Subject to Background

What promotes better achievement for bright but disadvantaged students?

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Improving social mobility through education

THE SUTTON TRUST

Foreword by Sir Peter Lampl

Able young people from disadvantaged backgrounds lose out at every stage in our education system. The poorest children are 19 months behind on school readiness at the age of five. As this report shows, those who are shown to be bright in their national tests at 11 are barely half as likely as their more advantaged classmates to get the A-levels they need to go to a good university. And our previous research has shown that, even then, there are around 3,000 students every year with the grades to go to the best dozen or so universities who do not end up there.

This important new research from Professor Pam Sammons, Dr Katalin Toth and Professor Kathy Sylva at Oxford University sheds valuable new light not just on the extent to which able young people from disadvantaged backgrounds are missing out, but offers reasons why some are more likely to succeed than others.

In their findings on the importance of good pre-school education, they reaffirm the conclusions of our Sound Foundations report on having well qualified pre-school staff. In highlighting the impact of enrichment beyond the curriculum, they show the importance of reading for pleasure, educational trips and homework, where our research briefing, Extra-curricular Inequalities, highlighted differential access to private tuition and other academic enrichment between those from disadvantaged backgrounds and the more advantaged. And in showing the difference that good teachers and schools make to a child's chances, it reinforces the messages from our What Makes Great Teaching report.

The stark differences in A-level attainment between different groups of students of similar ability also show how crucial it is that we address the inadequacy of provision for able children in many of our state schools.

Our Sutton Scholars programme is working with these young people from the age of 11 and our summer schools lift their aspirations when they are in sixth form. The fact that bright disadvantaged students fall so far behind when they reach their A-levels shows the urgency of government and schools to provide for students from less advantaged backgrounds.

We must ensure that access to the best schools and opportunities for academic enrichment outside of school are not restricted to those with the means to make the most of them, perhaps through better out of school provision or vouchers funded through the pupil premium. It is also vital that schools advise their students on the right subject choices at GCSE and A-level so as not to close off opportunities.

I am very grateful to the researchers for their work on this report, the first of several reports for the Sutton Trust drawing on data from the Effective Pre-School, Primary and Secondary Education (EPPSE) cohort. I hope it provides food for thought to politicians of all parties as they consider education policies in the coming months.

Sir Peter Lampl,
Chairman, The Sutton Trust
March 2015

This study provides a longitudinal perspective on children's educational careers by identifying a group of disadvantaged children, establishing what predicted their academic success at the age of 11 and following them up to age 18.

This report outlines the pattern of academic attainment of a group of 'bright' but socio-economically disadvantaged children from pre-school until their A-levels at the end of Key Stage 5, drawn from a sample of over 3,000 children whom we have tracked since the age of three. It compares their attainment in public examinations in secondary school or college to that of other 'bright' but less disadvantaged students.

The research aims to establish what drives success through:

- Analysing the later AS and A-level attainment of 'bright' children (those identified in primary school who achieved Level 5+ in the national Key Stage 2 tests) from disadvantaged families as they move onto take GCSEs, A-levels and other equivalent qualifications.[1]
- Exploring the characteristics of students who gain the kind of A-levels needed for university entrance and identifying the main barriers and facilitators for obtaining good A-level results for the most disadvantaged students.
- Establishing what enhances or reduces the later academic success of such bright but disadvantaged students in secondary school, including how far such students take up facilitating subjects for entry to high status universities and more demanding higher education courses.

Key Findings

The factors associated with higher attainment at age 11

1. *Early years and primary school experiences, along with better home learning environments in the early years and up to the age of seven, provide a significant boost in attainment for children at the age of 11 and help to counteract disadvantage.*

First, we identified the most disadvantaged pupils in our sample. We went on to define bright or high achievers as those children who had obtained Level 5 – the standard expected for 14 year-olds - or higher on any of the three 'core' subjects - English, maths or science, in national assessments at the end of primary school (Year 6). This led us to focus on 349 students from the original sample, just over one in five (23%) of the pupils in the disadvantaged group at the age of 11.

Using statistical (regression) analysis, we were able to isolate those child and family characteristics that predicted a higher, and statistically significant, probability of a disadvantaged pupil being in the high achieving group. Such pupils were over three times more likely than average to have a mother with a university degree, and twice as likely to have experienced a 'good' home environment in their early years. These pupils were also nearly twice as likely as other disadvantaged children in our group to have enjoyed a reasonable number of enrichment activities, such as visits to libraries or playing sports. They were almost twice as likely to be involved in reading books at home, to have painted, danced or taken part in other such individual activities.

There were a number of pre-school and primary school characteristics that predicted a higher and statistically significant probability of being in the high achieving group. Such pupils were more than twice as likely to have attended a pre-school, particularly one identified as of higher quality or more

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[1] Level 4 was the 'expected level' in the Key Stage 2 tests at age 11. Pupils reaching level 5 achieve the standard expected for an average 14 year old.

effective by the original EPPSE research,[2] and they were more than twice as likely to have gone to a more academically effective primary school, that was better at promoting pupils' value added progress in English.

The factors associated with better GCSE, AS and A-level results

2. *Bright but disadvantaged students obtained statistically significant better GCSE results[3] when they engaged in average or better out of school academic enrichment through activities such as educational outings or reading at home.*

They also had better examination results where they reported more positive experiences of secondary school in terms of:
- a high emphasis on learning
- the head teacher was around and involved in their school's activities
- that students were valued
- that the relationships between students and teachers were good in terms of trust, respect and fairness

3. *Bright but disadvantaged students were significantly more likely to go on to get four or more AS-levels when they had attended any pre-school, especially one of higher quality (rather than no pre-school) and where they had competent teachers and engaged in academic enrichment activities at home, such as reading or learning opportunities including family visits to museums and galleries, between the ages of 11 and 14.*

These were some of the significant factors that made it more likely they would go on to achieve four or more AS-levels:
- They experienced a reasonable or good level of academic enrichment, such as reading at home and going on educational visits and trips in the first years of secondary school (up to age-14 years)
- They had attended any pre-school, in particular one that was highly effective in ensuring that children had an early grasp of numbers and one that was rated average or good quality
- They had attended a secondary school identified by Ofsted inspection as outstanding for the quality of pupils' learning
- They had better experiences at secondary school in terms of their reports of:
    - competent teachers focused on ensuring they were learning well
    - good relationships between students and teachers, with trust, respect and fairness
    - a high level of monitoring of their work by teachers
    - greater levels of teacher feedback on their work.

4. *Bright but disadvantaged students were significantly more likely to go on to attain three or more A-levels when they attended a secondary school rated outstanding by Ofsted for the quality of its pupils' learning and where they experienced average or good levels of academic enrichment at home.*

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[2] Based on researcher observations of quality based on international instruments such as the ECERS scale and measures of effects on child progress
[3] In terms of total GCSE score

Homework

Students' own reports of the time they spent on homework on a typical school night were tested as a predictor of high AS and A-level attainment in Key Stage 5. Our earlier research had shown time on homework in Year 9 and Year 11 to be strong predictors of GCSE success for all students.

> 5. *Students who reported they spent significant amounts of time on homework daily in Year 11 were nine times more likely to get three A-levels than those who did no regular homework.[4]*

The strongest positive effects were found for completing 2-3 hours homework a night rather than none (increasing the probability of getting over four AS-levels by 12 times and the likelihood of getting more than three A-levels by nine times). Spending time on homework is likely to reflect both student motivation and engagement, study skills and independence, school policies and the priority teachers attach to encouraging students to study at home (or provide opportunities after school), as well as parental attitudes and support.

Facilitating subjects

Entry to higher education, especially in prestigious universities, is often strongly influenced by the individual choice of subjects taken at AS and A-level and the grades obtained in these exams. Certain subjects provide an advantage for university entry; these are commonly referred to as facilitating subjects and are particularly important for success to Russell Group universities, including Oxbridge.[5]

Nearly twice as many advantaged as disadvantaged students in our group identified as high achieving (bright) at age 11 went on to take one or more of the A-level subjects seen as providing access to top universities.

> 6. *Nearly twice as many advantaged as disadvantaged bright students are taking one or more of the A-level subjects seen as providing access to good universities.*

High achieving disadvantaged students were significantly less likely to go on to attain three or more A-levels when compared with high achieving less disadvantaged students (35% vs. 60%). Moreover, only 33% of bright but disadvantaged students took one or more A-level exams in facilitating subjects when compared to 58% of bright but more advantaged students. Entry into higher education is not only determined by the number of AS/A-levels taken in specific facilitating subjects, but also on the grade achieved for these subjects. Advantaged students were even more likely to gain a B, A or A* in these subjects, with 41% doing so compared with only 18% of the disadvantaged group.

These different patterns of choices are also apparent when we look at which particular subjects were taken in the first year of the sixth form, at AS-level. Comparing disadvantaged to advantaged bright students we found the following: maths (21% vs. 33%), English (14% vs 19%), physics (10% vs. 16%), biology (17% vs. 27%), chemistry (13% vs. 21%), geography (5% vs. 11%), history (10% vs. 21%), modern languages (4% vs. 9%). Overall, bright but disadvantaged students were significantly less likely to take one or more of any of these subjects at AS-level when compared to bright but more advantaged students (44% vs. 67%).

Only 20% of bright but disadvantaged students obtained a grade B, A or A* in facilitating subjects at AS-level, compared to 42% of more advantaged bright students.

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[4] It is worth noting that the numbers in this sub-group of students within the sample were relatively small, but the results are statistically significant. Similar results were found for homework effects on GCSE performance in earlier research on the EPPSE cohort.
[5] For further information please see the Russell Group report, *Informed Choices*

1. **Support to encourage reading for pleasure, educational trips and out-of-school studying opportunities should be provided to promote attainment for disadvantaged students at all ages, and especially those who were found to be high attaining at age 11. Enrichment vouchers should be funded through the pupil premium for both primary and secondary pupils.**

   The experience of a better home learning environment during adolescence reflected in academic enrichment activities (including reading at home and going on educational visits and trips) also boosts later school attainment at GCSE and the chances of bright but poor students going on to gain better AS and A-level outcomes. This has implications for those responsible for planning the use of pupil premium funds in all schools because disadvantaged students, as a group, tend to have fewer enrichment opportunities at home. Support to encourage reading for pleasure, educational trips and providing studying opportunities may prove especially necessary to promote attainment for disadvantaged students especially those who were found to be high attaining in Key Stage 2.

2. **Bright but disadvantaged students should have more opportunities to go to the best schools – those rated outstanding – by Ofsted with fairer admissions policies linked to free school transport.**

   Going to a high quality secondary school (one identified as Outstanding by Ofsted inspection ratings of the quality of learning) also makes a positive difference for the public examination results of bright but disadvantaged students. Improving the quality of secondary schools in terms of the focus on raising the quality of learning is likely to be especially beneficial in boosting attainment and higher education opportunities for disadvantaged adolescents. Government should find ways to make admissions fairer, using ballots or banding, linked to free school transport, to widen access to the highest achieving schools in urban areas.

3. **Teachers should provide good feedback to students and monitor their work systematically.**

   The quality of students' own secondary school experiences, especially the quality of teaching and support they receive, also makes a significant difference for bright but disadvantaged young people. Favourable perceptions of relationships between students and teachers in the school as a whole, of teachers' emphasis on learning, getting regular and useful feedback about their work, teachers' monitoring their work and attending a school with a pleasant and attractive environment were also among the important predictors of better academic outcomes.

4. **Disadvantaged children should be given the opportunity to attend good pre-school settings with qualified staff.**

   Attending a pre-school also continued to predict better outcomes in the longer term, right up to A-levels especially if the pre-school was of higher overall quality or more effective in promoting early learning providing a lasting boost to exam success. Investment in the early years shows long term benefits. This is in line with previous research on the broader EPPSE sample that found pre-school has lasting effects in reducing both educational and economic differences between richer and poorer children and is likely to generate savings to the Exchequer through higher lifetime earnings. The Sutton Trust has highlighted the impact of well qualified early years staff on school readiness in *Sound Foundations* (2014).

