave 1)

Substance use

Frequent smoker	**I usually smoke more than six cigarettes per week** (Wave 1)
Frequent drinker	**Over the last 12 months, I had at least one or two drinks per week** (Wave 1)
Ever tried cannabis	**Have you ever tried cannabis?** (Wave 1)

Teacher-child relations (scale)

How many teachers do the following phrases apply to: My teachers praise me when I do my school work well. **I like my teachers.** (all W1) My teachers treat everyone the same regardless of skin, or cultural background. My teachers don't really listen to what I say in class. I get treated unfairly by my teachers (all W2)

Most of my teachers. 1. Try hard to make me work as well as I am able; 2. Are fairly easily; satisfied; 3. Don't seem to care whether I work or not. How do you think your teachers would describe your school work? (very good; above average; average; below average; not at all good) (W1). Compared to other pupils in my class my teachers. 1. Are more likely to take an interest in my work 2. Are less likely to take an interest in my work 3. Will treat me much the same as anyone else; 1. Are more likely to praise my work 2. Are less likely to praise my work, 3. Will treat me much the same as anyone else. (W2)

Participation in positive / leisure activities

Reads regularly	**Reads books, magazines or newspapers for pleasure at least once a week** (Wave 1)
Attends religious classes or courses	Attended a religious class or course at least once in the last 12 months (Wave 1)
Participates in positive activities	Whether in the last 4 weeks: took part in any kind of sport; been to cinema, theatre or concert; played a musical instrument; been to political meeting or march; done community work; been to a youth club. **Plays sport at least once a week** (Wave 1)

Note: all questions highlighted bold are used in the analysis across waves.

Parental attitudes and behaviours	
Educational values (scale)	Nowadays you need qualifications in order to get a job worth having. Leaving school at 16 limits young people's career opportunities later in life. (Wave 1)
Aspirations for age 16 (%)	**What would you like YP to do at 16 (FTE / work / training / other)?**
Expectations for HE (%)	How likely do you think it is that YP will go on to university to do a degree sometime in the future?
Parent child education interactions (scale)	When you get YP's school reports, do you talk about them? How often? Did you talk to YP about what subjects he/she might do in Year 10?
Family child interactions (scale)	How often do you have an evening meal together as a family in a normal week? How often do you spend an evening home together as a family? How often do you go out together as a family to some sort of event / entertainment / special visit somewhere? **How often do you argue with YP?** All in all, how well or badly would you say you get on with YP?
Parental involvement in school activities (scale)	Whether parents have ever attended parents' evenings. How personally involved main parent feels in YP's school life. Whether the main parent gets involved in any of the following activities: helping out in class, helping out elsewhere in school, fundraising activities, special interest groups, parent and teacher associations, teacher assessments. Whether the parent is a school/parent governor, has hosted an exchange student, has donated to the school, is employed at the school or has attended events at school.

Material resources

In the last 12 months have you or other family member paid for YP to have extra lessons in subjects they also do at school? How often did they go to them? Any other classes (+ how often)? **Does your household have a computer at home? Can you access the internet at home?**

School composition and characteristics

Key Stage 2 average point score; Key Stage 2 to 3 value-added; Key Stage 3 to 4 value-added; % of pupils in school with SEN statement; whether school has a sixth form; whether school is a grammar school; % of pupils in school who are eligible for FSM; % of pupils in school with English as an additional language; % White boys; % White girls; % Asian boys; % Asian girls; % Black boys; % Black girls; last Ofsted inspection Outstanding / Good / Inadequate; YP thinks most friends will stay in FTE at 16; YP thinks most friends will do something else. (Merged in using Wave 1 school.)

Neighbourhood composition

% of secondary school pupils in SOA eligible for FSM; % for whom English is an additional language; % White boys; % White girls; % Asian boys; % Asian girls; % Black boys; % Black girls; Index of Multiple Deprivation quintiles. (Merged in using SOA identifier at Wave 1.)

Note: all questions highlighted bold are used in the analysis across waves.

Appendix 2   Socio-economic gradients in key variables

Table A2.1   Socio-economic gradients in teenage outcomes

	SEP quintile					
	Bottom	**2**	**3**	**4**	**Top**	**Top minus bottom**
Educational outcomes						
Key stage 3 standardised score (SDs)	-0.624	-0.281	0.027	0.259	0.620	1.244
Key stage 4 standardised score (SDs)	-0.596	-0.252	0.041	0.252	0.555	1.151
% NEET (age 17)	14.5%	8.3%	6.6%	4.2%	1.7%	-12.9ppts
Behavioural outcomes (age 14)						
Ever smoked	15.0%	12.8%	10.0%	8.8%	6.5%	-8.5ppts
Frequent smoker	6.2%	5.2%	3.5%	2.6%	1.3%	-4.9ppts
Ever drank alcohol	47.8%	54.4%	56.6%	61.7%	59.2%	11.4ppts
Frequent drinker	5.3%	7.0%	7.5%	9.0%	7.8%	2.5ppts
Ever tried cannabis	10.3%	9.7%	8.8%	9.1%	8.3%	-2.0ppts
Ever involved in anti-social behaviour	41.3%	34.0%	31.0%	26.9%	20.8%	-20.5ppts
Ever played truant	23.6%	16.8%	14.3%	12.5%	8.2%	-15.4ppts
Participated in positive activities	89.2%	92.1%	93.8%	95.1%	97.5%	8.3ppts
Behavioural outcomes (age 16)						
Ever smoked	24.2%	21.3%	20.5%	20.0%	19.9%	-4.3ppts
Frequent smoker	16.5%	12.7%	11.1%	8.6%	7.1%	-9.4ppts
Ever drank alcohol	47.2%	55.6%	61.4%	69.0%	77.6%	30.4ppts
Frequent drinker	10.8%	13.9%	15.6%	16.4%	19.6%	8.7ppts
Ever tried cannabis	20.6%	20.3%	22.7%	22.0%	24.9%	4.3ppts
Ever involved in anti-social behaviour	21.7%	19.6%	19.4%	16.6%	17.0%	-4.7ppts
Ever played truant	24.3%	21.1%	20.9%	17.9%	18.5%	-5.7ppts

Table A2.2   Socio-economic gradients in individual and family background characteristics

	SEP quintile					
	Bottom	**2**	**3**	**4**	**Top**	**Top minus bottom**
Individual characteristics						
Female	49.4%	49.5%	47.5%	50.8%	50.2%	0.8ppts
White British	77.9%	85.9%	89.9%	92.6%	94.3%	16.4ppts
Mixed race	2.7%	1.8%	1.3%	1.1%	1.0%	-1.7ppts
Indian	2.5%	3.6%	3.1%	2.3%	1.6%	-0.9ppts
Pakistani	5.1%	3.5%	1.6%	0.7%	0.6%	-4.5ppts
Bangladeshi	3.4%	0.9%	0.3%	0.1%	0.1%	-3.3ppts
Caribbean	2.7%	1.9%	1.4%	1.2%	0.6%	-2.1ppts
African	3.0%	1.0%	0.7%	0.7%	0.6%	-2.4ppts
Chinese	0.4%	0.2%	0.4%	0.3%	0.3%	-0.1ppts
Other ethnicity	2.5%	1.2%	1.2%	0.9%	1.0%	-1.4ppts
SEN status (age 13/14)	6.0%	4.4%	3.3%	2.7%	1.8%	-4.2ppts
Birthweight (kg)	3.2	3.3	3.4	3.4	3.4	0.2
Birthweight squared (kg)	10.8	11.1	11.6	11.8	11.9	1.1
Born in January	8.8%	8.2%	8.3%	7.2%	7.6%	-1.2ppts
Born in February	7.7%	8.5%	7.4%	8.1%	8.6%	0.8ppts
Born in March	7.3%	7.7%	8.9%	8.6%	8.5%	1.2ppts
Born in April	9.3%	8.4%	8.2%	8.6%	7.7%	-1.6ppts
Born in May	9.3%	9.1%	9.0%	8.9%	9.0%	-0.3ppts
Born in June	8.1%	8.7%	8.2%	8.2%	9.0%	0.9ppts
Born in July	8.6%	8.6%	8.8%	8.3%	10.4%	1.8ppts
Born in August	9.2%	8.3%	9.1%	8.7%	8.7%	-0.5ppts
Born in October	8.6%	7.7%	7.7%	8.0%	8.3%	-0.2ppts
Born in November	7.7%	8.7%	7.3%	7.9%	7.5%	-0.2ppts
Born in December	8.0%	8.5%	7.6%	8.3%	7.3%	-0.7ppts
Family background characteristics						
Mum: no qualifications	45.7%	24.7%	15.3%	8.4%	2.9%	-42.8ppts
Mum highest qualification: NVQ Level 1	11.5%	12.2%	9.9%	7.0%	2.9%	-8.6ppts
Mum highest qualification: NVQ Level 2	26.3%	37.3%	40.5%	36.5%	27.8%	1.4ppts
Mum highest qualification: NVQ Level 3	9.0%	12.7%	14.9%	17.5%	15.6%	6.6ppts
Mum highest qualification: NVQ Level 4/5	5.2%	10.6%	17.5%	29.1%	50.1%	44.9ppts
Mum highest qualification: Other	2.3%	2.4%	2.0%	1.4%	0.9%	-1.4ppts
Dad: no qualifications	44.7%	25.9%	17.7%	10.6%	3.7%	-41ppts
Dad highest qualification: NVQ Level 1	9.3%	9.0%	6.8%	5.1%	2.1%	-7.3ppts
Dad highest qualification: NVQ Level 2	27.4%	38.0%	36.4%	33.1%	20.9%	-6.4ppts
Dad highest qualification: NVQ Level 3	9.8%	14.4%	18.5%	21.0%	21.5%	11.7ppts
Dad highest qualification: NVQ Level 4/5	6.0%	10.4%	18.7%	29.0%	51.4%	45.4ppts
Dad highest qualification: Other	2.8%	2.3%	1.9%	1.2%	0.4%	-2.4ppts
Lone parent	49.8%	31.7%	20.8%	15.3%	10.9%	-38.8ppts
Mum aged 13-19 at birth	12.7%	7.7%	4.1%	3.3%	1.0%	-11.7ppts
Mum aged 20-24 at birth	34.1%	30.2%	24.5%	18.3%	12.8%	-21.3ppts
Mum aged 25-29 at birth	29.9%	34.0%	38.6%	39.1%	38.8%	8.9ppts
Mum aged 30-34 at birth	14.7%	19.5%	23.6%	28.1%	34.5%	19.8ppts
Mum aged 35+ at birth	7.7%	7.7%	8.7%	10.6%	12.4%	4.7ppts

