

Minority Ethnic Pupils in the Longitudinal Study of Young People in England

Extension Report on Performance in Public Examinations at Age 16

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Executive Summary

Introduction

Strand (2007) reported an analysis of the LSYPE Wave 1 data, specifically linked to the pupils' attainment in Key Stage 3 (KS3) national tests in 2004. However, the end of KS3 (age 14) represents an intermediate stage in secondary education, just over halfway through the secondary phase. In contrast to KS3 tests, public examinations at age 16 are 'high stakes' examinations that have a direct impact on pupils' employment prospects and/or entry to further education. There is evidence that many ethnic groups make stronger educational progress during Key Stage 4 (KS4) than they do during KS3 (Strand, 2006; Demie & Strand, 2006; Wilson et al, 2005). For these reasons this extension was undertaken to consider outcomes at age 16 in 2006, and in particular associations between ethnicity and educational attainment and progress over the entire secondary phase. The report is intended and should be read as an Appendix to the original report (Strand, 2007).

Key findings

Raw ethnic group differences in attainment at age 16

The mean score in the KS3 national tests in English, mathematics and science for Pakistani, Bangladeshi, Black Caribbean and Black African groups were all substantially below the mean for White British pupils, and to roughly the same extent, by the equivalent of over a whole year of progress in terms of National Curriculum levels. At KS4, the mean score for Black Caribbean pupils is still significantly lower than White British. However, the mean score for Pakistani pupils is only just below the White British mean, and the mean scores for Bangladeshi and Black African pupils do not differ significantly from the mean for White British pupils. At KS3, Indian pupils were only marginally ahead of White British, but at KS4 they are substantially ahead.

Socio-economic status and gender

It is important to consider the overall size of ethnic group, parental socio-economic classification (SEC) and gender 'gaps' in attainment. The social class gap at KS4 is 1.34 SD (contrast between higher managerial and professional vs. long term unemployed). This is substantially larger than the ethnic gap of 0.65 SD between the highest and lowest performing ethnic groups (Indian vs. Black Caribbean). The gender gap at 0.23 SD is the smallest of all, though still significant. As a result the social class gap, and the poor attainment of pupils from low SEC homes whatever their ethnic group, ought to be seen as a cause for concern.

The attainment of White British pupils was differentiated to a greater extent than any other ethnic group by a wide range of socio-economic variables. The educational attainment of White British pupils was particularly vulnerable to low parental social class, mothers with no educational qualifications, relative poverty (entitled to Free School Meals (FSM)), living in single parent households, living in rented housing and living in deprived neighbourhoods. These factors impact negatively on attainment within most ethnic groups, but seem to be associated with disproportionately low attainment among White British pupils. In effect, White British are the most polarised ethnic group in terms of attainment: White British pupils from high SEC homes are one of the highest attaining ethnic groups, while White British pupils living in disadvantaged circumstances are the lowest attaining group.

The results indicate the need for differentiation within ethnic groups by both gender and the SEC of the home. After controlling for the range of socio-economic variables indicated above the groups for whom low attainment is the greatest concern are:

- White British boys and girls, and Black Caribbean boys, from low SEC homes. These are the three lowest attaining groups;
- Black Caribbean pupils, particularly but not exclusively boys, from middle and high SEC homes, who underachieve relative to their White British peers.

Proximal influences on KS4 attainment

The above findings raises particular questions as to which factors account for greater resilience among many ethnic groups to deprivation, relative to their deprived White British peers. A wide range of parent and pupil variables were available from LSYPE and these were included in statistical models. The factors found to have the greatest impact on attainment were *pupils educational aspirations, parents educational aspirations for their child and pupils academic self-concept*. These are important factors through which the effect of social class is mediated.

Parental and pupil educational aspirations and pupil's academic self-concept could account for the high attainment of Indian, Pakistani, Bangladeshi, Black Caribbean and Black African pupils, and the low attainment of White British pupils, within low SEC homes. However, Black Caribbean and Black African pupils from high SEC homes also had high aspirations and high academic self-concept, but their attainment was significantly lower than similar White British pupils. Pupils from these two ethnic groups in high SEC homes underachieved in relation to their academic self-concept and aspirations.

Pupil progress during secondary school

The main findings are:

- Indian pupils do not differ significantly from White British at KS2, but make more progress and have pulled substantially ahead by KS4.
- Black African and Bangladeshi pupils were well behind their White British peers at KS2 but make more progress during secondary school and have caught up by KS4.
- Pakistani pupils were well behind at KS2 but make greater progress during secondary school and almost close the gap by the end of KS4.
- Pupils of mixed heritage had similar attainment to White British pupils at KS2 and make similar progress, so they remain on a par with White British at KS4.
- Black Caribbean pupils started well behind White British pupils at KS2 and make the same progress during secondary school. As a consequence the Black Caribbean gap relative to White British pupils neither widens nor lessens and Black Caribbean remain substantially behind at KS4.

However, progress, like attainment, was strongly differentiated by ethnic group, gender and the SEC of the home. After all socio-economic variables (SES) were taken into account - including the SEC of the home, mother's education, FSM status, rented accommodation status, single parent household status and neighbourhood deprivation - White British pupils from low SEC homes made the least progress over the course of secondary school. These differences in progress reflect the fact that White British pupils started secondary school from a much higher base than their minority ethnic peers as indicated by KS2 test results.

Poor progress was most pronounced for White British boys and girls from low SEC homes, and ethnic group differences in middle and high SEC homes were far less pronounced. After controlling for all socio-economic variables, the groups with the poorest progress were: (i) White British boys in general but particularly from low SEC homes; (ii) White British girls from low SEC homes; and (iii) Black Caribbean, Black African and Bangladeshi boys from high SEC homes.

Accounting for differential progress

A wide range of parent and pupil variables were strongly related to educational progress. Factors which had a significant impact on progress included parents' provision of a home computer or private tuition, parental monitoring of the child's whereabouts, family discord, Special Educational Needs (SEN), attendance, school exclusion, involvement with social or welfare services and attitude to school. However the most significant factors were the frequency of completing homework, academic self-concept and pupils educational aspirations. These variables play a large part in accounting for the differential progress among pupils from low SEC homes, and could statistically explain the strong progress of minority ethnic pupils and the poor progress of White British pupils from low SEC homes. White British pupils were one of the two ethnic groups who reported doing the least amount of homework and the ethnic group with the lowest academic self-concept and the lowest educational aspirations, and these factors are key in interpreting their poor progress.

However, the same factors revealed that Black Caribbean, Black African and Bangladeshi boys from high SEC homes made less than expected progress. Despite high academic self-concept and educational aspirations, and completing at least the same amount (in the case of Black Caribbean pupils) and significantly more homework (in the case of Black African and Bangladeshi pupils), their progress did not reflect this.

In some ways, therefore, we return to the conclusions from the initial results. The groups of primary concern in terms of low attainment are White British 'working class' pupils, both boys and girls, and Black Caribbean pupils particularly from high SEC homes.

Conclusions

There is a need to move from a monolithic conception of White British as an homogeneous group to explicitly recognise the high degree of polarisation around socio-economic factors within the White British group. White British pupils are consistently the lowest achieving ethnic group whatever the socio-economic dimension (SEC of the home, mother's education, entitlement to FSM, rented housing, single parent households and neighbourhood deprivation). This indicates a range of socio-economic effects broader than just parental occupation, but as a shorthand the term 'White British working class' can serve to unite these findings. The group with the lowest examination attainment at age 16 are White British working class pupils, both boys and girls.

It is important to stress that the above should not be read as indicating that it is only the low attainment of White British 'working class' pupils that is a concern. Socio-economic gaps are much bigger than ethnic group differences, and the substantial gap between high and low socio-economic status is an equity issue for all ethnic groups. Also a concern for the low attainment of working class pupils should not obscure a continued focus on ethnic differentials within high SEC homes, where absolute attainment might not be as low but ethnic gaps, particularly for Black Caribbean pupils, are pronounced. However by better understanding the factors that to some extent mitigate the effects of low SEC among many minority ethnic groups we may learn lessons of benefit to all pupils.

This research has highlighted some key proximal factors that substantially impact on the size of ethnic, social class and gender gaps in educational attainment and progress. Four factors have particularly large associations with attainment and progress, these are:

- Pupil's educational aspirations
- Parents' educational aspirations for their child
- Pupil's academic self concept
- Frequency of completing homework

This does not indicate any 'quick fix' to long standing issues of low attainment. However it does indicate areas where intervention programmes can focus, early in pupils school careers, to have the best chance of impacting on examination attainment at age 16.

These factors play an important role in accounting for the greater progress during secondary school and the high attainment at age 16 of most minority ethnic groups, as well as the low attainment White British pupils from low SEC homes. However there are still questions about why in particular Black Caribbean and Black African boys from high SEC homes underachieve relative to their White British peers, despite the high aspirations of the pupils and parents, their positive attitudes to school and high frequency of undertaking homework. The impact of factors such as teacher expectations, described in detail in the original report (Strand, 2007), need to be further investigated and acted upon.

Section 1: Background

Strand (2007) has reported an analysis of the LSYPE Wave 1 data, specifically linked to pupils' KS2 and KS3 test outcomes. The analysis uncovered some significant and substantial findings. For example Black Caribbean pupils:

- (a) have substantially lower attainment at KS3 than White British pupils, and this cannot be accounted for by social class, poverty, school or neighbourhood deprivation or any of the wide range of variables included in the analysis;
- (b) Black Caribbean pupils make significantly less progress between KS2 and KS3 than White British pupils, falling further behind their White British peers. Again this finding cannot be explained by any of the wide range of explanatory variables in the analysis;
- (c) Black Caribbean pupils are systematically under-represented in entry to the higher tier papers in the KS3 mathematics and science tests. This bias remains when factors including prior attainment, socio-economic status and a wide range of pupil, family school and neighbourhood variables are included. This bias may be an indicator of 'in-school' factors that impact on the low attainment and progress of Black Caribbean pupils.

It is not intended to describe the above report in detail in this extension. The current report is intended and should be read as an Appendix to the original report (Strand, 2007).

Rationale for the extension

The end of KS3 (age 14) represents an intermediate stage in secondary education, just over halfway through the secondary phase. There are perceptions that KS3 tests are not treated with the same seriousness - either by students or by schools - as examinations at the end of secondary schooling (age 16). In contrast to KS3 tests, public examinations in GCSE and other vocational qualifications at age 16 are high stake exams that have a direct impact on pupils' employment prospects and/or entry to further/higher education. There is evidence that many ethnic groups make stronger educational progress during KS4 than they do during KS3 (Strand, 2006; Demie & Strand, 2006; Wilson et al, 2005). For these reasons an analysis of end of KS3 outcomes only presents part of the picture in terms of students' progress through secondary school, and the results may not reflect those that would be obtained from an analysis across the full secondary phase. Therefore, this analysis will explore associations between ethnicity and educational attainment at age 16 and attempt to account for any differences using a range of explanatory variables drawn from the LSYPE dataset. Value added analyses will also be completed to look at associations between ethnic group and educational *progress* age 11-16, and factors influencing such progress.

4

Raw' examination results at Key Stage 4 (age 16)

KS4 results were found for 15,066 (96%) of the 15,770 pupils in the wave 1 sample. Table 1 presents descriptive statistics on the KS4 results for the LSYPE sample.

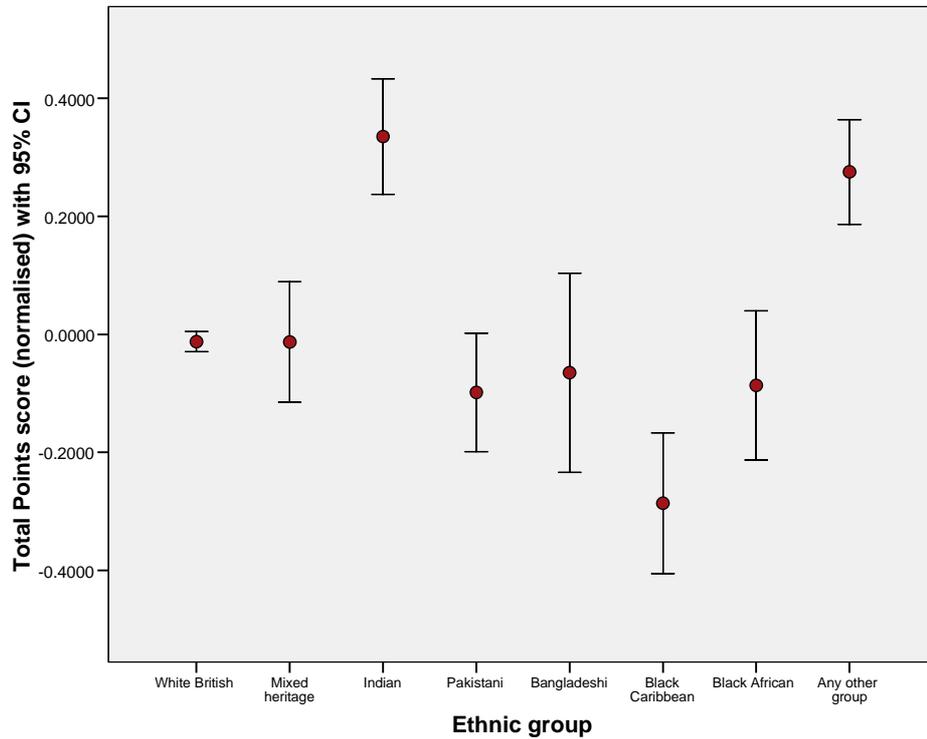
Table 1: KS4 results by ethnic group 2006

Ethnic group	un-weighted n	5+ A*-C including English and maths		5+ GCSE A*-C or equivalent		5+ GCSE A*-G or equivalent		average total point score (TPS) per student	
		%	(SD)	%	(SD)	%	(SD)	Mean	(SD)
White British	9896	47.6	(.50)	59.9	(.49)	90.7	(.29)	368.0	(161.00)
Mixed heritage	766	45.7	(.50)	57.8	(.49)	90.2	(.30)	366.8	(168.07)
Indian	1004	60.3	(.49)	72.4	(.45)	96.7	(.18)	423.6	(147.37)
Pakistani	922	39.5	(.49)	53.9	(.50)	94.0	(.24)	354.8	(151.65)
Bangladeshi	709	40.6	(.49)	57.7	(.50)	89.8	(.30)	358.8	(162.71)
Black Caribbean	555	30.5	(.46)	47.1	(.50)	90.5	(.29)	325.3	(146.51)
Black African	584	41.6	(.49)	54.8	(.50)	92.0	(.27)	356.9	(153.65)
Any other group	630	55.3	(.50)	65.8	(.47)	93.2	(.25)	410.9	(171.48)
Total	15066	47.6	(.50)	60.0	(.49)	91.0	(.29)	369.9	(161.32)

Note: The data in this and all subsequent tables are weighted to reflect the combined design and non-response weights for the sample.

Figure 1 graphs the average total points score (TPS) for each ethnic group with 95% confidence bands around the means. In the figure TPS has been normalised to aid interpretation.

Figure 1: Mean total point score (normalised) by ethnic group with 95% Confidence band



The pattern of results by ethnic group at KS4 are significantly different to those found for KS3.

- At KS3, Indian pupils were only marginally ($p < .05$) ahead of White British. At KS4 they are substantially ahead.
- At KS3, the mean scores for Pakistani, Bangladeshi, Black Caribbean and Black African were all substantially below the mean for White British pupils, and to roughly the same extent, by the equivalent of over a whole year of progress in terms of National Curriculum levels. At KS4, the mean score for Black Caribbean is still significantly lower than White British. However, the mean score for Pakistani pupils is only just below the White British mean ($p < .05$), and the mean scores for Bangladeshi and Black African pupils do not differ significantly from the mean for White British pupils.

The results for the LSYPE sample are representative of the national results at both KS3 and KS4 and these findings reflect the national outcomes (DfES, 2007).

Comparing gaps at KS2, KS3 and GCSE using standardised scores

To get an overview on changes in the relative standing of ethnic groups across KS2, KS3 and KS4, normal score transformations were created for three attainment measures (KS2 average test marks, KS3 average fine-grained points score and KS4 total points score) to place them all on a common scale with a mean of 0 and SD of 1. Table 2 presents an analysis of the mean scores by a selection of pupil background factors.

Some gaps change very little. For example the relative gap associated with social class, mother's educational qualifications and entitlement to a FSM did not change substantially over the three time points. Other gaps did show substantial change. For example the gender gap increases significantly, from less than 0.07 SD at KS2 to 0.23 SD by the end of KS4, with the largest shift occurring between KS3 and KS4. The gaps for some ethnic groups decrease substantially, for example Pakistani, Bangladeshi and Black African mean scores were significantly below the White British mean at KS2 and KS3 but these gaps narrowed to less than 0.1 SD by the end of KS4, again with the big change happening during KS4.

Strong patterns emerge when the change in performance for ethnic groups are analysed separately by the Socio-Economic Classification (SEC) of the family, based on the occupational group of the head of the household. Figure 2 shows the pattern of results for ethnic group and SEC. The top pane shows the results for high SEC (1&2: managerial and professional occupations), the middle pane shows the results for intermediate SEC (3-5: intermediate, small employers and own account workers, lower supervisory and technical staff) and the bottom pane shows the results for low SEC (6-8: semi-routine, routine and long term unemployed). Full data is given in Appendix 2.

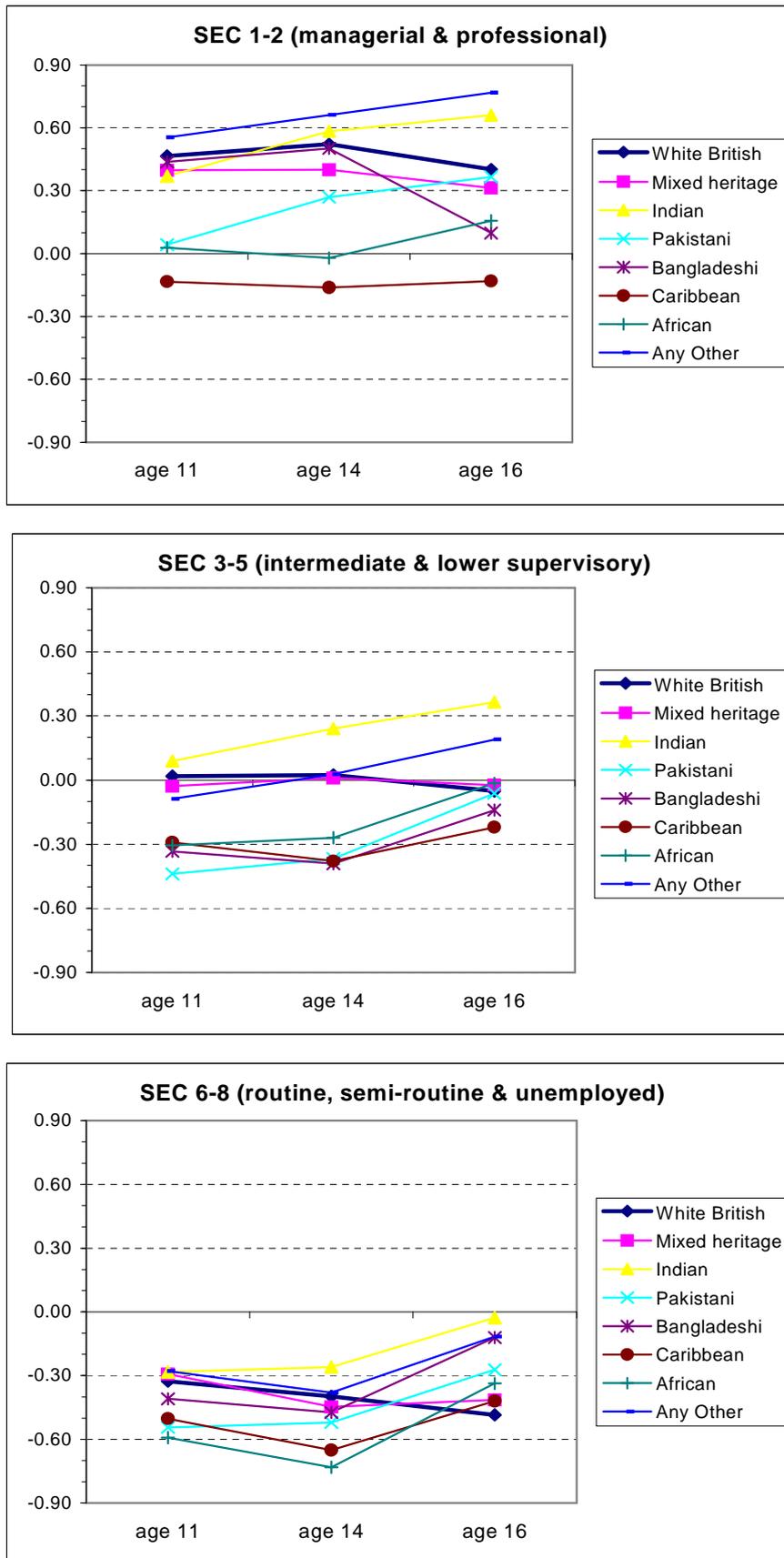
White British pupils show a decline between KS3 and KS4 in all three SEC groups. However most minority groups (with the exception of mixed heritage) show a relative improvement between KS3 and KS4. The contrast is most pronounced in the low SEC group. Among pupils from low SEC homes, White British show a significant decline between KS2 and KS4, from -0.3 to -0.5 SD. Most other ethnic groups show a decline KS2 to KS3, but all except Mixed heritage show a strong relative improvement between KS3 and KS4. At the end of KS4 while White British pupils are still one of the highest performing ethnic groups among the high SEC, and do not differ substantially from most minority ethnic groups among the medium SEC, for the low SEC all ethnic minority groups improve substantially, leaving White British pupils as the lowest performing of all groups at KS4.