5. **Some groups of students, particularly white working class boys, should have additional encouragement and support to enable them to engage in self-directed study, do sufficient homework and read more books, the activities that provide extra academic dividends. Schools should provide such opportunities where they are unlikely to be available at home**

   Some groups of disadvantaged students do better than others, girls and ethnic minority students in the bright but disadvantaged group showed better attainment in public examinations at GCSE, AS and A-levels than boys and those from white UK backgrounds. Schools may need to pay particular attention to ensuring that they can promote better outcomes for white working class boys by promoting additional or tailored opportunities for them to learn in and out of school. Interestingly, some of the differences in exam success seem to reflect variations between student groups in the time they report spending on homework ahead of their GCSEs. Out of school learning or additional study opportunities in school may reflect differences in expectations of teachers and parents. The school day is relatively short and the effects of some regular increase in study time mount up and may provide a cumulative advantage.

6. **Schools and colleges need to monitor and guide option choices to ensure bright but disadvantaged students maximise their potential to enter higher education, especially the best universities and more prestigious courses.**

   Bright but poor students are also significantly less likely to take AS/A-levels in the important group of 'facilitating' subjects. They are also are less likely to get good results in these subjects than other bright but more advantaged students if they do take them. There should be an entitlement to good careers and subject advice for every student, including on the subject choices likely to lead to good universities and higher education courses.

Economic and educational inequalities continue to hinder social mobility and decrease the chances of poor children achieving the same levels of academic success as their more advantaged peers. There is considerable evidence that an educational equity gap exists across all phases of the English educational system and that the effects of disadvantage are cumulative so that the gap tends to increase as children grow older, especially during secondary schooling.[1, 2] Social and financial disadvantages are likely to reduce the chances of young people's later attainment post 16 and especially, at Advanced level studies at age 18, so that poor children, even if high achievers are less likely to enrol in higher education.[3, 4] In 2013, the Government reported that young people living in the most disadvantaged areas of the country are nearly three times less likely to participate in higher education than their peers living in more advantaged neighbourhoods, and it was found that the most advantaged young people are seven times more likely to attend the most selective universities as the most disadvantaged.[5]

Most previous research has focused on the immediate requirements students need for higher education entry (studying the equity gap in terms of differences in GCSE or A-level results). However, in order to fully understand the interconnections between family background, school, academic attainment and success in being admitted into higher education, we need to follow children's academic trajectories across all phases of education, starting with the early years. Individual, family and school characteristics are likely to have various influences at different educational stages, some of them having longer term effects, others perhaps influential at particular time points. Understanding these different influences helps us to pinpoint the main drivers and implications for policy makers and practitioners. Few studies have investigated children's trajectories from earlier phases of education until entry to higher education by simultaneously examining both the influence of background, neighbourhood and educational experiences.[6]

This study was commissioned by the Sutton Trust to provide a longitudinal perspective on children's education careers, starting with the specific characteristics that increase the chances of disadvantaged children becoming high achievers by the end of primary school and then to follow this group up to age 18 to see whether they continue to experience academic success. It is the first of several reports for the Trust looking at this group of students. The research aims to illuminate the 'drivers' of success by:

1) analysing the later AS and A-level attainment of 'bright' children (those identified in primary school who achieved Level 5+ at the end of Key Stage 2) from disadvantaged families as they move through secondary education and comparing their outcomes to those of other bright children who were more advantaged.

2) exploring the characteristics of students who gain 'good enough' A-level qualifications for university entrance and identify the main barriers and facilitators for obtaining good A-level results for the most disadvantaged students.

3) establishing what enhances or reduces the later academic success of such bright but disadvantaged students in secondary school, this will also address how far such students take up facilitating subjects for entry to high status universities and more demanding higher education courses.

Sample

The sample for this research is drawn from the Effective Pre-school, Primary and Secondary Education Project (EPPSE3+-16), a major large-scale, longitudinal study of the progress and development of children from pre-school through to post-compulsory education in England.[7, 8, 9, 10, 11] It has investigated various aspects of pre-school, primary and secondary school provision that shape children's attainment, progress and development over successive phases of education up to age 16.

The original sample of 3172 children was assessed at the start of pre-school, when the children were about three years old and their development was monitored until they entered school around the age

of five. This original sample also includes over 300 'home' children who had not attended any type of pre-school and who were recruited to the study at age five, representing the comparison 'no pre-school' group. The sample was followed up across primary school into adolescence and children were assessed again at key points until the end of Key Stage 4 in secondary school. These young people were most recently followed through their final year of compulsory schooling and on to their post 16 educational, training and employment choices.

This Sutton Trust follow-up study investigates these students' destinations (academic/non-academic routes), their AS and A-level take up and attainment in Key Stage 5. Data provided by the Department for Education's National Pupil Database (number of AS and A-levels attained, subjects taken, Key Stage 5 grades and total point scores) were merged into the EPPSE dataset to examine these students' A-level and AS achievement and the factors that predict success, specifically obtaining results that are deemed good enough to enter higher education, especially for more prestigious universities. The research used multilevel logistic regression, multiple and logistic regression as appropriate to predict differences in students' national assessment (at age 11 and age 14) results and their later examination results at GCSE, AS and A-level. Odds ratios are used to show the effects of different predictors in increasing or decreasing the likelihood of good outcomes for the bright but disadvantaged group.

Measures

The EPPSE datasets provide rich information on these young people's lives and educational/social progress from the early years at age 3+ to age 16+. Information on changing home circumstances was collected from parents and later from students themselves (at ages 3, 7, and 14) and assessments of these students' academic, social and attitudinal development were available for 8 time points in the period 3-18 years.

Pre-school quality

Pre-school quality was measured with two different scales: ECERS-R and ECERS-E.[18, 19] The American Early Childhood Environment Rating Scale (ECERS-R) [20] is based on child centred pedagogy and also assesses resources for indoor and outdoor play. The English rating scale (ECERS-E) [21] was intended as a supplement to the ECERS-R and was developed specially for the EPPE study to reflect the Learning Outcomes in successive versions of the Early Years Foundation Stage.

As ECERS-E, which focuses on the education aspects of pre-school, had the most consistent effects upon cognitive attainment, the effects of this measures are reported here. The original sample was divided into groups of children whose pre-school experience could be classified as ranging from no quality (i.e., the 'home' group) through low, medium and high quality, based on individual pre-school centres' ECERS-E scores. The classification in four categories was based on the original distribution of the average ECERS scores (no score, lowest - 20%, medium 60% and highest 20%). The distribution of ECERS-E groups in this sample was: no pre-school (10%) low quality (14%), medium quality (54%) and high quality (22%).

Pre-school effectiveness

Measures of pre-school centre effectiveness were calculated separately for Pre-Reading and Early Number Concepts for all pre-school centres in the original EPPSE study. These measures were based on the residuals from multilevel value added models predicting cognitive attainment (at the end of pre-school) of pupils who attended a pre-school centre, controlling for their prior attainment at entry to the study and background influences. Pre-schools where children made more progress than predicted were classified as more effective than those where children made less progress that

predicted (on basis of prior attainment and background characteristics).[22] The classification in four categories was based on the original distribution of the effectiveness scores: no score (the home sample), lowest - 20%, medium 60% and highest 20%.

Primary school academic effectiveness

The value added effectiveness measures for primary schools were calculated using National Assessment data for all primary schools in England linking Key Stage 1 and 2 results, and separate indicators were calculated for the different core curriculum subjects English, mathematics and science.[23, 24] These provided a measure of the academic success of individual primary schools in promoting pupils' academic progress. For each EPPSE pupil, these measures provide indicators of the academic quality of their primary schools. Categories of low, medium and high academic effectiveness were created based on the distribution of scores below and above a standard deviation from the mean.

Social disadvantage

Various individual, family, and neighbourhood characteristics are known to be significant predictors of academic and social-behaviour outcomes. To identify students who form the more 'disadvantaged' group in our sample, we used multiple individual measures like free school meal (FSM) status, family socio-economic status (SES) based on parents' occupations, parents' salary, parents' educational qualifications, parents' employment status, and indicators of neighbourhood disadvantage based on home address post code that measure 'place' poverty, including the Income Deprivation Affecting Children Index (IDACI) and the Index of Multiple Deprivation - (IMD). IDACI represents the percentage of children in each Standard Output Area (SOA) that live in families that are income deprived. The overall IMD is a nationwide index combining weighted measures or levels of: crime, barriers to housing, living environment, education and skills training, health deprivation and disability, employment and income. The greater the IMD score, the greater the level of neighbourhood deprivation. This means that both 'person' and 'place' (neighbourhood) drivers of educational outcomes can be identified and compared with educational influences (pre-school, primary and secondary) to throw light on what affects the outcomes of the disadvantaged group in comparison with other more advantaged peers.

The EPPSE research team had also created its own *multiple disadvantage index* to classify all the individual children in the sample based on their own and their family characteristics (see Table 1) that provides a powerful summary measure of the overall extent of disadvantage that increases the risk of low attainment for a child from pre-school age and beyond. This summary measure has been shown to predict the likelihood of special educational needs (SEN) identification in primary school and is associated with poorer educational outcomes across different phases of education up to age 16.[12, 13, 14, 15, 16, 17] The Sutton Trust recognised the benefits of obtaining evidence about multiple dimensions of disadvantage whenever possible, rather than just considering free school meals alone, because though an important measure, it is relatively crude. In many studies only the free school meals indicator is available, but the EPPSE data set is unusual because it provides information to address multiple disadvantage, as shown in table 1.

Table 1. Measures included in the EPPSE Multiple Disadvantage Index

Child variables
• **First language: English as an additional language (EAL)**
• **Large family: 3 or more siblings**
• **Pre-maturity / low birth weight**
Parent variables
• **Mother's highest qualification level: no qualifications**
• **Social class of father's occupation: Semi-skilled, unskilled, never worked, absent father**
• **Father not employed**
• **Young Mother (Age 13-17 at birth of EPPE child)**
• **Lone parent**
• **Mother not working / unemployed**
• **Low Early years Home learning (HLE)**

Additionally, unique information on the family home learning contexts was measured at four different time points. These measures were based on parent interviews for the early years, and surveys at older ages. They reflect parent-child interactions and learning opportunities in the family. The family home learning environment can interact with pre-school and school processes in shaping achievement trajectories. Of particular note is the role of the early years home learning environment measured in the pre-school period and of enrichment opportunities in adolescence identified later on, during Key Stage 3. Academic enrichment was based on questionnaire responses and measured at age 14. The measure identifies three groups: low, medium and high. Further details are provided in the Glossary at the end of this report.

The present report follows the pattern of academic attainment of a group of high achieving but socially disadvantaged children identified at the end of primary school education. It looks back at what shaped their attainment from pre-school onwards and follows them up through secondary education until the end of Key Stage 5. The study compares them to other high achieving but less disadvantaged children also identified at the end of Key Stage 2.

First, we examined the individual, family and school characteristics that helped the disadvantaged children to be identified as 'successful' in primary school. This success was measured by above expected attainment at age 11 (performance at Level 5 and above in national assessments). Therefore, we selected from our sample, the more disadvantaged children and tested which of the background characteristics were influential for their academic attainment at the end of Year 6.

The classification of the 'disadvantaged' group was made by using multiple background characteristics like FSM status in Year 6 and Year 9, family SES at four time points (measured at entrance to the study, Key Stages 1, 2 and 3), low parental salary or no earned income (at Key Stage 1) and using the composite measure of the multiple disadvantaged index. Just under half, 49% (n=1,550) of the original EPPSE sample were classified as disadvantaged on one or more of these criteria.

In terms of background characteristics the disadvantaged sample of children (n=1,550), it was found that:
- 89% of parents of this selected subsample reported they had no earned income or their joint salary was below £15,000 (measured in Key Stage 1);
- 60% had 3 or more established disadvantages in the early years (as measured with the multiple disadvantage index);
- 55% had lower family social-economic status (semi-skilled, not working or unemployed) in Key Stage 1;
- 52% were boys;
- 62% were white UK.

What background and school characteristics predict being a high achiever in Key Stage 2?

We defined as 'bright' or high achievers those children who obtained Level 5 or more on any of the three 'core' subjects - English, maths or science, in national assessments conducted at the end of Year 6. The total number of students meeting this criterion was 1058 (about 33% of the original sample of 3,172). About 40% (n=422) of these students obtained Level 5 or more on all three subjects, 29% (n=311) on two subjects and 31% (n=325) on one subject only.

We selected the 1550 disadvantaged students from our original sample and examined how many were high achievers at the end of Year 6. Under a quarter (23% compared with 33% of the total sample) of the disadvantaged children were found to be high achievers at the end of Key Stage 2 (n=349). As a whole, the disadvantaged group were significantly less likely to show high attainment by age 11 than their more advantaged peers. The full results are in Table 2.