Table A2.2 continued

	SEP quintile					
	Bottom	**2**	**3**	**4**	**Top**	**Top minus bottom**
Family background characteristics continued						
No older siblings	35.3%	35.8%	38.0%	37.4%	38.5%	3.2ppts
1 older sibling	35.1%	34.8%	37.1%	38.5%	38.8%	3.7ppts
2 older siblings	20.0%	17.9%	12.4%	11.6%	10.6%	-9.4ppts
3 older siblings	10.1%	12.1%	12.7%	12.8%	12.4%	2.3ppts
No younger siblings	37.8%	43.7%	45.3%	49.1%	49.7%	11.9ppts
1 younger sibling	32.9%	34.8%	36.9%	37.9%	38.1%	5.2ppts
2 younger siblings	17.8%	15.7%	13.6%	10.7%	10.8%	-7.0ppts
3 younger siblings	11.9%	6.2%	4.3%	2.6%	1.7%	-10.3ppts
Mum full-time employee (W1)	9.0%	25.5%	36.1%	42.3%	48.3%	39.3ppts
Mum part-time employee (W1)	23.8%	41.0%	40.3%	39.8%	37.0%	13.3ppts
Mum self-employed (W1)	0.9%	3.8%	6.1%	5.6%	4.7%	3.8ppts
Mum unemployed (W1)	4.0%	0.8%	0.5%	0.3%	0.4%	-3.6ppts
Mum in full-time education/training (W1)	2.2%	0.9%	0.8%	0.8%	0.6%	-1.6ppts
Mum sick or disabled (W1)	6.2%	2.6%	1.6%	0.9%	0.2%	-6.0ppts
Mum looking after home/family (W1)	53.8%	25.3%	14.6%	10.3%	8.7%	-45.1ppts
Mum retired (W1)	0.1%	0.0%	0.2%	0.0%	0.1%	-0.1ppts
Dad full-time employee (W1)	41.6%	71.0%	75.6%	80.0%	86.2%	44.6ppts
Dad part-time employee (W1)	7.5%	3.2%	1.6%	1.5%	1.0%	-6.5ppts
Dad self-employed (W1)	4.7%	14.4%	18.8%	16.0%	10.5%	5.7ppts
Dad unemployed (W1)	16.2%	2.7%	0.8%	0.3%	0.4%	-15.8ppts
Dad in full-time education/training (W1)	0.8%	0.1%	0.3%	0.1%	0.1%	-0.7ppts
Dad sick or disabled (W1)	18.9%	5.3%	1.4%	0.7%	0.6%	-18.3ppts
Dad looking after home/family (W1)	8.0%	2.5%	0.6%	0.4%	0.2%	-7.9ppts
Dad retired (W1)	2.3%	0.7%	0.9%	1.0%	1.1%	-1.2ppts
Mum's health very good (W1)	33.9%	48.2%	54.4%	61.1%	66.3%	32.4ppts
Mum's health fairly good (W1)	39.9%	38.2%	35.8%	32.2%	28.4%	-11.5ppts
Mum's health not very good (W1)	19.5%	10.3%	7.2%	5.8%	4.1%	-15.4ppts
Mum's health not good at all (W1)	6.7%	3.3%	2.6%	1.0%	1.2%	-5.5ppts
Mum has limiting illness (W1)	33.3%	21.6%	18.9%	15.9%	13.4%	-19.9ppts
Mum has long-term limiting illness (W1)	76.6%	64.4%	60.3%	48.0%	50.0%	-26.6ppts
Dad's health very good (W1)	34.0%	50.0%	57.0%	60.7%	64.4%	30.4ppts
Dad's health fairly good (W1)	37.3%	37.1%	35.2%	34.6%	31.8%	-5.5ppts
Dad's health not very good (W1)	18.6%	9.2%	6.5%	3.8%	3.0%	-15.5ppts
Dad's health not good at all (W1)	10.1%	3.8%	1.3%	0.9%	0.8%	-9.3ppts
Dad has limiting illness (W1)	38.5%	22.9%	18.7%	17.4%	15.7%	-22.8ppts
Dad has long-term limiting illness (W1)	83.8%	64.5%	44.7%	47.4%	50.3%	-33.4ppts

Table A2.3   Socio-economic gradients in school/peer and neighbourhood characteristics

	SEP quintile					Top minus bottom
	Bottom	2	3	4	Top	
School/peer characteristics						
KS2 average point score	26.6	27.0	27.4	27.7	28.1	1.6
KS2-KS3 value-added measure	99.3	99.6	99.8	100.0	100.3	1.0
KS3-KS4 value-added measure	989.7	988.9	990.2	991.4	993.4	3.7
% pupils with SEN statement	2.7%	2.6%	2.4%	2.2%	2.0%	-0.6ppts
School has a sixth form	50.4%	53.8%	59.5%	64.4%	68.6%	18.2ppts
Grammar school	1.0%	2.0%	3.0%	5.2%	8.2%	7.2ppts
% pupils eligible for FSM	22.5%	16.6%	12.9%	10.9%	8.7%	-13.8ppts
% EAL pupils	15.3%	9.6%	6.9%	6.1%	5.8%	-9.5ppts
% White boys	38.7%	42.4%	44.1%	44.9%	44.8%	6.1ppts
% White girls	37.1%	40.8%	42.0%	42.1%	42.2%	5.1ppts
% Asian boys	5.2%	3.6%	2.6%	2.4%	2.1%	-3.1ppts
% Asian girls	5.5%	3.7%	2.7%	2.3%	2.2%	-3.3ppts
% Black boys	2.6%	1.4%	1.0%	1.0%	0.8%	-1.7ppts
% Black girls	2.8%	1.6%	1.2%	0.9%	1.0%	-1.8ppts
Outstanding Ofsted report	16.4%	17.6%	20.7%	20.5%	27.3%	10.9ppts
Good Ofsted report	42.2%	40.3%	44.4%	43.6%	44.6%	2.4ppts
Inadequate Ofsted report	6.2%	6.6%	4.8%	5.0%	4.2%	-2.0ppts
YP thinks most friends will stay on post 16	63.3%	64.7%	73.4%	78.6%	85.9%	22.5ppts
YP thinks most friends will do something else	4.8%	4.1%	3.1%	3.3%	2.8%	-2.0ppts
Neighbourhood characteristics						
SOA % eligible for FSM	26.8%	17.7%	12.3%	9.4%	6.8%	-20.0ppts
SOA % EAL	14.8%	9.9%	6.7%	6.0%	5.3%	-9.5ppts
SOA % White boys	38.2%	41.7%	44.0%	44.3%	45.0%	6.8ppts
SOA % Asian boys	4.7%	3.6%	2.4%	2.0%	1.6%	-3.1ppts
SOA % Black boys	2.5%	1.3%	0.9%	0.8%	0.6%	-1.9ppts
SOA % White girls	37.3%	40.8%	42.5%	43.2%	43.4%	6.1ppts
SOA % Asian girls	4.5%	3.4%	2.2%	1.9%	1.6%	-2.9ppts
SOA % Black girls	2.7%	1.4%	0.9%	0.8%	0.6%	-2.1ppts
Bottom IMD quintile	46.1%	26.4%	15.5%	8.2%	3.8%	-42.3ppts
2nd IMD quintile	27.1%	25.1%	20.7%	16.7%	10.4%	-16.7ppts
3rd IMD quintile	13.4%	21.2%	23.1%	22.3%	20.0%	6.6ppts
4th IMD quintile	8.9%	16.6%	21.4%	25.7%	27.4%	18.5ppts
Top IMD quintile	4.5%	10.6%	19.3%	27.1%	38.5%	33.9ppts

