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Ethnic segregation and educational performance at secondary school in Bradford and Leicester

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Abstract

Evidence suggests considerable variation among British ethnic groups in their performance at different stages of their educational careers. Many members of those groups are concentrated in particular parts of certain cities, and as a consequence many attend ethnically-segregated schools. Using pupil- and school-level data from the Pupil Level Annual School Census (PLASC) in England, this paper explores the relationship between performance and various student and school characteristics in Bradford (which has a large Pakistani population) and Leicester (with a large Indian population). It finds evidence of a correlation between school ethnic composition and performance in Bradford but not Leicester.

Keywords: ethnic segregation, schools, attainment levels, Bradford, Leicester

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Britain's multi-cultural policy is a subject of considerable current controversy. Its defenders promote multi-culturalism as a means of assimilating those who identify with minority ethnic communities into the country's economic and political systems whilst allowing them to retain desired aspects of their cultural identity and social institutions. Opponents – including the chair of the Commission for Racial Equality – argue for much greater integration of all cultural groups, creating, an 'integrated society, one in which people are equal under the law, where there are some common values' with a 'core of Britishness' (*The Times*, 3.4.2004, p.1). The nature of that desired 'integrated society … where people can be different' (ibid, p.3) is not entirely clear, but greater interaction among the various cultural minorities and between those groups and the majority, white, society, would seem a necessary if not sufficient condition (Amin 2002).

Some of the concerns being expressed focus on schools. These are ethnically segregated, at least to the same extent as the country's residential areas, and probably a little more (Johnston, Wilson and Burgess, 2004a; Burgess and Wilson, 2005; Burgess, Wilson and Lupton, 2005). Most white Britons attend schools containing very few students from one or more of the main ethnic groups: many non-white Britons attend schools where members of their own ethnic community form a substantial proportion of the student population (Johnston, Wilson and Burgess, 2004b). This issue was taken up by the Chair of the Commission for Racial Equality, who claimed in a September 2005 speech to the Manchester Council for Community Relations that 'Our ordinary schools .. are becoming more exclusive', at the same time as residential segregation is increasing, especially for Asians.[1] To counter this

‘sleepwalking into New Orleans-style racial segregation … [a] Britain of passively coexisting ethnic and religious communities, eyeing each other uneasily over the fences of our differences’, he suggested that measures such as ‘forcing “white” schools to take larger numbers of ethnic minorities to help to encourage integration’ might be necessary.

Part of that school segregation reflects the distribution of students of different ethnic backgrounds across the country. Many Local Education Authorities (LEAs) contain only small numbers drawn from the minority communities, so a large proportion of the country’s white students will encounter few from other ethnic backgrounds. But where members of ethnic minority groups are concentrated into particular places (mainly in London, Birmingham and some other major towns and cities), they are segregated residentially to a much greater extent than expected because of their position in the labour market alone (Peach, 1996). Through a combination of disadvantage, a desire to cluster for cultural, social and, perhaps, economic and physical security too, as well as some residual discrimination in labour and housing markets, members of various Asian and, to a lesser extent, Black communities are concentrated to a much greater extent than anticipated in certain parts of the urban fabric. There are no ghettos, with the intensity of segregation that occurs in the United States (Johnston, Poulsen and Forrest, 2003), but there is a relatively small number of substantial ethnic enclaves where one or more of the minority groups predominate alongside few whites. Schools in those cities tend to be somewhat more segregated than their surrounding residential areas, suggesting that some parents of white students are exercising their choice to send their children to schools elsewhere (Johnston, Wilson and Burgess, 2004a; Burgess, Wilson and Lupton, 2005).

In this context, one important question to be addressed is how this segregation is related relate to both the development of positive, multi-cultural attitudes and student academic performance? In this paper we investigate whether that segregation is significantly associated with student educational performance: the development of multi-cultural attitudes in different settings is not feasible with the available data sets. We report an initial exploration of the relative importance of individual- and school-level factors on educational performance in England's schools by members of different ethnic groups in two sample cities.

A key point to recognise throughout the paper is that we are investigating the existence of a correlation between school composition and student performance. Where we find such a correlation there is no presumption that this is causal – that the ethnic composition of the school influences student outcomes. The correlation could arise through selection. For example, it may be that ambitious parents send their children to schools with high percentages of white students, and that these parents also encourage and support their children in working hard at school. Thus a correlation would arise between high test scores and school ethnic composition that was not causal, but based on parental choice. Different decisions on school choice could result in the simple empirical correlation between ethnic composition and student performance either under- or overstating the role of the former. For example:

1. It might be that members of ethnic group *x* do perform better in schools with a high proportion of the student population drawn from *x*. However, if the more able members of *x* choose to attend schools with low *x* proportions whereas

the less able go to those with high proportions, the impact of school composition is likely to be substantially masked.

2. Alternatively, it might be that school composition has no impact at all on the performance of members of ethnic group *x*. If, however, schools with high proportions of *x* in their enrolment attract the more able members of *x* on average, then a spurious relationship between school ethnic composition and test performance might be observed. If, on the other hand, school composition does have an effect and the better able members of *x* attend the schools with high proportions of *x*, then the impact of school composition is likely to be over-stated.