Table 2. Distribution of 'high achievers' within the EPPSE sample

Disadvantaged	High achievers					
	No		Yes		Total	
	N	%	N	%	N	%
No	901	56.2	702	43.8	1603	100
Yes	1201	77.5	349	22.5	1550	100
Total	2102	66.7	1051	33.3	3153	100

Pearson chi2(1) = 160.5331   Pr = 0.000

As shown in Table 3, high achieving disadvantaged students were more likely to have FSM (26% vs. 2% in Year 6 or 27% vs. 3% in Year 9), to have family salaries that are lower than £15,000 (91% vs. 4%), to come from families with lower social-economic status (28% vs. 4%) and to have multiple disadvantages (52% vs. 1%) than their richer high achieving peers. The majority of the academically able but poor students were boys (54%) and of white UK ethnic origin (63%), compared to their more advantaged peers who were 52% boys and 85% white UK. When compared with the more advantaged group, disadvantaged students in our high achieving group were significantly more likely to be of a minority ethnic origin (35% vs. 13%).

Table 3. Background characteristics of disadvantaged high achievers

	High achiever more disadvantaged children		High achiever less disadvantaged children	
	N	**%**	**N**	**%**
Year 6 FSM				
No	249	73	677	97.8
Yes	92	27	15	2.2
Total	341	100	692	100
Year 9 FSM				
No	248	74	657	96.8
Yes	87	26	22	3.2
Total	335	100	679	100
KS1Total Family Salary				
No Salary	121	42.8	1	0.2
£2500-15000 Salary	135	47.7	21	3.7
£17500-27500 Salary	18	6.4	150	26.2
£30000-35000 Salary	4	1.4	112	19.6
£37500-66000 Salary	5	1.8	209	36.5
£67500-132000 Salary	0	0	79	13.8
Total	283	100	572	100
First Parent Interview Family SES				
Professional Non-Manual	5	1.5	111	15.9
Other Professional Non-Manual	32	9.4	313	44.8
Skilled Non-Manual	148	43.7	201	28.8
Skilled Manual	61	18	45	6.4
Semi-Skilled	61	18	26	3.7
Unskilled	10	2.9	2	0.3
Never Worked	22	6.5	0	0
Total	339	100	698	100
KS1 Family SES				
Professional Non-Manual	2	0.7	107	18.1
Other Professional Non-Manual	29	10.5	330	55.9
Skilled Non-Manual	63	22.7	97	16.4
Skilled Manual	52	18.8	46	7.8
Semi-Skilled	35	12.6	10	1.7
Unskilled	6	2.2	0	0
Never Worked	90	32.5	0	0
Total	277	100	590	100
KS2 Family SES				
Professional Non-Manual	6	2.6	107	18.7
Other Professional Non-Manual	44	19.2	310	54.2
Skilled Non-Manual	61	26.6	91	15.9
Skilled Manual	32	14	37	6.5
Semi-Skilled	21	9.2	14	2.4

Unskilled	2	0.9	2	0.3
Never Worked	63	27.5	11	1.9
Total	229	100	572	100
KS3 Family SES				
Professional Non-Manual	3	1.6	89	17.9
Other Professional Non-Manual	32	17.6	287	57.6
Skilled Non-Manual	41	22.5	70	14.1
Skilled Manual	30	16.5	28	5.6
Semi-Skilled	21	11.5	18	3.6
Unskilled	5	2.7	0	0
Never Worked	50	27.5	6	1.2
Total	182	100	498	100
EPPSE Multiple Disadvantage Index				
0	25	8	265	39.1
1	51	16.3	288	42.5
2	76	24.3	118	17.4
3	84	26.8	5	0.7
4	42	13.4	2	0.3
5	35	11.2	0	0
Total	313	100	678	100
Ethnicity				
White European Heritage	6	1.7	15	2.1
Black Caribbean Heritage	25	7.2	18	2.6
Black African Heritage	8	2.3	12	1.7
Any Other Ethnic Minority	15	4.3	6	0.9
Indian	15	4.3	9	1.3
Pakistani	28	8	6	0.9
Bangladeshi	6	1.7	3	0.4
Mixed Race	25	7.2	34	4.9
White UK Heritage (Cons)	220	63.2	598	85.3
Total	348	100	701	100
Gender				
Male	188	53.9	365	52
Female	161	46.1	337	48
Total	349	100	702	100

We studied the child and family characteristics that predicted a higher and statistically significant probability of being in the high achieving group. The analysis used multilevel logistic regression,[6] which estimates the likelihood of being in the high achieving group, while taking into account the background characteristics and the fact that the children are clustered in primary schools. The analyses included approximately 1,436 children from 641 primary schools.[7]

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[6] Results are presented in odds ratios (OR) representing the odds of achieving certain benchmark performance indicators given certain characteristics relative to the odds of the reference group. A value higher than 1 represents a positive effect. Results significant at $p < 0.05$ are presented.
[7] Numbers of students and school vary based on the available data on different predictors.

Several background characteristics predicted a greater likelihood of being in the high achieving group at age 11 for the disadvantaged children as shown in Figure 1. Older (for their year group) disadvantaged children were more likely to be in the higher achieving group than younger peers. Although disadvantaged in other measures, having a mother with higher qualification levels, with a degree or higher degree was a major advantage and increased the likelihood of being in the high achieving group more than three fold. The quality of parent-child interactions and home learning activities in the early years was also beneficial for later attainment. Those children who experienced a good quality early years home learning environment were more than twice as likely to be high achievers as those disadvantaged children who lacked such experiences of those important early years activities. Continuing to have outings and enrichment experiences with parents during primary school as well as engaging in individual activities like painting, reading and dancing also almost doubled the chances of otherwise disadvantaged children being a high achiever at the end of Key Stage 2.

Figure 1. Odds ratios for individual and family factors that predict being in the high achieving group at the end of Key Stage 2
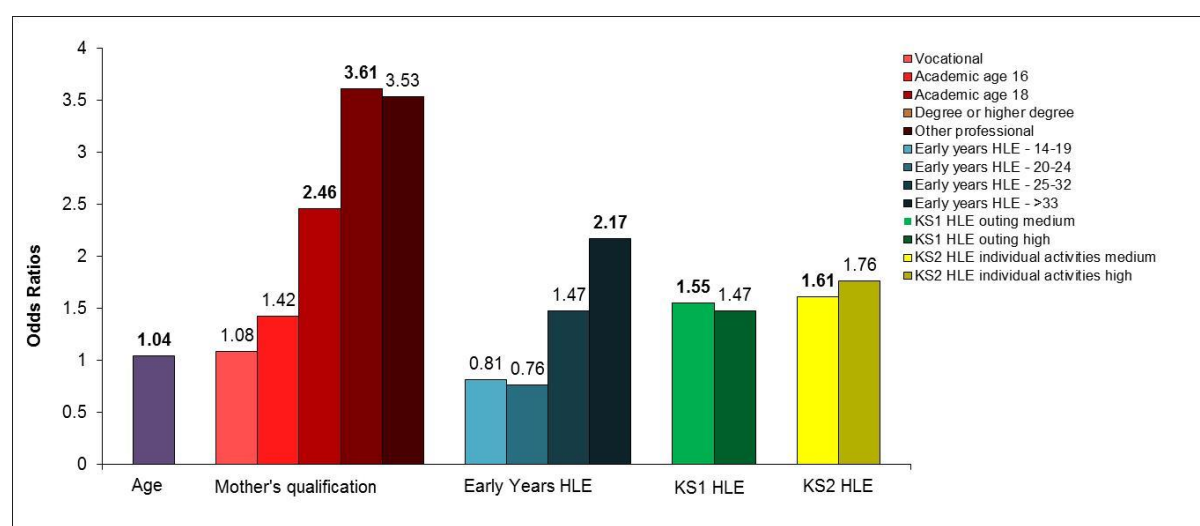
Note: Statistically significant ORs are in bold. See Table A.1 in Appendix for the full model.

Becoming a high achiever at the end of primary school is influenced not only by specific family characteristics, the quality of parent-child interactions and engagement in enriching activities, but is also shaped by the educational experiences in pre-school and primary school. Disadvantaged children doubled their chances of being classed as high achievers by the end of primary school when they had attended any pre-school, compared to the 'home' group who had not attended pre-school. Their likelihood was improved even more if the child had attended a highly effective or high quality pre-school. Similar effects on the probability of being a high achiever were noted in terms of the academic effectiveness of the primary school a child attended. Attending a primary school that was independently identified as highly academically effective rather than attending a low effective primary school (measured using three years of national data for all primary schools in England) more than doubled the chances of academic success for disadvantaged children in our sample. Odds ratios for pre-school and school measures are shown in Figure 2, below.
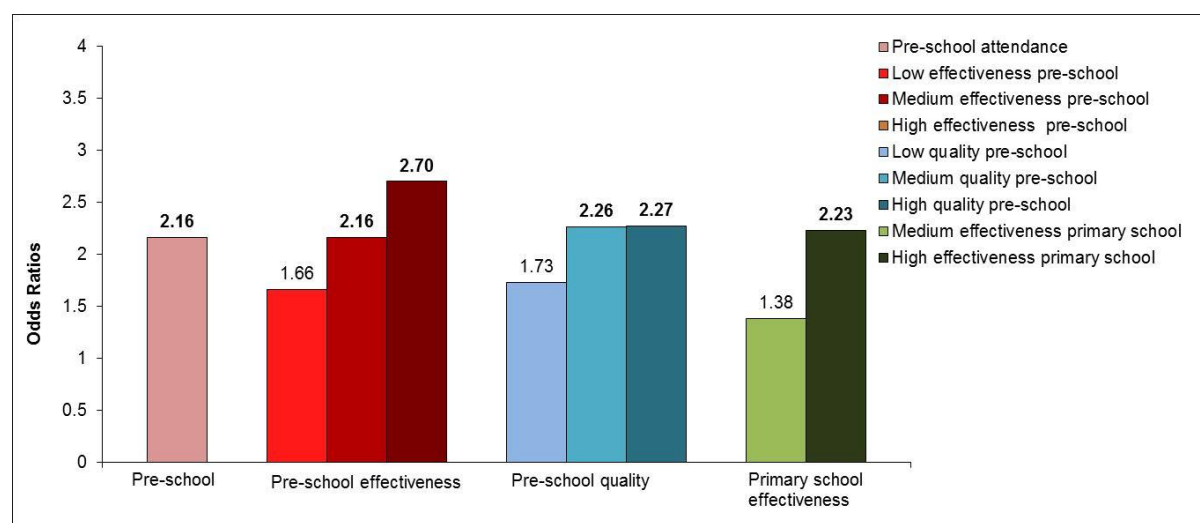
Figure 2. Odds ratios for pre-school and school measures that predict being in the high achieving group at the end of Key Stage 2

Note: Statistically significant ORs are in bold. See Tables A.2-A.5 in Appendix for the full models.

These findings show that pre-school and primary school experiences as well as better home learning environments (early years, Key Stage 1 and Key Stage 2 home learning activities) can provide a significant attainment boost for disadvantaged children and help to counteract the adverse impact of disadvantage.

How are these children achieving in secondary school and after compulsory education?

The prime focus of interest in this report is the group of disadvantaged children who were classified as high achievers at the end of primary school. These were therefore followed up during Key Stage 4 and 5 to investigate subsequent differences in their GCSE, AS and A-levels results (n=349). Due to the relatively small sample size, multiple and logistic regressions were used to analyse the data. Additionally, only a few child and family related predictors were tested, since most were already covered by our classification of 'disadvantage'.

GCSE results[8]

Age within the year group remained significant. In this group, older students obtained statistically significant higher total GCSE scores (about five more points) compared with younger students. The gender difference was also notable. High achieving and disadvantaged girls obtained on average 35 GCSE points more in their total GCSE points score and about half a grade higher in GCSE English than high achieving disadvantaged boys. Students of Indian and Pakistani ethnic origin obtained on average over 90 points more on their total GCSE scores than their white UK peers. Indian students also obtained almost one full grade more in GCSE English and over three full grades more in GCSE maths than white UK students of a similar level of disadvantage. Those disadvantaged students who experienced academic enrichment in Key Stage 3 (reading and engaging in educational and library visits in secondary school) obtained on average 50 points more on their total GCSE score, two and a half points more in GCSE English and three points (or half a grade) more in GCSE maths than disadvantaged students who were not engaged in these activities.

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[8] Results can been seen in the Appendix, Tables A.6-A.12.