Table A2.4   Socio-economic gradients in main parent's attitudes, expectations and behaviours, and material resources

	SEP quintile					
	Bottom	2	3	4	Top	Top minus bottom
Main parent's attitudes and behaviours						
Wave 1 levels						
Parent education value (scale)	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/training/apprenticeship	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 v/fairly likely YP will go to uni	53.4%	52.3%	57.4%	66.3%	80.7%	27.4ppts
Parent child interactions: education (scale)	-0.312	-0.076	0.077	0.120	0.191	0.503
Family child interactions (scale)	-0.063	-0.022	-0.003	0.021	0.069	0.132
Parental involvement in school activities (scale)	-0.079	-0.037	0.001	0.026	0.088	0.167
Change between Wave 1 and Wave 3						
Starts wanting YP to stay in FTE beyond 16	7.6%	8.6%	8.2%	5.9%	4.3%	-3.3ppts
Stops wanting YP to stay in FTE beyond 16	28.2%	26.4%	20.9%	18.1%	10.2%	-18.0ppts
Starts frequently arguing with YP	10.1%	8.0%	9.7%	8.8%	7.8%	-2.3ppts
Stops frequently arguing with YP	19.0%	18.6%	17.8%	18.5%	15.5%	-3.5ppts
Material resources						
Wave 1 levels						
Private tuition	10.1%	17.6%	25.0%	33.3%	45.4%	35.3ppts
Computer access	71.4%	86.8%	94.4%	96.5%	99.4%	28.0ppts
Internet access	45.5%	67.9%	82.9%	90.0%	96.7%	51.1ppts
Change between Wave 1 and Wave 3						
Gets computer access	15.1%	8.5%	3.8%	2.6%	0.5%	-14.5ppts
Loses computer access	7.4%	3.6%	1.9%	0.8%	0.2%	-7.2ppts
Gets internet access	22.6%	17.1%	11.0%	7.0%	2.6%	-20.0ppts
Loses internet access	6.9%	4.7%	3.5%	1.9%	1.2%	-5.7ppts
Family income drops more than 20ppts of equivalised income scale	13.9%	22.1%	23.8%	19.7%	12.8%	-1.1ppts
Family income rises more than 20ppts of equivalised income scale	13.0%	16.5%	19.1%	20.7%	17.0%	4.0ppts

Table A2.5   Socio-economic gradients in young person's attitudes, expectations and behaviours at age 13/14

	SEP quintile					Top minus bottom
	Bottom	**2**	**3**	**4**	**Top**	
Self-concept and education values						
Ability beliefs (scale) (SDs)	-0.091	-0.063	-0.018	0.028	0.125	0.217
Enjoyment of school (intrinsic value scale) (SDs)	-0.073	-0.057	0.003	0.023	0.068	0.141
Usefulness of school (extrinsic value 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
Education/job aspirations and expectations						
Wants to stay on in FTE at 16	55.5%	52.6%	56.6%	61.2%	65.5%	10.0ppts
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/training	5.2%	4.5%	4.6%	2.6%	1.7%	-3.6ppts
Other intentions at 16	1.5%	1.7%	1.2%	1.0%	0.6%	-0.9ppts
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 to HE, but not likely to get in	9.6%	10.7%	7.1%	8.3%	7.0%	-2.6ppts
Not likely to apply to HE, but likely would get in	6.4%	8.6%	7.8%	8.3%	5.2%	-1.1ppts
Not 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
Behavioural difficulties and bullying						
Experience of bullying (scale) (SDs)	0.103	0.039	-0.011	-0.037	-0.081	-0.184
Education behavioural difficulties (scale) (SDs)	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
Frequent smoker	6.2%	5.2%	3.5%	2.6%	1.3%	-4.9ppts
Frequent drinker	5.3%	7.0%	7.5%	9.0%	7.8%	2.5ppts
Ever tried cannabis	10.3%	9.7%	8.8%	9.1%	8.3%	-2.0ppts
'Good citizen' behaviours and attitudes						
Teacher-child relations (scale) (SDs)	-0.089	-0.064	-0.024	0.021	0.095	0.184
Reads regularly in spare time	69.7%	71.0%	75.2%	76.6%	81.4%	11.7ppts
Attends religious classes or courses	20.4%	16.0%	15.3%	13.8%	17.7%	-2.7ppts
Participates in positive activities	89.2%	92.1%	93.8%	95.1%	97.5%	8.3ppts

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Table A2.6   Socio-economic gradients in changes in young person's attitudes, expectations and behaviours between 13/14 and 15/16

	SEP quintile					Top minus bottom
	Bottom	2	3	4	Top	
Starts getting good marks	4.5%	4.5%	4.9%	2.6%	2.8%	-1.7ppts
Stops getting good marks	13.2%	11.5%	7.2%	6.3%	5.3%	-7.9ppts
Starts liking school	31.0%	33.4%	31.6%	32.1%	33.3%	2.3ppts
Stops liking school	40.9%	36.7%	37.3%	35.7%	31.7%	-9.2ppts
Starts finding school valuable	10.6%	10.3%	10.2%	8.4%	7.5%	-3.2ppts
Stops finding school valuable	16.5%	15.7%	11.5%	12.6%	12.5%	-4.0ppts
Starts wanting to stay in school beyond age 16	7.7%	7.7%	5.5%	4.9%	2.4%	-5.2ppts
Stops wanting to stay in school beyond age 16	19.0%	19.0%	17.9%	16.6%	17.9%	-1.1ppts
Starts thinking it likely that they will apply to HE	9.3%	10.9%	10.0%	11.0%	8.4%	-1.0ppts
Stops thinking it likely that they will apply to HE	18.7%	17.4%	15.1%	13.0%	9.8%	-8.9ppts
Starts being bullied frequently	3.6%	3.6%	3.1%	3.2%	2.7%	-0.9ppts
Stops being bullied frequently	12.4%	11.2%	10.9%	9.4%	8.0%	-4.5ppts
Starts playing truant	25.3%	23.4%	22.7%	20.3%	19.6%	-5.6ppts
Starts being suspended from school	9.2%	7.4%	6.5%	4.9%	3.9%	-5.3ppts
Starts being expelled from school	1.8%	1.6%	0.3%	0.4%	0.1%	-1.7ppts
Starts smoking cannabis	18.8%	17.7%	20.0%	18.0%	18.7%	-0.1ppts
Stops smoking cannabis	1.1%	0.9%	0.5%	1.0%	0.5%	-0.6ppts
Starts smoking cigarettes frequently	15.4%	11.7%	10.6%	7.6%	6.1%	-9.3ppts
Stops smoking cigarettes frequently	0.8%	0.7%	0.8%	0.5%	0.2%	-0.6ppts
Starts drinking regularly	11.3%	14.6%	15.9%	14.4%	16.5%	5.2ppts
Stops drinking regularly	2.2%	2.8%	3.4%	4.1%	2.8%	0.6ppts
Starts getting involved in anti-social behaviour	9.7%	10.8%	10.8%	8.5%	8.7%	-1.0ppts
Stops getting involved in anti-social behaviour	21.0%	17.3%	16.5%	15.1%	10.1%	-10.9ppts
Starts liking their teachers	8.1%	7.0%	7.9%	5.7%	6.9%	-1.2ppts
Stops liking their teachers	10.3%	9.1%	7.5%	5.9%	5.9%	-4.3ppts
Starts playing sport in their spare time	11.4%	10.9%	8.1%	10.5%	7.6%	-3.7ppts
Stops playing sport in their spare time	16.0%	14.9%	12.6%	12.1%	10.0%	-6.0ppts
Starts reading in their spare time	11.4%	12.5%	9.7%	9.8%	7.5%	-3.9ppts
Stops reading in their spare time	15.5%	16.0%	14.3%	11.9%	12.6%	-2.9ppts

Appendix 3   Relating GCSE points to GCSE grades

Table A3.1   Relationship between GCSE grades, GCSE points and Key Stage 4 standardised scores

Grade	GCSE points	Key Stage 4 standard deviations
A*	58	0.374
A	52	0.335
B	46	0.298
C	40	0.258
D	34	0.219
E	28	0.181
F	22	0.142
G	16	0.103

Notes: Column 3 is calculated on the basis that 1 standard deviation in Key Stage 4 scores is equivalent to 155 GCSE points.