Table 2: Standardised mean scores for KS2, KS3 and KS4 by a selection of pupil background variables

variable	Values	KS2 average test marks	KS3 average point score	KS4 total points score	KS4 Best 8 points score	KS4 core points score
gender	Boys	0.00	-0.05	-0.11	-0.11	-0.08
	Girls	0.07	0.06	0.11	0.16	0.08
	<i>Gap</i>	<i>-0.07</i>	<i>-0.11</i>	<i>-0.23</i>	<i>-0.26</i>	<i>-0.16</i>
ethnic group	White British	0.06	0.04	-0.01	0.01	0.00
	Mixed heritage	0.03	-0.03	-0.01	0.05	-0.07
	Indian	0.03	0.12	0.34	0.33	0.33
	Pakistani	-0.45	-0.41	-0.10	-0.11	-0.14
	Bangladeshi	-0.30	-0.39	-0.07	-0.11	-0.09
	Black Caribbean	-0.33	-0.45	-0.29	-0.30	-0.31
	Black African	-0.25	-0.39	-0.09	-0.09	-0.11
	Any other ethnic group	0.00	0.02	0.28	0.32	0.12
	<i>Gap (highest vs. lowest)</i>	<i>0.52</i>	<i>0.56</i>	<i>0.62</i>	<i>0.62</i>	<i>0.64</i>
Social Class	Higher managerial & prof.	0.63	0.69	0.59	0.73	0.69
	Lower managerial & prof.	0.35	0.35	0.30	0.37	0.35
	Intermediate	0.13	0.09	0.05	0.05	0.08
	Small employers & own account	0.01	0.03	0.03	0.04	0.04
	Lower supervisory & tech.	-0.10	-0.15	-0.17	-0.21	-0.16
	Semi-routine	-0.23	-0.32	-0.29	-0.33	-0.33
	Routine	-0.34	-0.46	-0.48	-0.52	-0.45
	Long term unemployed	-0.62	-0.74	-0.73	-0.76	-0.71
	<i>Gap (top vs. bottom)</i>	<i>1.26</i>	<i>1.43</i>	<i>1.32</i>	<i>1.49</i>	<i>1.40</i>
FSM	Entitled	-0.56	-0.68	-0.69	-0.72	-0.65
	Not entitled	0.14	0.12	0.07	0.06	0.12
	<i>Gap</i>	<i>0.70</i>	<i>0.80</i>	<i>0.75</i>	<i>0.78</i>	<i>0.78</i>
Mothers' highest educational Qualification	Degree or equivalent	0.80	0.65	0.80	0.71	0.82
	HE below degree level	0.34	0.28	0.32	0.29	0.37
	GCE A Level or equivalent	0.22	0.19	0.20	0.16	0.22
	GCSE grades A-C or equivalent	0.02	-0.01	-0.03	-0.04	-0.02
	Other qualifications	-0.26	-0.24	-0.28	-0.26	-0.28
	None	-0.46	-0.30	-0.34	-0.35	-0.49
	<i>Gap (top vs. bottom)</i>	<i>1.26</i>	<i>0.95</i>	<i>1.14</i>	<i>1.06</i>	<i>1.30</i>

Note: the different KS4 points scores ('total', 'best 8' and 'core') are described on page 13.

Figure 2: Mean normal score at KS2, KS3 and KS4 by ethnic group and social class.



It is apparent from the above results that minority ethnic pupils make a strong improvement between KS3 and KS4. This will be discussed further later. However, for the moment, the point to note is that the analysis of the KS4 results for the LSYPE sample might be expected to produce different results from the previous analysis based on KS3 outcomes.

Different point score measures at KS4

Table 2 gives an analysis of three points score outcomes at KS4:

- (a) total points score;
- (b) Capped points score based on the 'Best 8' results;
- (c) Average of GCSE English, mathematics and science grades.

These measures each give a slightly different perspective on attainment at age 16. Total points score gives credit to any and all qualifications and is the most inclusive measure of attainment at age 16. Capped points score indicates the pupils performance using the best eight GCSE or equivalent results they achieved. While most pupils are expected to take the equivalent of eight GCSE examinations some schools enter pupils for nine, 10 or 11 or more examinations. This capped measure allows all pupils to be compared on the same basis, and is the outcome used in the 'value-added' analysis in performance tables. Third, core points score is the average of the pupil's GCSE English, mathematics and science scores. This outcome is not generally reported, but is used here to give an indication of performance in the three core subjects and to reflect the fact that GCSE English and mathematics are seen as key indicators of basic skills acquisition¹.

Despite the different nature of the three points score measures, Table 2 indicates the pattern of results at KS4 is very similar whichever of these outcomes is employed. Therefore, the most inclusive measure, total points score (TPS), will be used in the analysis.

¹ This is indicated by the fact that from 2006 onwards the key benchmark at age 16 is achieving five or more GCSE A*-C grades or equivalent including English and mathematics. Previously there was no specification of individual subjects within the five passes, which could be in any subject.

Section 2: Contextualising examination performance

A strong relationship between socio-economic status (SES) and measures of educational attainment has been revealed in studies in the UK (Feinstein, 1998; Bynner & Joshi, 2002), in the US (Coleman et al, 1966; Sirin, 2005; Zwick & Green, 2007) and in international comparative studies (OECD 2001, 2003). This section seeks to interpret the data on educational attainment while taking into account contextual data on SES.

Analytic strategy

The only measure of SES contained in the National Pupil Database (NPD) is entitlement to FSM. This is widely seen as a limited measure of SES (e.g. Lindsay et al, 2006) and indeed Hobbs & Vignoles (2007) have demonstrated that FSM is an imperfect surrogate for SES as measured by a wider range of variables. LYSPE adds significantly to previous research by collecting rich and diverse measures of SES. The analytic strategy here is to control first for parental occupation, as indicated by the Office for National Statistics (ONS) Socio-Economic Classification (SEC) of the head of the pupil's household. SEC is seen as one of the most significant indicators of SES, because occupational measures represent information not only about the income and education required for an occupation, but also about the social prestige and status of a given occupational stratum.

However, SES is broader than just parental occupation (White, 1982; Sirin, 2005). After controlling for SEC, the analysis will also investigate the impact of adding further measures of SES collected in the LSYPE, including:

- Mother's highest educational qualification
- Family poverty (entitlement to FSM)
- Rented versus owner occupied housing
- Family composition (Single parent households)
- Neighbourhood disadvantage (Income Deprivation Affecting Children Index - IDACI)

While there is a substantial body of research establishing the relationship between structural variables such as social class and pupils' educational attainment, there is relatively little evidence of the mechanisms or the more proximal influences through which this association is mediated. LSYPE has collected a wealth of data from the in-depth interviews conducted with pupil and parents/carers. Strand (2007) used this data to create some key indicators of pupil, family school and neighbourhood factors. These include variables such as pupil and parent educational aspirations, parental involvement in school, educational resources in the home, the quality of family relationships, a range pupil 'risk' factors such as Special Educational Needs, attendance and exclusions; attitudes to school, homework completion, school type and school deprivation. The full set of factors are described in detail in Strand (2007). A third stage of the contextual analysis will assess the impact of including these variables and the extent to which they may throw light on ethnic gaps in attainment.

Ethnic group, gender and socio-economic classification (SEC)

Table 3, model 1 shows the ethnic differences before controlling for any contextual variables. This restates the results presented in Figure 1 showing that, in raw score terms, Indian pupils and those from any other ethnic group have higher attainment than White British pupils. There is no difference on average between the White British group and pupils from Black African, Bangladeshi and Mixed heritage pupils. The mean for Pakistani pupils is slightly below the White British mean ($p < .05$), but the mean score of Black Caribbean pupils is substantially lower ($p < .001$).

Table 3, Model 2 controls for gender and SEC. The results indicate that girls have significantly higher attainment than boys by 0.2 SD. The results also show a strong gradient for SEC. The base category is families where the head of the household is long term unemployed. There is a strong and linear gradient for SEC, with a 0.3 advantage for those from homes where the Household Reference Person (HRP) in routine employment, 0.5 for semi-routine, 0.6 for lower supervisory, 0.8 for self-employed, 0.9 for intermediate occupations, a full SD for lower managerial and professional and 1.4 SD for those in higher managerial and professional occupations.

Including SEC and gender has a significant impact on the ethnic coefficients. Most ethnic groups show a marked improvement when SEC is included as a control. In particular, Pakistani and Bangladeshi groups now join the Indian and any other ethnic groups in scoring higher than White British, relative to their SEC profile. However, the negative coefficient for Black Caribbean pupils hardly changes and these pupils are still scoring on average around -0.2 SD below their White British peers. Black Caribbean are the only ethnic group to underachieve relative to White British after controlling for SEC.

Table 3: Mean KS4 total points score by ethnic group, gender and socio-economic classification (SEC) of the home

Variable	Value	Model 1			Model 2			Model 3		
		B	SE		B	SE		B	SE	
Intercept	Intercept	-.05	.019		-.91	.038		-.60	.038	
Ethnic group (Base= White British)	Mixed heritage	-.03	.040		-.01	.038		-.04	.092	
	Indian	.37	.042	***	.45	.039	***	.43	.064	***
	Pakistani	-.08	.037	*	.13	.035	***	.16	.051	***
	Bangladeshi	.01	.046		.33	.049	***	.30	.064	***
	Black Caribbean	-.24	.035	***	-.21	.034	***	-.02	.070	
	Black African	-.04	.046		.11	.042		.16	.080	*
	Any other ethnic group	.24	.045	***	.33	.043	***	.30	.095	**
Gender	Female (vs. male)				.22	.018	***	.24	.032	***
SEC of the home	Higher managerial & prof.				1.36	.044	***	.86	.036	***
	Lower managerial & prof.				1.05	.039	***			
	Intermediate				.84	.044	***			
	Small employers/own account				.78	.041	***	.43	.032	***
	Lower supervisory & tech.				.61	.042	***			
	Semi-routine				.50	.042	***			
	Routine				.31	.041	***			
	Long term unemployed									reference group
										reference group
Ethnic by gender	Mixed heritage * girls							-.08	.072	
	Indian * girls							.03	.054	
	Pakistani * girls							.07	.052	
	Bangladeshi * girls							.14	.064	*
	Black Caribbean * girls							.18	.059	***
	Black African * girls							.01	.069	
	Any other group * girls						.11	.089		
Ethnic group by Family SEC	Mixed heritage * high							-.08	.106	
	Mixed heritage * medium							.02	.100	
	Indian * high							-1.5	.078	
	Indian * medium							.01	.073	
	Pakistani * high							-.29	.092	**
	Pakistani * medium							-.18	.059	**
	Bangladeshi * high							-.62	.159	***
	Bangladeshi * medium							-.43	.106	***
	Black Caribbean * high							-.56	.078	***
	Black Caribbean * medium							-.26	.090	**
	Black African * high							-.40	.103	***
	Black African * medium							-.09	.111	
	Any Other group * high							-.10	.105	
Any other group * medium							-.12	.112		
r squared		0.6%			13.1%			11.8%		

Notes

Coefficients for missing values and interactions with missing values are not shown. Sample size is 13,825 for all three models. * $p < .05$; ** $p < .01$; *** $p < .001$.

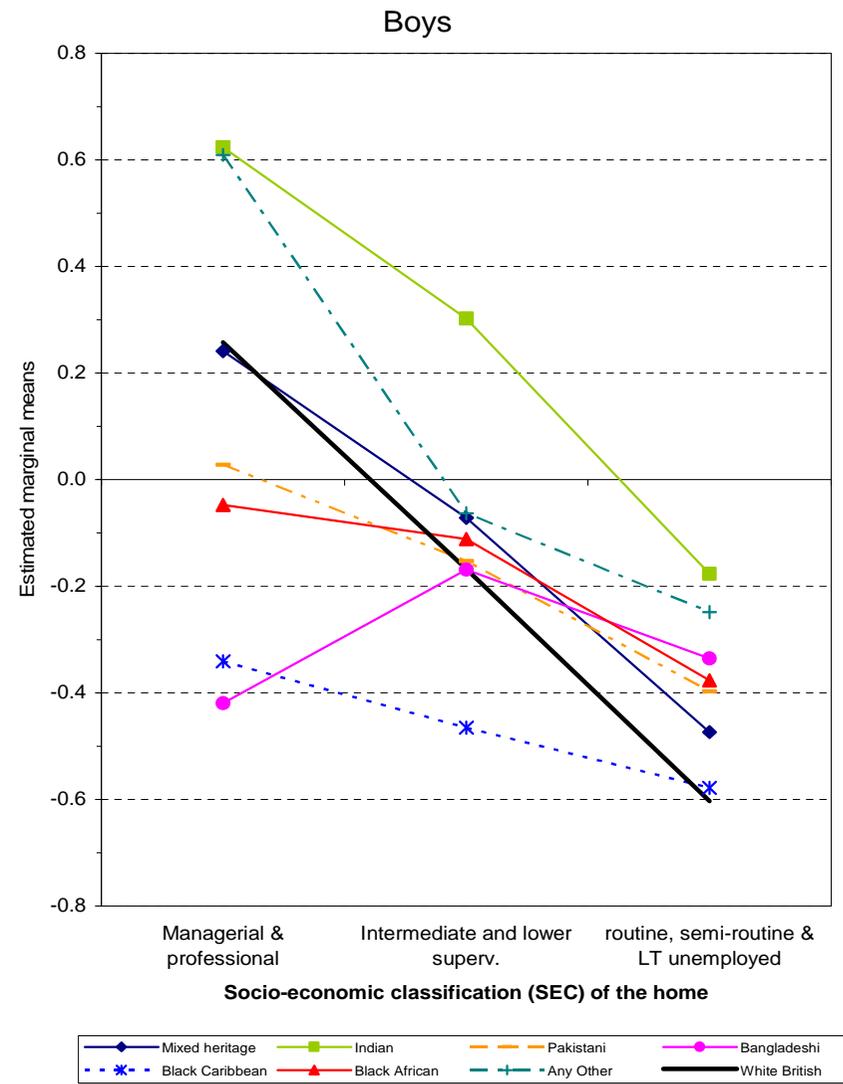
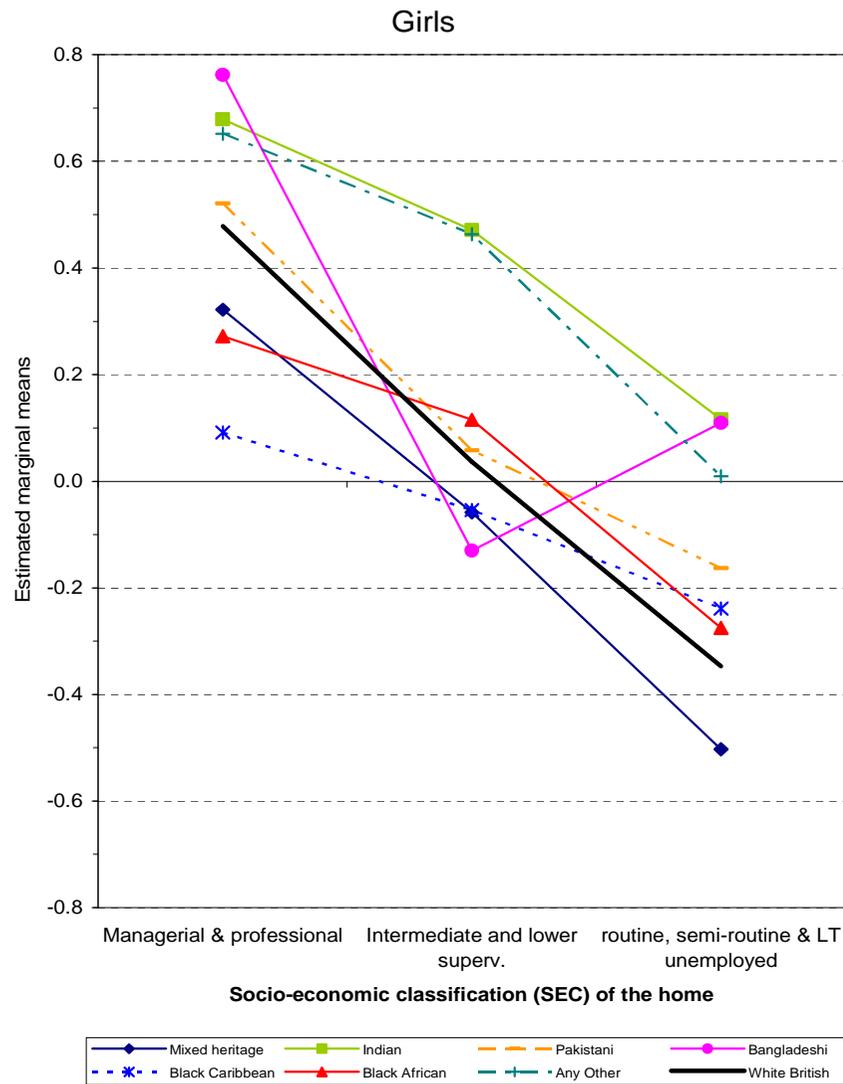
Interactions between ethnic group, gender and SEC

The above is a simple additive model. This assumes, for example, that the 'effect' of gender or the 'effect' of SEC is consistent across all ethnic groups. While some research suggests simple additive models are sufficient to model the relationship of attainment with ethnicity, gender and social class (e.g. Connolly, 2006) other research suggests significant interactions between these factors (e.g., Strand, 1997, 1999; Melhuish, 2006). The preliminary analyses presented in Section 1 suggest that significant interactions between ethnic group and social class are present in the current data. This section explicitly models interaction effects to determine whether they are statistically significant and need to be accounted for.

Because of the small sample size in some of the higher SEC for some ethnic groups, the eight SEC categories were collapsed to three categories of approximately equal size: SEC 1&2 (managerial and professional), SEC3-5 (intermediate, small employers & own account, lower supervisory & technical), SEC 6-8 (semi-routine and routine occupations and long term unemployed). These groups accounted for 36%, 32% and 32% respectively of all pupils for whom SEC was known.

The results indicate the presence of significant interactions between ethnicity, gender and SEC. In the presence of interactions it is not possible to interpret the 'main effect' of ethnic group as in Models 1 and 2. Thus in Model 3 the coefficients for 'ethnic group' do not represent all possible contrasts, rather they compare the 'effect' of ethnicity for the reference group of boys from low SEC families. These particular coefficients therefore show that among boys from low SEC homes, there is no significant difference in the attainment of White British, Black Caribbean and mixed heritage boys, but these boys achieve significantly lower scores than the other ethnic groups. Rather than directly examining the coefficients, Figure 3 aids interpretation by presenting the estimated marginal means (EMM) for all combinations of ethnicity, gender and SEC.