We previously showed the importance of pre-school experiences in increasing the likelihood of being classed as a high achiever at the end of primary schooling for those children who were socially disadvantaged. Pre-school continued to influence these students' academic attainment in secondary school as well. High achieving students who had attended a high quality pre-school obtained on average, more than 90 points on their total GCSE scores than those high achieving students who had not attended any pre-school.

High achieving disadvantaged students who attended a higher quality secondary school also obtained significantly better results in their GCSE exams. Academically able students who went on to continue their education in an outstanding secondary school (rated by Ofsted inspection for the quality of pupil learning in the school) obtained a full grade more in English in Key Stage 4 than those who attended an inadequate school.

Students' perceptions of their own educational experiences in secondary school also mattered. Those who reported that their secondary school put a high emphasis on learning obtained on average over 150 GCSE points more on their total GCSE score. Similar positive effects were found for reports on the head teacher's leadership (perceiving that the head teacher was around and involved in the school's activities). This was equivalent to an extra 72 points on the total GCSE score and to half a grade more in GCSE English. Similarly, feeling that students were valued was also a significant predictor (an extra 90 points on total GCSE score), as was the student report measure that teachers were competent and focused on learning (more than half a grade in maths and half a grade in English) and that the relationships between students and teachers were good in terms of trust, respect and fairness (effect of an extra 59 points on total GCSE score, more than half a grade in GCSE maths and half a grade in English).

Overall good educational experiences in secondary school during both Key Stage 3 and Key Stage 4 (from ages 11-16) are shown to enhance the GCSE outcomes of the bright but poor group. Enrichment experiences in Key Stage 3 are also influential.

Obtaining good GCSE results is an important pre-requisite for further and higher education because it has a major impact in shaping students' post 16 destinations. Many schools and colleges require students to have certain GCSE grades to enter AS and A-level study, especially for subjects deemed to be 'harder' such as English, history, geography, mathematics and science subjects.

AS-levels

The high achieving disadvantaged students in our study were less likely to attain four or more AS-levels when compared with the equivalent high achieving but more advantaged students (only 36% vs. 61%) as shown in Table 4. Those who attained four or more AS-levels (n=126/349) were more likely to be girls and relatively less likely to be of white UK background. The experience of enrichment activities during Key Stage 3 of secondary school much increased the likelihood of these students going on to attain four or more AS-levels greater than threefold.[9]

So far, we have highlighted the positive predictors of attaining better outcomes in Key Stage 5, but economic and social disadvantage continues to show negative effects on post-16 academic attainment. 'Place' poverty of home neighbourhood, as measured by the IDACI and IMD indices of deprivation and children living in poverty also significantly reduced the chances of our high achieving but disadvantaged students attaining four or more AS-levels, although effects are modest (see Appendix A.13)

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[9] Odds ratios are presented in Table A.13 in the Appendix.

Table 4. Number of AS-levels attained by the high achiever disadvantaged student group

High achiever disadvantaged children	Attained 4 or more AS-levels?									
	No AS		Less than 4 AS		Four or more AS		KS5 Data unavailable		Total	
	N	%	N	%	N	%	N	%	N	%
No	60	8.5	137	19.5	426	60.7	79	11.3	702	100
Yes	47	13.5	81	23.2	126	36.1	95	27.2	349	100
Total	107	10.2	218	20.7	552	52.5	174	16.6	1051	100

Pearson chi2(3) = 69.7901 Pr = 0.000

The long term benefit of attending any pre-school is again evident in shaping later attainment in Key Stage 5 by a statistically significant increase in the likelihood of attaining four or more AS-levels, doubling the chance of disadvantaged high achievers gaining this result. Figure 3 below shows that the pre-school effect was much stronger when the provision was classed as highly effective in terms of promoting children's attainment in early-number concepts (quadrupled), while the experience of general high quality tripled the chances of a disadvantaged high achiever going on to gain four or more AS-levels.

Figure 3. Odds ratios for pre-school and school measures that predict attaining four or more AS-levels
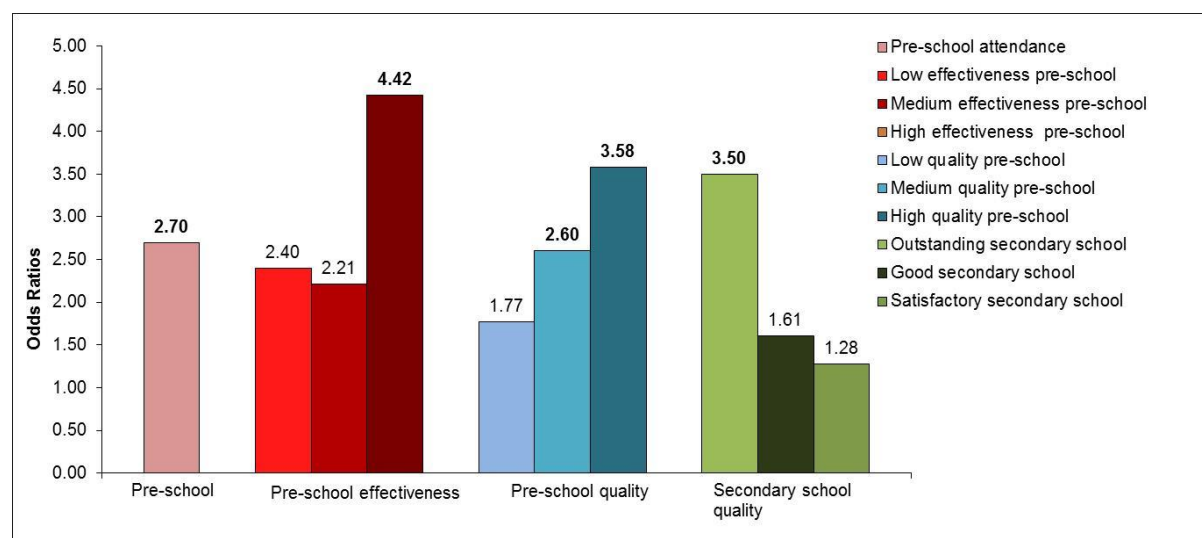
Note: Statistically significant ORs are in bold. See Tables A.14-A.17 in Appendix for the full models.

Positive secondary school experiences also provided additional benefits to the high achieving disadvantaged group. Having the opportunity to attend a secondary school rated by Ofsted as outstanding rather than inadequate in terms of quality of learning during Key Stage 3 increased more than threefold the probability of our focus group going on to attain the required benchmark in AS-levels. Students were also significantly more likely to gain four or more AS-levels if they had positive educational experiences in Key Stage 3 and 4. For example, when they reported that teachers focused on learning and were competent, that the relationships between students and teachers were good in terms of trust, respect and fairness, there were higher levels of monitoring of their work by teachers and greater levels of teacher feedback on their work.[10] Again these findings point to the importance of high quality teaching and learning experiences in secondary school for our high achieving disadvantaged group of students if they are to continue to experience success up to Key Stage 5.

A-levels

The findings on A-level results showed similarities to those described above for AS-levels. High achieving disadvantaged students were significantly less likely to go on to attain three or more A-levels when compared with high achieving less disadvantaged students as shown in Table 5 (35% vs. 60%; n=123/349). Certain individual and family characteristics predicted better attainment at A-level, as Figure 4 illustrates, results are described in detail in the Appendix (Table A.18 & A.19). Of our disadvantaged high achieving group, girls were twice as likely to obtain three or more A-levels as boys. Students who were reading in their own time and who participated in enriching activities at home during Key Stage 3 of secondary school were also more likely to go on to attain three or more A-levels. The only secondary school characteristic that predicted getting three or more A-levels was the Ofsted measure of secondary school quality, where attending an outstanding' school increased the likelihood of attaining three or more A-levels four fold.

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[10] Odds ratios are presented in Table A.18 in the Appendix.

Table 5. Number of A-levels attained by the high achievers comparing disadvantaged and no-disadvantaged student groups

High achiever disadvantaged students	Attained three or more A-levels?									
	No A		Less than 3 A-levels		Three or more A-levels		KS5 Data unavailable		Total	
	N	%	N	%	N	%	N	%	N	%
No	122	17.4	79	11.3	422	60.1	79	11.3	702	100
Yes	92	26.4	39	11.2	123	35.2	95	27.2	349	100
Total	214	20.4	118	11.2	545	51.9	174	16.6	1051	100

Pearson chi2(3) = 72.9408 Pr = 0.000

Figure 4. Odds ratios for individual, family factors and secondary school measures that predict attaining three or more A-levels
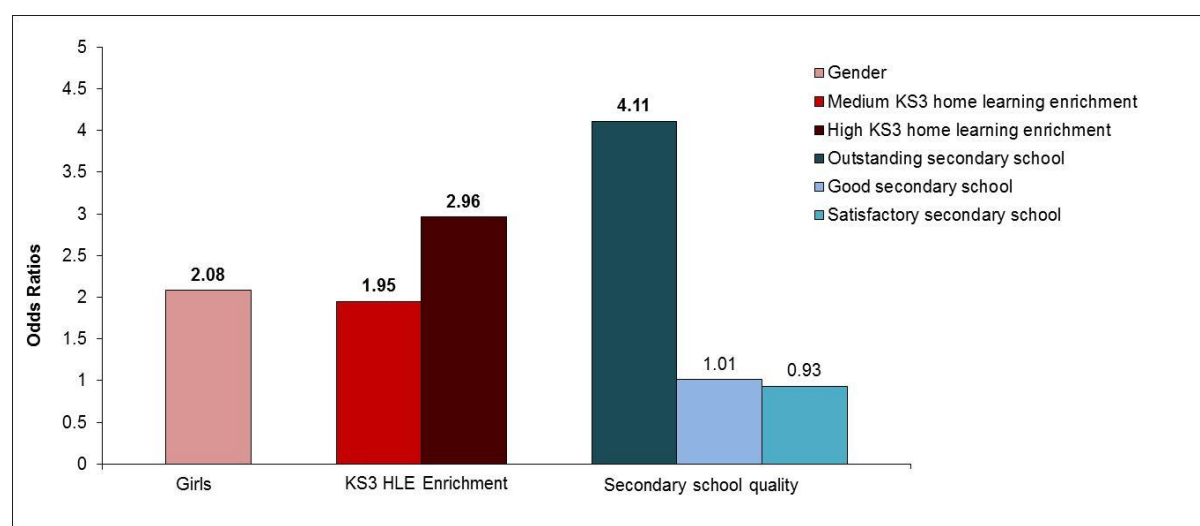
Note: Statistically significant ORs are in bold. See Table A.19 in Appendix for the full models.

Homework

Students' self-reports of the time they spent on homework on a typical school night were tested as a predictor of high attainment in Key Stage 5. Time spent on homework had been found to be a strong and positive predictor of academic attainment in Key Stage 3 and 4 [8, 9] for the overall EPPSE sample, thus it was anticipated that spending more time on homework might also predict later academic attainment in Key Stage 5 for the disadvantaged high achieving group that are the focus of this study. We found that time spent on homework in Year 11 was a positive and statistically significant predictor of later attaining four or more AS-levels and also of attaining three or more A-levels. The strongest positive effects were found for completing 2-3 hours homework a night rather than none (increasing the probability of getting over four AS-levels by 12 times and the likelihood of getting more than three A-levels by nine times). Spending time on homework is likely to reflect both student motivation and engagement, school policies and the priority teachers attach to encouraging students to study at home (or provide opportunities after school), and parental attitudes and support. Elsewhere we have found links between self-regulation, gender and engagement in homework in Key Stage 3 and 4. Given the smaller number in our high achieving disadvantaged sample at ages 17-18 we are not able to undertake such further exploration for AS/A-level results. However, our findings suggest that

encouraging this during the run up to GCSEs is an important feature of secondary education that can much enhance their chances of later academic success post 16 for high achieving disadvantaged students. Spending more time (given the relatively short length of the school day devoted to academic work) increases opportunity to learn and is likely to promote independence and study skills. It is likely to have a cumulative effect in supporting attainment if undertaken regularly over several school years, particularly during Key Stage 4 and 5.