Appendix 4 Additional tables explaining teenage education and behavioural outcomes

Table A4.1 Relationship between parental education and selected teenage education and behavioural outcomes

	KS3 normalised score	KS3 value-added	Ever tried smoking (age 14)	Frequent smoker (age 14)	Ever tried alcohol (age 14)	Frequent drinker (age 14)	Ever tried cannabis (age 14)	Ever involved in anti-social behaviour (age 14)	Ever played truant (age 14)	Ever tried smoking (age 16)	Ever tried alcohol (age 16)
Parental education											
Mother's highest qualification NVQ Level 1	0.03	-0.014	0.018	0.005	-0.001	-0.011	-0.01	0.003	-0.001	-0.009	0.046
Mother's highest qualification NVQ Level 2	0.097**	0.012	0	0.004	0.016	-0.016*	0.007	-0.01	0.003	-0.004	-0.000
Mother's highest qualification NVQ Level 3	0.136**	0.018	0.009	0.006	0.011	0.005	0.014	-0.018	-0.015	-0.000	0.026
Mother's highest qualification NVQ Level 4/5	0.168**	0.055**	0.01	0.009	0.01	0.001	0.023	-0.009	0.006	-0.003	0.029
Mother's highest qualification other	0.002	-0.025	0.032	0.007	-0.006	0.001	0.01	-0.004	0.047	-0.030	-0.077
Father's highest qualification NVQ Level 1	0.054	0.037	-0.017	-0.001	-0.023	-0.006	0.004	-0.005	-0.009	0.009	-0.001
Father's highest qualification NVQ Level 2	0.048*	0.022	-0.004	0.003	0.003	0.003	0.006	0.035*	0.008	0.002	0.066**
Father's highest qualification NVQ Level 3	0.081**	0.033*	-0.020*	0.002	-0.002	-0.001	0.003	0.019	0.007	0.014	0.032
Father's highest qualification NVQ Level 4/5	0.114**	0.049**	-0.013	-0.002	-0.008	-0.003	0.008	0.031	0.006	-0.007	-0.002
Father's highest qualification other	0.015	0.088*	-0.012	0	0.033	0.015	0.007	-0.012	0.014	0.029	0.077

Notes: these regressions also control for demographic and other family background characteristics (described in detail in Chapter 2), plus all of our potential transmission mechanisms (i.e. school and neighbourhood characteristics, material resources, and the attitudes and behaviours of the young person and their main parent), as set out in Tables A4.2 to A4.6. * indicates significance at 5% level; ** at the 1% level.

Table A4.2   Relationship between school/peer characteristics and selected teenage education and behavioural outcomes

	KS3 normalised score	KS3 value-added	Ever tried smoking (age 14)	Frequent smoker (age 14)	Ever tried alcohol (age 14)	Frequent drinker (age 14)	Ever tried cannabis (age 14)	Ever involved in anti-social behaviour (age 14)	Ever played truant (age 14)	Ever tried smoking (age 16)	Ever tried alcohol (age 16)
School quality											
KS2-KS3 value-added measure	0.099**	0.122**	-0.004	0.001	-0.004	-0.005	0.006	0.008	0.002	0.001	-0.013
KS3-KS4 value-added measure	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Outstanding Ofsted report	0.012	0.008	0.008	-0.004	0.041*	0.016	-0.005	0.011	-0.005	-0.007	0.010
Good Ofsted report	-0.004	-0.003	0.011	-0.001	0.043**	0.014*	0.001	0.034*	0.011	0.021*	0.048*
Inadequate Ofsted report	0.007	-0.002	0.000	-0.003	-0.022	-0.006	-0.013	-0.015	0.025	0.004	0.036
School composition											
KS2 average point score	0.058**	-0.040**	0.000	0.000	0.001	0.003*	0.005**	0.001	-0.004	0.001	0.003
% pupils with SEN statement	-0.010*	-0.006	0.002	0.000	-0.001	0.002	0.003	-0.005	-0.001	0.003	0.002
% pupils eligible for FSM	-0.117	0.036	-0.051	-0.004	-0.164	-0.011	0.023	0.123	-0.001	-0.094*	-0.152
% EAL pupils	-0.355*	-0.111	-0.024	-0.007	-0.317*	-0.118	-0.072	-0.012	0.017	0.008	0.103
% White boys	-0.269*	0.011	0.048	0.012	-0.123	-0.066	0.024	0.238*	0.005	0.032	0.011
% White girls	-0.272*	0.002	0.028	0.002	-0.158	-0.038	-0.024	0.147	-0.023	-0.025	0.007
% Asian boys	0.012	0.028	0.071	0.024	-0.033	0.067	0.089	0.120	-0.002	0.062	-0.086
% Asian girls	0.029	0.028	0.048	0.012	0.024	-0.009	-0.073	0.139	-0.116	0.048	-0.448*
% Black boys	-0.371	0.169	-0.043	0.050	-0.031	-0.106	0.016	0.39	0.141	-0.282	-0.804**
% Black girls	-0.075	0.062	0.098	0.063	-0.075	-0.159	0.128	0.325	0.032	0.023	-0.354
School type											
School has a sixth form	0.006	0.004	-0.009	-0.003	0.01	0.002	-0.006	0.021	0.007	0.001	0.008
Grammar school	0.462**	0.021	0.004	-0.006	-0.068	-0.001	0.001	-0.086**	-0.056**	-0.044**	0.097*
Friends' expectations for education											
YP thinks most friends will stay on post 16	0.136**	0.065**	-0.023**	-0.008*	-0.027	-0.011	-0.013	-0.038**	-0.025**	-0.022**	-0.026
YP thinks most friends will do something else	0.033	0.019	0.006	-0.005	-0.023	-0.015	-0.019	-0.018	-0.019	-0.033*	-0.060

Notes: omitted categories are bottom IMD quintile. These regressions also control for parental education, demographic and other family background characteristics (described in detail in Chapter 2), plus all of our other potential transmission mechanisms (i.e. neighbourhood characteristics, material resources, and the attitudes and behaviours of the young person and their main parent), as set out in Tables A4.3 to A4.6. * indicates significance at the 5% level; ** at the 1% level.

Table A4.3   Relationship between neighbourhood characteristics and selected teenage education and behavioural outcomes

	KS3 normalised score	KS3 value-added	Ever tried smoking (age 14)	Frequent smoker (age 14)	Ever tried alcohol (age 14)	Frequent drinker (age 14)	Ever tried cannabis (age 14)	Ever involved in anti-social behaviour (age 14)	Ever played truant (age 14)	Ever tried smoking (age 16)	Ever tried alcohol (age 16)
Neighbourhood composition											
SOA % eligible for FSM	0.110	-0.108	-0.029	-0.009	-0.035	-0.025	-0.004	0.007	0.011	0.007	0.066
SOA % EAL	0.179	0.077	0.016	-0.045	-0.060	-0.008	0.035	-0.010	0.021	0.075	-0.313
SOA % White boys	0.366*	0.109	0.043	0.006	0.138	0.101*	0.021	-0.170	0.005	-0.044	-0.026
SOA % Asian boys	-0.229	-0.100	0.097	0.045	0.325	0.123	-0.098	-0.212	0.106	-0.258	0.252
SOA % Black boys	0.398	0.035	0.037	0.062	0.173	0.502**	-0.281	-0.329	-0.061	-0.407	-0.037
SOA % White girls	0.200	-0.010	0.044	-0.018	0.245	0.128*	-0.005	-0.266*	-0.023	0.005	-0.133
SOA % Asian girls	0.345	-0.058	-0.020	0.026	-0.079	0.117	0.134	-0.205	-0.095	0.028	0.060
SOA % Black girls	-0.253	-0.058	0.119	-0.126	-0.046	-0.194	0.219	-0.502	-0.007	0.328	0.299
Neighbourhood deprivation											
2nd IMD quintile	-0.001	0.022	-0.008	-0.002	-0.042*	-0.002	-0.006	-0.037*	-0.016	0.004	0.025
3rd IMD quintile	0.031	0.043*	-0.001	-0.001	-0.003	-0.004	-0.004	-0.053*	-0.027*	0.024	0.021
4th IMD quintile	0.006	0.047*	0.003	-0.002	0.004	-0.006	-0.01	-0.049*	-0.026	0.035*	0.085*
Top IMD quintile	0.005	0.049*	-0.002	-0.007	-0.024	-0.014	-0.021	-0.077**	-0.037*	0.027	0.038

Notes: omitted categories are bottom IMD quintile. These regressions also control for parental education, demographic and other family background characteristics (described in detail in Chapter 2), plus all of our other potential transmission mechanisms (i.e. school/peer characteristics, material resources and the attitudes and behaviours of the young person and their main parent), as set out in Tables A4.2 and A4.4 to A4.6. * indicates significance at the 5% level; ** at the 1% level.

Notes to Table A4.6 (below): omitted categories are YP wants to go into f/t work at 16; YP thinks not at all likely will apply to HE. These regressions also control for parental education, demographic and other family background characteristics (described in detail in Chapter 2), plus all of our other potential transmission mechanisms (i.e. school and neighbourhood characteristics, material resources, and the attitudes, expectations and behaviours of the young person's main parent), as set out in Tables A4.2 to A4.5. Note that we do not include controls for educational behavioural difficulties, anti-social behaviour, being a heavy smoker, drinking regularly, ever having smoked cannabis, reading regularly, attending religious classes and participating in positive activities (or changes in these variables) in our models for behavioural outcomes. * indicates significance at the 5% level; ** at the 1% level.