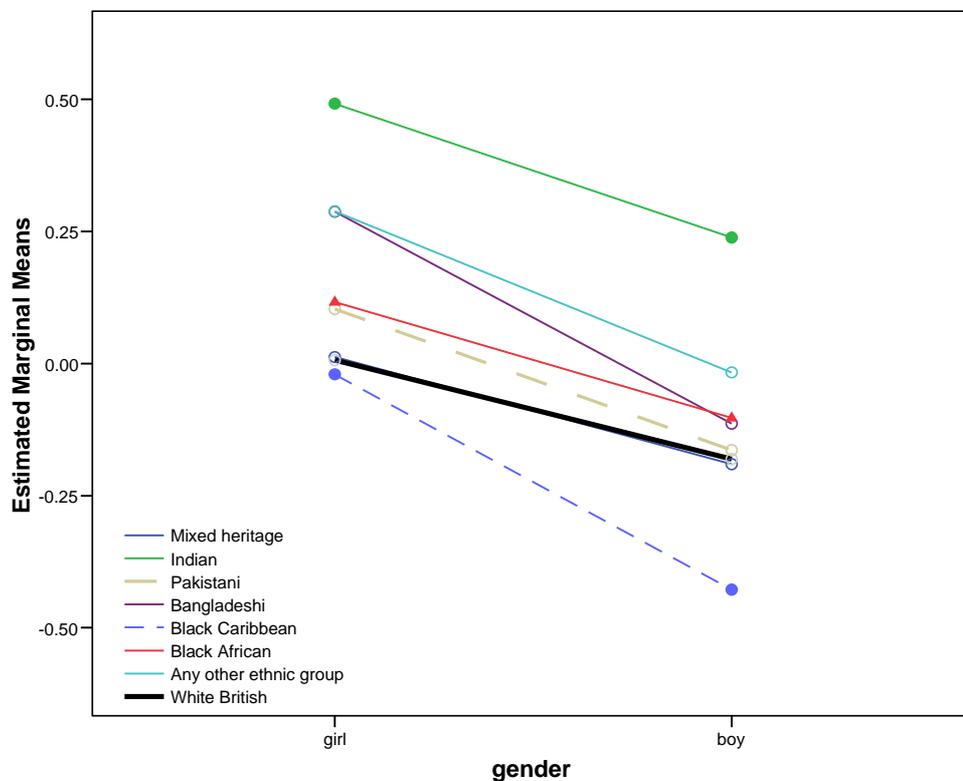
Figure 3: KS4 points score by ethnic group, gender and socio-economic classification (SEC) of the home



There were significant and substantial two way interactions between ethnic group and SEC². The gradient for SEC is particularly steep for White British pupils and the negative impact of low SEC is particularly pronounced for White British. However, there were significant ethnic group interactions with SEC indicated by negative coefficients for high and medium SEC for Pakistani, Bangladeshi, Black Caribbean and Black African groups. The SEC gradient for these groups is less steep and SEC has a smaller differential impact on pupils from these four ethnic groups. Perhaps most notably pupils from low SEC families in these groups tend to perform as well or better than comparable White British pupils, but pupils from high SEC perform less well than comparable White British pupils.

There were also significant interaction terms for ethnicity by gender. Among White British pupils girls did better than boys. However the gender gap in favour of girls was even greater for Bangladeshi and Black Caribbean groups. These results can be seen in Figure 3, but for clarity are also shown graphically in Figure 4.

Figure 4: KS4 total points score by ethnic group and gender



². In an initial model there was a significant three way interaction between ethnic group, gender and SEC. The only statistically significant term was for Bangladeshi girls from high SEC who had significantly higher attainment than Bangladeshi boys from high SEC group. Modelling only the two way interactions is actually closer to the true structure of the data

Groups causing concern

It is important to consider the overall size of ethnic group, social class and gender 'gaps' to place these gaps in context. Referring back to Table 2, it can be seen that the social class gap at KS4 is 1.34 SD (higher managerial and professional vs. long term unemployed). This is substantially larger than the ethnic gap of 0.65 SD between the highest and lowest performing ethnic groups (Indian vs. Black Caribbean). The gender gap at 0.23 SD is the smallest of all. As a result the social class gap, and the low attainment of all pupils from low SEC families whatever their ethnic group, can be seen as a cause for concern.

However, the pattern of interactions suggests there are groupings with particularly low attainment. These interactions need careful interpretation. They indicate differential attainment between two groups but the interpretation of the gap depends on which group we take as the base or reference category. If we take as an example Figure 4, this could be interpreted as indicating that Black Caribbean girls are doing better than expected (taking the base as Black Caribbean boys), or it could indicate that Black Caribbean boys are doing less well than expected (taking the base as Black Caribbean girls).

The results indicate the need for differentiation within ethnic groups by both SEC and gender. The groups whose low attainment is most pronounced are:

- White British, Black Caribbean and Mixed heritage boys from low SEC - these are the lowest attaining of all groups;
- Black Caribbean pupils, particularly but not exclusively boys, from medium and high SEC homes.

In addition, as argued above, all pupils from low SEC homes score poorly compared to their more advantaged peers which should be a cause for concern.

Including a broader range of SES variables

Introduction

The above analysis has indicated something of the complexity of the relationships between ethnicity, gender and the SEC of the home. However, the model explained a relatively small amount of the variation in KS4 outcome, only around 12%. As argued earlier, socio-economic status (SES) can be indicated by a wider set of factors than just parental occupation (White, 1987, Sirin 2005). A wider set of factors can be drawn from LSYPE to include the following six variables:

- Socio-economic classification (SEC) of the home
- Mother's highest educational qualification
- Family poverty (entitlement to a FSM)
- Family composition (Single parent households)
- Rented accommodation
- Neighbourhood disadvantage (IDACI)

The original report detailed the significant differences between ethnic groups in relation to these measures (Strand, 2007, p28-36 and p46-48 for IDACI). Ethnic group differences varied in magnitude on different measures, but all minority ethnic groups, and especially Pakistani, Bangladeshi and Black African groups, were substantially more disadvantaged than White British.

A simple additive model including all the above factors simultaneously indicated that each of these six SES variables had a unique association with attainment independent of all the other SES factors. This also boosted the explanatory power of the model, increasing the R square to 24%, providing a significantly better fit to the data. It is therefore, appropriate to consider all the SES factors in the model.

Interaction effects

Mindful of the significant interactions between ethnic group and gender, and ethnic group and SEC, the analysis tested for ethnic group interactions with each of the additional SES variables. When tested sequentially, all the additional SES variables showed strong interactions with ethnic group. The tables below show the mean KS4 total points score by ethnic group and each of the additional SES variables to demonstrate this.

Ethnic group by maternal education: Table 4 shows the mean total points score by ethnic group and mother's highest educational qualification. For White British pupils, there is a strong gradient in attainment associated with maternal education. Pupils with mothers with degrees or other HE qualifications have significantly higher attainment than those whose mothers have A/AS or GCSE A*-C qualification. This group in turn have significantly higher attainment than those with no or 'other' qualifications. In comparison the attainment gradient is relatively flat for many minority ethnic groups, particularly Black Caribbean, Black African and any other ethnic groups. The lowest attaining group is White British pupils whose mothers have no educational qualifications.

Table 4: Mean KS4 total points score by ethnic group and maternal education

Ethnic group	HE or degree		A/AS or GCSE A*-C		Below GCSE	
	Mean	SD	Mean	SD	Mean	SD
Mixed heritage	0.38	(.98)	-0.13	(1.03)	-0.40	(1.01)
Indian	0.75	(.94)	0.42	(.92)	0.15	(.98)
Pakistani	0.56	(.90)	0.09	(.81)	-0.25	(.95)
Bangladeshi	0.55	(1.54)	0.25	(1.16)	-0.08	(.98)
Black Caribbean	-0.11	(.87)	-0.36	(.84)	-0.43	(.90)
Black African	0.26	(.87)	-0.10	(.94)	-0.33	(.91)
Any other group	0.65	(.96)	0.21	(1.06)	0.07	(1.12)
White British	0.45	(.94)	0.01	(.93)	-0.50	(.95)

Ethnic group by entitlement to FSM: Table 5 plots the mean TPS by ethnic group and FSM. Again the negative association between FSM and attainment is most substantial for the White British group. Among Bangladeshi, Pakistani and Black Caribbean groups FSM has a much smaller association with attainment. The lowest performing group are White British pupils entitled to FSM.

Table 5: Mean total points score by ethnic group and entitlement to FSM

Ethnic group	Not entitled to FSM		Entitled to FSM	
	Mean	SD	Mean	SD
Mixed heritage	0.09	(1.01)	-0.61	(.92)
Indian	0.40	(.94)	-0.18	(.96)
Pakistani	0.00	(.93)	-0.33	(.92)
Bangladeshi	0.10	(.95)	-0.14	(1.00)
Black Caribbean	-0.20	(.84)	-0.56	(.91)
Black African	0.19	(.88)	-0.44	(.90)
Any other group	0.41	(1.05)	-0.35	(1.03)
White British	0.06	(.96)	-0.79	(.94)

Ethnic group by single parent households: Table 6 shows the mean TPS by single parent households. The association of single parent households with low attainment is strongest for White British, mixed heritage and Bangladeshi groups, and much less pronounced for Black Caribbean and Pakistani groups. The lowest performing group is White British pupils from single parent households.

Table 6: Mean KS4 total points score by ethnic group and single parent households

Ethnic group	Dual parent		Single parent	
	Mean	SD	Mean	SD
Mixed heritage	0.14	(1.03)	-0.37	(.97)
Indian	0.36	(.96)	0.01	(.95)
Pakistani	-0.11	(.94)	-0.24	(.98)
Bangladeshi	0.00	(.99)	-0.28	(1.08)
Black Caribbean	-0.14	(.86)	-0.41	(.85)
Black African	0.15	(.92)	-0.36	(.91)
Any other group	0.26	(1.07)	-0.06	(1.15)
White British	0.07	(.96)	-0.44	(1.02)

Ethnic group by owner occupation: Table 7 presents the mean TPS by ethnic group and owner occupation. For White British pupils there was a particular strong negative association of residing in rented accommodation compared to owner occupied. For Indian, Pakistani, Bangladeshi and Black African pupils the negative impact of living in rented accommodation was significantly smaller. White British pupils in rented accommodation were the lowest attaining group.

Table 7: Mean KS4 total points score by ethnic group and owner occupation

Ethnic group	Rented		Owner occupied	
	Mean	SD	Mean	SD
Mixed heritage	-0.49	(.94)	0.22	(1.01)
Indian	0.02	(1.03)	0.37	(.95)
Pakistani	-0.22	(.92)	-0.09	(.96)
Bangladeshi	-0.17	(.98)	0.11	(1.00)
Black Caribbean	-0.46	(.81)	-0.07	(.89)
Black African	-0.21	(.92)	0.22	(.95)
Any other group	-0.12	(1.06)	0.52	(1.03)
White British	-0.63	(.95)	0.16	(.94)

Ethnic group by neighbourhood deprivation: Table 8 presents the mean TPS by ethnic group and Income Deprivation Affecting Children Index (IDACI) score for the neighbourhood³. There was a strong negative association between neighbourhood deprivation and attainment among all ethnic groups. However the slope of the regression line (as indicate by the B coefficient in Table 8) was steepest among White British pupils. White British pupils in the least disadvantaged areas were one of the two highest attaining ethnic groups but White British pupils in the most disadvantaged areas were the lowest attaining ethnic group.

³ . Neighbourhood is defined as the 32,482 ONS super output area (SOA) lower layers for England, each containing on average approximately 1,500 people and 200 children. See Strand (2007) p46-47 for further detail.

Table 8: Mean KS4 total points score by ethnic group and neighbourhood deprivation (IDACI)

Ethnic group	Slope (B)	IDACI normal score (least to most deprived)						
		-3	-2	-1	0	1	2	3
Mixed heritage	-0.26	0.72	0.47	0.21	-0.05	-0.30	-0.56	-0.82
Indian	-0.26	1.09	0.83	0.58	0.32	0.06	-0.19	-0.45
Pakistani	-0.17	0.44	0.28	0.11	-0.05	-0.22	-0.38	-0.55
Bangladeshi	-0.07	0.24	0.17	0.10	0.03	-0.04	-0.11	-0.18
Black Caribbean	-0.20	0.46	0.26	0.05	-0.15	-0.35	-0.56	-0.76
Black African	-0.15	0.49	0.33	0.18	0.03	-0.13	-0.28	-0.44
Any other group	-0.21	0.85	0.64	0.43	0.22	0.00	-0.21	-0.42
White British	-0.33	0.86	0.53	0.20	-0.13	-0.46	-0.79	-1.12

Taking all SES factors into account simultaneously

A multiple regression was completed including all six SES variables and allowing interactions between ethnic group and each SES variable. The full results are presented in Appendix 3. When all possible interaction terms were included there were no significant interactions between ethnicity and FSM, IDACI and single parent households. FSM had a significant negative association with attainment, -0.22 SD, even after control for all other factors. Being in a two parent family (as opposed to a single parent family) had a positive association (0.16 SD). Neighbourhood deprivation had a significant negative association with attainment, with a difference of -0.22 SD between neighbourhoods one SD above and one SD below the average deprivation. There were significant interactions between ethnicity and four variables. The largest interactions were found for ethnic group by sex and ethnic group by SEC, but the interactions for ethnic group by owner occupation and maternal education were also statistically significant.

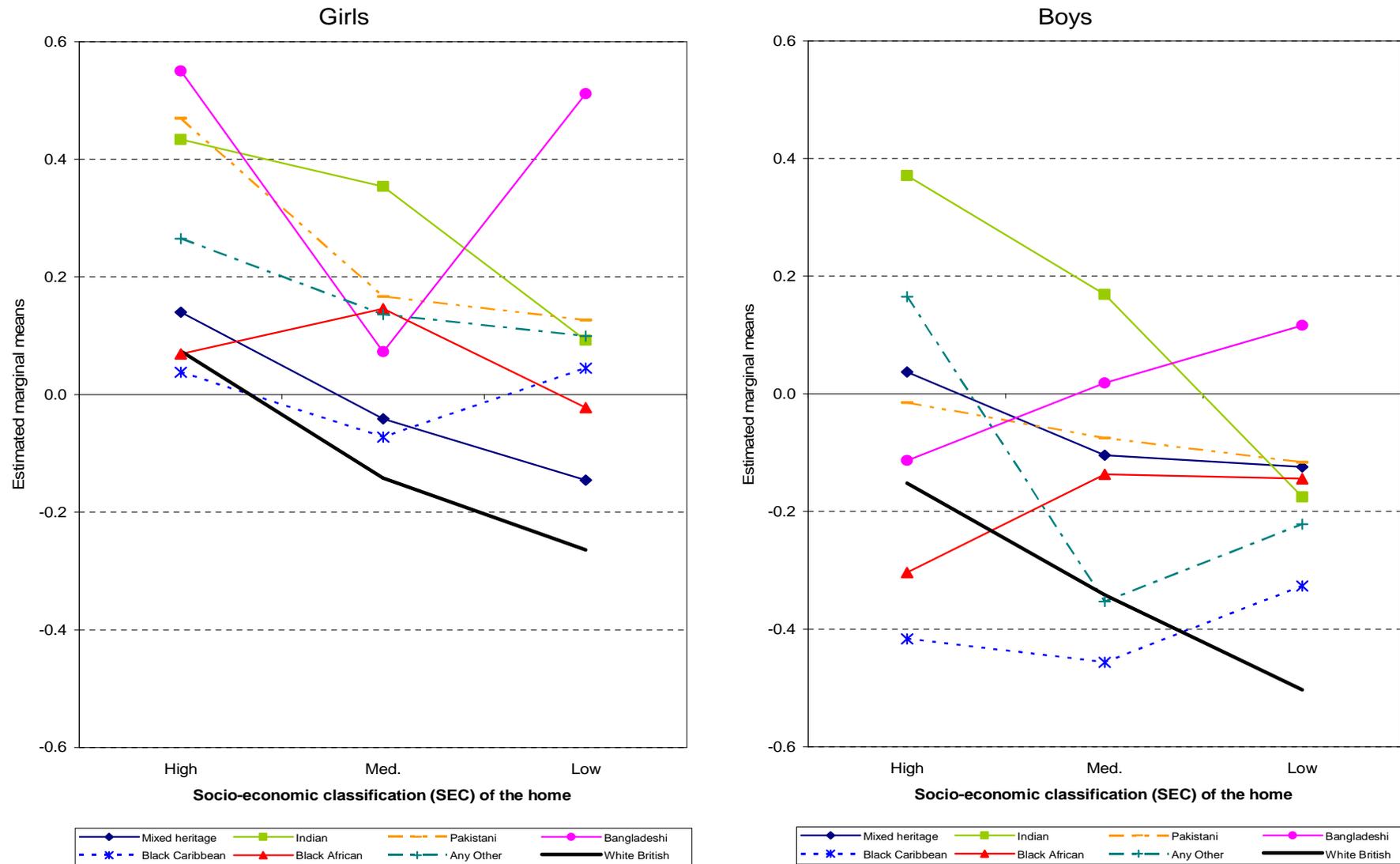
Table 9 and Figure 5 present the estimated marginal means after adjusting for all SES variables. Since the SEC of the home is the most central SES variable, the results are presented by ethnic group, gender and SEC. These results differ from those presented in Figure 3 because these mean scores are net of the effect of all other SES variables, including mother's educational qualifications, entitlement to FSM, single parent households, owner occupation and IDACI.

Table 9: Estimated marginal means by ethnic group, gender and SEC of the home, controlling for all SES variables

Ethnic Group	SEC	Boys					Girls				
		Mean	SE	Lower 95% CI	Upper 95% CI	Sig.	Mean	SE	Lower 95% CI	Upper 95% CI	Sig.
Mixed heritage	High	0.04	0.11	-0.18	0.25		0.14	0.11	-0.07	0.35	
Indian	High	0.37	0.08	0.22	0.52	Hi	0.43	0.10	0.24	0.62	Hi
Pakistani	High	-0.01	0.12	-0.25	0.22		0.47	0.09	0.29	0.65	Hi
Bangladeshi	High	-0.11	0.22	-0.54	0.32		0.90	0.16	0.58	1.21	Hi
Black Caribbean	High	-0.42	0.11	-0.64	-0.19		0.04	0.10	-0.17	0.24	
Black African	High	-0.30	0.14	-0.58	-0.03		0.07	0.09	-0.12	0.25	
Any Other	High	0.17	0.14	-0.12	0.45		0.27	0.12	0.04	0.49	
White British	High	-0.15	0.04	-0.23	-0.07		0.07	0.04	-0.01	0.16	
Mixed heritage	Medium	-0.10	0.09	-0.28	0.07		-0.04	0.10	-0.24	0.16	
Indian	Medium	0.17	0.08	0.00	0.33	Hi	0.35	0.09	0.18	0.52	Hi
Pakistani	Medium	-0.08	0.07	-0.22	0.07	Hi	0.17	0.08	0.00	0.33	Hi
Bangladeshi	Medium	0.02	0.14	-0.25	0.29	Hi	0.07	0.21	-0.35	0.49	
Black Caribbean	Medium	-0.46	0.11	-0.67	-0.24		-0.07	0.11	-0.29	0.15	
Black African	Medium	-0.14	0.10	-0.34	0.07		0.15	0.15	-0.15	0.45	
Any Other	Medium	-0.35	0.13	-0.61	-0.09		0.14	0.14	-0.13	0.40	
White British	Medium	-0.34	0.04	-0.42	-0.27		-0.14	0.04	-0.22	-0.06	
Mixed heritage	Low	-0.12	0.12	-0.36	0.11	Hi	-0.15	0.12	-0.37	0.08	
Indian	Low	-0.18	0.07	-0.32	-0.03	Hi	0.09	0.09	-0.09	0.27	Hi
Pakistani	Low	-0.12	0.07	-0.25	0.02	Hi	0.13	0.06	0.00	0.25	Hi
Bangladeshi	Low	0.12	0.13	-0.15	0.38	Hi	0.51	0.13	0.26	0.76	Hi
Black Caribbean	Low	-0.33	0.12	-0.56	-0.09		0.05	0.10	-0.15	0.24	Hi
Black African	Low	-0.14	0.10	-0.35	0.06	Hi	-0.02	0.09	-0.20	0.16	
Any Other	Low	-0.22	0.14	-0.50	0.06		0.10	0.13	-0.16	0.36	Hi
White British	Low	-0.50	0.05	-0.59	-0.41		-0.26	0.04	-0.34	-0.18	

Notes: 'Hi' and 'Low' indicates the estimated marginal mean is significantly higher or lower than the relevant mean for White British pupils of that gender and SEC .