Ethnicity and school performance

The issue of the impact of ethnic segregation in schools on educational performance has been of considerable concern in the United States: fifty years ago the landmark *Brown v Board of Education* Supreme Court decision condemned the 'separate but equal' educational systems then operated for blacks and whites. Equal educational opportunity was to replace that illegally discriminatory system and a variety of mechanisms put in place – such as bussing – to create greater racial mixture in schools than would be feasible if all students attended their local school, because of residential segregation. Whether those Court-mandated programmes have achieved their goals is an important contemporary research issue. Lee (2004) and Orfield and Lee (2004) show that desegregated schools produce better educational outcomes than segregated schools – but also that schools are becoming more segregated over time, thereby under-cutting the advantages that successful implementation of *Brown* and its

successors should have produced (see also Frankenberg, Lee and Orfield, 2003; Armor and Rossell, 2002; Thernstrom, 2002).

In the United Kingdom, despite much work on the importance of the school setting for educational development, and on differences across the main ethnic groups in their educational achievements (Modood, 2003; Office of National Statistics, 2004), very little has been done on the importance, if any, of a school's ethnic composition to its students' performance. Do students perform better in schools where members of their ethnic group are in the majority, or do they perform better when they are in a small minority in a white-dominated school? Complementing that question, do white students perform better in predominantly-white schools? A study of performance in mainly white schools in a sample of LEAs suggested that ethnic composition of a school may be an important influence on student performance (Cline et al, 2002). Performance by whites was better in such schools than was that of their contemporaries in more ethnically-mixed schools, and students from Black Caribbean, Indian and Pakistani backgrounds also performed better in predominantly white schools in their GCSE examinations (taken at age 16). Qualitative analyses of case study schools suggest that where a school has strong leadership, high expectations, effective teaching and learning strategies, an 'ethos of respect with a clear approach to racism and bad behaviour', and parental involvement, then excellent performances by minority ethnic pupils can be expected (Department for Education and Skills, 2003: see also Ofsted 2004a, 2004b).

Other work on educational performance by ethnicity has indicated considerable variation across groups. Nuttall et al (1989) and Bradley and Taylor (2004), for

example, have shown that, when other variables likely to influence performance are held constant, Afro-Caribbean students generally under-perform relative to their white peers, while those with Asian ethnicity tend to perform better than whites. Bradley and Taylor included not only individual-level variables relating to the students whose results were analysed (family structure and size, family income/wealth, parents' employment status and occupation and ethnicity) but also school-level variables (type of school according to its government, its composition by gender, its admissions policy and its resource base).

What these studies omit, however, is any direct analysis of the relationship between a school's ethnic composition and educational outcomes across the full range from predominantly white to predominantly minority schools. To address this issue we look at performance by students identified by ethnic group in two of England's large cities with substantial minority ethnic populations – Leicester and Bradford. These were selected not only because each has a large, single ethnic minority – Indians in Leicester and Pakistanis in Bradford – but also because of differences between those two groups. Leicester's Indian population includes a substantial proportion with a middle-class background, for example, whereas most of Bradford's Pakistanis (many of whose roots are in Kashmir) moved to that city in order to find employment in the textile industry.

There are clear differences between the two cities in the performance of students in their dominant minority ethnic group. Aggregate data for the GCSE examinations in 2002 in Leicester, for example, show an average point score for Indians of 40.9 (standard deviation 17.3), whereas in Bradford for Pakistanis it was 31.4 (SD 17.9):

for whites in the two cities it was 32.2 (SD 20.5) and 35.3 (SD 19.4) respectively. To what extent are these variations correlated with school ethnic composition?

Data

For this analysis we use the Pupil Level Annual School Census (PLASC), a key administrative dataset recently released by the Department for Education and Skills (DfES). PLASC covers all pupils in both primary and secondary schools in England and Wales and has approximately half a million pupils in each cohort.[2] In this analysis we focus on state maintained secondary schools, and omit independent (fee-paying) schools.[3] PLASC contains linked histories of student outcomes, plus some individual characteristics – including ethnicity – as well as a range of school characteristics. (It does not, however, allow us to identify students who moved school – e.g. between taking the KS3 tests and GCSE exams.)

As part of the national curriculum, students in England and Wales take Standardised Assessment Tests (SATs) at the ages of 7, 11, 14 and 16. These are known as Key Stage 1 (KS1) to KS4 tests respectively. KS1 and KS2 tests are taken at primary school, and KS3 and KS4 at secondary school. KS1 tests cover English and Maths, and KS2-KS3 also include Science: a broader range of subjects is examined at the end of Key Stage 4, in what are known as GCSE and GNVQ examinations. The results from these standardised tests form the outcome variables in the analyses reported here. Each student is allocated a point score, so these are continuous variables.[4] We analyse the results for the cohort who took GCSEs in 2002 and KS3 in 2000. We also

have the KS2 scores for this cohort, taken in 1997 just prior to starting secondary school.