Figure 5. Odds ratios for time spent on homework in Year 11 predicting the probability of attaining four or more AS-levels and three or more A-levels
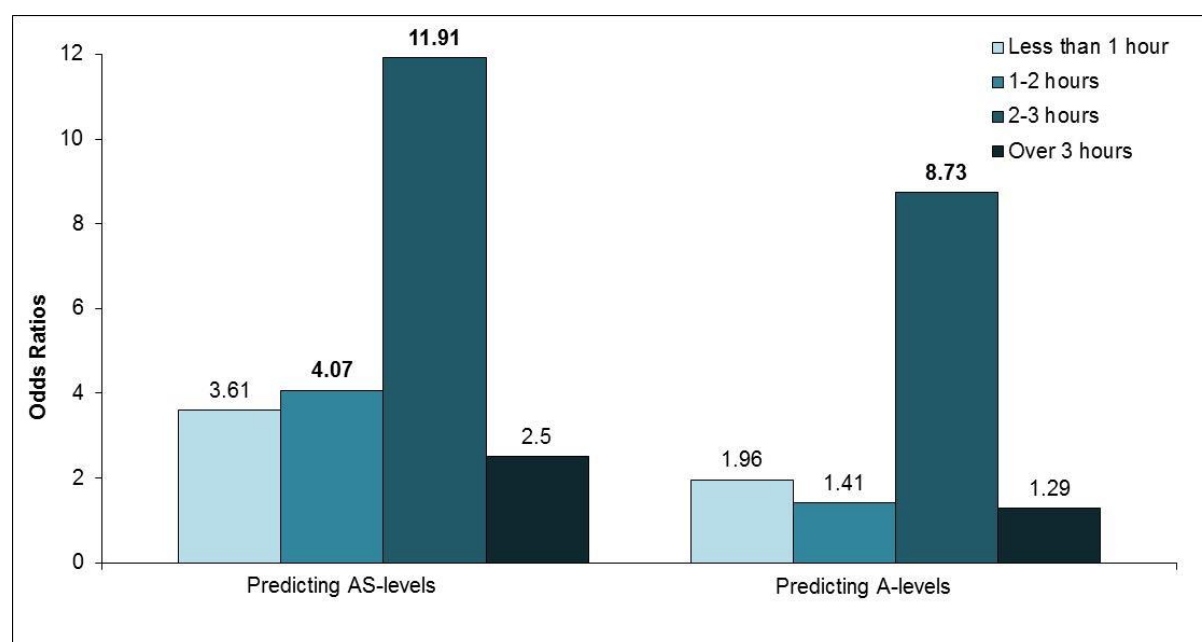
Note: Statistically significant ORs are in bold.

Facilitating subjects taken for AS/A-levels

Entry to higher education, especially in prestigious universities is often strongly influenced by the individual choice of subjects for AS and later A-level and the grades obtained in these exams. Certain subjects provide an advantage for higher education entry; we call these *facilitating subjects*.

Given the relatively small numbers we compared (using simple cross-tabulation) the proportions of high achieving disadvantaged students taking facilitating subjects and their grades and the proportions of high achieving less disadvantaged students taking the same subjects and their grades.

Our sample of bright but disadvantaged students were significantly less likely to take one or more AS-level exams in facilitating subjects like maths (21% vs. 33%), English (14% vs. 19%), physics (10% vs. 16%), biology (17% vs. 27%), chemistry (13% vs. 21%), geography (5% vs. 11%), history (10% vs. 21%), modern languages (4% vs. 9%) than the more advantaged students identified as high achievers in Key Stage 2 (the bright but more advantaged group). Overall, high achieving but disadvantaged students were significantly less likely to take one or more of any of these facilitating subjects when compared to high achieving but more advantaged students (44% vs. 67%), as shown in Table 6.

Table 6. Comparison of number of AS-levels attained in facilitating subjects for high achiever students comparing disadvantaged and non-disadvantaged groups

High achiever disadvan- taged students	Number of AS-levels facilitating subjects													
	None		One		Two		Three		Four		Five		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
No	230	32.8	129	18.4	122	17.4	155	22.1	65	9.3	1	0.1	702	100
Yes	195	55.9	55	15.8	47	13.5	34	9.7	18	5.2	0	0	349	100
Total	425	40.4	184	17.5	169	16.1	189	18	83	7.9	1	0.1	1051	100

Pearson chi2(5) = 59.1135 Pr = 0.000

Entry into higher education is not only determined by the number of AS/A-levels taken in specific facilitating subjects, but also by the grades obtained these subjects. Only 20% of high achieving but disadvantaged students obtained a grade B or better in facilitating subjects for AS-level, while 42% of more advantaged high achieving students obtained a grade B or higher in the same subjects:

Table 7. Comparison of number of AS-levels attained in facilitating subjects with good grades for high achiever students comparing disadvantaged and non-disadvantaged groups

High achiever disadvantaged students	Number of AS-levels in facilitating subjects with grades A*, A and B											
	None		One		Two		Three		Four		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
No	404	57.5	123	17.5	88	12.5	62	8.8	25	3.6	702	100
Yes	280	80.2	37	10.6	17	4.9	10	2.9	5	1.4	349	100
Total	684	65.1	160	15.2	105	10	72	6.9	30	2.9	1051	100

Pearson chi2(4) = 55.2763 Pr = 0.000

The results in Table 8 show that girls were significantly more likely to take more than one AS-level in a facilitating subject (51% vs. 38%) or to obtain A*, A or B grades (26% vs. 15%) than boys.

Table 8. Gender distribution of the number of AS-levels attained in facilitating subjects for high achiever disadvantaged student group

High achiever disadvantaged students and their AS-levels					
Gender	No AS-levels		At least one AS-level		Total	
	N	%	N	%	N	%
Male	116	61.7	72	38.3	188	100
Female	79	49.1	82	50.9	161	100
Total	195	55.9	154	44.1	349	100

Table 9. Gender distribution of the number of AS-levels attained in facilitating subjects with good grades for high achiever disadvantaged student group

High achiever disadvantaged students and their AS-levels Grades					
Gender	No AS-levels with A*AB grade		At least one AS-level with A*AB grade		Total	
	N	%	N	%	N	%
Male	160	85.1	28	14.9	188	100
Female	120	74.5	41	25.5	161	100
Total	280	80.2	69	19.8	349	100

Similarly, only 33% of the bright but disadvantaged students took one or more A-level exams in facilitating subjects when compared with 58% of bright but more advantaged students.

Table 10. Number of A-levels attained in facilitating subjects for high achiever students comparing disadvantaged and non-disadvantaged groups

High achiever disadvantaged students	Number of A-levels in facilitating subjects											
	None		One		Two		Three		Four		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
No	294	41.9	133	18.9	167	23.8	100	14.2	8	1.1	702	100
Yes	233	66.8	50	14.3	39	11.2	25	7.2	2	0.6	349	100
Total	527	50.1	183	17.4	206	19.6	125	11.9	10	1	1051	100

Pearson chi2(4) = 61.1787 Pr = 0.000

The percentages are even smaller when the grades (B or above) of these exams are considered (18% vs. 41%).

Table 11. Number of A-levels attained in facilitating subjects with good grades for high achiever students comparing disadvantaged and non-disadvantaged groups

High achiever disadvantaged students	Number of A-levels in facilitating subjects with grades A*, A and B											
	None		One		Two		Three		Four		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
No	417	59.4	121	17.2	97	13.8	59	8.4	8	1.1	702	100
Yes	287	82.2	33	9.5	17	4.9	11	3.2	1	0.3	349	100
Total	704	67	154	14.7	114	10.8	70	6.7	9	0.9	1051	100

Pearson chi2(4) = 56.6148 Pr = 0.000

Girls were significantly more likely to take more than one A-level (41% vs. 27%), as shown in Table 12, or to obtain grades of A*, A or B (25% vs. 12%) than boys, as shown in Table 13.

Table 12. Gender distribution of the number of A-levels attained in facilitating subjects by high achiever disadvantaged student group

Gender	High achiever disadvantaged students and A-levels					
	No A-levels		At least one A-level		Total	
	N	%	N	%	N	%
Male	138	73.4	50	26.6	188	100
Female	95	59	66	41	161	100
Total	233	66.8	116	33.2	349	100

Pearson chi2(1) = 8.1022 Pr = 0.004

Table 13. Gender distribution of the number of A-levels attained in facilitating subjects with good grades by high achiever disadvantaged student group

Gender	High achiever disadvantaged students and A-levels grades					
	No A-levels with A*AB grade		At least one A-level with A*AB grade		Total	
	N	%	N	%	N	%
Male	166	88.3	22	11.7	188	100
Female	121	75.2	40	24.8	161	100
Total	287	82.2	62	17.8	349	100

Pearson chi2(1) = 10.2541 Pr = 0.001

There is considerable evidence of a large equity gap in achievement at school for disadvantaged children and students across all phases of education in England. This is also the case in many other systems, but international comparisons in PISA suggest it is particularly marked in England. Many claim that the achievement gap widens over time especially at secondary school and that this reduces further the chances of going to university, especially at better (Russell Group) universities and the kinds of degree subjects taken.[1, 2]

This research has identified a group of children who were classed as 'bright' (relatively high attaining) but disadvantaged at the end of primary school. They did well in national assessments at age 11 in core subjects. Our analyses reveal that certain educational factors helped to improve their chances of doing well at primary school. Following them to age 18, we can see that it is the combination of experiences over their educational careers (pre-school, primary and secondary) that shape long term educational outcomes and the likelihood of getting good enough results to be able to enter more prestigious higher education courses and universities.

Certain educational factors helped to improve these children's chances of doing well at primary school. These include:

- The quality of the early years home learning environment and experience of enrichment activities in primary school
- More educated parents (mothers)
- Attending a pre-school, especially one of higher quality/ more effective in promoting cognitive development
- Attending a more academically effective primary school.

A key message from these analyses is that:

1. **Early learning experiences (at home, in pre-school and primary school) matter as they can boost the attainment of poor children up to age 11.**

By following these 'bright' (higher attaining) but disadvantaged students into adolescence we can see what increases or decreases the chances of them doing well at Key Stage 5 in their AS and A-level results. Overall, bright but disadvantaged students go on to do less well than similar bright but more advantaged peers in terms of taking four or more AS-levels and of taking three or more A-levels. They do significantly less well in obtaining post 16 academic qualifications. This confirms that they remain at greater risk of lower achievement both at GCSE and post 16.[7, 8, 9, 17] The equity gap does widen during secondary school. Nonetheless, a number of educational influences increase the chances of their getting better GCSE results, going on to study AS and A-levels and getting better results at Advanced level and seem to promote resilience, echoing findings from younger ages. [12, 13, 14, 15, 16] Overall, the educational features highlighted in this report that predict long term success in AS and A-Level outcomes are good for students of all social backgrounds, but they are likely to be especially relevant to support the continued success of bright but disadvantaged students. They are also likely to provide pointers to policy makers and practitioners seeking to reduce the equity gap in achievement in public examination success in secondary schooling and enhance higher education opportunities. Three further messages from these results are that:

2. **The experience of a better home learning environment during adolescence in Key Stage 3 in terms of academic enrichment activities (including reading at home and going on educational visits and trips) boosts later school attainment at GCSE and the chances of bright but poor students gaining better AS and A-level outcomes. This has implications for pupil premium use in secondary schools as disadvantaged students as a group tend to have fewer enrichment opportunities at home.** Support to encourage

reading for pleasure, educational trips and providing studying opportunities may also prove beneficial.

3. **Going to a better secondary school (as identified by Ofsted quality ratings) also makes a positive difference for the attainment of bright but disadvantaged students. Improving the quality of secondary schools in terms of the focus on learning is likely to be especially beneficial in boosting attainment and higher education opportunities for disadvantaged pupils.**

4. **The quality of students' own secondary school experiences especially the quality of teaching also makes a difference for bright but poor young people.** Positive relationships with teachers, teachers' emphasis on learning, getting feedback about their work, teachers' monitoring their work and a pleasant attractive school environment were also among the important predictors of better outcomes.

5. **Attending a pre-school continued to predict better outcomes in the longer term right up to Key Stage 5 especially if the pre-school was of higher overall quality or more effective in promoting early learning in terms of providing a lasting boost.** Investment in the early years has long lasting benefits. This is in line with previous research on the broader EPPSE sample that has shown pre-school has lasting effects in reducing both educational and economic differences between richer and poorer children.[15]

6. **Some groups of disadvantaged students do better than others.** Girls and ethnic minority students in the bright but disadvantaged group showed better attainment in public examinations at GCSE, AS and A-levels than boys and those from white UK backgrounds. Schools may need to pay particular attention to ensuring that they can promote better outcomes for these students (boys/white UK) by promoting additional or tailored opportunities for them to learn in and out of school. Interestingly, part of these differences in success in public examinations seems to reflect variations between student groups in terms of the time they report they spent on homework in Key Stage 4. Out of school learning or additional study opportunities in school may reflect differences in expectations of teachers and parents. Some student groups may need more encouragement or support to engage in the self-directed study and additional reading that provides extra academic dividends. The school day is relatively short and the effects of some regular increase in study time mount up and may provide a cumulative advantage.