Figure 5: KS4 points score by ethnic group, gender and SEC of the home after also controlling for maternal education, entitlement to FSM, family composition, owner occupation status and neighbourhood deprivation.



In terms of gender, there is a large gender gap at age 16. The size of the gender gap is generally consistent across ethnic groups, except for Black Caribbean and Bangladeshi where the gender gaps in favour of girls is significantly larger. In relation to the SEC of the home, there is a significant gradient for White British pupils, but for most minority ethnic groups the SEC of the home exerts a smaller influence on attainment than it does for White British pupils. Indeed for Bangladeshi, Black Caribbean and Black African pupils there was relatively little difference in the attainment of pupils from high SEC and low SEC homes, after adjusting for all SES factors⁴. In contrast for White British and Indian pupils there was a strong divide between high SEC and low SEC homes.

Indian, Bangladeshi and Pakistani groups are extremely disadvantaged on many of the SES measures of mother's educational qualifications, entitlement to FSM, family composition, rented housing and neighbourhood deprivation. Taking these factors into account, their attainment is even further above that of White British pupils than was indicated previously in Figure 3. This finding is consistent across all SEC homes. Similarly when the greater disadvantage of Black African and Mixed heritage pupils is taken into account their performance does not differ significantly from White British pupils among medium and high SEC homes, and is significantly better in low SEC homes.

Black Caribbean pupils are more similar to their White British peers in respect of SES, for example the social class and maternal education profile of Black Caribbean families does not differ substantially from White British families (see Strand 2007, p28-34). When only the SEC of the home is considered, it appears that Black Caribbean pupils, and boys in particular, underachieve relative to their White British peers in medium and high SEC homes (see Figure 3). However, a higher proportion of Black Caribbean than White British pupils are entitled to FSM, live in single parent households, rented accommodation and in the most deprived neighbourhoods. When these factors are also included Black Caribbean girls from low SEC home do significantly better than comparable White British girls, but otherwise White British and Black Caribbean pupils do not differ significantly. However Black Caribbean boys are the lowest scoring group within high SEC homes and the result is only just short of significance.

Perhaps the most striking feature to emerge is that, after controlling for a wide range of SES variables, the lowest scoring groups are White British boys and girls from low SEC homes. All minority ethnic groups, except Black Caribbean boys, have significantly higher attainment than White British pupils in this SEC. The educational attainment of White British pupils seem particularly vulnerable to low SEC, mothers with no educational qualifications, relative poverty (entitled to FSM), living in single parent households, rented housing or deprived neighbourhoods. These factors impact negatively on attainment within all ethnic groups, but seem to be associated with disproportionately low attainment among White British.

Summary

What emerges from the analysis so far is a complicated pattern of attainment differentiated by ethnicity, gender, socio-economic status and the interactions between these factors. In raw score terms, as discussed in Section 1, all ethnic groups except Black Caribbean, and to a lesser extent Pakistani, are achieving as well or better than White British pupils at the end of KS4. When additional controls are included for a wide range of SES variables, Pakistani pupils then also perform at least as well or better than White British pupils at all levels of SEC. After such controls Black Caribbean pupils are also achieving as well as White British pupils, and in the case of Black Caribbean girls in low SEC homes significantly better. However the low attainment of Black Caribbean pupils from high SEC homes remains a concern.

⁴. *The ethnic by SEC interaction coefficients in Appendix 3 are negative because they are calculated relative to the ethnic differences for the low SEC group, where these groups scored significantly higher than White British pupils.*

The finding that White British pupils are consistently the lowest achieving whatever the SES dimension (the SEC of the home, mother's educational qualifications, entitlement to a FSM, rented housing, family composition or neighbourhood deprivation) indicates this phenomena is wider than a narrow definition of parental occupational class. Nevertheless the pattern is seen clearly in the SEC data and the shorthand White British 'working class' can serve as a label to unite these findings. The main groups of concern in relation to examination attainment at age 16 are White British 'working class' pupils, both boys and girls, and Black Caribbean boys.

This raises particular questions as to which factors account for the greater resilience to economic disadvantage among many minority ethnic groups, in terms of their attainment, compared to their similarly disadvantaged White British peers. This is the question that is explored next.

Proximal influences on attainment gaps

While there is a substantial body of research establishing the relation between structural variables such as socio-economic status and pupils' educational attainment, to which this research adds significantly, there is relatively little evidence of the mechanisms or the more proximal influences through which this association is mediated. By entering the SES variables first, as has been described above, it is possible to explore the subsequent effect of entering more dynamic family or individual measures. If these more proximal measures influence or mediate the effect of social class we might expect the inclusion of these variables to (a) improve the prediction of educational attainment and (b) reduce the relative impact of variables such as social class. This may also help us to better understand how social class effects on attainment are mediated.

LSYPE has collected a wealth of data from the in-depth interviews conducted with pupil and parents/carers. Strand (2007) used this data to create some key indicators of pupil, family school and neighbourhood factors. These include variables such as pupil and parent educational aspirations, parental involvement in school, educational resources in the home, the quality of family relationships, a range pupil 'risk' factors such as Special Educational Needs, attendance, exclusions; attitude to school, homework completion, school type and school deprivation. The full set of factors are described in detail in Strand (2007). The report (a) identified key variables in relation to attainment (b) identified the extent to which there was variation between ethnic groups in relation to these variables (c) assessed the impact of these variables on ethnic gaps in attainment and progress during KS3.

The next stage of this report is to evaluate the impact of this wider range of variables on attainment at KS4, with a special focus on the impact on ethnic gaps.

Separate regressions for each ethnic group

Because of the large number of interactions between ethnic group and SES variables (parental social class, gender, Mother's educational qualifications and owner occupation) it is prudent to consider whether other new explanatory factors may also interact with ethnicity. As an initial test for the presence of such differential associations, separate regressions were completed for the full set of explanatory factors. This cannot conclusively determine that interaction effects will not occur in a combined model, but can determine the extent to which variables are differentially predictive (or not) across different ethnic groups.

Table 10 presents the results of separate regressions for the parent, pupil and school explanatory factors as detailed in Strand 2007 (p36-46). The number of pupils in the minority ethnic groups are small in relation to White British, even despite the boost to the sample for these groups employed in LSYPE. Hence the statistical significance of a factor will not always be a good guide to differential effects across ethnic groups: a factor may have a statistically significant association with attainment within the White British group but not within a minority group because of the smaller sample size in the minority group. We will, therefore, also compare the size of the coefficients in the White British and minority groups for each variable to determine whether they are of similar magnitude, even if the particular variable is not statistically significant.

SES variables: The results substantially confirm the SEC effects reported above. The effect of SEC is of a similar magnitude for the White British, Mixed heritage, Indian and Pakistani groups, but smaller for the Black African and actually negative for the Bangladeshi groups. Similarly the maternal education effects are small for the Black Caribbean and Black African groups. Home ownership is also a particularly negligible factor for Indian and Pakistani groups. IDACI also had a consistent impact across ethnic groups. Being in a single parent household did not appear to impact so negatively on Indian, Pakistani or Black Caribbean

pupils as it does for White British pupils, although it had a small negative effect on most ethnic groups, particular Black African pupils.

Parent variables: Among the parent variables there is a high degree of consistency across ethnic groups. Not owning a home computer for the use of the child has a negative impact in all ethnic groups, and statistically significant for most. Providing home tuition has a similar impact across all groups, as does knowing where the child is when s/he is out. Parent reported frequent quarrelling with their children (most days) has a negative impact, except for Pakistani and Bangladeshi groups. However this might reflect the fact that the latter groups very rarely reported any quarrelling. Parental aspirations for their child to continue in FTE after age 16 are strongly associated with attainment, although the effect was relatively small within the Black Caribbean group.

Table 10: Separate regression of KS4 points score within each ethnic group

Parameter	White British		Mixed Heritage		Indian		Pakistani		Bangladeshi		Black Caribbean		Black African		Any Other	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
Intercept	-0.27	0.09	-0.05	0.35	-0.73	0.33	-1.13	0.35	-0.16	0.45	0.12	0.44	-0.88	0.47	-0.42	0.41
girls	0.09 ***	0.02	0.11	0.07	0.21 ***	0.06	0.20 **	0.07	0.31 ***	0.09	0.18 *	0.08	0.23 **	0.08	0.22 *	0.08
SEC High	0.14 **	0.05	0.12	0.15	0.44 **	0.13	0.37 **	0.12	-0.19	0.18	0.13	0.16	-0.06	0.14	0.24	0.15
SEC Medium	0.06	0.05	0.02	0.15	0.41 **	0.13	0.15	0.10	-0.18	0.12	0.15	0.15	0.05	0.13	0.17	0.15
Degree/HE	0.25 ***	0.02	0.06	0.10	0.08	0.09	0.30 *	0.12	0.61 *	0.25	0.00	0.10	0.12	0.11	0.20	0.11
A/AS-GCSE	0.11 ***	0.02	0.01	0.08	0.05	0.06	0.17	0.09	0.15	0.14	-0.10	0.09	0.01	0.11	-0.03	0.09
FSM	-0.05	0.03	-0.07	0.09	-0.01	0.09	-0.01	0.07	-0.13	0.08	0.01	0.09	-0.13	0.10	-0.15	0.11
rented	-0.17 ***	0.02	-0.12	0.08	-0.07	0.08	0.01	0.07	-0.18 *	0.07	-0.23 **	0.08	-0.15	0.10	-0.11	0.09
Single parent	0.06 **	0.02	0.14 *	0.07	0.02	0.09	0.00	0.09	0.11	0.11	-0.02	0.07	0.17 *	0.08	0.06	0.09
IDACI_n	-0.05 ***	0.01	-0.03	0.04	-0.02	0.04	0.01	0.04	0.02	0.06	-0.04	0.05	-0.04	0.05	-0.02	0.05
Home computer	-0.19 ***	0.03	-0.25 **	0.09	-0.13	0.10	-0.22 **	0.07	-0.11	0.09	-0.29 **	0.09	-0.43 ***	0.11	-0.27 *	0.12
home tuition	-0.07 **	0.02	-0.02	0.09	0.08	0.06	0.08	0.09	-0.02	0.12	0.07	0.10	0.17	0.09	0.15	0.10
parent invove - high	-0.03	0.04	-0.27	0.21	0.19	0.14	0.23	0.13	-0.01	0.13	-0.12	0.24	-0.29	0.22	0.00	0.18
medium	0.03	0.05	-0.16	0.23	0.19	0.16	0.18	0.16	-0.10	0.18	-0.08	0.25	-0.12	0.25	-0.10	0.21
Know when out	-0.09 ***	0.02	0.01	0.08	-0.16	0.09	-0.07	0.09	-0.02	0.10	-0.07	0.09	0.02	0.12	-0.03	0.12
Parents aspirations	-0.16 ***	0.02	-0.30 **	0.10	-0.32 *	0.13	-0.09	0.12	-0.30	0.16	0.06	0.12	-0.33	0.27	-0.40 **	0.14
Frequent quaralls	-0.13 ***	0.02	-0.14	0.09	-0.17	0.09	-0.07	0.11	0.18	0.20	-0.15	0.11	-0.17	0.12	-0.34 **	0.12
medium quarells	-0.07 ***	0.02	-0.19 *	0.08	0.04	0.07	-0.06	0.10	-0.13	0.16	0.06	0.08	-0.08	0.11	-0.13	0.11
SEN	-0.52 ***	0.03	-0.53 ***	0.12	-0.93 ***	0.13	-0.50 ***	0.12	-0.64 ***	0.15	-0.58 ***	0.10	-0.13	0.15	-0.53 **	0.18
truancy	-0.16 ***	0.02	-0.14	0.08	0.01	0.10	0.00	0.09	-0.12	0.11	-0.02	0.09	-0.45 ***	0.12	-0.16	0.12
LT absence	-0.25 ***	0.04	0.10	0.12	-0.08	0.15	-0.17	0.15	-0.10	0.37	-0.20	0.19	-0.20	0.34	-0.23	0.23
EWS/SS involvement	-0.21 ***	0.03	0.15	0.12	0.02	0.16	-0.15	0.17	-0.38	0.26	-0.25	0.13	-0.01	0.17	-0.19	0.20
Police involvement	-0.16 ***	0.03	-0.34 **	0.11	0.25	0.20	0.07	0.23	-0.15	0.38	-0.32	0.17	0.01	0.22	-0.27	0.20
Exclusion	-0.25 ***	0.03	-0.42 ***	0.10	-0.37 **	0.14	-0.45 **	0.14	-0.10	0.26	-0.34 ***	0.09	-0.32 *	0.14	-0.18	0.16
Pupil aspirations	-0.22 ***	0.02	-0.07	0.09	-0.14	0.12	-0.31 **	0.11	-0.30 *	0.14	-0.26 *	0.10	-0.42 *	0.21	-0.07	0.12
Planning - very high	-0.19 ***	0.03	-0.32 *	0.13	-0.44 ***	0.10	-0.40 ***	0.09	-0.51 ***	0.11	-0.48 ***	0.13	-0.42 ***	0.13	-0.25	0.16
high	-0.14 ***	0.03	-0.34 **	0.12	-0.30 ***	0.09	-0.27 **	0.09	-0.23 *	0.11	-0.06	0.15	-0.40 *	0.17	-0.10	0.13
low	-0.04 *	0.02	-0.02	0.07	-0.15 *	0.06	-0.15 *	0.07	-0.18 *	0.08	-0.09	0.07	-0.14	0.08	-0.09	0.08
Homework 1 day	0.03	0.05	0.11	0.20	0.00	0.22	-0.05	0.21	0.06	0.27	0.18	0.19	0.18	0.30	-0.30	0.29
2 days	0.07	0.04	0.10	0.19	0.17	0.22	0.18	0.20	0.23	0.26	0.08	0.18	0.45	0.28	-0.26	0.28
3 days	0.17 ***	0.04	0.16	0.19	0.21	0.21	0.32	0.19	0.27	0.26	0.18	0.17	0.41	0.27	-0.17	0.28
4 days	0.23 ***	0.05	0.07	0.20	0.35	0.22	0.21	0.20	0.39	0.27	0.26	0.20	0.27	0.28	0.14	0.29
5 days	0.21 ***	0.05	0.15	0.20	0.39	0.21	0.41 *	0.20	0.28	0.26	0.35	0.19	0.35	0.28	0.06	0.29
ASC - very high	0.70 ***	0.03	0.78 ***	0.12	0.58 ***	0.13	0.57 ***	0.14	0.46 **	0.17	0.42 **	0.14	0.80 ***	0.19	1.12 ***	0.16
high	0.41 ***	0.03	0.40 ***	0.11	0.35 **	0.13	0.41 **	0.14	0.28	0.17	0.22	0.13	0.47 *	0.19	0.82 ***	0.15
low	0.16 ***	0.03	0.19	0.11	0.15	0.13	0.21	0.14	0.02	0.17	0.04	0.13	0.37	0.19	0.46 **	0.15
Attitude - very high	0.05 *	0.02	-0.06	0.10	0.03	0.10	-0.06	0.10	0.16	0.12	-0.09	0.10	0.12	0.12	-0.20	0.12
high	0.07 **	0.02	0.04	0.10	0.07	0.10	0.13	0.11	0.13	0.13	0.13	0.10	0.24	0.14	0.01	0.13
low	0.06 **	0.02	-0.09	0.09	0.08	0.10	0.15	0.11	0.07	0.13	0.10	0.10	0.24	0.13	-0.13	0.12
FSM 35%+	-0.16 ***	0.04	-0.09	0.14	-0.28 *	0.14	0.11	0.19	0.03	0.26	-0.36	0.21	0.18	0.23	-0.26	0.16
FSM 21%-35%	-0.06 *	0.03	0.03	0.13	-0.10	0.13	-0.01	0.19	0.02	0.27	-0.47 *	0.20	-0.01	0.23	-0.12	0.16
FSM 13%-21%	-0.07 *	0.03	-0.07	0.12	-0.08	0.13	0.18	0.19	0.09	0.28	-0.37	0.20	0.15	0.23	-0.20	0.15
FSM9%-13%	-0.08 **	0.03	-0.04	0.13	0.04	0.13	0.19	0.20	-0.12	0.30	-0.27	0.22	-0.19	0.25	0.03	0.15
FSM 5%-9%	-0.05 *	0.02	0.19	0.12	0.06	0.14	0.28	0.21	-0.30	0.33	-0.22	0.22	0.30	0.25	-0.14	0.15
Modern	-0.08 *	0.04	0.05	0.18	-0.27	0.17	-0.05	0.17	-0.28	0.34	0.42	0.27	-0.17	0.21	-0.32	0.18
Grammar	0.55 ***	0.05	0.70 ***	0.18	0.74 ***	0.17	0.53 *	0.27	0.22	0.56	0.57 *	0.28	0.87 **	0.31	0.39	0.23
Church	0.08 ***	0.02	0.09	0.08	-0.11	0.11	0.12	0.17	0.08	0.12	-0.03	0.08	0.32 ***	0.09	0.28 **	0.10
Foundation	0.02	0.02	0.22 **	0.08	0.19 **	0.07	0.12	0.10	0.01	0.15	-0.08	0.10	-0.19	0.13	0.15	0.10

Notes: Coefficients for missing values are not shown. * p<.05; ** p<.01; *** p<.001.

Pupil risk factors: SEN was a very large and highly statistically significant factor for all groups, although somewhat less pronounced for Black African. The same was true for truancy, although not for Indian pupils, again maybe because of the very low level of truancy among this group. Long term absence from school of more than a month was a consistent risk factor. Exclusion from school was also a large and consistent risk factor across all groups. Involvement with social services or police was also negative except for Asian groups, but again was very infrequently reported for these groups.

Positive pupil factors: Pupil's aspiration to continue in full-time education (FTE) after age 16 was a strong factor related to high attainment for all groups, as was self-organisation, planning for the future, the amount of homework completed and academic self concept. Attitude to school was only weakly related to attainment but had a consistently positive association across all groups.

School factors: There was a small negative association of being in a school with a high proportion of pupils entitled to FSM, even though both pupil and neighbourhood deprivation factors are also taken into account in the model. This effect was particularly notable for Black Caribbean pupils but was not marked for Pakistani, Bangladeshi and Black African pupils. These groups did not appear to perform much less well in very economically disadvantaged schools, mirroring the results reported above in relation to the resilience of these groups to SES disadvantage. There was a positive boost to attainment from being in a grammar school for all groups. Church schools had a positive association with attainment, although this was most marked and significant for Black African and Any Other groups.

Summary

These results need to be analysed in greater detail, which will be done in subsequent work. For now it is sufficient to note that, with only one or two exceptions, the above factors appear to operate in a consistent manner and direction for all ethnic groups. We can therefore move to complete a full contextual analysis where all the above factors are considered jointly in an attempt to contextualise the ethnic attainment gaps.

Full contextual analysis of attainment

This model parallels the analysis in Table 24, p53-54 of the original report. However, it differs in that the outcome is KS4 attainment and that it models interactions of ethnicity with gender and SES variables that were not present at KS3.

As in the original report, including the family, pupil and school variables significantly improved the fit of the model. The proportion of variance in GCSE attainment that can be explained rises from 24% using gender and the six SES variables alone to 51% when all parental, pupil and school factors are also included (n=13,268). The results are presented in Appendix 4. The Estimated Marginal Means are shown in Table 11.

All factors, except parental involvement with school, were significantly related to attainment. However five variables had a particularly large association with attainment as indicated by the WALD F statistic (see Appendix 4). The model arising from the SES variables plus these five variables alone accounts for 43% of the variance in KS4 outcome. These five factors are:

- SEN (school action plus or statemented)
- Academic self-concept (seven item scale, see original report p40-41)
- Pupils' educational aspirations (stay in Full-time Education after age 16)
- Parents' educational aspirations for the child (stay in Full-time Education after age 16)
- Computer available in home for use by the child.