The following individual- and school-level characteristics, available in the PLASC data set, are used as explanatory variables:

Individual level:

Gender: there are well-established gender differences in test scores. (For recent work see, inter alia, Arnot et al, 1998, Warrington, Younger and McLellan, 2003; Younger, Warrington and McLellan, 2002.)

Special educational needs: all students are classified according to whether they are categorised as having special needs and, if so, at what level of severity. For most, that level is on a scale of 1-5 (with zero indicating no special needs), although a small number are categorised on an alternative, alphabetic scale. The underlying hypothesis is that those with special educational needs will perform less well than those with none. (For full details on SEN coding, see DfES 2001.)

English as a second language: this is a simple, dichotomous variable used to explore whether those for whom English is a second language perform less well.

Free school meals entitlement: as this is based on an assessment of low family income, it is widely used in British educational studies (notably in the absence of alternative measures of family structure and occupational status) as an indicator of

home background – those qualifying for free school meals come from poorer backgrounds, and are expected to perform less well on average.

Ethnicity: this is recorded in the data set in ten categories – white, Black Caribbean, Black African, Black other, Indian, Pakistani, Bangladeshi, Chinese, other and not known,[5] across which there are known performance variations (e.g. Office of National Statistics 2004).

School level:

School gender: with a threefold division – mixed, boys, and girls. It is anticipated that single-sex, especially girls', schools will on average produce better performances than mixed schools. Of Leicester's 16 secondary schools, 14 were mixed, with one single sex school each for boys and girls; Bradford had two boys' schools, three girls' schools, and the remaining 19 were mixed. (On gender mix in schools, see Arnot et al, 1998.)

School religious denomination: most English state-funded schools are non-denominational, but some have a religious foundation; such schools may produce different performances from their non-denominational contemporaries. Bradford had four Roman Catholic and one Muslim school; Leicester had two Roman Catholic schools.

School funding: most English schools are funded by the state through the relevant LEA but a small proportion of secondary schools receive part of their funding through

foundations or other, mainly religious (and known as voluntary), bodies. In addition some special types of schools (mostly selective with regard to pupil admissions policy) are directly funded by central government (in some cases with additional sponsorship from local businesses), usually at significantly higher levels than the standard LEA-funded schools.[6] These funding variations, which are indicators of resource endowments, should be reflected in student performance levels. Eight of Bradford's schools were voluntary aided (including the four Roman Catholic Schools); both of Leicester's Roman Catholic schools were voluntary aided and the remainder were LEA-funded.

School size: English schools vary considerably in their size. Larger schools may enjoy economies of both scale and scope, and hence produce better average test performances than their smaller contemporaries.

School ethnic composition: a classification system based on recent studies of ethnic residential segregation (Poulsen, Johnston and Forrest, 2001) has recently been adapted to studies of school ethnic composition (Johnston, Wilson and Burgess, 2004a). It puts schools into one of five types (I-V) according to the schema shown in Figure 1. Three variables determine the position of a school in the classification scheme: the percentage of students who are white (the upper horizontal scale); the percentage who are members of minority ethnic groups (the lower horizontal scale); and the percentage of the latter who are members of one ethnic group (the right-hand vertical scale). The five types are:

I: White predominant school: white students comprise 80%< of the total;

II: White majority school: white students comprise 50-80% of the total;

III: White minority, ethnically mixed school: white students 30-49% of the total;

IV: Non-white predominant school : members of non-white ethnic groups 70%< of total, but no single group dominant; and

V: Exclusive non-white school: members of non-white ethnic groups 70%< of total, with members of one of those groups forming a majority of the non-white total.

The expectation is that white students achieve higher scores in schools with white majorities. No specific expectation is presented for non-white students: one argument suggests that they score higher in the predominantly-white schools; an alternative suggests that they score higher where members of their ethnic group are in a majority; a third option suggests that they score higher in mixed schools. Any such relationship would probably be the outcome of a mix of selection and causality.

Given the overall emphasis of this paper on the impact of school ethnic composition on student performance, the last of these variables is of particular interest. The distribution of students across the types is shown in Table 1, with the ethnic groups other than whites plus the largest in each city (Indians in Leicester; Pakistanis in Bradford) grouped into a residual 'other' category.[7]

Leicester's 16 secondary schools averaged 222 students taking GCSEs in 2002: Bradford's 24 averaged 217. Leicester had no schools in Types III and IV; Bradford had two in Type III and none in Type IV. In both cities, the majority of students from the largest ethnic group were in white-minority schools, with about one-fifth in each case in the white-dominated institutions (Types I and II). Whites were more

segregated in Bradford's than Leicester's schools and members of the 'other' group were relatively evenly distributed across the various types.