7. **Bright but poor students are also significantly less likely to take AS/A-levels in the important group of 'facilitating' subjects. They are also are less likely to get good results in these subjects than other bright but more advantaged students if they do take them**. Schools and colleges need to monitor and guide option choices to ensure bright but disadvantaged students maximise their potential to enter HE especially at better universities or take more prestigious courses

This research shows that various experiences over their educational careers (pre-school, primary and secondary) shape children's long term educational outcomes up to A-level and the likelihood of getting good enough results to be able to enter more prestigious higher education courses and institutions.. There is no 'silver bullet' that alone can make a difference at any one age. It is the combination of better (or poorer) experiences over time that counts, particularly for disadvantaged children who are at greater risk of educational failure.[25] For those that were identified as 'bright' in terms of having achieved well at primary school, but were also found to be disadvantaged at the end of Key Stage 2, a number of factors are shown to shape how far they are likely to continue to achieve academic success at AS/A-level. There are important implications for policy and practice that can help to promote their chances of continuing to do well. Ensuring such students attend high quality

secondary schools (as rated by Ofsted), and experience excellent teaching and learning opportunities is important. In addition, the research reveals that the socio-emotional features of secondary schools environments, in terms of students' reports of positive relationships and support from teachers were also significant for success.

Moreover out of school learning in terms of enrichment opportunities and the encouragement of study and reading at home (or further opportunities at school if appropriate) also proved to be important in promoting academic success in public examinations up to A-level. The disadvantaged are less likely to have such enrichment support at home so schools need to see how far this can be compensated for through additional opportunities and support in or through the school. In addition, greater attention needs to be given to ensuring appropriate support and guidance to help such bright but disadvantaged students to maximise their future university and employment chances. Clear and well informed option choice guidance and support throughout Key Stage 3 and onwards will be needed if the current gap in the likelihood of disadvantaged but bright students in taking and also in experiencing success in achieving good grades in A-level qualifications in facilitating subjects is to be reduced.

Overall, the educational features highlighted in this report provide detailed evidence about what predicts long term success in AS and A-level outcomes. These features show benefits for all students, not just the disadvantaged, but they are likely to be especially relevant to support the disadvantaged and make a particularly important difference to the likelihood of continued success of bright but disadvantaged students. The findings provide pointers to the policy makers and practitioners seeking to reduce the equity gap in achievement in public examination success in secondary schooling and enhance higher education opportunities.

A Note on the Sample and Methodology for the Research

The sample for this report is drawn from the Effective Pre-school, Primary and Secondary Education Project (EPPSE3+-16), a major large-scale, longitudinal study of the progress and development of children from pre-school through to post-compulsory education in England. It has investigated various aspects of pre-school, primary and secondary school provision that shape children's attainment, progress and development over successive phases of education up to age 16.

The original EPPSE sample of 3,172 children was assessed at the start of pre-school around the age of 3 and their development was monitored until they entered school around the age of 5. This original sample included over 300 'home' children who had not attended any type of pre-school and who were recruited to the study at age 5, representing a no pre-school comparison group. The sample was followed up across primary school into adolescence and children were assessed again at key points until the end of Key Stage 4 in secondary school. These young people were most recently followed through their final year of compulsory schooling and on to their post 16 educational, training and employment choices.

The Sutton Trust commissioned a follow-up study to investigate these students' destinations (academic/non-academic routes), AS and A-level take up and attainment at Key Stage 5. Data provided by the Department for Education's National Pupil Database (number of AS and A-levels attained, subjects taken, Key Stage 5 grades and total point scores) were merged into the EPPSE dataset to examine these students' achievement in Key Stage 5 and the factors that predict success, specifically obtaining A-level results that are deemed good enough to enter HE, especially for more prestigious universities.

Approach to Analyses

First we defined academic success as showing higher than expected attainment in national assessments taken at age 11, the end of Key Stage 2. Obtaining Level 5 or better in national assessments in the three 'core' subjects English, maths or science was used as the measure of 'success'. Then we explored the individual, family and school characteristics that helped disadvantaged children to be successful at primary school. We selected from our sample the more disadvantaged children and tested which of a wide range of background characteristics were influential in predicting their academic success (achieving Level 5 or above in one of more of the three core areas) at the end of Year 6 when they were 11.

The criteria for being identified as disadvantaged was made using multiple background characteristics like Free School Meal (FSM) status, family socio-economic status based on parents' occupations, low salary and using a composite measure we created that predicts the 'risk' of low attainment termed the multiple disadvantaged index. Just under half (49%, n=1550) of the original EPPSE sample were classified as 'disadvantaged' on one or more of these criteria.

Having selected the 1,550 disadvantaged students from our original sample we examined how many were classed as high achievers at the end of Year 6. Only 23% (compared with 33% of the total sample) of the disadvantaged children (n=349) were found to be high achievers at the end of primary school. This highlights the adverse impact of disadvantage in reducing the chances of academic success at age 11.

The research used multilevel logistic regression, multiple and logistic regression as appropriate to predict differences in students' national assessment results (at age 11 and age 14) and their later examination results at GCSE, AS and A-level. Odds ratios are used to show the effects of different predictors in increasing or decreasing the likelihood of good outcomes for the bright but disadvantaged group.

Home learning environment
These measures were based on parent interviews for the early years when children were first recruited to the EPPSE study at age 3 plus, and surveys at older ages. They reflect parent-child interactions and learning opportunities in the family.

The ***early years home learning environment measure*** was based on parents' reports of engagement in activities and interactions such as going to the library, being read to, learning about the alphabet and numbers/shapes, songs/poems/nursery rhymes and painting or drawing activities.

The ***Academic Enrichment measure*** of out of school learning opportunities was obtained from the survey of EPPSE students at age 14. It covers aspects such as reading on your own for pleasure, going on educational visits with family and going to the library.

Neighbourhood poverty
Based on children's postcodes it was possible to establish if they lived in a disadvantaged neighbourhood using two measures, IDACI and IMD. IDACI represents the percentage of children in each Standard Output Area (SOA) that live in families that are income deprived.

IMD is a nationwide index combining weighted measures or levels of: crime, barriers to housing, living environment, education and skills training, health deprivation and disability, employment and income. The greater the IMD score, the greater the level of overall neighbourhood deprivation.

Pre-school quality
Pre-school quality was measured with two different scales: ECERS-R and ECERS-E.[18, 19] The American Early Childhood Environment Rating Scale (ECERS-R) [20] is based on child centred pedagogy and also assesses resources for indoor and outdoor play. The English rating scale (ECERS-E) [21] was intended as a supplement to the ECERS-R and was developed specially for the EPPE study to reflect the Learning Outcomes in successive versions of the Early Years Foundation Stage.

As ECERS-E, which focuses on the education aspects of pre-school, had the most consistent effects upon cognitive attainment, the effects of this measures are reported here. The original sample was divided into groups of children whose pre-school experience could be classified as ranging from no quality (i.e., the 'home' group) through low, medium and high quality, based on individual pre-school centres' ECERS-E scores. The classification in four categories was based on the original distribution of the average ECERS scores (no score, lowest - 20%, medium 60% and highest 20%). The distribution of ECERS-E groups in the present sample was the following: no pre-school (10%) low quality (14%), medium quality (54%) and high quality (22%).

Pre-school effectiveness
Measures of pre-school centre effectiveness were calculated separately for Pre-Reading and Early Number Concepts for all pre-school centres in the original EPPSE study. These measures were based on the residuals from multilevel value added models predicting cognitive attainment (at the end of pre-school) of pupils who attended a pre-school centre, controlling for their prior attainment at entry to the study and background influences. Pre-schools where children made more progress than predicted were classified as more effective than those where children made less progress that predicted (on basis of prior attainment and background characteristics) [22.] The classification in four categories was based on the original distribution of the effectiveness scores: no score (the home sample), lowest 20%, medium 60% and highest 20%.

Primary school academic effectiveness
The value added effectiveness measures for primary schools were calculated using National Assessment data for all primary schools in England linking Key Stage 1 and 2 results, and separate

indicators were calculated for the different core curriculum subjects English, mathematics and science.[23, 24] These provided a measure of the academic success of individual primary school in promoting pupils' academic progress. For each EPPSE pupil, these measures provide indicators of the academic quality of their primary schools. Categories of low, medium and high academic effectiveness were created based on the distribution of scores below and above a standard deviation from the mean.

For further details about the full EPPSE sample, measures and design plus earlier research results up to GCSE see:

http://www.ioe.ac.uk/research/66737.html

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High achievers in KS2

Table A.5. Individual and family factors that predict being in the high achieving group at the end of Key Stage 2

	Coef.	Std. Error	Odds Ratios	Sig.
Age	0.04	0.02	1.04	*
Gender	-0.41	0.15	0.66	**
Ethnic group (compared to White UK)				
White European Heritage	-1.24	0.50	0.29	*
Black Caribbean Heritage	0.79	0.32	2.21	*
Black African Heritage	-0.09	0.49	0.92	
Any Other Ethnic Minority	-0.02	0.38	0.98	
Indian	0.62	0.44	1.86	
Pakistani	0.46	0.31	1.58	
Bangladeshi	0.04	0.53	1.04	
Mixed Race	0.25	0.29	1.28	
Early developmental problems (compared to none)				
1+ Developmental problem	-0.23	0.22	0.80	
Early behavioural problems (compared to none)				
1+ Behavioural problem	-0.31	0.22	0.73	
Number of siblings at age 3/5(compared to none)				
1 sibling	-0.07	0.21	0.93	
2 siblings	-0.02	0.21	0.98	
3 + siblings	-0.38	0.24	0.68	
Missing	-0.51	0.67	0.60	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.08	0.24	1.08	
Academic age 16	0.35	0.18	1.42	
Academic age 18	0.90	0.33	2.46	**
Degree or higher degree	1.28	0.41	3.61	**
Other professional	1.26	0.70	3.53	
Missing	-0.20	0.52	0.82	
Early years home learning (compared to 0-13)				
14-19	-0.21	0.22	0.81	
20-24	-0.27	0.24	0.76	
25-32	0.39	0.23	1.47	
>33	0.78	0.35	2.17	*
KS1 home learning interaction (compared to low)				
KS1 home learning interaction medium	0.05	0.20	1.05	
KS1 home learning interaction high	-0.59	0.30	0.55	
KS1 home learning outing (compared to low)				
KS1 home learning outing medium	0.44	0.20	1.55	*
KS1 home learning outing high	0.39	0.35	1.47	
KS2 home learning (compared to low)				
KS2 home learning medium	-0.30	0.24	0.74	
KS2 home learning high	-0.29	0.36	0.75	
KS2 home learning individual activities (compared to low)				
KS2 home learning individual activities medium	0.47	0.23	1.61	*
KS2 home learning individual activities high	0.57	0.37	1.76	
Intercept	-1.50	0.28		***
Variance-school level	0.65	0.25		
Number of students	1436			
Number of schools	641			

		Coef.	Std. Error	Odds Ratios	Sig.
Deviance (-2 x Log Restricted-Likelihood)		1465.46			
% Reduction school variance		-13.5			

* p<0.05, ** p<0.01, *** p<0.001

Table A.6. Pre-school attendance predicting the probability of being in the high achieving group at the end of Key stage 2