In comparing the confidence intervals by ethnic group and SEC there were five significant differences. Black African and Black Caribbean pupils from high SEC homes had significantly

lower attainment than similar White British pupils, and Bangladeshi pupils from low SEC homes had significantly higher attainment than similar White British pupils.

Special educational needs (School Action Plus or statemented) has a strong negative association with attainment. Black Caribbean pupils are over-represented in relation to SEN while the Asian groups are under-represented. However this variable plays only a small role in explaining the low attainment of Black Caribbean pupils relative to White British pupils.

Table 11: Full contextual analysis of KS4 total points score controlling for gender, six SES variables and a range of parent, pupil and school variables

Ethnic Group	SEC	Boys					Girls				
		Mean	SE	Lower 95% CI	Upper 95% CI	Sig.	Mean	SE	Lower 95% CI	Upper 95% CI	Sig.
Mixed heritage	High	0.06	0.11	-0.15	0.27		0.12	0.11	-0.09	0.34	
Indian	High	0.12	0.08	-0.03	0.27		0.34	0.08	0.19	0.50	
Pakistani	High	0.06	0.08	-0.10	0.23		0.36	0.08	0.19	0.53	
Bangladeshi	High	0.00	0.20	-0.40	0.40		0.31	0.19	-0.06	0.68	
Black Caribbean	High	-0.30	0.08	-0.46	-0.14	low	-0.18	0.08	-0.33	-0.03	low
Black African	High	-0.23	0.10	-0.43	-0.04	low	-0.07	0.10	-0.26	0.12	
Any Other	High	0.09	0.10	-0.11	0.29		0.27	0.11	0.06	0.48	
White British	High	0.10	0.05	0.00	0.19		0.17	0.05	0.07	0.28	
Mixed heritage	Medium	-0.01	0.10	-0.21	0.19		0.06	0.11	-0.15	0.27	
Indian	Medium	0.10	0.07	-0.05	0.24		0.32	0.08	0.16	0.48	
Pakistani	Medium	-0.13	0.07	-0.27	0.00		0.16	0.07	0.02	0.31	
Bangladeshi	Medium	0.00	0.10	-0.20	0.20		0.31	0.12	0.07	0.55	
Black Caribbean	Medium	-0.17	0.08	-0.32	-0.02		-0.05	0.08	-0.20	0.10	
Black African	Medium	-0.04	0.10	-0.23	0.16		0.13	0.10	-0.07	0.33	
Any Other	Medium	-0.07	0.10	-0.27	0.13		0.11	0.12	-0.12	0.33	
White British	Medium	0.00	0.05	-0.09	0.09		0.08	0.05	-0.02	0.18	
Mixed heritage	Low	0.10	0.11	-0.12	0.33		0.17	0.11	-0.05	0.39	
Indian	Low	-0.14	0.08	-0.30	0.01		0.08	0.08	-0.08	0.24	
Pakistani	Low	-0.19	0.06	-0.30	-0.07		0.11	0.07	-0.02	0.24	
Bangladeshi	Low	0.23	0.08	0.07	0.39	Hi	0.54	0.09	0.37	0.71	Hi
Black Caribbean	Low	-0.05	0.08	-0.20	0.10		0.07	0.08	-0.08	0.22	
Black African	Low	-0.19	0.10	-0.38	0.00		-0.02	0.10	-0.22	0.17	
Any Other	Low	0.00	0.10	-0.20	0.19		0.17	0.11	-0.04	0.38	
White British	Low	-0.04	0.05	-0.14	0.05		0.04	0.05	-0.06	0.14	

Notes: 'Hi' and 'Low' indicates the estimated marginal mean is significantly higher or lower than the relevant mean for White British pupils of that gender and SEC.

Where the household owned a home computer for use by the child, this had a positive association with attainment. However, again, this variable had only a small effect on ethnic gaps, making only a slight impact on the coefficients for Black Caribbean pupils, reflecting the fact that among middle and high SEC homes, Black Caribbean pupils were the ethnic group least likely to own a home computer (84% for Black Caribbean compared to 95% for White British).

The variables with the largest impact were pupils and parents' educational aspirations and academic self-concept. Pupils who aspire to continue in FTE after age 16 have significantly higher KS4 total points score than their peers who do not aspire to do so. There is also an independent and positive association between parental educational aspirations and pupil's attainment. These two factors appear to explain a substantial proportion of the ethnic gap for pupils from low SEC homes, as can be seen by comparing Table 9 with Table 11. It does not explain all the differences, since Bangladeshi pupils still achieve significantly higher KS4 points scores than would be expected, but the differences between ethnic groups largely disappear. Therefore, a large part of the low attainment of White British pupils from low SEC homes can be explained through the particularly low educational aspirations of these pupils

and parents. At the same time, including aspirations has a negative impact on the performance of Black Caribbean and Black African pupils from high SEC homes. Despite their high aspirations (relative to the White British group) these pupils do not achieve the outcomes that would be expected⁵.

High academic self-concept (ASC) is also strongly related to KS4 points score. Causal relationships between attainment and academic self concept are complex. While ASC is correlated with KS4 attainment ($r=0.41$) it is also correlated with attainment at age 11 ($r=0.40$) suggesting that high ASC may be a reflection of prior attainment as much as a cause of later attainment. However the partial correlation between ASC and KS4 performance remains statistically significant when the correlation with KS2 is partialled out (partial $r=0.23$, $p<.001$)⁶. Thus a measure of ASC explains some part of the variance in KS4 attainment over and above that accounted for by earlier attainment. If high SEC households encourage high ASC, then this may mediate the impact on KS4 attainment. In relation to ethnic group differences in attainment, White British pupils had the lowest ASC and the Asian groups the highest, with Black Caribbean in between the two. The low attainment of White British pupils from low SEC homes seems to be partly explained by their low ASC. However, as with educational aspirations, despite the high ASC of Black Caribbean pupils (relative to White British) Black Caribbean pupils from high SEC homes did not achieve the exam success that would be expected of their ASC. This was also seen for Black African pupils from high SEC homes⁷.

Summary

Adding more proximal parent and pupil variables substantially improved the explanatory power of the model, and increased the proportion of variance in KS4 points score explained from 24% to over 50%. Adding these factors reduced the size of the SEC effect, from 0.34 to 0.14 for high SEC homes and from 0.14 to 0.04 for medium SEC homes (see Appendix 3 and 4). This suggests that these are important factors through which the effect of SEC is mediated.

The factors with the biggest impact on ethnic gaps were parental and pupil educational aspirations and pupils academic self-concept. In relation to the attainment of ethnic groups the main conclusions are:

- The attainment of White British pupils from low SEC homes reflects low pupil and parental aspirations and low ASC. These factors could explain the significantly higher attainment of Indian, Pakistani, Bangladeshi and Black African groups among low SEC homes, although the Bangladeshi results.
- Black Caribbean and Black African pupils from high SEC homes had high aspirations and high ASC similar to their White British peers, but their attainment did not reflect this. Pupils from these two ethnic groups in high SEC homes underachieved in relation to White British pupils.

In some ways, therefore, we return to our conclusions from the initial results presented in Figure 3 and discussed earlier. The groups of primary concern in terms of low attainment are

⁵. This is expressed in a three-way interaction between ethnic group, family SEC of the home and educational aspirations. This is not presented here because the impact, in terms of differential outcomes, is adequately revealed in Table 11.

⁶. This remains true even if both KS2 attainment and SEC of the home are partialled out ($r=0.23$, $p<.001$).

⁷. This is revealed in another three way interaction this time between ethnic group, family SEC and academic self concept. Again this not shown in Appendix 4 because the impact is clearly revealed in Table 11.

White British working class pupils and Black Caribbean pupils particularly from middle and high SEC homes. Hopefully though we now have better understanding of some of the factors that underlie these differences.

Section 3: Pupil progress during secondary school

The above models have sought to interpret the attainment of minority ethnic pupils by drawing on a wide range of contextual variables. However there is one very powerful variable that has not so far been included and that is prior attainment. This has not been included so far because it changes the nature of the phenomenon that is to be explained. The models explored so far seek to explain differences in *educational attainment* through reference to other variables. By adding prior attainment the model is no longer exploring how these other variables impact on attainment, rather it is indicating how the variables impact on *educational progress* over the course of secondary school. This section will include the results of national KS2 tests completed by the pupils at age 11 in order to look at educational progress between age 11 and age 16.

KS2 results by ethnic group

Table 12 presents the results of the national end of KS2 tests completed at the age of 11. The results reveal significantly lower attainment for Pakistani, Bangladeshi, Black Caribbean and Black African groups relative to White British pupils at the end of primary school. The Pakistani mean KS2 score was almost half a SD below the White British mean, the Black Caribbean and Bangladeshi means were nearly one-third of a SD lower and the Black African mean was one-quarter of a SD below the White British mean.

Table 12: KS2 results for the LSYPE sample by ethnic group

Ethnic group	KS2 % Level 4 or above			KS2 test marks (normalised)	
	English	maths	science	Mean	SD
White British	75.2	71.5	88.6	0.06	0.99
Mixed heritage	74.8	68.2	87.1	0.03	1.02
Indian	77.3	72.9	83.9	0.03	1.00
Pakistani	63.1	55.7	71.6	-0.45	0.96
Bangladeshi	65.7	59.6	76.4	-0.30	1.03
Black Caribbean	67.2	54.5	80.2	-0.33	0.95
Black African	68.2	59.2	79.7	-0.25	1.04
Any Other group	69.9	66.4	82.4	0.00	1.12
Total	75.0	70.0	88.0	0.04	1.00

'Pure' progress by ethnic group

Prior attainment is a very powerful predictor of later attainment (the correlation between KS2 test marks and KS4 total points score is 0.69), indicating that KS2 test marks can explain 50% of the variance in KS4 total points score. Table 13 presents the results of the modelling of pupil progress over secondary school.

The first column (model 1) enters ethnic group and KS2 test marks to look at a 'pure' measure of ethnic differences in pupil progress. In relation to ethnic group it is apparent that pupils from most minority ethnic groups make substantially more progress than White British pupils. The main findings are:

- Indian pupils do not differ significantly from White British at KS2, but have pulled substantially ahead by KS4.
- Black African and Bangladeshi pupils were well behind at KS2 but have caught up by KS4.
- Pakistani pupils were well behind at KS2 but have made greater progress during secondary school and almost closed the gap by the end of KS4.

The exception among minority ethnic groups are Mixed heritage and Black Caribbean pupils who make on average the same progress as White British pupils. The findings for these two groups are:

- Pupils of mixed heritage had similar attainment at KS2 to White British pupils and make similar progress, so they remain on a par with White British at KS4.
- Black Caribbean pupils started well behind White British pupils at KS2 and make the same progress over secondary school. As a consequence the Black Caribbean gap relative to White British pupils neither widens nor lessens and Black Caribbean remain substantially behind at KS4.

Table 13: Progress age 11 to age 16 by ethnic group, gender and family socio-economic classification (SEC)

Variable	Value	Model 1			Model 2			Model 3		
		B	SE		B	SE		B	SE	
Intercept	Intercept	-.10	0.01		.51	.031		-.341	.019	
Ethnic group (Base=White British)	Mixed heritage	.00	0.03		.01	.032		.029	.076	
	Indian	.40	0.03	***	.44	.030	***	.443	.041	***
	Pakistani	.27	0.03	***	.34	.028	***	.279	.047	***
	Bangladeshi	.28	0.04	***	.40	.039	***	.311	.049	***
	Black Caribbean	.02	0.03		.02	.027		.108	.063	
	Black African	.29	0.04	***	.32	.041	***	.400	.075	***
	Any other ethnic group	.32	0.04	***	.36	.037	***	.417	.088	***
Gender	Female (vs. male)				.18	.012	***	.170	.012	***
Family social class	Higher managerial & prof.				.56	.035	***	.314	.019	***
	Lower managerial & prof.				.43	.033	***			
	Intermediate				.36	.036	***	.180	.017	***
	Small employers/own account				.38	.033	***			
	Lower supervisory & tech.				.29	.035	***	reference group		
	Semi-routine				.25	.034	***			
	Routine				.15	.034	***	reference group		
	Long term unemployed				reference group					
Ethnic by gender	Mixed heritage * girls							-.112	.064	
	Indian * girls							.011	.037	
	Pakistani * girls							.109	.040	**
	Bangladeshi * girls							.216	.054	***
	Black Caribbean * girls							.105	.051	*
	Black African * girls							-.016	.072	
	Any other group * girls							.050	.070	
Ethnic group by Family SEC	Mixed heritage * high							.030	.097	
	Mixed heritage * medium							.040	.086	
	Indian * high							-.087	.053	
	Indian * medium							-.046	.049	
	Pakistani * high							-.109	.070	
	Pakistani * medium							-.017	.047	
	Bangladeshi * high							-.423	.186	*
	Bangladeshi * medium							-.241	.063	***
	Black Caribbean * high							-.250	.063	***
	Black Caribbean * medium							-.187	.076	*
	Black African * high							-.250	.103	*
	Black African * medium							-.010	.102	
	Any Other group * high							-.244	.090	
Any other group * medium							-.114	.097		
r squared		48.9%			51.3%			51.1%		

Notes

Coefficients for missing values and interactions with missing values are not shown. N=13,062 in all models. * p<.05; ** p<.01; *** p<.001.

Pupil progress controlling for the SEC of the home

Can the ethnic group differences in pupil progress be explained by the contextual variables described in the previous section? Model 2 adds gender and the SEC of the home to the equation. Both factors are related to progress, with girls making more progress than boys and pupils from high SEC homes making more progress than those from low SEC homes. However including these variables does not appear to change the pattern of results by ethnic group.

However, mindful of the significant interaction effects found earlier, Model 3 allows the SEC of the home and gender to interact with ethnic group. Significant two-way interactions between ethnicity and gender and between ethnicity and the SEC of the home are found. While White British pupils generally make less progress than most minority ethnic groups across all SEC, the differences were most pronounced within low SEC homes. In low SEC homes Indian, Bangladeshi, Pakistani and Black African groups in particular make significantly better progress than White British pupils. Girls make more progress than boys in all ethnic groups, but Pakistani, Bangladeshi and Black Caribbean girls make even stronger progress than boys from these groups.

Pupil progress controlling for all six SES variables

The above results are not explored in further detail here because we know from the analysis of attainment reported earlier that other SES variables also play a significant role in the relationship between ethnic group, gender and the SEC of the home. All six SES variables were included in a further model including:

- Socio-economic classification (SEC) of the home
- Mother's highest educational qualification
- Family poverty (entitlement to a FSM)
- Family composition (single parent households)
- Rented accommodation
- Neighbourhood disadvantage (IDACI)

The model indicated that each of these six SES variables had a unique association with pupil progress. This increased the R square from 51% with SEC alone to 54% including all six SES variables. There were again significant interactions between ethnicity and gender, the SEC of the home, maternal education and owner occupation. Appendix 5 presents the results. Again to aid interpretation the Estimated Marginal Means (EMM) are presented graphically in Figure 6 for each ethnic group, gender and SEC combination. It should be noted that these effects are net of the effect of the other five SES variables in the model.

Main effects

FSM had a small negative association with progress, -0.09 SD, even after controlling for all other factors. Being in a two parent family (as opposed to a single parent family) had a positive association with progress (0.15 SD). Neighbourhood deprivation had a significant negative association with attainment, with a difference of -0.10 SD between neighbourhood one SD above and one SD below the average deprivation.

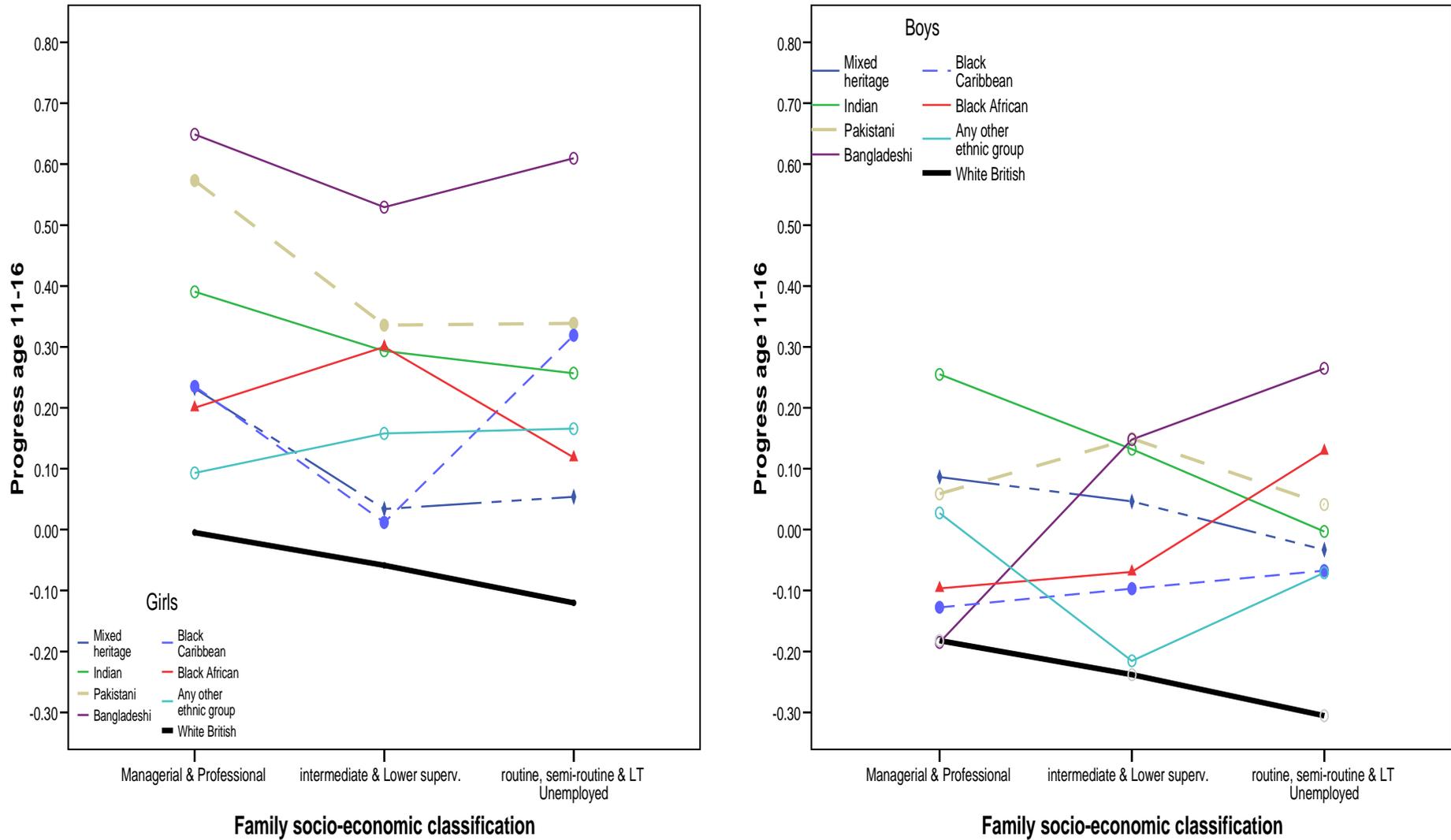
Interaction effects

Ethnic group by gender: Among White British pupils girls made more progress than boys by 0.19 SD. However, for Pakistani, Bangladeshi and Black Caribbean groups the sex difference in favour of girls was significantly larger. For these groups girls made even more progress than boys, relative to the gender difference for White British pupils.

Ethnic group by maternal education: For White British, Pakistani and Bangladeshi pupils there was a strong gradient related to mother's educational qualifications. Compared to pupils whose mothers had none or low educational qualifications, pupils with a mother with GCSE/AS qualifications or with HE qualifications made significantly better progress (0.06 and 0.16 SD respectively). However, mother's education had less impact on Black African and Black Caribbean pupils, and was not statistically significant for pupils from Indian, mixed heritage and any other ethnic groups. Having a mother with no or low educational qualifications had little impact for these ethnic groups.