As the outcome variable we are studying – each individual student's score on the relevant tests – is a continuous measurement, whereas all of the explanatory variables listed above are categorical (either nominal or ordinal), we use multivariate analysis of variance (ANOVA) to establish the strength of relationships between the two. Where performance at one set of tests is to be held constant in analyses of a later set (to assess value-added), this continuous variable is included as a covariate.[8] Only the main effects are identified and presented, with no discussion of interaction effects.[9]

The results of multivariate analyses can be confounded by substantial collinearities among the explanatory variables. Prior exploration identified two situations where this was likely to occur in the present analyses. The first concerned school funding and religious denomination in Leicester: both Roman Catholic schools there were voluntary aided, producing a perfect correlation between the two variables. The funding variable was omitted from all studies of Leicester schools. Secondly, there were strong correlations between an individual student's ethnicity and whether or not he/she used English as the first language. (The R^2 values correlating the two were 0.515 for Leicester and 0.778 for Bradford.) As a consequence, the language variable was excluded from those ANOVAs reported below in which ethnicity was an explanatory variable. Apart from that, none of the R^2 values for any pair of explanatory variables exceeded 0.5 in either city (The average R^2 value, excluding the ethnicity-language correlation, was only 0.067 in each city). Collinearity is thus not a significant issue in the results discussed below.

The analysis proceeds through a series of stages. We first establish that there are significant links between school attended and educational performance, holding constant students' individual characteristics. For each city we then present descriptive data on KS3 and GCSE performance using all of the explanatory variables, and report on ANOVAs which establish the relative significance of each variable plus the model's overall goodness-of-fit. This procedure is repeated for each ethnic group in each city, inquiring whether similar relationships occur for all. Finally, we report the regression coefficients from models for each ethnic group and use these to assess the performance differences – if any – between schools with different ethnic composition, both generally (i.e. holding all other variables constant), and then for selected stereotypical individuals. Through these stages we establish the major relationships between measured school performance and the various individual- and school-level characteristics, thereby identifying the independent link with school ethnic composition.

Overall differences: individual- and school-level characteristics

There is a wide distribution of scores on all of the tests within each city. To unpack this variation into the relative importance of school and individual level variables, Table 2 reports the R^2 values (adjusted for degrees of freedom) from initial ANOVAs. Three analyses were undertaken for each:

1. Using school as the only variable – i.e. the analysis looked at differences among schools (the 16 in Leicester and 24 in Bradford), irrespective of their characteristics;

2. Using the five individual-level characteristics (listed above) as the only variables;
3. Using both individual-level characteristics and school as the variables;

The first test thus identified the extent of between-school differences, irrespective of their students' characteristics, whereas the second identified between-individual differences irrespective of school attended. The third combined individual-level characteristics with between-school differences.

The R^2 values for the first tests show that differences between students in their performance were more closely associated with school attended in Bradford than Leicester, accounting for only 12 and 15 per cent of the variation for the two tests respectively in Leicester compared to 22 and 21 per cent in Bradford. In Leicester, individual student characteristics accounted for about twice as much of the variation as did the school they attended, whereas in Bradford the two sets of variables accounted for roughly the same amount. When both individual student characteristics and school were included in the final stage, the proportion of the variation accounted for was substantially larger than when only one of the two sets was deployed. Between one-third and two-fifths of the variation in score tests could be accounted for by student characteristics plus the school they attended.

Table 2 also shows the variation across schools in the average score on each test (the score range – SR) for each analysis in which school was included as a variable. In each case, the range of average scores is less for the third test – when individual student characteristics are held constant – than for the first, when they are not. Knowing students' individual characteristics accounts for some of the variation in

their performance, therefore, but only between one-fifth and one-quarter, depending on city and test.

School matters, therefore, accounting on average for some 10 per cent of the variation in score levels at the two tests when individual student characteristics are held constant (i.e. the difference in the average R^2 value between the second and third analyses). Although individual characteristics are the more important influences on performance in the two tests, there are significant between-school variations when these are held constant. To what extent are those differences between schools related to ethnicity, both the ethnicity of the individual student and the ethnic composition of the school he/she attends?

The overall pattern of test scores

Table 3 shows substantial differences in test scores according to the student's gender, free school meal entitlement and special educational needs – with the average difference in performance between males and females much greater in both cities at GCSE than at KS3. In Leicester those whose first language is other than English outperform native speakers by a considerable margin, especially at GCSE, whereas native English-speakers perform much better on average in Bradford. This last difference is replicated in the data for ethnicity: in Leicester, Indians far outperform members of other ethnic groups, whereas in Bradford whites on average perform several points higher than Pakistanis.

There are no clear-cut differences by school size, but school gender composition is clearly linked to performance: single-sex schools outperform mixed schools, to a greater extent in Leicester than Bradford. In Leicester students attending schools with a Roman Catholic foundation perform considerably better on average than those attending all other schools. Bradford has four types of school according to their religious denomination and five according to funding: there, too, the religious schools tend to produce better-than-average performances at GCSE.

Regarding school ethnic composition average performance in Leicester is slightly better in the type V schools, where white students are in a small minority, than in the white-majority establishments (Types I and II). In Bradford, on the other hand, average performance is considerably lower in the school types with a white minority (III and V) than in those with a white majority (I and II).