	Coef.	Std. Error	Odds Ratios	Sig.
Age	0.04	0.02	1.04	
Gender	-0.42	0.15	0.66	**
Ethnic group (compared to White UK)				
White European Heritage	-1.22	0.49	0.30	*
Black Caribbean Heritage	0.74	0.36	2.09	*
Black African Heritage	-0.22	0.52	0.80	
Any Other Ethnic Minority	-0.09	0.40	0.91	
Indian	0.71	0.49	2.04	
Pakistani	0.73	0.38	2.08	
Bangladeshi	0.37	0.57	1.44	
Mixed Race	0.16	0.31	1.17	
Early developmental problems (compared to none)				
1+ Developmental problem	-0.19	0.22	0.83	
Early behavioural problems (compared to none)				
1+ Behavioural problem	-0.28	0.23	0.76	
Number of siblings at age 3/5(compared to none)				
1 sibling	-0.04	0.21	0.96	
2 siblings	0.06	0.22	1.06	
3 + siblings	-0.38	0.24	0.68	
Missing	-0.40	0.67	0.67	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.05	0.24	1.05	
Academic age 16	0.34	0.18	1.41	
Academic age 18	0.86	0.34	2.35	*
Degree or higher degree	1.10	0.42	3.00	**
Other professional	1.30	0.78	3.68	
Missing	-0.09	0.52	0.91	
Early years home learning (compared to 0-13)				
14-19	-0.29	0.23	0.75	
20-24	-0.31	0.24	0.73	
25-32	0.31	0.24	1.37	
>33	0.78	0.35	2.19	*
KS1 home learning interaction high	-0.62	0.28	0.54	*
KS1 home learning missing	0.20	0.25	1.22	
KS1 home learning outing (compared to low)				
KS1 home learning outing medium	0.59	0.25	1.80	*
KS1 home learning outing high	0.53	0.40	1.70	
KS2 home computer learning (compared to low)				
KS2 home computer learning medium	-0.27	0.24	0.77	
KS2 home computer learning high	-0.08	0.36	0.92	
KS2 home learning individual activities (compared to low)				
KS2 home learning individual activities medium	0.46	0.23	1.59	*
KS2 home learning individual activities high	0.50	0.37	1.64	
% White British (continuous)	0.00	0.00	1.00	
FSM school level (continuous)	0.01	0.01	1.01	
Pre-school (compared to no pre-school)	0.77	0.27	2.16	**

	Coef.	Std. Error	Odds Ratios	
Intercept	-2.27	0.42		***
Variance-school level	0.52	0.24		
Number of students	1354			
Number of schools	600			
Deviance (-2 x Log Restricted-Likelihood)	1385.64			
% Reduction school variance	9.6			

* p<0.05, ** p<0.01, *** p<0.001

Table A.7. Pre-school effectiveness predicting the probability of being in the high achieving group at the end of Key stage 2

	Coef.	Std. Error	Odds Ratios	
Age	0.04	0.02	1.04	
Gender	-0.41	0.15	0.67	**
Ethnic group (compared to White UK)				
White European Heritage	-1.25	0.49	0.29	*
Black Caribbean Heritage	0.69	0.36	1.99	
Black African Heritage	-0.18	0.52	0.84	
Any Other Ethnic Minority	-0.13	0.40	0.88	
Indian	0.66	0.49	1.94	
Pakistani	0.74	0.38	2.11	*
Bangladeshi	0.35	0.57	1.43	
Mixed Race	0.13	0.31	1.14	
Early developmental problems (compared to none)				
1+ Developmental problem	-0.18	0.22	0.83	
Early behavioural problems (compared to none)				
1+ Behavioural problem	-0.29	0.23	0.75	
Number of siblings at age 3/5(compared to none)				
1 sibling	-0.03	0.21	0.97	
2 siblings	0.06	0.22	1.06	
3 + siblings	-0.38	0.24	0.69	
Missing	-0.43	0.67	0.65	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.03	0.24	1.04	
Academic age 16	0.34	0.18	1.40	
Academic age 18	0.86	0.34	2.36	*
Degree or higher degree	1.13	0.42	3.08	**
Other professional	1.36	0.77	3.90	
Missing	-0.10	0.52	0.90	
Early years home learning (compared to 0-13)				
14-19	-0.30	0.23	0.74	
20-24	-0.33	0.24	0.72	
25-32	0.30	0.24	1.36	
>33	0.78	0.35	2.17	*
KS1 home learning interaction high	-0.62	0.28	0.54	*
KS1 home learning missing	0.21	0.25	1.24	
KS1 home learning outing (compared to low)				
KS1 home learning outing medium	0.59	0.25	1.81	*
KS1 home learning outing high	0.55	0.40	1.74	
KS2 home computer learning (compared to low)				
KS2 home computer learning medium	-0.25	0.24	0.78	
KS2 home computer learning high	-0.08	0.36	0.92	
KS2 home learning individual activities (compared to low)				

	Coef.	Std. Error	Odds Ratios	Sig.
KS2 home learning individual activities medium	0.46	0.23	1.59	*
KS2 home learning individual activities high	0.47	0.37	1.60	
% White British (continuous)	0.00	0.00	1.00	
FSM school level (continuous)	0.01	0.01	1.01	
Pre-school effectiveness-Early number concepts (compared to no pre-school)				
Low effectiveness	0.51	0.32	1.66	
Medium effectiveness	0.77	0.28	2.16	**
High effectiveness	0.99	0.31	2.70	**
Intercept	-2.27	0.42		***
Variance-school level	0.49	0.23		
Number of students	1354			
Number of schools	600			
Deviance (-2 x Log Restricted-Likelihood)	1382.19			
% Reduction school variance	13.8			

* p<0.05, ** p<0.01, *** p<0.001

Table A.8. Pre-school quality predicting the probability of being in the high achieving group at the end of Key stage 2

	Coef.	Std. Error	Odds Ratios	Sig.
Age	0.04	0.02	1.04	
Gender	-0.42	0.15	0.66	**
Ethnic group (compared to White UK)				
White European Heritage	-1.25	0.50	0.29	*
Black Caribbean Heritage	0.71	0.36	2.04	*
Black African Heritage	-0.23	0.52	0.79	
Any Other Ethnic Minority	-0.12	0.40	0.88	
Indian	0.70	0.49	2.01	
Pakistani	0.77	0.38	2.16	*
Bangladeshi	0.35	0.57	1.41	
Mixed Race	0.15	0.31	1.16	
Early developmental problems (compared to none)				
1+ Developmental problem	-0.18	0.22	0.83	
Early behavioural problems (compared to none)				
1+ Behavioural problem	-0.28	0.23	0.76	
Number of siblings at age 3/5(compared to none)				
1 sibling	-0.03	0.21	0.97	
2 siblings	0.05	0.22	1.05	
3 + siblings	-0.38	0.24	0.68	
Missing	-0.40	0.67	0.67	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.06	0.24	1.06	
Academic age 16	0.34	0.18	1.41	
Academic age 18	0.86	0.34	2.37	*
Degree or higher degree	1.10	0.42	3.01	**
Other professional	1.35	0.78	3.86	
Missing	-0.10	0.52	0.90	
Early years home learning (compared to 0-13)				
14-19	-0.30	0.23	0.74	
20-24	-0.33	0.25	0.72	
25-32	0.31	0.24	1.36	
>33	0.78	0.36	2.17	*

	Coef.	Std. Error	Odds Ratios	Sig.
KS1 home learning interaction high	-0.61	0.28	0.54	*
KS1 home learning missing	0.19	0.25	1.21	
KS1 home learning outing (compared to low)				
KS1 home learning outing medium	0.58	0.25	1.79	*
KS1 home learning outing high	0.51	0.40	1.67	
KS2 home computer learning (compared to low)				
KS2 home computer learning medium	-0.26	0.24	0.77	
KS2 home computer learning high	-0.08	0.36	0.92	
KS2 home learning individual activities (compared to low)				
KS2 home learning individual activities medium	0.46	0.23	1.59	*
KS2 home learning individual activities high	0.50	0.37	1.64	
FSM school level (continuous)	0.01	0.01	1.01	
% White British (continuous)	0.00	0.00	1.00	
Pre-school quality-ECERS-E (compared to no pre-school)				
Low quality	0.55	0.34	1.73	
Medium quality	0.82	0.28	2.26	**
High quality	0.82	0.31	2.27	**
Intercept	-2.27	0.42		***
Variance-school level	0.54	0.24		
Number of students	1354			
Number of schools	600			
Deviance (-2 x Log Restricted-Likelihood)	1384.43			
% Reduction school variance	5.1			

* p<0.05, ** p<0.01, *** p<0.001

Table A.9. Primary school academic effectiveness predicting the probability of being in the high achieving group at the end of Key stage 2

	Coef.	Std. Error	Odds Ratios	Sig.
Age	0.04	0.02	1.04	
Gender	-0.44	0.15	0.64	**
Ethnic group (compared to White UK)				
White European Heritage	-1.20	0.50	0.30	*
Black Caribbean Heritage	0.78	0.36	2.18	*
Black African Heritage	-0.29	0.53	0.75	
Any Other Ethnic Minority	-0.04	0.40	0.96	
Indian	0.63	0.49	1.88	
Pakistani	0.57	0.38	1.77	
Bangladeshi	0.23	0.56	1.25	
Mixed Race	0.18	0.31	1.20	
Early developmental problems (compared to none)				
1+ Developmental problem	-0.19	0.22	0.83	
Early behavioural problems (compared to none)				
1+ Behavioural problem	-0.28	0.23	0.76	
Number of siblings at age 3/5(compared to none)				
1 sibling	-0.07	0.21	0.93	
2 siblings	0.01	0.22	1.01	
3 + siblings	-0.44	0.24	0.64	
Missing	-0.33	0.67	0.72	
Mother's highest qualifications level at age 3/5 (compared to none)				
Vocational	0.11	0.24	1.11	
Academic age 16	0.37	0.18	1.44	*
Academic age 18	0.93	0.34	2.52	**
Degree or higher degree	1.23	0.42	3.41	**

Other professional	1.23	0.76	3.43	
Missing	-0.23	0.51	0.79	
Early years home learning (compared to 0-13)				
14-19	-0.30	0.23	0.74	
20-24	-0.31	0.24	0.74	
25-32	0.29	0.24	1.34	
>33	0.78	0.36	2.18	*
KS1 home learning interaction high	-0.63	0.28	0.53	*
KS1 home learning missing	0.29	0.25	1.34	
KS1 home learning outing (compared to low)				
KS1 home learning outing medium	0.64	0.25	1.90	**
KS1 home learning outing high	0.58	0.40	1.79	
KS2 home learning individual activities (compared to low)				
KS2 home learning individual activities medium	-0.28	0.24	0.76	
KS2 home learning individual activities high	-0.13	0.36	0.88	
KS2 home computer learning (compared to low)				
KS2 home computer learning medium	0.45	0.23	1.57	
KS2 home computer learning high	0.49	0.37	1.63	
FSM school level (continuous)	0.00	0.01	1.00	
% White British (continuous)	0.00	0.00	1.00	
Primary school effectiveness English (compared to low)				
Primary school effectiveness missing	-0.05	0.29	0.95	
Primary school effectiveness medium	0.33	0.25	1.38	
Primary school effectiveness high	0.80	0.32	2.23	*
Intercept	-1.86	0.41		***
Variance-school level	0.52	0.22		
Number of students	1354			
Number of schools	600			
Deviance (-2 x Log Restricted-Likelihood)	1383.87			
% Reduction school variance	8.3			

* p<0.05, ** p<0.01, *** p<0.001

Key Stage 4 Results

Table A.10. Predictors of Total GCSE Score for the high achiever disadvantaged student group

Total GCSE score	Coef.	Std. Error	Beta	Sig.
Age	5.14	2.46	0.11	*
Gender	35.23	17.35	0.11	*
Ethnic group (compared to White UK)				
White European Heritage	46.85	67.33	0.04	
Black Caribbean Heritage	17.91	32.22	0.03	
Black African Heritage	53.85	57.41	0.05	
Any Other Ethnic Minority	52.78	44.52	0.06	
Indian	96.74	40.2	0.13	*
Pakistani	94.11	32.79	0.16	**
Bangladeshi	82.99	62.17	0.07	
Mixed Race	34.65	34.22	0.06	
KS3 home learning enrichment (compared to low)				

KS3 home learning enrichment medium	50.45	19.85	0.14	*
KS3 home learning enrichment high	38.29	27.74	0.08	
Intercept	465.82	13.85		***
Number of students	325			
R squared	0.11			
R squared adjusted	0.07			

* p<0.05, ** p<0.01, *** p<0.001

Table A.11. Predictors of GCSE English for the high achiever disadvantaged student group

Grade in English	Coef.	Std. Error	Beta	
Age	0.14	0.11	0.06	
Gender	3.14	0.78	0.22	***
Ethnic group (compared to White UK)				
White European Heritage	4.02	3.02	0.07	
Black Caribbean Heritage	-0.19	1.45	-0.01	
Black African Heritage	10.62	2.58	0.21	***
Any Other Ethnic Minority	2.2	2	0.06	
Indian	5.73	1.81	0.17	**
Pakistani	1.22	1.47	0.04	
Bangladeshi	1.5	2.79	0.03	
Mixed Race	3.76	1.54	0.13	*
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	2.73	0.89	0.16	**
KS3 HLE enrichment high	2.55	1.25	0.11	*
Intercept	40.06	0.63		***
Number of students	322			
R squared	0.18			
R squared adjusted	0.15			