Ethnic group by owner occupation: White British pupils living in rented accommodation made less progress (-0.17 SD) than pupils in owner occupied accommodation. A similar pattern held for Black Caribbean and Mixed heritage groups, but for Indian, Pakistan, Bangladeshi and Black African pupils living in rented accommodation was not significantly related to poorer progress.

Figure 6: Pupil progress age 11-16 by ethnic group, gender and the SEC of the home controlling for mothers education, entitlement to FSM, single parent families, owner occupation and neighbourhood deprivation.



Ethnic group by SEC of the home: There was a significant social class gradient for White British, Indian, Pakistani and mixed heritage pupils, with pupils from low SEC homes making less progress than their peers from the medium and high SEC homes. However, there were significant interactions with SEC for Bangladeshi, Black Caribbean and Black African pupils. Low SEC pupils from these groups actually made more progress than high SEC pupils. The effect seems particularly pronounced for Bangladeshi boys, but the sample size for this group is extremely small (n=5) so should not be given excessive weight. Overall, White British pupils from low SEC families made the least progress.

Summary

For all levels of SEC, and for both genders, White British pupils made the least progress over the course of secondary school. These differences in progress reflect the fact that overall White British pupils started secondary school well ahead of their minority ethnic peers as indicated by KS2 test results, but fall behind. However poor progress is most pronounced for White British boys and girls from low SEC homes, and ethnic group differences in middle and high SEC homes are far less pronounced.

After control for all six SES variables, the groups with the poorest progress (EMM <-0.1) are:

- White British boys, but particularly those from low SEC homes;
- White British girls from low SEC homes;
- Black Caribbean and Black African boys from medium and high SEC homes, and Bangladeshi boys from high SEC homes.

Proximal influences on attainment gaps - a Contextual Value Added (CVA) model

We saw earlier that a range of parent and pupil variables, and in particular educational aspirations and academic self-concept, could account for a large part of the group differences in educational attainment. To what extent can these factors also account for differences in pupil progress? The same set of variables were included in a further model of pupil progress. The amount of variance explained rises from 51% when including SES variables alone to 62% when also adding the parent, pupil and school variables. The full results of the model are presented in Appendix 6.

All factors had statistically significant associations with pupil progress, except the three school variables (%FSM, selective status and school type) and entitlement to FSM (after accounting for the other SES variables like IDACI, rented accommodation and mother's education). These factors effectively accounted for the overall SEC differences in educational progress (although within some ethnic groups SES effects remained, and will be discussed further below). Eight factors had a particularly high association with progress (indicated by a high WALD F statistic in Appendix 6). These variables in order of the size of their impact were:

Homework: There was a significant boost to progress for pupils who reported they completed homework on three (0.10), four (0.14) or five (0.15) evenings a week, relative to those who reported they never completed homework.

Academic Self-Concept (ASC): Relative to those pupils with very low ASC when assessed in Y9, there was a significant positive association with progress for low (0.07), high (0.18) and very high (0.30) ASC.

Long term absence from school: pupils with an absence or more than a month in the last year (at the time the data was collected in Y9) made significantly less progress (-0.22) than those who were not absent.

Gender: girls made significantly more progress than boys (0.06).

Home computer: Where the household owned a home computer for use by the child this had a positive association with attainment (0.16).

Pupils' educational aspirations: Pupils who reported in Y9 that they aspired to continue in FTE after age 16 made significantly more progress (0.07) than those who did not express this aspiration.

Parental monitoring: Pupils whose parents reported they always knew where their child was when s/he was out made significantly more progress (0.10) than those whose parents did not.

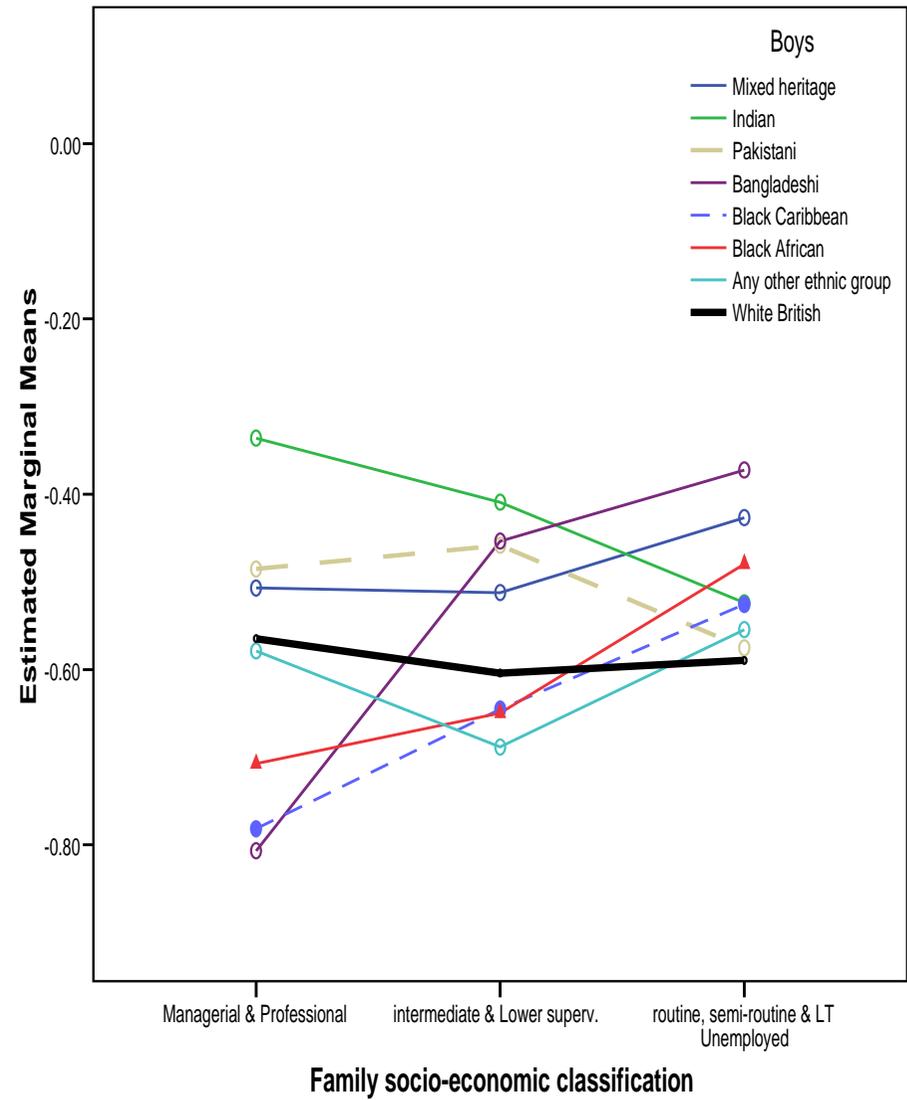
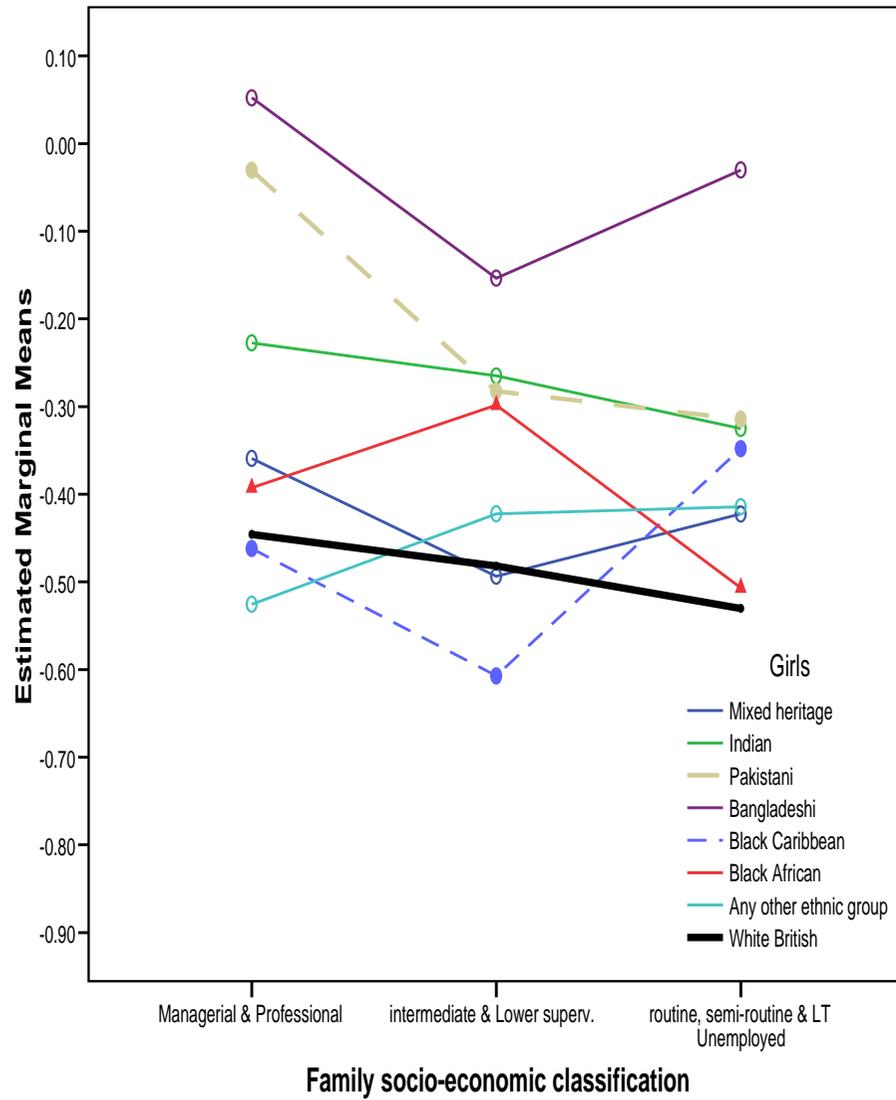
Involvement of Social Services or Education Welfare Service: Those pupils where the Social Services or Education Welfare Service (EWS) were involved with the family made significantly less progress (-0.17) than those in families without service involvement.

Of these eight variables, the two with by far the largest impact were homework and ASC, as these two variables alone explained more than half of the increase in R square relative to the SES only model.

Figure 7 presents the EMM from the model, separately for each ethnic group, gender and SEC combination. The main focus here is on how the results have changed relative to the results presented in Figure 6, that is to what extent the additional parent, pupil and school factors have accounted for the SES effects on progress. While some of the EMM appear to indicate very large differences it should be remembered they are sometimes based on relatively small cell sizes. The statistical significance of the differences, as indicated in Appendix 6, are therefore important in interpreting the results.

There is now no significant difference in the progress made by White British boys and boys from the other main ethnic groups in low SEC homes (although mixed heritage and any other group boys make slightly greater progress). A similar pattern is observed for girls from low SEC homes, where the ethnic differences have shrunk considerably, although Indian, Pakistani, Bangladeshi and Black Caribbean girls still make significantly more progress. Since homework and ASC were by far the most important variables these are likely to account for the findings. White British pupils were one of the two ethnic groups who reported doing the least amount of homework and the ethnic group with the lowest academic self concept and the lowest educational aspirations, and these factors are key in interpreting the poor progress of White British working class pupils.

Figure 7: KS4 total points score: Full Contextual Value Added (CVA) model



However, it is apparent that after including aspirations and homework, there are now ethnic groups who make less progress than White British among middle and high SEC homes. In particular Appendix 6 indicates that Black Caribbean and Black African boys in high SEC homes made significantly less than expected progress. Despite high academic self-concept and high educational aspirations (relative to the White British group) and completing at least the same amount of homework (in the case of Black Caribbean) and significantly more homework (in the case of Black African) these boys do not achieve the outcomes that would be expected.

Summary

The variables with by far the biggest impact on progress were homework and ASC. High academic self-concept, high effort (as indicated by amount of homework) and high educational aspirations play a large part in the differential performance among pupils from low SEC homes, explaining the better progress of ethnic minority pupils in this SEC group.

These factors could statistically explain the poor progress of White British pupils from low SEC homes. However the same factors revealed that Black Caribbean, Black African and Bangladeshi boys from high SES homes made less than expected progress. These pupils completed the same or greater amounts of homework as their White British peers and had academic self concept and high educational aspirations but their progress did not reflect this.

Discussion

Group differences in examination attainment at KS4

What emerges from this analysis is a complicated picture of attainment differentiated by ethnic group, gender, socio-economic circumstances and the interactions between these factors. Most research on ethnic groups differences in educational attainment has treated socio-economic factors as control variables in simple additive models. This assumes, for example, that the 'effect' of gender or the 'effect' of the SEC of the home is consistent across all ethnic groups. While some research suggests simple additive models are sufficient to model the relationship of attainment with ethnicity, gender and social class (e.g. Connolly, 2006) other research suggests significant interactions between these factors (e.g., Strand, 1997, 1999; Melhuish et al, 2006). The current analysis reports significant interactions between ethnic group, gender and social class in attainment at the end of KS4. In this context it makes no sense to talk of main effects of ethnicity when the effect depends on the level of other factors, such as gender or the SEC of the home. A more constructive approach may be to consider combinations of factors as defining groups whose educational progress and attainment is of particular concern (Strand, 1999, p190).

Perhaps the most striking feature to emerge from this analysis is that the attainment of White British pupils is differentiated to a greater extent than any other ethnic group by factors related to SES. Whether the factor is low SEC homes, mothers with low educational qualifications, relative poverty (entitled to FSM), living in single parent households, living in rented housing or neighbourhood deprivation, White British pupils are the lowest attaining ethnic group. These factors impact negatively on attainment within all ethnic groups, but seem to be associated with disproportionately low attainment among White British pupils. At the same time, at the other pole of these dimensions, White British pupils are among the highest attaining ethnic groups. In sum, White British are the most highly polarised ethnic group in terms of attainment. There is therefore a need to move from a monolithic conception of White British as an homogeneous group to explicitly recognise this high degree of polarisation around SES for White British pupils. The finding that White British pupils are consistently the lowest achieving whatever the SES dimension indicates this phenomena is wider than a narrow definition of parental occupational class. Nevertheless the pattern is seen clearly in the data on the SEC of the home and the shorthand White British 'working class' can serve as a label to unite these findings. One of the main groups of concern in relation to low examination attainment at age 16 is therefore White British 'working class' pupils, both boys and girls.

However, these are not the only group of concern. Black Caribbean boys from low SEC homes do not fare much better than similar White British boys. Gender differences are particularly pronounced within the Black Caribbean group, and Black Caribbean girls perform significantly better than Black Caribbean boys. However there is marked under-achievement for both Black Caribbean boys and girls from high SEC homes. This is apparent both when controlling just for gender and the SEC of the home and in the full contextual analysis. Black Caribbean pupils, both boys and girls, are the lowest achieving ethnic group from high SEC homes.

In contrast, Indian, Pakistani, Bangladeshi and Black African groups all make significantly more progress than either White British or Black Caribbean pupils, particularly after control for socio-economic factors and do so across all SEC groups, although particularly in low SEC homes. As a consequence Indian pupils pull even further ahead of their White British peers, and Pakistani, Bangladeshi and Black African pupils catch up with their White British peers, so that their attainment at the end of KS4 is significantly higher than (in the case of Indian pupils) or no different from (in the case of Black African, Pakistani and Bangladeshi pupils) their White British peers.

Changes between KS3 and KS4

A key question is why such large changes in academic attainment occur between the end of KS3 and the end of KS4. At KS3, Pakistani, Bangladeshi, Black African and Black Caribbean pupils all substantially underperformed relative to White British pupils. At the end of KS4 most minority ethnic groups (except Black Caribbean) have caught up with or exceed the performance of White British pupils. One speculation is that minority groups have a higher rate of taking GNVQs than White British pupils. While 21% of White British students take one or more GNVQs, the corresponding figure for Indian pupils was 26%, Pakistani pupils 30%, Bangladeshi 32%, Black African 24% and Black Caribbean 25% (Kingdon & Cassen, 2007). Kingdon & Cassen also show that the likelihood of low attainment is higher for GCSE only takers than for GNVQ takers, suggesting that it could be easier to get good grades in GNVQs than in GCSE examinations. However this explanation is not supported by the current finding that the advantage of minority ethnic groups is replicated when using just the KS4 points score for the three core subjects of English, mathematics and science which excludes GNVQs. Another explanation for ethnic minority advantage could be that they take easier subjects than White British pupils, but again this is not supported by the results for the KS4 core points score. A further difference between KS3 and KS4 assessment is the nature of the examination at GCSE, which includes an element of coursework and assessment over a longer time period. Most minority ethnic groups report doing more homework and may also get more support from home with their studies. This may relate to the findings on pupil and parental aspirations, academic self-concept and homework which are discussed further below.

Accounting for differential progress and attainment

Ethnicity appears to be an important variable moderating the relationship between the SEC of the home and educational attainment. This raises the question of what factors account for the greater resilience to economic disadvantage among many minority ethnic groups in terms of their attainment, compared to their similarly disadvantaged White British peers.

One candidate is in accounting for the greater progress of Indian, Pakistani, Bangladeshi and Black African pupils is the language factor. It is difficult to disentangle language from other characteristics of ethnic groups since having English as an Additional Language (EAL) is so highly correlated with ethnicity. However the results suggest that while first language other than English is a strong disadvantage at an earlier age it may not be such a key factor by age 16. At age 11 having EAL was associated with a -0.50 SD difference relative to English as the first or main language, but by age 16 this reduced to -0.17 SD. While EAL had a modest association with greater progress it had no significant association with attainment at age 16, when all factors were included in the full contextual model⁸. It is likely that speaking English as a first or main language accounts for some of the difference *within* minority ethnic groups, but relatively little of the difference *between* ethnic groups.

Other factors seem more powerful as they can explain both the high attainment of most minority groups and the low attainment of White British pupils. Key among these is educational aspirations. Several authors have emphasised the importance of aspirational cultures, particularly among Asian groups (Caplan et al, 1991; Modood, 2003). Recent research (Strand & Winston, in press) has further pointed to the importance of educational aspirations in the home as a key influence. The 'immigrant paradigm' suggests that immigrants devote themselves more to education than the native population because they lack financial capital and see education as a way out of poverty. This research shows the significant impact that parental and pupil aspirations have on attainment at KS4, and this

⁸ . EAL has not been included in the models reported here because of this non-significant effect.

(along with academic self-concept and homework) could statistically account for the higher attainment of most Asian groups from low SEC homes in particular.

This would still have to explain why there was such big change in attainment in the two years between KS3 and KS4. This could reflect the different stakes of KS3 tests and age 16 examinations. In contrast to KS3 tests, examinations at age 16 are 'high stakes' as they have a direct impact on students' employment prospects and/or entry to further/higher education. This may focus attention and enhance family and community support for minority pupils who are more aspirational and seeking to continue in full-time education, enter university and get on in the professions.

Strand & Winston (in press) in a study of inner city English secondary schools suggest that the dominant White British working class attitude in the area they studied, while not necessarily negative to schooling, tended to see education as less significant in achieving their vocational career goals. This contrasted with the career aspirations of many ethnic minority pupils which tended more towards the professions and consequently their educational aspirations were higher. They also suggest this as a reason why the White British boys in their focus groups aspired only to typically working class jobs, whilst those Black African and Asian pupils whose families were more recent arrivals to the country demonstrated high levels of both educational and career aspiration. A study by McLeod (1995) of two gangs of adolescent boys, one White, the other Black, both from the same deprived, inner city neighbourhood in the US, suggests a possible reason for the lower aspirations of disadvantaged White US communities. The white teenagers showed the lowest aspirations and all came from families who had lived longest in the neighbourhood. McLeod emphasises this as particularly significant when analyzing their attitudes, which he sees as demonstrative of immobility and stagnation. When interviewing these boys and their parents, he found none of the language of hope that he found in the families of the black teenagers. Parents of the white boys were reticent in fostering high aspirations for their children; they saw them as unrealistic and did not want their children to experience disappointment, frustration and feelings of failure. By contrast, the parents of the black teenagers, all of whom were relatively recent arrivals in the neighbourhood, encouraged them to aspire to middle class values and norms. Thus McLeod (1995) suggests that those groups who have been located for longest within an area of social deprivation may feel more reluctant to embrace the educational aspirations that promise an escape from it. Evans (2006) has described vividly white working class culture in inner London, and also emphasises the gap between the culture and values of working class homes and the school.