ANOVA tests

Table 4 indicates the relative strength of the relationship between each explanatory variable and the outcome, holding all others constant. In addition to analyses of the test scores, further ANOVAs were conducted to assess value-added: these held constant individual performance at a previous test (either KS2 or KS3). Three such analyses were conducted: performance at KS3 holding constant KS2; at GCSE holding constant KS2 (thus evaluating change over the full secondary school career); and at GCSE holding constant KS3.

Among the individual-level characteristics, special educational needs and free school meal entitlement have the largest F-values in the analyses of both KS3 and GCSE performance (Table 4). Student gender is unrelated to performance at KS3, but is significantly linked to GCSE performance, with females outscoring males by some 4 points on average, when all other variables are held constant.[10] Ethnicity is related to performance at both tests in Bradford – Pakistani performance was lower on average – but only at GCSE in Leicester, where Indians outperformed others by an average of some 3 points. Of the school-level characteristics, school size and ethnic composition were significantly linked to performance at both tests, with students at the bigger schools performing better than average. The most significant difference was between schools according to their religious adherence. In Leicester, the Roman Catholic schools outscored all others on average, when all other variables are held constant: in Bradford, the schools without a religious foundation tended to outperform the others. School funding was only an issue in Bradford; voluntary aided schools had the poorest average performance, when all other variables were held constant.

The value-added analyses indicate the importance of prior performance as a predictor of an individual's score at both KS3 and GCSE; the goodness-of-fit figure (R^2) is more than double htat for the analysis of raw scores in every case. (With GCSE performance, this is so whether either KS2 or KS3 performance is held constant. Holding both constant – the results are not tabulated here – produces the same R^2 value, with only the KS3 score making a significant contribution.) Most of the other variables are also significantly related to value-added. At KS3, holding constant KS2 performance, those not qualifying for free school meals and categorised as having special educational needs improve more on average than their counterparts with either

or both of those categorisations; those in Roman Catholic schools improve less than those in non-denominational establishments in Leicester, as do those in smaller schools: school gender is relatively unimportant in the analyses of value-added, however. The differences between schools according to their ethnic composition are slight – although significant – in the value-added between the KS2 and KS3 tests.

Although performance at either of the prior tests is by far the most significant correlate of GCSE score, most of the individual- and school-level characteristics are also significantly linked to the outcome. The most significant when holding KS2 score constant is special educational needs: in both cities, those without such needs improved more than those who did. But when holding KS3 scores constant – and thus evaluating relative change over a two-year period of schooling – gender was the most significant variable in both cities, with girls on average improving in relative terms much more than boys. Also highly significant as a predictor of change between those two tests was student ethnicity: Pakistani performance declined between KS3 and GCSE relative to that of whites and other groups in Bradford, whereas in Leicester the performance of Indian students improved on average relative to that of whites.

School characteristics were also linked to value-added between these pairs of tests, but the levels of significance were generally relatively small. Students in smaller schools in general performed less well than those in the larger establishments, for example.

Differences among ethnic groups

The above results indicate that the dominant influences on school performance in the two cities occur at the individual rather than school level. Differences among the ethnic groups are relatively small in most of the analyses, as are differences between schools on the various indicators. In Leicester, however, Indians on average outperform whites, whereas in Bradford whites outperform Pakistanis. Although illuminating, these findings only partially address the issue whether test score outcomes for the different ethnic groups are associated with different types of school context. To address that question, we undertake separate analyses for each ethnic group in each city.

Descriptive patterns

Tables 5-6 give the mean scores for each ethnic group on each of the tests, replicating the overall means in Table 3. The individual-level differences are the same in both cities and for all three ethnic groups. At school level, the relatively good performance of all-girl schools in Bradford stands out, especially at GCSE, as too does the performance of students at schools with religious foundations. By school ethnic type, the main differences are in Bradford where both whites and Pakistanis record higher scores in white-majority schools (Types I and II), as (very largely) do those in the heterogeneous ‘Other Ethnic’ category.

ANOVA tests

These general interpretations are confirmed by multivariate ANOVAs conducted separately for each ethnic group for each test in each city; for GCSE only the value-added analyses holding constant KS2 performance were conducted, given the earlier findings.[11] In both cities, special educational needs dominated for each ethnic group at both KS3 and GCSE (Tables 7 and 8). Gender was of much greater importance at the individual-level in the prediction of GCSE than of KS3, and especially of value-added at GCSE, with KS2 performance held constant, for all three ethnic groups in both cities. Girls outperform boys very significantly in all ethnic groups in this set of exams, and improve more than boys over their KS3 results.

There are few consistent patterns among the other variables. For whites, all of the school-level variables were significantly related to KS3 performance in Bradford, and to value-added over KS2 performance, but much less so in Leicester. Most importantly, there is no evidence of substantial and significant differences in test performance between schools of different ethnic composition. Only for GCSE by the members of the main ethnic minority in each city is there strong evidence of differences in performance between those types.