Table A4.4   Relationship between main parent attitudes and behaviours and selected teenage education and behavioural outcomes

	KS3 normalised score	KS3 value-added	Ever tried smoking (age 14)	Frequent smoker (age 14)	Ever tried alcohol (age 14)	Frequent drinker (age 14)	Ever tried cannabis (age 14)	Ever involved in anti-social behaviour (age 14)	Ever played truant (age 14)	Ever tried smoking (age 16)	Ever tried alcohol (age 16)
Education values											
Parent education value (scale)	-0.012	-0.003	-0.001	0.000	-0.018*	-0.005	-0.005	0.011	-0.007	0.006	-0.006
Education aspirations and expectations											
Parent wants YP to stay in FTE at 16	0.199**	0.106*	0.030	0.008	0.022	0.018	0.000	0.008	-0.018	0.009	0.051
Parent wants YP to learn a trade/training/apprenticeship	0.025	0.015	0.037	0.008	0.022	0.006	0.000	0.041	0.004	0.014	0.010
Parent has other aspirations for YP at 16	0.256**	0.091	0.061	0.020	0.019	0.033	-0.006	0.094	0.001	0.013	-0.043
Parent thinks v/fairly likely YP will go to uni	0.406**	0.138**	-0.013	-0.001	0.031*	-0.007	0.011	-0.024	-0.004	0.005	0.033
Parent-child interactions and activities											
Parent child interactions: education (scale)	0.045**	0.025**	0.002	0.000	0.008	-0.003	0.005	0.001	-0.008*	0.003	0.015
Family child interactions (scale)	0.003	0.021**	-0.033**	-0.009*	-0.086**	-0.015**	-0.032**	-0.066**	-0.030**	-0.039**	-0.063**
Parental involvement in school activities (scale)	0.007	-0.003	-0.010	-0.003	0.012	-0.002	0.005	-0.005	-0.014	-0.013	0.015

Notes: omitted categories are parent wants YP to go into f/t work at 16; parent thinks fairly/very unlikely YP will go to university. These regressions also control for parental education, demographic and other family background characteristics (described in detail in Chapter 2), plus all of our other potential transmission mechanisms (i.e. school and neighbourhood characteristics, material resources, and the attitudes and behaviours of the young person), as set out in Tables A4.2, A4.3, A4.5 and A4.6. * indicates significance at the 5% level; ** at the 1% level.

Table A3.5   Relationship between material resources and selected teenage education and behavioural outcomes

	KS3 normalised score	KS3 value-added	Ever tried smoking (age 14)	Frequent smoker (age 14)	Ever tried alcohol (age 14)	Frequent drinker (age 14)	Ever tried cannabis (age 14)	Ever involved in anti-social behaviour (age 14)	Ever played truant (age 14)	Ever tried smoking (age 16)	Ever tried alcohol (age 16)
Material resources											
Private tuition	0.051**	0.048**	-0.016**	-0.005	0.01	0.001	0.001	-0.012	-0.022**	0.011	0.020
Computer access	0.068*	0.047*	-0.013	-0.005	-0.023	-0.013	-0.007	-0.026	-0.025*	-0.048*	-0.035
Internet access	0.091**	0.017	-0.004	0	0.011	0.007	-0.001	-0.024	-0.001	-0.010	0.079**

Notes: these regressions also control for parental education, demographic and other family background characteristics (described in detail in Chapter 2), plus all of our other potential transmission mechanisms (i.e. school and neighbourhood characteristics, and the attitudes and behaviours of the young person and their main parent), as set out in Tables A4.2 to A4.4 and A4.6. * indicates significance at the 5% level; ** at the 1% level.

Table A4.6   Relationship between young person attitudes and behaviours and selected teenage education and behavioural outcomes

	KS3 normalised score	KS3 value-added	Ever tried smoking (age 14)	Frequent smoker (age 14)	Ever tried alcohol (age 14)	Frequent drinker (age 14)	Ever tried cannabis (age 14)	Ever involved in anti-social behaviour (age 14)	Ever played truant (age 14)	Ever tried smoking (age 16)	Ever tried alcohol (age 16)
Wave 1 levels											
Self-concept and education values											
Ability beliefs (scale)	0.391**	0.139**	-0.002	0.000	0.000	0.009*	-0.008	-0.016	-0.004	-0.009	0.005
Enjoyment of school (intrinsic value scale)	-0.104**	-0.031**	-0.029**	-0.007*	-0.075**	-0.026**	-0.022**	-0.071**	-0.054**	-0.021**	-0.078**
Usefulness of school (extrinsic value scale)	0.059**	0.024**	-0.013**	-0.002	-0.007	-0.009*	-0.005	-0.027**	-0.016**	-0.018**	-0.016
Locus of control (scale)	0.108**	0.048**	-0.001	-0.002	0.001	-0.003	0.001	-0.009	-0.001	-0.008	0.014
Education/job aspirations and expectations											
Wants to stay on in FTE at 16	0.165**	0.042	-0.004	-0.004	0.061*	0.009	0.008	-0.024	-0.019	-0.013	0.018
Wants to leave FTE at 16 but return later	0.101	0.048	0.001	0.000	-0.013	0.034	0.018	0.001	-0.034	0.018	0.099
Wants to learn a trade/training	0.122**	0.007	0.001	0.004	0.090**	0.007	0.025	-0.019	-0.014	-0.017	0.071
Other intentions at 16	0.062	0.050	-0.014	-0.001	-0.001	0.056	0.004	-0.032	-0.024	-0.006	0.022
Likely to apply to HE, and likely to get in	0.154**	0.051**	-0.018*	-0.008	-0.032	-0.019*	-0.012	0.021	-0.003	-0.041**	-0.015
Likely to apply to HE, but not likely to get in	0.102**	0.055**	-0.006	-0.006	-0.031	-0.014	-0.010	0.027	-0.007	-0.016	0.024
Not very likely to apply to HE, but likely would get in	0.189**	0.039	-0.007	0.000	-0.001	-0.021**	-0.002	0.018	-0.004	-0.040**	-0.029
Not very likely to apply to HE, and not likely to get in	0.081**	0.040	-0.021**	-0.006	-0.026	-0.017*	-0.015	0.011	-0.004	-0.027*	-0.023
Job aspirations (scale)	-0.013	-0.011	0.007	0.002	0.039**	0.000	0.008*	0.020**	0.001	0.013**	0.034**
Behavioural difficulties and bullying											
Experience of bullying (scale)	-0.141**	-0.022**	0.021**	0.002	0.000	0.008*	0.010*	0.041**	0.027**	0.014*	-0.042**
Education behavioural difficulties (scale)	-0.089**	-0.053**									
Anti-social behaviour (scale)	-0.031*	-0.039**									
Frequent smoker	-0.128**	-0.165**									
Drinks regularly	0.057*	0.015									
Ever tried cannabis	0.100**	0.005									
'Good citizen' behaviours and attitudes											
Teacher-child relations (scale)	-0.050**	0.017	-0.044**	-0.009*	-0.114**	-0.018**	-0.046**	-0.141**	-0.078**	-0.059**	-0.078**
Reads regularly in spare time	0.104**	0.044**									
Attends religious classes or courses	0.059**	0.023									
Participates in positive activities	0.120**	0.044*									

Appendix 5 Relationship between young person and main parent educational aspirations

Table A5.1 Relationship between young person and main parent educational aspirations in Wave 1

	YP wants to stay in FTE beyond age 16		YP thinks likely will apply to HE and likely will get in	
	(1)	(2)	(1)	(2)
MP wants YP to stay in FTE beyond age 16	0.380**	0.224**		
Parent thinks v/fairly likely YP will go to uni			0.612**	0.537**

Notes:
(1) illustrates the raw correlation between the young person and main parent's aspirations.
(2) also controls for socio-economic position and parental education, plus other family, school and neighbourhood characteristics. See Chapter 2 and Appendix 1 for details.
* indicates significance at the 5% level; ** indicates significance at the 1% level.

Appendix 6 Additional tables explaining the socio-economic gaps in teenage education and behavioural outcomes

Table A6.1 Explaining the socio-economic gradient in education outcomes at age 14

	Standardised Key Stage 3 Score								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	0.342**	75%**	48%**	43%**	43%**	44%**	34%**	35%**	22%**
3rd SEP quintile	0.651**	75%**	51%**	39%**	46%**	44%**	38%**	36%**	21%**
4th SEP quintile	0.882**	72%**	50%**	36%**	44%**	38%**	38%**	34%**	17%**
Top SEP quintile	1.244**	69%**	52%**	36%**	45%**	37%**	41%**	33%**	15%**
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			0.165**	90%**	90%**	92%**	70%**	72%**	46%**
3rd SEP quintile			0.333**	77%**	89%**	86%**	74%**	71%**	41%**
4th SEP quintile			0.442**	71%**	87%**	76%**	76%**	67%**	33%**
Top SEP quintile			0.643**	69%**	88%**	71%**	80%**	63%**	29%**
R-squared	0.18	0.23	0.32	0.42	0.33	0.47	0.34	0.51	0.61
	Standardised Key Stage 3 Score (with Key Stage 2 control)								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	0.110**	89%**	60%**	56%**	43%**	58%**	43%**	53%**	29%*
3rd SEP quintile	0.212**	87%**	64%**	52%**	47%**	60%**	49%**	55%**	29%**
4th SEP quintile	0.276**	83%**	61%**	46%**	42%**	52%**	47%**	50%**	22%**
Top SEP quintile	0.388**	78%**	60%**	44%**	43%**	49%**	48%**	46%**	18%**
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			0.066**	94%**	71%**	97%**	71%**	88%**	48%*
3rd SEP quintile			0.135**	81%**	73%**	95%**	77%**	86%**	45%**
4th SEP quintile			0.167**	77%**	69%**	86%**	77%**	83%**	36%**
Top SEP quintile			0.233**	74%**	72%**	81%**	79%**	77%**	30%**
R-squared	0.76	0.76	0.77	0.81	0.78	0.79	0.78	0.80	0.84
	Controls								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
Parental education		√	√	√	√	√	√	√	√
Family background			√	√	√	√	√	√	√
Schools				√					√
Neighbourhoods					√				√
MP As & Bs						√			√
Material resources							√		√
YP As & Bs								√	√

Notes: * indicates that the underlying coefficient is significantly different from zero at the 5% level; ** indicates it is significant at the 1% level.