How does this analysis relate to the findings for Black Caribbean pupils? Ogbu's (1978) concept of 'voluntary' and 'involuntary' minorities may be relevant, and is similar to McLeod's analysis described above. Ogbu makes a distinction between 'voluntary minorities' (such as immigrant groups who may be recent arrivals to the country and have very high aspirations) and 'involuntary' or 'caste like' minorities (such as African Americans) who have different orientations (Ogbu, 1978). From such a standpoint Black Caribbean families would also be seen to constitute an involuntary minority. However this explanation is not without problems. Fewer Black Caribbean parents and pupils had high aspirations than in the Asian groups, but they were more likely to report high educational aspirations than White British pupils and parents. However they do not (except in low SEC homes) have higher attainment than White British pupils. A key issue is why the high aspirations of Black Caribbean pupils from high SEC homes are not translated into high academic attainment.

In the above discussion, and in much of the literature, educational aspirations are seen as a causal factor that drives or motivates young people to strive for academic success. However we should recognise that high levels of intending to continue in FTE among some minority groups may actually reflect students' knowledge of the greater risk of unemployment for young members of minority ethnic groups relative to Whites if they enter the labour market at

16, together with the fear of racial discrimination in the workplace (Payne, 2003). White British students may have lower 'educational aspirations' because they do not face these barriers. Using Mickelson's (1990) distinction between abstract aspirations and concrete attitudes, Black Caribbean pupils may evidence high aspirations in the form of general ideological beliefs about the value of education (e.g., "education is the key to success in the future"). However their concrete attitudes, derived from their experience of unequal returns to education for their family or community (e.g. "people in my family haven't been treated fairly at work no matter how much education they have"), may be lower than their White peers, and according to Mickelson it is these attitudes that most strongly inform achievement behaviour and school grades (Mickelson, 1990). This chimes with Strand & Winston (in press) who suggest that low educational aspirations may have different mediating influences in different ethnic groups. The low aspirations of White British pupils seemed to relate most strongly to poor academic self-concept and low educational aspirations in the home, while for Black Caribbean pupils disaffection, negative peers and low commitment to schooling appeared more relevant.

These perspectives are important to challenge an uncritical interpretation of aspirations as evidence of psychological dispositions to achieve, or of a simple causal relationship between aspirations and subsequent attainment. Nevertheless, the balance of evidence suggests a model of 'pragmatic rationality' taking a middle position that recognises the role of structural constraints on attainment but also the young persons own attitudes, predispositions and aspirations (Payne, 2003).

School influences

A number of authors have suggested that Black Caribbean gaps relative to white British pupils might arise from Caribbean pupils being over-represented within less effective or lower quality schools (e.g. Drew & Gray, 1991). Certainly if Black Caribbean pupils from high SEC homes attend schools of lower quality than White British pupils from high SEC homes, this could be a relevant factor. Recent research using econometric methods in the UK is inconclusive. For example while Kingdon and Cassen (2007) suggest that minority ethnic pupils on average attend significantly worse quality schools than White British pupils, Burgess and Briggs (2006) conclude exactly the opposite, that minority pupils attended better quality schools. A more refined question, in the school effectiveness tradition, is whether the size of the difference in progress between different groups varies across schools. Previous research on differential school effects in relation to ethnic minority pupils have suggested that such effects are not often found (e.g., Strand, 1999; Wilson et al, 2005). While the particular school a pupil attends had a significant association with pupil progress, there was little evidence of differential school effectiveness by ethnicity, gender or poverty, i.e. the same schools that are more effective for White British, girls or economically advantaged pupils were also most effective for Black Caribbean, boys or economically disadvantaged pupils. The LSYPE dataset, because of the sampling method employed, is not best suited to such an analysis. LSYPE suggests that over 30% of the variance in unadjusted KS3 test scores is at school level whereas whole school population data suggests a figure closer to 10%. A high proportion of the variance is at school level because the size of the sample from each school (average $n=25$) is small relative to the size of the relevant year group in each school. While this is strength in terms of the representativeness of the LSYPE sample as a whole, it is problematic in drawing firm conclusion around school effects. However further research, using approaches such as those adopted in the The Effective Pre-School and Primary Education (EPPE) 3-11 Project (Sammons et. al., 2006) are warranted.

The above findings on differential school effectiveness do not deny the possibility that processes occurring within schools and classroom may contribute to the low attainment of some social and ethnic groups, but implies that such processes would need to be operating consistently across schools. The impact of factors such as teacher expectations, described in the original report (Strand, 2007), need to be further investigated and acted upon.

This research has highlighted some key proximal factors that substantially impact on the size of ethnic, social class and gender gaps in educational attainment and progress. Chief among these are pupils and parents educational aspirations, pupils academic self-concept and frequency of completing homework. This does not indicate any 'quick fix' to long standing issues of low attainment. However it does indicate areas where intervention programmes can focus, earlier in students school careers, to have the best chance of impacting on GCSE attainment at age 16.

References

- Burgess, S. & Briggs, A. (2006). *School assignment, school choice and social mobility*. CMPO working paper 157. Bristol: CMPO, University of Bristol.
- Bynner, J., & Joshi, H. (2002). Equality and opportunity in education: Evidence from the 1958 and 1970 birth cohort studies. *Oxford Review of Education*, 28, (4), 405-425.
- Caplan, C., Choy, M., & Whitmore, J. (1991). *Children of the boat people: A study of educational success*. Ann Arbor: University of Michigan Press.
- Connolly, P. (2006). The effects of social class and ethnicity on gender differences in GCSE Attainment: A secondary analysis of the youth cohort study of England and Wales 1997-2001. *BERJ*, 32, (1), 3-21.
- Coleman, J., Campbell, E., Hobson, C., McPartland, J, Mood, A., Weinfield, F & York, R. (1966). *Equality of educational opportunity*. Washington DC: US Government Printing Office.
- Demie, F., & Strand, S. (2006). English language acquisition and educational attainment at the end of secondary school. *Educational Studies*, 32, (2), 215-231.
- DfES (2007). *National Curriculum assessments, GCSE and equivalent attainment and post-16 attainment by pupil characteristics in England 2005/06 (Revised)*. SFR04/2007. London: DfES.
- Drew, D., & Gray, J. (1991). The black-white gap in examination results: A statistical critique of a decade's research. *New Community*, 17, (2), 159-172.
- Evans, G. (2006). *Educational failure and working class white children in Britain*. Basingstoke: Palgrave Macmillan.
- Feinstein, L. (1998). *Pre-school educational inequality? British children in the 1970 Cohort. Discussion paper 404*. London: Centre for Economic Performance, London School of Economics.
- Garner, R. (2007). Majority of private schools 'ditched at least one GCSE' . *The Independent*, 29th September 2007. Available from [www at: http://news.independent.co.uk/education/education_news/article3010204.ece](http://www.independent.co.uk/news/education/education_news/article3010204.ece)
- Hobb, G. & Vignoles, A. (2007). *Is free school meal status a valid proxy for socio-economic status (in school research)?* London: Centre for the Economics of Education.
- Lindsay, G., Pather, S., & Strand, S. (2006). *Special educational needs and ethnicity: Issues of over- and under-representation*. DfES Research Report 757. Nottingham: Department for Education and Skills. Available online at: <http://www.dfes.gov.uk/research/data/uploadfiles/RR757.pdf> .
- Kingdon, G., & Cassen, R. (2007). *Understanding low achievement in English schools*. Case paper 118. London: London School of Economics.
- McLeod, J. (1995) *Ain't no makin' It: Aspirations and attainment in a low income neighbourhood*. Boulder Colorado: Westview Press.
- Melhuish, E., Romaniuk, H., Sammons, P., Sylva, K., Siraj-Blatchford, I., & Taggart, B. (2006). *The effectiveness of primary schools in England in KS2 for 2002, 2003 and 2004*. London: Institute of Education.
- Modood, T. (2003). *Ethnic differentials in educational performance*. In Mason, D. (2003) (Ed). *Explaining ethnic differences: Changing patterns of disadvantage in Britain*. Bristol: Open Press.
- Mickelson, R. (1990). The attitude-achievement paradox among black adolescents. *Sociology of Education*, 63, 44-61.
- Mortimore, P., Sammons, P., Stoll, L., Lewis, D. & Ecob, R. (1988). *School matters: The junior years*. Somerset: Open Books.
- OECD (2001). *Knowledge and skills for life: First results from PISA 2000*. Paris: OECD.
- OECD (2003). *Literacy skills for the world of tomorrow: Further results from PISA 2000*. Paris: OECD.
- Ogbu, J. (1978). *Minority education and caste*. New York: Academic Press.

- Payne, J. (2003). *Choice at the end of compulsory schooling: A review of research*. RR414. London: Department for Education and Skills.
- Sammons, P., Sylva, K., Melhuish, E., Siraj-Blatchford, I., Taggart, B., Grabbe, Y & Barreau, S. (2006). *Influences on Children's attainment and progress in Key Stage 2: Cognitive Outcomes in Year 5. EPPE 3-11 Project*. London: Institute of Education.
- Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, 75, (32), 417-453.
- Strand, S. (1997). Pupil progress during Key Stage 1: A value added analysis of school effects. *British Educational Research Journal*, 23, (4), 471-487.
- Strand, S. (1999). Ethnic group, sex and economic disadvantage: Associations with pupils' educational progress from Baseline to the end of Key Stage 1. *British Educational Research Journal*, 25, (2), 179-202.
- Strand, S. (2006). The educational progress of African heritage pupils in Lambeth schools. (p24-p42). In Demie, F., McLean, C., & Lewis, K. (2006) (Eds). *The achievement of African heritage pupils: Good practice in Lambeth schools*. Lambeth: Lambeth Children and Young People's Service (ISBN 0-9545519-6-6).
- Strand, S. (2007). *Minority ethnic pupils in the Longitudinal Study of Young People in England*. DCSF Research Report RR-002. London: Department for Children, Schools and Families. Available online at: <http://www.dfes.gov.uk/research/data/uploadfiles/DCSF-RR002.pdf> (128 pages).
- Strand, S. & Winston, J. (in press). Educational aspirations in inner city schools. *Educational Studies*, 34, (4).
- White, K. (1982). The relation between socioeconomic status and academic achievement. *Psychological Bulletin*, 91, 461-481.
- Wilson, D., Burgess, S. & Briggs, A. (2005). *The dynamics of school attainment of England's ethnic minorities*. Bristol: CMPO working paper.
- Zwick, R., & Green, J. (2007). New perspectives on the correlation of SAT scores, high school grades, and socioeconomic factors. *Journal of Educational Measurement*, 44, (1), 23-45.

APPENDIX 1

Calculating average GCSE English, mathematics and science score

This measure is important for two reasons. First, it reflects the emphasis given to the core subjects, particularly English and mathematics which are seen as key measures of basic skills acquisition. Second, it is the closest analogy to the summary measures of performance at KS2 and KS3, where average point scores are calculated from performance across the national tests in English, mathematics and science.

The aggregation of English, mathematics and science GCSEs is not as straightforward as for KS2 and KS3 because of the multiplicity of pathways that may be followed in KS4. Science includes all of double award science (taken by 67% of the pupil roll), three separate science subjects (7%) or a single award GCSE science. The KS4 data file does however include a measure of the average GCSE science grade achieved in any science subject and this is used in combination with the English and mathematics grade to calculate an average points score across the three core subjects at GCSE. Pupils without a GCSE grade in any one subject are included but with a score of zero in that subject.

There is also the complication that some students may have taken non-GCSE awards in English and Mathematics that still have a tariff value. This can be inferred from the difference between the 5+A*-C (including GCSE English and Maths) and 5+A*-C (including any Level 2 or equivalent English and Maths), which for the LYPSE sample shows 46.3% passed the first hurdle and 46.9% passed the second, or an additional 96 pupils. However the available data set at KS4 does not include the specific qualifications which are identified as Level 2 English or Maths equivalents. We have two possible responses. One is award a score of 40 (equivalent to a GCSE Grade C) in any case where GCSE grade in the subject was <40 and there was a pass in a L2 functional equivalent examination. An alternative, given the small number of students affected, is to focus only on GCSE entries, which is consistent with the DCSF emphasis on GCSE passes in English and mathematics (DfES, SFR 01/2007).

It also the case that, particularly among independent schools, some pupils with extremely high total points scores do not have a GCSE pass in English or mathematics. Table A1 breakdowns the proportion of pupils entered for all three qualifications by school type. While over 95% of students are entered for a GCSE in English, mathematics and science in state funded schools (community, voluntary and foundation, CTCs and Academies) only around one-third (35%) are so entered from the Independent sector. This may be because many Independent schools take the International GCSE examinations in English, mathematics or science (IGCSE, popularly termed 'O' level examinations), which although rigorous are not recognised by the QCA⁹. National statistics are hard to obtain, since at least one of the two boards concerned would not release statistics by school type for "confidentiality reasons" (Allen, 2007, personal communication). However press reports (Garner, 2007) suggest that 90% of HMC schools offer at least one IGCSE qualification, with 52% of the schools offering mathematics, 22% offering science, and 15% offering English. One independent school with

⁹ *The International General Certificate of Secondary Education (IGCSE), is an international qualification for school students currently offered as a qualification by both Cambridge International and Edexcel International. The IGCSE is typically taken by 14 to 16-year-olds, and it prepares students for further academic work, including progression to A Level, AS Level study and the IB Diploma Programme. Cambridge and Edexcel IGCSEs are recognised by academic institutions and employers around the world. UCAS recognises IGCSE as equivalent to the UK GCSE. In both 2006 and 2007 QCA decided not to recognise the IGCSE for league table or funding purposes, although an exception was made with IGCSE maths in 2007, the results for which were included in the level 2 maths totals for that year.*

whom I have worked recently recorded 98% 5+A*-C, but only 20% 5+A*-C including English and maths, because it offered IGCE rather than GCSE English at the end of KS4.

Consequently Independent schools are not included in the analysis for the core subject indicator. It should be remembered that in any event many of these pupils (approximately 40% of all independent school pupils at KS4) would be excluded from a value added analysis since they did not complete KS2 tests at age 11.

TABLE A1: Number and proportion of pupils entered for GCSE English, maths and science by school type

			validn			Total
			1.00	2.00	3.00	
k4_stype2	1 Community	Count	254	239	9543	10036
		%	2.5%	2.4%	95.1%	100.0%
	2 Voluntary	Count	27	44	2047	2118
		%	1.3%	2.1%	96.6%	100.0%
	5 Foundation	Count	46	31	2225	2302
		%	2.0%	1.3%	96.7%	100.0%
	6 CTC	Count	0	1	76	77
		%	.0%	1.3%	98.7%	100.0%
	7 Special	Count	103	30	17	150
		%	68.7%	20.0%	11.3%	100.0%
	11 Independent	Count	331	5	183	519
		%	63.8%	1.0%	35.3%	100.0%
	14 PRU/Secure Unit	Count	12	13	33	58
		%	20.7%	22.4%	56.9%	100.0%
	18 FE	Count	12	0	7	19
		%	63.2%	.0%	36.8%	100.0%
	28 Academy	Count	3	3	118	124
		%	2.4%	2.4%	95.2%	100.0%
Total		Count	788	366	14249	15403
		%	5.1%	2.4%	92.5%	100.0%

APPENDIX 2

Ethnic group by socio-economic status at KS2, KS3 and KS4.

Ethnic Group	Social Class	Weighted mean score			Unweighted n		
		KS2	KS3	KS4	KS2	KS3	KS4
White British	1 Managerial & professional	0.47	0.52	0.40	3073	3116	3419
	2 Intermediate occupations	0.02	0.02	-0.05	2606	2631	2699
	3 Routine, semi-routine & LT unemployed	-0.33	-0.40	-0.48	2155	2173	2201
	Total	0.10	0.10	0.03	7834	7920	8319
Mixed Heritage	1 Managerial & professional	0.40	0.40	0.31	243	257	259
	2 Intermediate occupations	-0.03	0.01	-0.02	164	170	170
	3 Routine, semi-routine & LT unemployed	-0.29	-0.45	-0.41	194	198	197
	Total	0.06	0.04	0.01	601	625	626
Indian	1 Managerial & professional	0.37	0.58	0.66	197	206	213
	2 Intermediate occupations	0.09	0.24	0.36	286	295	296
	3 Routine, semi-routine & LT unemployed	-0.28	-0.26	-0.03	282	288	291
	Total	0.03	0.15	0.31	765	789	800
Pakistani	1 Managerial & professional	0.04	0.27	0.37	90	102	107
	2 Intermediate occupations	-0.44	-0.37	-0.06	234	243	241
	3 Routine, semi-routine & LT unemployed	-0.54	-0.52	-0.27	346	356	359
	Total	-0.41	-0.33	-0.07	670	701	707
Bangladeshi	1 Managerial & professional	0.44	0.50	0.10	32	34	35
	2 Intermediate occupations	-0.33	-0.39	-0.14	115	122	121
	3 Routine, semi-routine & LT unemployed	-0.41	-0.47	-0.12	311	331	333
	Total	-0.32	-0.37	-0.11	458	487	489
Black Caribbean	1 Managerial & professional	-0.13	-0.16	-0.13	161	169	171
	2 Intermediate occupations	-0.29	-0.38	-0.22	137	144	141
	3 Routine, semi-routine & LT unemployed	-0.50	-0.65	-0.42	126	141	140
	Total	-0.30	-0.38	-0.25	424	454	452
Black African	1 Managerial & professional	0.03	-0.02	0.16	115	145	152
	2 Intermediate occupations	-0.31	-0.27	-0.01	66	82	83
	3 Routine, semi-routine & LT unemployed	-0.59	-0.73	-0.34	155	229	228
	Total	-0.31	-0.41	-0.10	336	456	463
Any Other Group	1 Managerial & professional	0.55	0.66	0.77	125	150	167
	2 Intermediate occupations	-0.09	0.03	0.19	128	144	151
	3 Routine, semi-routine & LT unemployed	-0.28	-0.38	-0.12	143	169	173
	Total	0.04	0.08	0.29	396	463	491
Total	1 Managerial & Professional	0.45	0.50	0.40	4036	4179	4523
	2 Intermediate occupations	0.00	0.01	-0.03	3736	3831	3902
	3 Routine, semi-routine & LT unemployed	-0.34	-0.41	-0.43	3712	3885	3922
	Total	0.07	0.08	0.03	11484	11895	12347

Notes

KS2 score is average tests marks, KS3 score is average fine grained points score, KS4 score is average total points score. All scores are converted to Z scores with a grand mean of 0 and SD 1.

Intermediate occupations includes intermediate, small employers and own account and lower supervisory and technical.

Excludes pupils with missing information on social class.