School type differences

To explore this last point further, Tables 9 and 10 show the regression coefficients derived from the separate ANOVAs for each ethnic group in the two cities, for GCSE and GCSE-with-value-added. In both places, the three individual-level characteristics

are significantly related to performance and to value-added, with one exception only. Girls perform better and improve more relative to their KS2 performance than do boys. Those not qualifying for free school meals, and thus presumed to be from relatively prosperous homes, perform better than those who do: they also improve more over the secondary schooling period – save for those in 'other' ethnic groups in Bradford. Those without special educational needs perform much better than those with: indeed, in both places this is by far the most substantial regression coefficient for raw scores.

Turning to the school-level characteristics, the differences between single-sex and mixed schools are generally small and largely insignificant. In Leicester, however, the average performance at GCSE, and the average improvement between KS2 and GCSE, is much greater in boys' than in either girls' or mixed schools – with girls' schools outperforming the mixed schools. Although the relationship is not consistent, in general all students at small schools tend to perform less well than those at the largest – this is especially so with Indians in Leicester. Funding regime is a distinguishing characteristic among schools in Bradford only.

What of the role of a school's ethnic composition? In Leicester, Indian students recorded significantly higher test scores in Type II schools (those with a white majority but a substantial non-white minority – 20-50 per cent), whereas white students in the schools with non-white majorities (Type V) outperformed those in the white majority schools. In Bradford, on the other hand, there were no significant differences in white students' performance according to their school's ethnic composition, nor in their relative improvement over their period of attendance there –

a situation which also applied to those from 'other' ethnic groups (as it did in Leicester). For Pakistani students in Bradford, however, in general the larger the white component of their school's population the poorer their performance and the lower their relative value-added.

One difficulty in evaluating these school type differences may be introduced by selection effects, such as students from disadvantaged backgrounds and with educational difficulties being concentrated in certain types of school. Table 11 indicates that this is definitely the case with Bradford's secondary schools, where there are much higher percentages of students from each ethnic group who have special educational needs and qualify for free school meals in the Type V schools. In Leicester, on the other hand, any such differences are much less pronounced; indeed, the highest percentage of Indian students with special educational needs occurs in the predominantly-white Type I schools. Thus whereas in Bradford the less disadvantaged Pakistani and white students are more likely to be found in the predominantly-white schools, and vice versa, such spatial differentiation is much less marked in Leicester.

To explore these differences further, taking the issue of differential concentration into account, we have compared the mean performance by members of the two main ethnic groups in each city by calculating the expected test score for a stereotypical individual in each city.[12] This procedure involves solving the relevant ANOVA equation

$$Y = a + b_1X_1 + b_2X_2 \ldots + b_nX_n \qquad (1)$$

where

a is the constant term;

X_1 - X_n are the explanatory variables;

b_1 - b_n are the regression coefficients for those variables; and

Y is the estimated value for the outcome variable.

The stereotypical individuals are:

Leicester – Male, no Free School Meal Entitlement, no Special Educational Needs, English first language, attending a large mixed non-denominational school

Bradford – Male, no Free School Meal Entitlement, no Special Educational Needs, English first language, attending a large mixed non-denominational, community-funded school

In each case, equation (1) is solved by including the relevant regression coefficients for the specified variables. The ethnicity and school type regression coefficients are then added to show how those stereotypical individuals would have performed in the various school contexts.

Table 12 shows the estimated values for these individuals at KS3 and GCSE. In Leicester, stereotypical white males recorded higher test scores on average the greater the percentage of the school's pupils being of Indian ethnicity, with the differences particularly large at GCSE. (Table 1 shows that only a small percentage of them attend such schools, however.) Indians, on the other hand, performed best in the more

mixed Type II schools (white majority, but less than 80 per cent). Bradford shows little difference across the four school types in white performance, except that they tend to record higher GCSE scores in the predominantly white Type I schools whereas Pakistani students on average recorded higher GCSE (though not KS3) scores in the white-dominated schools.

Conclusions

The general consensus in the literature regarding the relative impact of individual and school characteristics on student performance is that the former are by far the most important but that in addition the school environment can have significant positive or negative impacts on students' learning experiences. This has resonance in the debate on the impact of school ethnic composition on educational outcomes. In the UK, as elsewhere, there has been concern over the relative educational performance of students with different ethnicities, and questions raised whether variations both within and between ethnic groups are linked to their school environment. One aspect of that environment stressed is its ethnic composition: do students from particular backgrounds perform better or worse – holding other characteristics constant – in schools with different ethnic mixes?

This initial case study of Indians in Leicester and Pakistanis in Bradford has explored answers to that question. Indian students generally perform better than white students, who in turn outperform Pakistanis, especially in the GCSE examinations. Each ethnic group has performance differences between males and females, between students from different home backgrounds (indexed by whether the student qualifies for free

school meals), and between those with varying levels of special needs (such as learning difficulties). Regarding the relationship between a school's ethnic composition and its students' test scores, the correlation was of little significance for Indian students in Leicester: on average they recorded high test scores in all types of school environment. For Pakistanis in Bradford, on the other hand, there is clear evidence – when other factors are held constant – of higher test scores the larger the proportion of white students in the schools they attend: where they are in a small minority they achieve more than where they dominate in the school. To reiterate – this may be picking up a causal relationship, or it may be showing that particular (high performing) types of Pakistani students attend mainly white schools. Finally, in Bradford though not in Leicester there was also evidence that the performance (or innate ability) of white students varied according to school ethnic composition: the larger the Pakistani proportion on the school roll, the lower the test scores recorded by members of the white minority. It may be, of course, that only low ability white students attend such schools; or it may be that white students perform badly when they attend schools dominated by another ethnic group, especially if the members of that group are themselves not performing well. As we have stressed throughout, the empirical correlation can arise from either a causal relationship or from school choice decisions – which students attend which schools.