Table A6.2 Explaining the socio-economic gradient in behavioural outcomes at age 14

	Ever tried smoking								
	None	**P Edu**	**Fam**	**Sch**	**Nei**	**MP**	**M Res**	**YP**	**All**
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	-0.017	106%	82%	100%	100%	65%	59%	71%	65%
3rd SEP quintile	-0.040**	95%**	68%**	70%**	78%**	53%*	53%*	48%*	40%*
4th SEP quintile	-0.051**	92%**	69%**	67%**	76%**	53%**	55%**	45%**	39%*
Top SEP quintile	-0.072**	88%**	64%**	57%**	68%**	42%**	50%**	35%*	25%
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			-0.014	121%	121%	79%	71%	86%	79%
3rd SEP quintile			-0.027**	104%**	115%**	78%*	78%*	70%*	59%*
4th SEP quintile			-0.035**	97%**	111%**	77%**	80%**	66%**	57%*
Top SEP quintile			-0.046**	89%**	107%**	65%**	78%**	54%*	39%
Pseudo R-squared	0.01	0.02	0.07	0.09	0.07	0.11	0.08	0.15	0.18
	Frequent smoker								
	None	**P Edu**	**Fam**	**Sch**	**Nei**	**MP**	**M Res**	**YP**	**All**
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	-0.006	133%	50%	67%	50%	17%	17%	50%	33%
3rd SEP quintile	-0.017**	106%**	53%*	41%*	53%*	35%	35%	35%	18%
4th SEP quintile	-0.024**	100%**	58%**	50%**	54%**	38%**	46%	38%*	21%
Top SEP quintile	-0.037**	95%**	62%**	49%	54%**	41%	51%*	35%*	19%*
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			-0.003	133%	100%	33%	33%	100%	67%
3rd SEP quintile			-0.009*	78%*	100%*	67%	67%	67%	33%
4th SEP quintile			-0.014**	86%**	93%**	64%**	79%	64%*	36%
Top SEP quintile			-0.023**	78%	87%**	65%	83%*	57%*	30%*
Pseudo R-squared	0.03	0.04	0.10	0.14	0.11	0.16	0.11	0.21	0.25
	Ever tried alcohol								
	None	**P Edu**	**Fam**	**Sch**	**Nei**	**MP**	**M Res**	**YP**	**All**
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	0.065**	63%*	12%	8%	8%	20%	15%	9%	3%
3rd SEP quintile	0.086**	63%**	8%	15%	17%	15%	12%	13%	9%
4th SEP quintile	0.136**	74%**	32%*	20%	15%	41%*	35%*	38%*	22%
Top SEP quintile	0.111**	71%**	16%	1%	7%	32%	19%	32%	9%
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			0.008	63%	63%	163%	125%	75%	25%
3rd SEP quintile			0.007	186%	214%	186%	143%	157%	114%
4th SEP quintile			0.044*	61%	48%	127%*	107%*	116%*	68%
Top SEP quintile			0.018	6%	44%	200%	117%	200%	56%
Pseudo R-squared	0.01	0.01	0.10	0.11	0.10	0.11	0.10	0.13	0.14
	Controls								
	None	**P Edu**	**Fam**	**Sch**	**Nei**	**MP**	**M Res**	**YP**	**All**
Parental education		√	√	√	√	√	√	√	√
Family background			√	√	√	√	√	√	√
Schools				√					√
Neighbourhoods					√				√
MP As & Bs						√			√
Material resources							√		√
YP As & Bs								√	√

Notes: * indicates that the underlying coefficient is significantly different from zero at the 5% level; ** indicates it is significant at the 1% level.

Table A6.2 continued

	Frequent drinker								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	0.021	95%	62%	43%	43%	71%	71%	62%	48%
3rd SEP quintile	0.027*	96%*	52%	33%	37%	70%	63%	70%	48%
4th SEP quintile	0.044**	95%**	59%*	52%	50%	73%*	66%*	70%*	59%*
Top SEP quintile	0.030**	97%**	50%	43%	43%	83%*	60%	87%*	70%
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			0.013	69%	69%	115%	115%	100%	77%
3rd SEP quintile			0.014	64%	71%	136%	121%	136%	93%
4th SEP quintile			0.026*	88%	85%	123%*	112%*	119%*	100%*
Top SEP quintile			0.015	87%	87%	167%*	120%	173%*	140%
Pseudo R-squared	0.00	0.01	0.04	0.06	0.05	0.05	0.04	0.08	0.11
	Ever tried cannabis								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	-0.006	200%	50%	50%	50%	0%	0%	67%	33%
3rd SEP quintile	-0.015	153%**	60%	60%	53%	33%	33%	40%	20%
4th SEP quintile	-0.012	200%**	50%	50%	33%	0%	17%	8%	8%
Top SEP quintile	-0.019*	189%**	74%	68%	53%	21%	47%	11%	5%
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			-0.003	100%	100%	0%	0%	133%	67%
3rd SEP quintile			-0.009	100%	89%	56%	56%	67%	33%
4th SEP quintile			-0.006	100%	67%	0%	33%	17%	17%
Top SEP quintile			-0.014	93%	71%	29%	64%	14%	7%
Pseudo R-squared	0.00	0.01	0.04	0.05	0.04	0.06	0.04	0.10	0.12
	Ever involved in anti-social behaviour								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	-0.065**	106%**	77%**	74%**	65%**	66%**	62%**	80%**	51%*
3rd SEP quintile	-0.091**	103%**	73%**	64%**	59%**	62%**	55%**	62%**	30%
4th SEP quintile	-0.129**	101%**	71%**	61%**	57%**	57%**	57%**	60%**	30%*
Top SEP quintile	-0.185**	99%**	77%**	67%**	66%**	61%**	65%**	61%**	36%**
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			-0.050**	96%**	84%**	86%**	80%**	104%**	66%*
3rd SEP quintile			-0.066**	88%**	82%**	85%**	76%**	85%**	41%
4th SEP quintile			-0.092**	86%**	80%**	80%**	80%**	84%**	42%*
Top SEP quintile			-0.142**	87%**	87%**	79%**	85%**	80%**	47%**
Pseudo R-squared	0.02	0.02	0.06	0.07	0.06	0.08	0.06	0.13	0.15
	Controls								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
Parental education		√	√	√	√	√	√	√	√
Family background			√	√	√	√	√	√	√
Schools				√					√
Neighbourhoods					√				√
MP As & Bs						√			√
Material resources							√		√
YP As & Bs								√	√

Notes: * indicates that the underlying coefficient is significantly different from zero at the 5% level; ** indicates it is significant at the 1% level.

Table A6.2 continued

	Ever played truant								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	-0.051**	96%**	65%**	61%**	55%**	57%**	53%*	65%**	45%*
3rd SEP quintile	-0.070**	93%**	57%**	46%**	44%**	46%**	41%**	43%**	17%
4th SEP quintile	-0.085**	92%**	58%**	44%**	42%**	40%**	44%**	40%**	12%
Top SEP quintile	-0.122**	92%**	68%**	54%**	57%**	50%**	56%**	47%**	23%*
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			-0.033**	94%**	85%**	88%**	82%**	100%**	70%*
3rd SEP quintile			-0.040**	80%**	78%**	80%**	73%**	75%**	30%
4th SEP quintile			-0.049**	76%**	73%**	69%**	76%**	69%**	20%
Top SEP quintile			-0.083**	80%**	84%**	73%**	82%**	69%**	34%*
Pseudo R-squared	0.02	0.03	0.05	0.07	0.05	0.08	0.05	0.15	0.17
	Participate in positive activities								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	0.019**	68%*	37%	42%	32%	37%	32%	32%	26%
3rd SEP quintile	0.031**	68%**	42%*	32%	32%	32%	26%	26%	10%
4th SEP quintile	0.041**	68%**	51%**	39%*	39%*	39%*	37%*	34%*	15%
Top SEP quintile	0.062**	76%**	61%**	52%**	52%**	50%**	48%**	48%**	29%**
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			0.007	114%	86%	100%	86%	86%	71%
3rd SEP quintile			0.013*	77%	77%	77%	62%	62%	23%
4th SEP quintile			0.021**	76%*	76%*	76%*	71%*	67%*	29%
Top SEP quintile			0.038**	84%**	84%**	82%**	79%**	79%**	47%**
Pseudo R-squared	0.03	0.04	0.08	0.10	0.09	0.10	0.10	0.11	0.15
	Controls								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
Parental education		√	√	√	√	√	√	√	√
Family background			√	√	√	√	√	√	√
Schools				√					√
Neighbourhoods					√				√
MP As & Bs						√			√
Material resources							√		√
YP As & Bs								√	√

Notes: * indicates that the underlying coefficient is significantly different from zero at the 5% level; ** indicates it is significant at the 1% level.