APPENDIX 3

Multiple regression of KS4 total points score against all six SES variables

3.1 Test of model effects

Source	df1	df2	Wald F	Sig.
(Corrected Model)	107.000	489.000	31.103	.000
(Intercept)	1.000	595.000	.173	.677
ethnic3	7.000	589.000	14.479	.000
sex3	1.000	595.000	118.291	.000
famsec3	3.000	593.000	9.041	.000
hiquamum3	3.000	593.000	23.377	.000
FSM3	1.000	595.000	97.339	.000
House	2.000	594.000	28.239	.000
Singlepar	2.000	594.000	41.392	.000
IDACI_n	1.000	595.000	107.138	.000
ethnic3 * sex3	7.000	589.000	3.439	.001
ethnic3 * famsec3	21.000	575.000	4.710	.000
ethnic3 * hiquamum3	21.000	575.000	2.697	.000
ethnic3 * house	14.000	582.000	6.157	.000
ethnic3 * sex3 * famsec3	24.000	572.000	1.661	.026

3.2. Parameter estimates

Variable	Value	estimate		SE
	Intercept	-0.59	***	0.03
Ethnic group	Mixed heritage	0.32	**	0.11
	Indian	0.37	***	0.07
	Pakistani	0.19	***	0.06
	Bangladeshi	0.56	***	0.07
	Black Caribbean	0.28	*	0.11
	Black African	0.34	**	0.11
	Any Other Group	0.69	***	0.11
Gender	girl	0.20	***	0.02
Social class	high	0.35	***	0.02
	medium	0.14	***	0.02
Mother's Education	Higher Education/Degree	0.53	***	0.03
	GCSE or A/AS	0.26	***	0.02
Free School Meal	yes	-0.22	***	0.02
Rented Accommodation	yes	-0.32	***	0.02
	missing	-0.17	*	0.07
Two parent family	yes	0.16	***	0.02

Neighbourhood deprivation	IDACI (normal score)	-0.11	***	0.01
Ethnic group * gender	Mixed heritage * girl	-0.09		0.07
	Indian * girl	0.02		0.05
	Pakistani * girl	0.09		0.05
	Bangladeshi * girl	0.13	*	0.06
	Black Caribbean * girl	0.18	**	0.06
	Black African * girl	0.03		0.06
	Any Other Group * girl	0.13		0.08
Ethnic group * social class	Mixed heritage * high	-0.13		0.12
	Mixed heritage * medium	-0.08		0.10
	Indian * high	0.11		0.08
	Indian * medium	0.16	*	0.07
	Pakistani * high	-0.13		0.09
	Pakistani * medium	-0.10		0.06
	Bangladeshi * high	-0.28	*	0.13
	Bangladeshi * medium	-0.39	***	0.10
	Black Caribbean * high	-0.39	***	0.08
	Black Caribbean * medium	-0.27	**	0.09
	Black African * high	-0.37	***	0.10
	Black African * medium	-0.05		0.10
	Any Other Group * high	-0.07		0.13
	Any Other Group * medium	-0.21		0.11
Ethnic group * Mother's education	Mixed heritage * Higher Education	-0.12		0.11
	Mixed heritage * GCSE or A/AS	-0.17		0.09
	Indian * Higher Education	-0.13		0.08
	Indian * GCSE or A/AS	-0.12		0.06
	Pakistani * Higher Education	0.13		0.10
	Pakistani * GCSE or A/AS	0.02		0.07
	Bangladeshi * Higher Education	-0.15		0.30
	Bangladeshi * GCSE or A/AS	-0.05		0.18
	Black Caribbean * Higher Education	-0.32	***	0.10
	Black Caribbean * GCSE or A/AS	-0.20	*	0.08
	Black African * Higher Education	-0.17	*	0.08
	Black African * GCSE or A/AS	-0.15		0.08
	Any Other Group * Higher Education	-0.38	***	0.11
	Any Other Group * GCSE or A/AS	-0.36	***	0.10
Ethnic group * rented Accommodation	Mixed heritage * rented	0.07		0.07
	Indian * rented	0.24	**	0.07
	Pakistani * rented	0.42	***	0.06
	Bangladeshi * rented	0.19	**	0.06
	Black Caribbean * rented	0.11		0.06
	Black African * rented	0.28	***	0.08
	Any Other Group * rented	-0.03		0.09

*Notes: Outcome= KS4 total points score, R square=23%_ Coefficients for missing values and interactions with missing values are not shown. Sample size is 13,825 for all three models. * p<.05; ** p<.01; *** p<.001.*

APPENDIX 4

Multiple regression of KS4 total points score against all explanatory variables (Full contextual analysis)

4.1. Test of model effects

Source	df1	df2	Wald F	Sig.
(Corrected Model)	109.000	481.000	115.051	.000
(Intercept)	1.000	589.000	278.887	.000
ethnic group	7.000	583.000	5.488	.000
Sex	1.000	589.000	75.865	.000
Family SEC	3.000	587.000	.468	.705
Mother's education	3.000	587.000	61.340	.000
FSM	1.000	589.000	14.024	.000
Rented housing	2.000	588.000	15.392	.000
Single parent	2.000	588.000	15.571	.000
Computer	1.000	589.000	124.031	.000
Tuition	1.000	589.000	5.619	.018
Parent school involvement	2.000	588.000	5.379	.005
parental monitoring	1.000	589.000	29.583	.000
parental aspirations	1.000	589.000	166.517	.000
Family discord	3.000	587.000	28.156	.000
ethnic * sex	7.000	583.000	5.892	.000
ethnic * SEC	21.000	569.000	5.743	.000
ethnic * rented	14.000	576.000	2.585	.001
SEN	1.000	589.000	349.067	.000
Truancy	2.000	588.000	48.368	.000
Absent	2.000	588.000	35.424	.000
Service	2.000	588.000	30.915	.000
Police	2.000	588.000	21.951	.000
Exclude	2.000	588.000	78.192	.000
Pupil aspirations	1.000	589.000	213.109	.000
Planning for future	3.000	587.000	41.559	.000
Homework	6.000	584.000	34.055	.000
ASC	4.000	586.000	297.593	.000
attitude to school	4.000	586.000	4.875	.001
School %FSM	5.000	585.000	5.091	.000
Selective status	2.000	588.000	38.015	.000
school type	2.000	588.000	4.111	.017
IDACI	1.000	589.000	14.884	.000

Unweighted n=13,268, Rsquare= 50.5%

4.2. Parameter estimates

Variable	Value	Coeff.		SE
Intercept	Intercept	-0.26	***	0.06
ethnic group (Base=White British)	Mixed heritage	0.20	*	0.09
	Indian	-0.10		0.06
	Pakistani	-0.21	***	0.05
	Bangladeshi	0.13		0.07
	Black Caribbean	0.03		0.07
	Black African	-0.19	*	0.09
	Any other ethnic group	0.22	*	0.09
Gender	Girl	0.08	***	0.01
Family SEC	High	0.14	***	0.02
	Medium	0.04	*	0.02
Mother's education (base=<GCSE)	Degree or HE	0.24	***	0.02
	A/AS or GCSE A*-C	0.10	***	0.01
FSM	Entitled to FSM	-0.07	***	0.02
Home ownership	Rented vs. owned	-0.17	***	0.02
Single parent	No (base=yes)	0.07	***	0.01
Computer	No (base=yes)	-0.22	***	0.02
Private tuition	No (base=yes)	-0.04	*	0.02
parent involvement in school	1-2 activities vs none	-0.03		0.03
	3 activities vs none	0.03		0.03
Parental monitoring	does not know always where YP is when out	-0.08	***	0.01
Parental aspiration	Not continue FTE (base=continue)	-0.18	***	0.01
Parents quarrel with YP	most days vs. < once a week	-0.14	***	0.02
	> once a week vs. < once a week	-0.07	***	0.01
SEN	SAP or statemented	-0.55	***	0.03
Truancy	any time during KS3	-0.16	***	0.02
Absence	>1 month in last year	-0.23	***	0.03
Service	SS / EWS contact	-0.19	***	0.02
Police	Contacted family because of YP	-0.15	***	0.02
Exclude	in last three years	-0.27	***	0.02
YP aspirations	Not stay in FTE	-0.20	***	0.01
Planning for the future (base=high)	very low	-0.21	***	0.02
	Low	-0.16	***	0.02
	Medium	-0.05	***	0.01
Homework (base=none)	1 day	0.03		0.03
	2 days	0.07	*	0.03
	3 days	0.18	***	0.03
	4 days	0.23	***	0.03
	5 days	0.23	***	0.04
Academic self concept (base=very low)	very high	0.68	***	0.02
	High	0.41	***	0.02
	Low	0.17	***	0.02

Attitude to school (base= v low)	very high	0.04	*	0.02
	High	0.07	***	0.02
	Low	0.05	***	0.01
School %FSM (Base <5%)	35%+	-0.21	***	0.04
	21%-35%	-0.09	*	0.04
	13%-21%	-0.09	*	0.04
	9%-13%	-0.08	*	0.03
	5%- 9%	-0.06	*	0.03
Selection (base=comp.)	Modern	-0.09	*	0.04
	Grammar	0.56	***	0.07
SchType (base=community)	Church	0.08	**	0.03
	Foundation	0.04		0.03
IDACI	normal score	-0.04	***	0.01
Ethnic * Sex	Mixed heritage * girls	-0.01		0.06
	Indian * girls	0.14	**	0.04
	Pakistani * girls	0.22	***	0.04
	Bangladeshi * girls	0.23	***	0.06
	Black Caribbean * girls	0.04		0.05
	Black African * girls	0.09		0.05
	Any other group * girls	0.10		0.07
Ethnic * SEC	Mixed * high	-0.18	*	0.09
	Mixed * medium	-0.15		0.08
	Indian * high	0.13		0.07
	Indian * medium	0.20	***	0.06
	Pakistani * high	0.11		0.07
	Pakistani * medium	0.01		0.05
	Bangladeshi * high	-0.36		0.19
	Bangladeshi * medium	-0.27	**	0.09
	Black Caribbean * high	-0.39	***	0.06
	Black Caribbean * medium	-0.16	*	0.07
	Black African * high	-0.18	*	0.08
	Black African * medium	0.11		0.08
	Any other group * high	-0.04		0.10
	Any other group * medium	-0.11		0.09
Ethnic * home ownership	Mixed heritage * rented	-0.02		0.06
	Indian * rented	0.09		0.06
	Pakistani * rented	0.25	***	0.06
	Bangladeshi * rented	0.07		0.06
	Black Caribbean * rented	0.00		0.06
	Black African * rented	0.13	*	0.06
	Any Other group * rented	-0.07		0.07

Note: Coefficients for missing values and interactions with missing values are not shown. Sample size is 13,825 for all three models. * p<.05; ** p<.01; * p<.001.**

APPENDIX 5

Pupil progress against all six SES variables

Variable	Value	estimate	SE
	Intercept	-0.39 ***	0.03
Ethnic group	Mixed heritage	0.33 **	0.11
	Indian	0.38 ***	0.05
	Pakistani	0.22 ***	0.06
	Bangladeshi	0.37 ***	0.07
	Black Caribbean	0.21 *	0.09
	Black African	0.52 ***	0.13
	Any Other Group	0.57 ***	0.13
Gender	girl	0.19 ***	0.03
Social class	High	0.13 ***	0.03
	medium	0.07 **	0.02
Mother's Education	Degree or Higher Education	0.16 ***	0.02
	GCSE or A/AS	0.07 ***	0.01
Free School Meal	yes	-0.09 ***	0.02
Rented accommodation	yes	-0.17 ***	0.02
Two parent family	yes	0.15 ***	0.01
Neighbourhood deprivation	IDAC1 (normal score)	-0.05 ***	0.01
KS2 score	KS2 total marks (normal score)	0.61 ***	0.01
Ethnic group * gender	Mixed heritage * girl	-0.32 *	0.14
	Indian * girl	0.02 *	0.06
	Pakistani * girl	0.13 *	0.07
	Bangladeshi * girl	0.15 *	0.06
	Black Caribbean * girl	0.17	0.11
	Black African * girl	-0.19	0.10
	Any Other Group * girl	-0.08	0.14
Ethnic group * social class	Mixed heritage * high	-0.13	0.14
	Mixed heritage * medium	0.01	0.12
	Indian * high	0.12	0.07
	Indian * medium	0.06	0.07
	Pakistani * high	-0.15	0.10
	Pakistani * medium	0.07	0.07
	Bangladeshi * high	-0.84 ***	0.21
	Bangladeshi * medium	-0.23 **	0.09
	Black Caribbean * high	-0.19	0.10
	Black Caribbean * medium	-0.09	0.11
	Black African * high	-0.49 **	0.16
	Black African * medium	-0.13	0.16
	Any Other Group * high	-0.11	0.17
Any Other Group * medium	-0.19	0.15	

Ethnic group *	Mixed heritage * missing	-0.23	**	0.09
Mother's education	Mixed heritage * Higher Education	-0.20	**	
	Mixed heritage * GCSE or A/AS	-0.16	*	0.07
	Indian * GCSE or A/AS	-0.09	*	0.04
	Pakistani * GCSE or A/AS	0.01		0.06
	Bangladeshi * GCSE or A/AS	0.17		0.11
	Black Caribbean * GCSE or A/AS	-0.06		0.06
	Black African * GCSE or A/AS	-0.11		0.08
	Any Other Group * GCSE or A/AS	-0.23	**	0.08
Ethnic group * accommodation	Mixed heritage * rented	-0.01		0.07
	Indian * rented	0.14	*	0.06
	Pakistani * rented	0.23	***	0.06
	Bangladeshi * rented	0.15	**	0.05
	Black Caribbean * rented	0.06		0.05
	Black African * rented	0.19	*	0.08
	Any Other Group * rented	0.11		0.08
Ethnic group * gender * SEC	Mixed * girls * high	0.36	*	0.18
	Mixed * girls * medium	-0.01		0.16
	Indian * girls * high	-0.11		0.08
	Indian * girls * medium	-0.07		0.09
	Pakistani * girls * high	0.21		0.12
	Pakistani * girls * medium	-0.14		0.09
	Bangladeshi * girls * high	0.91	***	0.25
	Bangladeshi * girls * medium	-0.07		0.14
	Black Caribbean * girls * high	-0.01		0.12
	Black Caribbean * girls * medium	-0.21		0.14
	Black African * girls * high	0.41	*	0.16
	Black African * girls * medium	0.31		0.19
	Any Other Group * girls * high	0.01		0.20
Any Other Group * girls * medium	0.23		0.19	

*Notes: Outcome is KS4 total points score. Coefficients for missing values and interactions with missing values are not shown. Sample size is 13,825 for all three models. * $p < .05$; ** $p < .01$; *** $p < .001$.*

APPENDIX 6

Pupil progress against all explanatory variables: Contextual Value Added (CVA) Model.

6.1. Test of model effects

Source	df1	df2	Wald F	Sig.
(Corrected Model)	134.000	456.000	151.438	.000
(Intercept)	1.000	589.000	141.692	.000
Ethnic group	7.000	583.000	6.813	.000
Gender	1.000	589.000	85.632	.000
Family SEC	3.000	587.000	.339	.797
Mother's education	3.000	587.000	11.943	.000
FSM	1.000	589.000	3.047	.081
Rented housing	2.000	588.000	12.004	.000
Single parent	2.000	588.000	24.380	.000
Computer	1.000	589.000	75.021	.000
Private tuition	1.000	589.000	13.660	.000
Parent school involvement	2.000	588.000	5.778	.003
Parental monitoring	1.000	589.000	64.701	.000
Parental aspirations	1.000	589.000	34.748	.000
Family discord	3.000	587.000	19.930	.000
ethnic * sex	1.000	589.000	47.858	.000
ethnic * SEC	2.000	588.000	61.764	.000
ethnic * rented	2.000	588.000	34.634	.000
SEN	2.000	588.000	32.410	.000
Truancy	2.000	588.000	27.986	.000
Absent	2.000	588.000	99.134	.000
Service	1.000	589.000	66.165	.000
Police	3.000	587.000	5.526	.001
Exclude	6.000	584.000	19.101	.000
Pupil aspirations	4.000	586.000	72.525	.000
Planning for future	4.000	586.000	24.506	.000
Homework	134.000	456.000	151.438	.000
ASC	1.000	589.000	141.692	.000
attitude to school	7.000	583.000	6.813	.000
School %FSM	5.000	585.000	.529	.754
Selective status	2.000	588.000	2.344	.097
school type	2.000	588.000	2.336	.098
Ethnic * gender	7.000	583.000	8.181	.000
Ethnic * SEC	21.000	569.000	3.291	.000
Ethnic * hose	14.000	576.000	2.790	.000
Ethnic * gender * SEC	24.000	566.000	2.940	.000
IDACI	1.000	589.000	7.976	.005
k2avn	1.000	589.000	3539.865	.000

Outcome is KS4 total points score. R square= 62.4%. n=12,691.

6.2. Parameter estimates

Variable	Value	estimate		SE
	Intercept	-0.22	***	0.05
Ethnic group	Mixed heritage	0.32	**	0.10
	Indian	0.06		0.05
	Pakistani	-0.08		0.05
	Bangladeshi	0.09		0.06
	Black Caribbean	0.13		0.08
	Black African	0.17		0.11
	Any Other Group	0.28	*	0.11
Gender	girl	0.06	*	0.03
Social class	High	0.03		0.02
	medium	-0.01		0.02
Mother's Education	Higher Education	0.09	***	0.02
	GCSE or A/AS	0.03	*	0.01
Free School Meal	yes	-0.03		0.02
Rented accommodation	yes	-0.11	***	0.02
Two parent family	yes	0.09	***	0.01
Computer for child	no	-0.16	***	0.02
Private tuition	yes	-0.06	***	0.02
Parental involvement with school	high	0.00		0.03
	medium	0.05		0.03
parent monitoring	not know where child is when out	-0.10	***	0.01
Parental aspirations	not stay in FTE after age 16	-0.07	***	0.01
Family discord	quarrelling most days	-0.10	***	0.01
	more than once a week	-0.06	***	0.01
SEN	SAP or statemented	-0.14	***	0.02
truancy	any time during KS3	-0.17	***	0.02
absent	>one month in twelve	-0.22	***	0.03
EWS/SS involvement	yes	-0.17	***	0.02
Police involvement	yes	-0.15	***	0.02
exclusion	yes	-0.28	***	0.02
pupil aspiration	not stay in FTE after age 16	-0.10	***	0.01

Pupil planning for their future	very high	-0.06	**	0.02
	high	-0.06	**	0.02
	low	-0.01		0.01
Homework	1 day	0.02		0.03
	2 days	0.02		0.03
	3 days	0.10	**	0.03
	4 days	0.14	***	0.03
	5 days	0.15	***	0.03
Academic Self Concept	very high	0.30	***	0.02
	high	0.18	***	0.02
	low	0.07	***	0.02
Attitude to school	very high	0.14	***	0.02
	high	0.11	***	0.01
	low	0.09	***	0.01
School %FSM	35%+	-0.03		0.03
	21%-35%	-0.01		0.04
	13%-21%	-0.05		0.04
	9%-13%	-0.02		0.03
	5%- 9%	-0.02		0.03
Selection policy	modern	0.01		0.04
	grammar	0.12	*	0.06
School type	Church	0.04		0.03
	Foundation	0.05		0.03
Ethnic group * gender	Mixed heritage * girl	-0.30	*	0.12
	Indian * girl	0.09		0.06
	Pakistani * girl	0.22	***	0.06
	Bangladeshi * girl	0.27	***	0.06
	Black Caribbean * girl	0.04		0.10
	Black African * girl	-0.10		0.10
	Any Other Group * girl	-0.01		0.12
Ethnic group * Social class	Mixed heritage * high	-0.29	*	0.12
	Mixed heritage * medium	-0.15		0.11
	Indian * high	0.15	*	0.07
	Indian * medium	0.12		0.06
	Pakistani * high	0.02		0.09
	Pakistani * medium	0.14	*	0.06
	Bangladeshi * high	-0.78	**	0.24
	Bangladeshi * medium	-0.09		0.08
	Black Caribbean * high	-0.31	***	0.09
	Black Caribbean * medium	-0.07		0.09
	Black African * high	-0.31	*	0.12
	Black African * medium	-0.02		0.15
	Any Other Group * high	-0.09		0.15
	Any Other Group * medium	-0.14		0.12

Ethnic group * rented accommodation	Mixed heritage * rented	-0.06		0.05
	Indian * rented	0.06		0.06
	Pakistani * rented	0.15	**	0.06
	Bangladeshi * rented	0.05		0.05
	Black Caribbean * rented	-0.02		0.05
	Black African * rented	0.05		0.06
	Any Other Group * rented	0.03		0.07
Ethnic group * gender * SEC	Mixed * girls * high	0.45	**	0.16
	Mixed * girls * medium	0.15		0.14
	Indian * girls * high	-0.04		0.08
	Indian * girls * medium	0.01		0.09
	Pakistani * girls * high	0.22		0.12
	Pakistani * girls * medium	-0.08		0.09
	Bangladeshi * girls * high	0.98	***	0.28
	Bangladeshi * girls * medium	-0.17		0.15
	Black Caribbean * girls * high	0.22		0.12
	Black Caribbean * girls * medium	-0.07		0.14
	Black African * girls * high	0.42	**	0.14
	Black African * girls * medium	0.31		0.18
	Any Other Group * girls * high	0.02		0.17
	Any Other Group * girls * medium	0.27		0.18
IDACI	normal score	-0.02	**	0.01
KS2 total test marks	normal score	0.47	***	0.01

Notes

Coefficients for missing values and interactions with missing values are not shown. Sample size is 13,825 for all three models. * $p < .05$; ** $p < .01$; *** $p < .00$

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