The differences between the two cities are important indicators that no general conclusions should be drawn regarding the posited link between educational outcomes, ethnic background, and school composition; the situation regarding Pakistanis in Bradford is not the same as that of Indians in Leicester. The likely explanation for this is probably a combination of the class background and

educational aspirations of the two groups rather than any specific features of educational provision in Bradford and Leicester. Nor, within the context of ongoing debates regarding multi-culturalism, can it be concluded that ethnic segregation associated with groups sustaining their separate identity is necessarily linked to educational outcomes: Indian students in Leicester are more likely to attend highly segregated schools than are Pakistanis in Bradford, but this is not reflected in their KS3 and GCSE performance. Different ethnic groups and different local contexts are linked to different outcomes.

These initial findings and tentative conclusions provide valuable first insights into the relationship between educational performance and the ethnic composition of the school setting, raising important questions regarding the processes that stimulate such observed differences. But the findings reported here cannot be taken as implying the existence, or lack, of a casual relationship between composition and performance. Only when students from different ethnic backgrounds and with different abilities are randomly allocated across a city's schools could conclusions such as those presented here be accepted as clear evidence for and against school effects – and that is certainly not the case in either Bradford or Leicester, or any other English LEA. The findings presented here are also based on two case studies only, albeit of cities with large ethnic minority populations: their relevance for other ethnic groups, in other cities, remains a subject for further study, especially as the differences between the two places and the performance of their dominant ethnic minority group are substantial. Nevertheless, at this stage it is clear that, in certain circumstances, a school's ethnic composition is significantly associated with students' test score outcomes.

Notes

[1] The speech received substantial pre-presentation coverage in *The Sunday Times* (18 September, 2005); the quotations repeated here were taken from *Times Online* (http://www.timesonline.co.uk/ accessed 18 September 2005.

[2] Pupils attend primary school from the age of 5 to 11, and secondary school from 11 to 16.

[3] We have focused on secondary schools only here because of the greater variability in GCSE results than at KS1 and KS2. Separate analyses of primary school data are being undertaken.

[4] GSCE scores are usually reported in terms of grades: from A* to G. Here, we report the underlying point score, with A* corresponding to eight points, down to G being worth one point.

[5] The ethnicity data are collected from parents when students are admitted to a school.

[6] Some English LEAs in England still have selective (i.e. grammar) secondary schools for which entry is competitive and based on educational performance, usually at age 11 (i.e. KS2). Neither of the LEAs studied here has retained such schools and the associated "11+" examination.

[7] In Bradford 27 per cent of the 582 individuals in the 'other' group are classified as Indian and 17 per cent as Bangladeshi; for 36 per cent, their ethnicity is recorded as 'unknown'. For Leicester, 26 per cent of the 767 grouped as 'other' have their ethnicity recorded as 'unknown' and a further 29 per cent as 'other'; 10 per cent are Pakistanis and 10 per cent Black Africans.

[8] Analysis of variance is the equivalent of fitting a regression model with dummy variables for the independents.

[9] With a large number of explanatory variables, many of these are difficult to evaluate because of degrees of freedom problems and small numbers of observations in many cells. Some, as between ethnicity and gender, have not been explored.

[10] The difference is shown by the associated regression coefficients, which are not tabulated here.

[11] The variable on English as second language is retained in these analyses, as the collinearity with ethnic group is not problematic.

[12] Many other stereotypical individuals could be used: the two deployed here illustrate the method and the outcomes.