* p<0.05, ** p<0.01, *** p<0.001

Table A.12. Predictors of GCSE maths for the high achiever disadvantaged student group

Grade in Maths	Coef.	Std. Error	Beta	
Age	0.15	0.12	0.07	
Gender	-1.57	0.85	-0.1	
Ethnic group (compared to White UK)				
White European Heritage	5.12	3.31	0.08	
Black Caribbean Heritage	1.18	1.58	0.04	
Black African Heritage	6.56	2.82	0.12	*
Any Other Ethnic Minority	4.33	2.19	0.1	*
Indian	10.33	1.97	0.28	***
Pakistani	4.27	1.61	0.14	**
Bangladeshi	4.25	3.05	0.07	

	Coef.	Std. Error	Beta	
Mixed Race	4.65	1.68	0.15	**
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	3.06	0.98	0.17	**
KS3 HLE enrichment high	3.02	1.36	0.12	*
Intercept	41.97	0.69		***
Number of students	323			
R squared	0.16			
R squared adjusted	0.13			

* p<0.05, ** p<0.01, *** p<0.001

Table A.13. Pre-school quality as predictor of Total GCSE score for the high achiever disadvantaged student group

Total GCSE score	Coef.	Std. Error	Beta	
Age	4.7	2.43	0.1	
Gender	39.83	17.23	0.13	*
Ethnic group (compared to White UK)				
White European Heritage	34.81	66.67	0.03	
Black Caribbean Heritage	0.41	32.28	0	
Black African Heritage	41.7	56.83	0.04	
Any Other Ethnic Minority	43.08	44.21	0.05	
Indian	109.14	40.04	0.15	**
Pakistani	108.6	34.13	0.18	**
Bangladeshi	77.56	61.65	0.07	
Mixed Race	28.29	33.98	0.05	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	52.01	19.69	0.15	**
KS3 HLE enrichment high	41.82	27.51	0.09	
Pre-school quality-ECERS-E (compared to no pre-school)				
Low quality	31.22	38.31	0.07	
Medium quality	39.86	31.45	0.13	
High quality	92.56	34.03	0.26	**
Intercept	415.12	32.22		***
Number of students	325			
R squared	0.14			
R squared adjusted	0.09			

* p<0.05, ** p<0.01, *** p<0.001

Table A.14. Secondary school quality as predictor of GCSE English for the high achiever disadvantaged student group

Grade in English	Coef.	Std. Error	Beta	
Age	0.19	0.11	0.09	
Gender	2.94	0.78	0.2	***
Ethnic group (compared to White UK)				
White European Heritage	4.52	2.99	0.08	
Black Caribbean Heritage	-0.49	1.43	-0.02	
Black African Heritage	10.99	2.55	0.22	***
Any Other Ethnic Minority	2.6	1.99	0.07	
Indian	3.76	1.91	0.11	*
Pakistani	1.52	1.46	0.06	
Bangladeshi	1.9	2.76	0.04	
Mixed Race	3.99	1.52	0.14	**
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	2.61	0.88	0.16	**
KS3 HLE enrichment high	2.24	1.24	0.1	
Ofsted secondary school quality: Quality of learning (compared to inadequate)				
Outstanding	6.1	1.78	0.21	***
Good	1.8	1.09	0.11	
Satisfactory	1.42	0.99	0.1	
Intercept	38.7	0.95		***
Number of students	322			
R squared	0.21			
R squared adjusted	0.18			

 * p<0.05, ** p<0.01, *** p<0.001

Table A.15. Secondary school experiences as predictors of Total GCSE Score for the high achiever disadvantaged student group

Total GCSE score	Coef.	Std. Error	Beta	Sig.
Emphasis on learning (continuous)	159.08	63.36	0.19	*
Headteacher (continuous)	71.65	23.31	0.23	**
Valuing pupils (continuous)	89.54	37.44	0.18	*
Positive relationships (continuous)	58.95	22.51	0.21	**

* p<0.05, ** p<0.01, *** p<0.001

Table A.16. Secondary school experiences as predictors of GCSE grades in English and maths for the high achiever disadvantaged student group

Grade in English	Coef.	Std. Error	Beta	Sig.
Behaviour climate (continuous)	3.4	1.53	0.17	*
Headteacher (continuous)	3.3	1.11	0.22	**
Teacher professional focus (continuous)	3.13	1.11	0.22	**
Positive relationships (continuous)	3.62	1.04	0.26	***
Grade in Maths				
Teacher professional focus (continuous)	4.11	1.31	0.24	**
Positive relationships (continuous)	4.94	1.22	0.3	***

* p<0.05, ** p<0.01, *** p<0.001

Key Stage 5 Results AS-levels

Table A.17. Predictors of attaining four or more AS-levels

	Coef.	Std. Error	Odds Ratios	Sig.
Age	0	0.04	1.00	
Gender	0.51	0.25	1.67	*
Ethnic group (compared to White UK)				
White European Heritage	1.85	0.93	6.39	*
Black Caribbean Heritage	0.61	0.47	1.83	
Black African Heritage	2.01	0.78	7.46	**
Any Other Ethnic Minority	1.65	0.56	5.18	**
Indian	1.71	0.61	5.52	**
Pakistani	0.62	0.45	1.86	
Bangladeshi	0.39	0.89	1.48	
Mixed Race	0.59	0.46	1.81	
KS3 home learning enrichment (compared to low)				
KS3 home learning enrichment medium	1.31	0.29	3.71	***
KS3 home learning enrichment high	1.33	0.39	3.79	***
Intercept	-1.73	0.23		***
Number of students	349			
Deviance (-2 x Log Restricted-Likelihood)	401			

* p<0.05, ** p<0.01, *** p<0.001

Table A.18. Pre-school attendance as predictor of attaining four or more AS-levels

	Coef.	Std. Error	Odds Ratios	Sig.
Age	0	0.04	1.00	
Gender	0.54	0.26	1.72	*
Ethnic group (compared to White UK)				
White European Heritage	1.8	0.93	6.05	
Black Caribbean Heritage	0.54	0.47	1.72	
Black African Heritage	2.1	0.8	8.13	**
Any Other Ethnic Minority	1.64	0.56	5.18	**
Indian	1.89	0.64	6.61	**
Pakistani	0.95	0.49	2.60	*
Bangladeshi	0.49	0.89	1.64	
Mixed Race	0.59	0.46	1.80	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	1.29	0.29	3.64	***
KS3 HLE enrichment high	1.37	0.4	3.95	***
Pre-school (compared to no pre-school)	0.99	0.47	2.70	*
Intercept	-2.67	0.51		***
Number of students	349			
Deviance (-2 x Log Restricted-Likelihood)	396			

* p<0.05, ** p<0.01, *** p<0.001

Table A.19. Pre-school effectiveness as predictor of attaining four or more AS-levels

	Coef.	Std. Error	Odds Ratios	Sig.
Age	0	0.04	1.00	
Gender	0.56	0.26	1.75	*
Ethnic group (compared to White UK)				
White European Heritage	1.72	0.93	5.60	
Black Caribbean Heritage	0.49	0.47	1.63	
Black African Heritage	2.09	0.8	8.07	**
Any Other Ethnic Minority	1.76	0.57	5.79	**
Indian	1.74	0.66	5.69	**
Pakistani	0.92	0.49	2.51	
Bangladeshi	0.61	0.9	1.85	
Mixed Race	0.59	0.46	1.80	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	1.37	0.29	3.93	***
KS3 HLE enrichment high	1.46	0.4	4.30	***
Pre-school effectiveness-Early number concepts (compared to no pre-school)				
Low effectiveness	0.88	0.56	2.40	
Medium effectiveness	0.79	0.49	2.21	

	Coef.	Std. Error	Odds Ratios	Sig.
High effectiveness	1.49	0.52	4.42	**
Intercept	-2.7	0.52		***
Number of students	349			
Deviance (-2 x Log Restricted-Likelihood)	391			

* p<0.05, ** p<0.01, *** p<0.001

Table A.20. Pre-school quality as predictor of attaining four or more AS-levels

	Coef.	Std. Error	Odds Ratios	Sig.
Age	0	0.04	1.00	
Gender	0.56	0.26	1.75	*
Ethnic group (compared to White UK)				
White European Heritage	1.7	0.93	5.50	
Black Caribbean Heritage	0.44	0.48	1.55	
Black African Heritage	2.09	0.8	8.05	**
Any Other Ethnic Minority	1.51	0.57	4.55	**
Indian	1.92	0.64	6.82	**
Pakistani	0.92	0.49	2.51	
Bangladeshi	0.38	0.92	1.46	
Mixed Race	0.51	0.47	1.66	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	1.34	0.29	3.82	***
KS3 HLE enrichment high	1.44	0.4	4.22	***
Pre-school quality-ECERS-E (compared to no pre-school)				
Low quality	0.57	0.6	1.77	
Medium quality	0.96	0.48	2.60	*
High quality	1.28	0.52	3.58	*
Intercept	-2.69	0.51		***
Number of students	349			
Deviance (-2 x Log Restricted-Likelihood)	393			

* p<0.05, ** p<0.01, *** p<0.001

Table A.21. Secondary school quality as predictor of attaining four or more AS-levels

	Coef.	Std. Error	Odds Ratios	Sig.
Age	0.01	0.04	1.01	
Gender	0.47	0.26	1.61	
Ethnic group (compared to White UK)				
White European Heritage	1.98	0.92	7.26	*
Black Caribbean Heritage	0.56	0.48	1.75	
Black African Heritage	2.15	0.79	8.55	**
Any Other Ethnic Minority	1.79	0.57	6.02	**
Indian	1.44	0.65	4.21	*

	Coef.	Std. Error	Odds Ratios	Sig.
Pakistani	0.73	0.46	2.07	
Bangladeshi	0.52	0.89	1.68	
Mixed Race	0.65	0.46	1.91	
KS3 HLE enrichment (compared to low)				
KS3 HLE enrichment medium	1.29	0.29	3.62	***
KS3 HLE enrichment high	1.28	0.4	3.60	**
Ofsted secondary school quality: Quality of learning (compared to inadequate)				
Outstanding	1.25	0.57	3.50	*
Good	0.47	0.37	1.61	
Satisfactory	0.25	0.34	1.28	
Intercept	-2.04	0.35		***
Number of students	349			
Deviance (-2 x Log Restricted-Likelihood)	396			

* p<0.05, ** p<0.01, *** p<0.001

Table A.22. Secondary school experiences as predictors of attaining four or more AS-levels

	Coef.	Std. Error	Odds Ratios	Sig.
Teacher professional focus (continuous)	0.82	0.41	2.27	*
Positive relationships (continuous)	1.09	0.42	2.99	**
Monitoring students (continuous)	0.82	0.37	2.28	*
Formative feedback (continuous)	0.86	0.34	2.35	*

* p<0.05, ** p<0.01, *** p<0.001

Key Stage 5 Results A-levels

Table A.23. Predictors of high achiever disadvantaged students attaining three or more A-levels

	Coef.	Std. Error	Odds Ratios	Sig.
Age	-0.02	0.04	0.98	
Gender	0.73	0.26	2.08	**
Ethnic group (compared to White UK)				
White European Heritage	1.22	0.88	3.40	
Black Caribbean Heritage	0.48	0.48	1.62	
Black African Heritage	2.69	0.86	14.73	**
Any Other Ethnic Minority	1.4	0.57	4.05	*
Indian	1.26	0.65	3.51	
Pakistani	0.58	0.46	1.79	
Bangladeshi	1.35	0.93	3.87	
Mixed Race	1.22	0.45	3.37	**
KS3 home learning enrichment (compared to low)				

KS3 home learning enrichment medium	0.67	0.3	1.95	*
KS3 home learning enrichment high	1.09	0.4	2.96	**
Ofsted secondary school quality: Quality of learning (compared to Inadequate)				
Outstanding	1.41	0.58	4.11	*
Good	0.01	0.37	1.01	
Satisfactory	-0.07	0.33	0.93	
Intercept	-1.75	0.34		***
Number of students	349			
Deviance (-2 x Log Restricted-Likelihood)	391			

* $p<0.05$, ** $p<0.01$, *** $p<0.001$