Table A6.3   Explaining the socio-economic gradient in behavioural outcomes at age 16

	None	P Edu	Fam	Sch	Nei	MP	M Res	YP	All
					Ever tried smoking				
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
				Gap as a % of raw SEP gradient (none)					
2nd SEP quintile	-0.027*	119%**	107%*	126%**	130%**	96%*	81%	70%	59%
3rd SEP quintile	-0.035**	114%**	89%*	106%**	117%**	103%**	74%*	51%	49%
4th SEP quintile	-0.040**	108%**	93%*	105%**	125%**	100%**	88%**	60%*	60%*
Top SEP quintile	-0.040**	95%**	70%	75%	108%**	80%*	93%*	45%	40%
			Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)						
2nd SEP quintile			-0.029*	117%**	121%**	90%*	76%	66%	55%
3rd SEP quintile			-0.031*	119%**	132%**	116%**	84%*	55%	55%
4th SEP quintile			-0.037*	114%**	135%**	108%**	95%**	65%*	65%*
Top SEP quintile			-0.028	107%	154%**	114%*	132%*	61%	57%
Pseudo R-squared	0.00	0.00	0.04	0.05	0.04	0.12	0.13	0.21	0.23
					Frequent smoker				
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
				Gap as a % of raw SEP gradient (none)					
2nd SEP quintile	-0.029**	107%**	79%**	83%**	83%**	59%*	52%*	38%*	24%
3rd SEP quintile	-0.042**	100%**	64%**	62%**	67%**	50%**	43%*	24%*	12%
4th SEP quintile	-0.063**	97%**	71%**	67%**	71%**	56%**	52%**	32%**	21%**
Top SEP quintile	-0.076**	91%**	66%**	57%**	64%**	45%**	50%**	26%**	13%
			Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)						
2nd SEP quintile			-0.023**	104%**	104%**	74%*	65%*	48%*	30%
3rd SEP quintile			-0.027**	96%**	104%**	78%**	67%*	37%*	15%
4th SEP quintile			-0.045**	93%**	100%**	78%**	73%**	44%**	29%**
Top SEP quintile			-0.050**	86%**	98%**	68%**	76%**	38%**	18%
Pseudo R-squared	0.02	0.02	0.07	0.09	0.07	0.16	0.15	0.25	0.28
					Ever tried alcohol				
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
				Gap as a % of raw SEP gradient (none)					
2nd SEP quintile	0.077**	61%**	19%	6%	10%	21%	18%	43%	22%
3rd SEP quintile	0.130**	68%**	33%*	21%	23%	8%	12%	25%	4%
4th SEP quintile	0.197**	77%**	48%**	39%**	41%**	25%*	26%*	39%**	16%
Top SEP quintile	0.275**	84%**	64%**	57%**	59%**	31%**	30%**	37%**	19%
			Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)						
2nd SEP quintile			0.015	33%	53%	107%	93%	227%	113%
3rd SEP quintile			0.043*	63%	70%	23%	37%	79%	12%
4th SEP quintile			0.095**	81%**	85%**	53%*	55%*	81%**	35%
Top SEP quintile			0.175**	90%**	93%**	49%**	47%**	60%**	30%
Pseudo R-squared	0.04	0.05	0.12	0.13	0.12	0.36	0.40	0.44	0.46
					Controls				
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
Parental education		√	√	√	√	√	√	√	√
Family background			√	√	√	√	√	√	√
Schools				√					√
Neighbourhoods					√				√
MP As & Bs						√			√
Material resources							√		√
YP As & Bs								√	√

Notes: * indicates that the underlying coefficient is significantly different from zero at the 5% level; ** indicates it is significant at the 1% level.

Table A6.3 continued

	None	P Edu	Fam	Sch	Nei	MP	M Res	YP	All
	Frequent drinker								
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	0.037**	86%*	49%	35%	32%	49%	57%	43%	35%
3rd SEP quintile	0.056**	88%**	50%	38%	34%	41%	52%*	45%*	39%*
4th SEP quintile	0.064**	88%**	50%*	39%	36%	41%	47%*	39%*	36%*
Top SEP quintile	0.099**	93%**	64%**	58%**	54%**	53%**	49%**	45%**	43%**
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			0.018	72%	67%	100%	117%	89%	78%
3rd SEP quintile			0.028	75%	68%	82%	104%*	93%*	82%*
4th SEP quintile			0.032*	78%	72%	81%	94%*	78%*	72%*
Top SEP quintile			0.063**	90%**	84%**	83%**	78%**	71%**	70%**
Pseudo R-squared	0.01	0.01	0.05	0.06	0.06	0.11	0.11	0.17	0.19
	Ever tried cannabis								
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	-0.003	533%	667%	800%	767%	667%	433%	533%	367%
3rd SEP quintile	0.022	5%	23%	45%	41%	59%	9%	5%	9%
4th SEP quintile	0.015	100%	147%	180%	173%	227%*	160%	147%	113%
Top SEP quintile	0.044**	9%	5%	16%	11%	45%	41%	25%	11%
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			-0.02	120%	115%	100%	65%	75%	50%
3rd SEP quintile			-0.005	200%	180%	260%	40%	20%	60%
4th SEP quintile			-0.022	123%	118%	155%	109%	95%	73%
Top SEP quintile			-0.002	350%	250%	1000%	900%	500%	200%
Pseudo R-squared	0.00	0.01	0.03	0.04	0.04	0.11	0.12	0.19	0.21
	Ever involved in anti-social behaviour								
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	-0.019	137%*	79%	79%	63%	84%	53%	53%	16%
3rd SEP quintile	-0.022*	136%**	68%	64%	41%	105%	50%	27%	14%
4th SEP quintile	-0.048**	119%**	75%*	65%*	56%	88%**	65%*	50%*	21%
Top SEP quintile	-0.044**	114%**	61%	41%	34%	80%*	70%*	32%	11%
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			-0.015	100%	80%	107%	67%	60%	13%
3rd SEP quintile			-0.015	93%	60%	153%	73%	40%	27%
4th SEP quintile			-0.036**	86%	75%	117%	86%	64%	25%
Top SEP quintile			-0.027	67%	56%	130%	115%	52%	19%
Pseudo R-squared	0.00	0.00	0.03	0.04	0.04	0.11	0.12	0.20	0.22
	Controls								
Parental education		√	√	√	√	√	√	√	√
Family background			√	√	√	√	√	√	√
Schools				√					√
Neighbourhoods					√				√
MP As & Bs						√			√
Material resources							√		√
YP As & Bs								√	√

Notes: * indicates that the underlying coefficient is significantly different from zero at the 5% level; ** indicates it is significant at the 1% level.

Table A6.3 continued

	Ever played truant								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
	Gap as a % of raw SEP gradient (none)								
2nd SEP quintile	-0.029**	124%**	117%**	117%**	107%**	114%**	93%*	86%**	59%
3rd SEP quintile	-0.031**	132%**	116%**	106%*	97%*	139%**	100%*	81%*	42%
4th SEP quintile	-0.059**	122%**	114%**	103%**	98%**	120%**	105%**	88%**	61%**
Top SEP quintile	-0.053**	132%**	121%**	98%**	98%**	132%**	125%**	91%**	51%*
	Gap as a % of SEP gradient after controlling for parental education and other family background characteristics (Fam)								
2nd SEP quintile			-0.034**	100%**	91%**	97%**	79%*	74%**	47%
3rd SEP quintile			-0.036**	92%*	83%*	119%**	86%*	69%*	36%
4th SEP quintile			-0.067**	91%**	87%**	106%**	93%**	78%**	52%**
Top SEP quintile			-0.064**	81%**	81%**	109%**	103%**	75%**	41%*
Pseudo R-squared	0.00	0.00	0.02	0.03	0.02	0.10	0.11	0.21	0.23
	Controls								
	None	*P Edu*	*Fam*	*Sch*	*Nei*	*MP*	*M Res*	*YP*	*All*
Parental education		√	√	√	√	√	√	√	√
Family background			√	√	√	√	√	√	√
Schools				√					√
Neighbourhoods					√				√
MP As & Bs						√			√
Material resources							√		√
YP As & Bs								√	√

Notes: * indicates that the underlying coefficient is significantly different from zero at the 5% level; ** indicates it is significant at the 1% level.

Appendix 7 Attempts to identify the causal impact of young people's attitudes and behaviours on Key Stage test scores

A central finding of this report is that young people's attitudes and behaviours appear to be important potential transmission mechanisms through which parental socio-economic position affects child outcomes (see Chapters 5 and 6).

Although it is tempting to conclude from these results that changing attitudes and behaviours amongst the poorest will narrow the attainment gap, it is in fact very difficult to draw robust policy conclusions from these findings, for the reasons discussed above and in Chapter 2.

In this section, we describe some analysis we unsuccessfully attempted to try to discover whether the strong statistical associations that we found between young people's attitudes and behaviours and educational attainment can be given a causal interpretation.

Our approach was to use information about government policies affecting sub-groups of young people sampled in the LSYPE in an attempt to find suitable instruments for young people's attitudes and behaviours in our models of educational attainment. The basic idea is that if we can find policies that change young people's attitudes and behaviours, but do not otherwise directly affect their educational attainment, then we can use this information to estimate the extent to which changes in attitudes and behaviours genuinely affect educational attainment.[61]

For this analysis, we made use of data on three[62] government programmes that potentially affected young people's attitudes and behaviours, but that were unlikely to directly affect their Key Stage test scores. The three programmes we considered were:

(i) **Mentoring services**: young people in the LSYPE are asked (in Wave 3) whether their school offers mentoring services. Whilst the questionnaire does not specify what is meant by "mentoring", it is usually a one-to-one relationship, in which the mentor helps the mentee to develop and achieve their goals, which are often behavioural. We aggregated responses to this question within schools, assuming that schools offer mentoring services if at least 50% of respondents report that they do so. Using this definition, 95% of individuals in the LSYPE attended a school offering mentoring services.

(ii) **Behaviour Improvement Programme**: introduced in two phases (from July 2002) in selected Local Authorities, with the aim of improving pupil behaviour and attendance.[63] School-level data mapped into the LSYPE tells us which schools operated the Behaviour Improvement Programme (BIP) in

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[61] See Chapter 2 for more details on the instrumental variables approach.

[62] We also attempted to use information about the Excellence in Cities (EiC) programme (introduced from September 1999), since certain elements of EiC were aimed at improving young people's attitudes and behaviours, including Learning Mentors and AimHigher. We used Edubase data from 2005 to identify schools participating in EiC, with 44% of individuals in the LSYPE attending such schools. However, we did not have information about which elements of EiC were in operation in different schools. As several elements of EiC (such as the Gifted and Talented strand, and Beacon schools (now Leading Edge schools)) were explicitly designed to improve educational attainment, we cannot be sure that the EiC programme as a whole only affected young people's attitudes and behaviours, but did not have any direct impact on their educational attainment. We thus did not pursue this analysis any further.

[63] See http://www.everychildmatters.gov.uk/ete/behaviour/bip/ for more details.

each phase.[64] 9% of individuals in the LSYPE attended a school operating the Behaviour Improvement Programme.

(iii) **Capital expenditure**: Local Authority reports of which schools in their area had been rebuilt or refurbished over the last 15 years were used to identify schools that had been entirely rebuilt or at least 50% refurbished. We focused on projects finishing in 2004-05 (corresponding to Wave 2 of the LSYPE), allowing us to examine changes in the young person's attitudes and behaviours between Wave 1 and Wave 3. 2% of individuals in the LSYPE attended a school that had been at least 50% refurbished, finishing in 2004-05.

The first stage of our analysis was to test whether or not these programmes affected any of the young person's attitudes or behaviours that we were able to measure. This is, of course, an absolute requirement for us to be able to use them to estimate the impact of attitudes and behaviours on educational attainment.

Unfortunately, once we controlled for all observable differences at the school and individual level between young people who were affected by the programmes described above and those who were not[65], we could not find enough robust or systematic evidence that these programmes did indeed affect young people's attitudes and behaviours for us to be able to take this approach any further (see Tables 6.1 and 6.2 below).

For example, the Behaviour Improvement Programme appeared to have no significant effect on any of the attitudes or behaviours considered. The availability of mentoring services at the young person's school appeared to detrimentally affect several of the young person's attitudes towards schooling. While large-scale capital expenditure appeared to significantly reduce the probability that the young person would stop thinking it likely that they would apply to university between Wave 1 and Wave 3, the programme also seemed to reduce the likelihood that a young person would start wanting to stay on at school beyond age 16. In the face of such conflicting evidence, and given the possibility that these differences could be driven by other unobserved differences between schools that we have not been able to control for in our models, it did not seem appropriate to pursue this approach any further.

Our findings are disappointing in that they mean we have not been able to make the progress we hoped in uncovering causal relationships between the young person's attitudes and behaviours and educational attainment. More importantly, perhaps, they also raise bigger questions as to the effectiveness of these programmes in achieving their goals. It would seem important that the LSYPE is now used for further work assessing the effectiveness of DCSF programmes that are aimed at improving young people's attitudes and behaviours, and, where appropriate, reconciling such findings with programme evaluations that have been conducted using other data sources.

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[64] This data also indicates which schools in the LSYPE formed part of the control group used in the formal evaluation of the Behaviour Improvement Programme (see Hallam et al., 2005). We run our analysis using only these schools as controls, and again using all potential non-BIP schools as controls. This choice makes little difference to our findings.
[65] We did this using both linear regression and propensity score matching methods, with little discernable difference between the results. See Blundell et al. (2005) and Blundell & Costa-Dias (2008) for more information on propensity score matching methods.

Table A7.1   Propensity Score Matching estimates of the impact of various government programmes on a variety of outcomes

	Mentoring services	Behaviour Improvement Programme	Excellence in Cities
Standardised Key Stage score	-0.101 [0.077]	-0.014 [0.038]	0.132** [0.042]
Gets good marks	-.179 ** [0.025]	0.003 [0.013]	-0.005 [0.014]
Likes school	-.17 ** [0.021]	-0.008 [0.012]	-0.020 [0.013]
Finds school valuable	-.137 ** [0.029]	-0.006 [0.016]	-0.024 [0.016]
Wants to stay in FTE beyond age 16	-.107 ** [0.034]	-0.002 [0.016]	0.005 [0.017]
Thinks it likely that they will apply to HE	-.077 * [0.034]	0.014 [0.019]	-0.001 [0.022]
Frequently bullied	0.008 [0.014]	0.002 [0.012]	-0.013 [0.014]
Ever plays truant	0.006 [0.032]	0.001 [0.014]	0.007 [0.015]
Ever suspended	0.002 [0.021]	-0.003 [0.012]	-0.029* [0.012]
Ever tried cannabis	0.002 [0.005]	0.002 [0.010]	-0.004 [0.003]
Smokes frequently	-0.003 [0.029]	-0.003 [0.007]	0.014 [0.012]
Drinks frequently	0.007 [0.017]	-0.001 [0.008]	-0.002 [0.008]
Engaged in anti-social behaviour	-0.017 [0.024]	0.001 [0.018]	-0.003 [0.011]

Notes: Wave 1 (age 13/14) outcomes are used to assess the Behaviour Improvement Programme and Excellence in Cities, because these programmes were introduced prior to the year in which we start following the LSYPE cohort (2003-04). Wave 3 (age 15/16) outcomes are used to assess school mentoring services, because this is when their availability is reported in the LSYPE. All models also include the full set of controls, as set out in Chapter 2 and Appendix 1. ** indicates significance at the 1% level; * indicates significance at the 5% level.

Table A7.2   Propensity Score Matching estimates of the impact of capital expenditure on changes in the young person's attitudes and behaviours between Wave 1 and Wave 3

	Capital expenditure		Capital expenditure
KS3 to KS4 valued-added	0.069 [0.076]		
Start getting good marks	0.007 [0.017]	Stop getting good mark	0.005 [0.028]
Start liking school	0.044 [0.047]	Stop liking school	-0.034 [0.025]
Start finding school valuable	-0.018 [0.021]	Stop finding school valuable	0.031 [0.024]
Start wanting to stay in FTE beyond age 16	-0.017* [0.007]	Stop wanting to stay in FTE beyond age 16	-0.024 [0.030]
Start thinking it likely that they will apply to HE	0.018 [0.014]	Stop thinking it likely that they will apply to HE	-0.050** [0.018]
Start being frequently bullied	0.001 [0.013]	Stop being frequently bullied	0.054 [0.039]
Start playing truant	0.025 [0.033]	Stop playing truant	
Start being suspended	-0.001 [0.023]	Stop being suspended	
Start smoking cannabis	0.034 [0.038]	Stop smoking cannabis	
Start smoking frequently	0.016 [0.026]	Stop smoking frequently	
Start drinking regularly	0.028 [0.031]	Stop drinking regularly	0.011 [0.017]
Start engaging in anti-social behaviour	-0.019 [0.012]	Stop engaging in anti-social behaviour	-0.02 [0.042]

Notes: outcomes relate to a change in attitude or behaviour between Wave 1 and Wave 3. All models also include the full set of controls, as set out in Chapter 2 and Appendix 1. ** indicates significance at the 1% level; * indicates significance at the 5% level.

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