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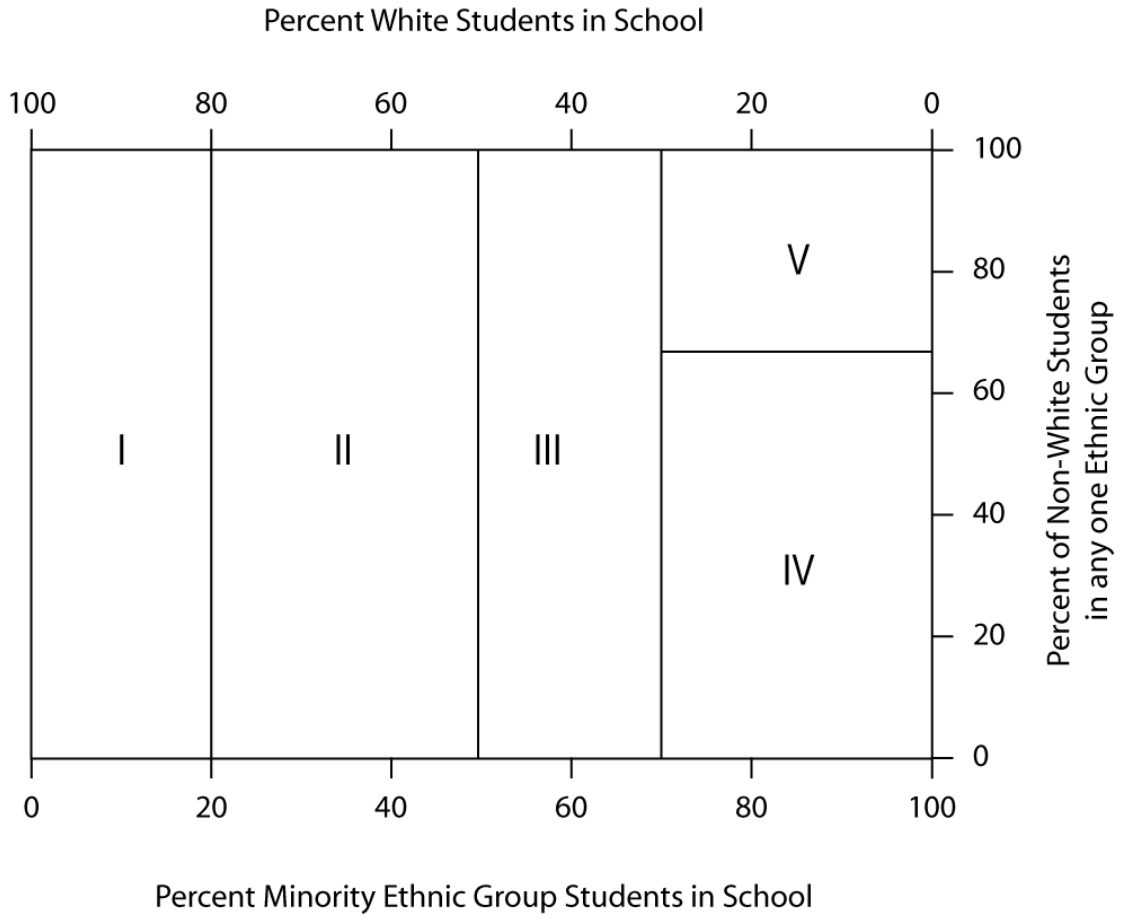

Figure 1. The classification of schools according to their ethnic composition

Table 1. Distribution of ethnic groups by school type defined by ethnic composition: percentage of secondary school students in Leicester and Bradford

	School Type					
	I	II	III	IV	V	N
Leicester						
White	42.0	47.0	0	0	11.0	1640
Indian	2.4	16.9	0	0	80.7	1144
Other	23.6	31.7	0	0	44.7	767
Bradford						
White	78.4	12.9	5.2	0	3.5	4085
Pakistani	11.2	9.0	21.0	0	58.8	1282
Other	36.6	16.0	14.4	0	33.0	582

For key to school types see text and Figure 1.

Table 2. The relative importance of student characteristics and school attended as predictors of test performance

	KS3		GCSE	
	R^2	SR	R^2	SR
Leicester				
School	0.12	8.58	0.15	26.72
Individual	0.27		0.29	
Individual + School	0.35	7.38	0.38	20.98
Bradford				
School	0.22	12.73	0.21	49.21
Individual	0.26		0.18	
Indivdual + School	0.36	10.22	0.34	46.12

R^2 – multiple correlation coefficient, adjusted for degrees of freedom
SR – range of average score on the relevant test across schools, holding constant individual student characteristics in the third analyses

Table 3. Mean scores for the individual- and school-level variables in the secondary school tests

	Leicester		Bradford	
	KS3	GCSE	KS3	GCSE
Total	31.2	35.8	30.9	34.6
Gender				
Male	31.0	33.5	30.5	31.7
Female	31.4	38.2	31.2	37.6
First Language				
English	30.7	32.8	32.1	35.4
Other	32.4	40.7	28.1	32.9
Free School Meal Entitlement				
Yes	27.6	25.9	27.3	26.2
No	32.2	38.5	32.2	37.8
Special Educational Needs				
Level 0	33.1	40.7	32.2	37.7
Level 1	27.5	25.0	25.8	22.2
Level 2	25.2	16.1	24.5	15.5
Level 3	24.5	17.7	25.2	17.5
Level 4	-	-	-	-
Level 5	23.2	14.5	18.1	21.9
Ethnicity				
White	30.5	32.2	32.1	35.3
Indian	32.4	40.9		
Pakistani			27.6	31.4
Other	31.0	34.8	29.7	38.6
School Size				
<1000	30.3	32.5	30.8	34.7
1000-1200	31.2	37.3	31.7	35.5
1200<	31.7	36.0	30.3	33.9
School Gender				
Mixed	31.1	35.4	30.9	34.4
Boys	31.6	37.4	31.1	32.2
Girls	33.3	40.0	30.8	38.5
School Religious Denomination				
Does Not Apply	-	-	29.6	31.3
None	30.9	34.7	36.3	51.4
Roman Catholic	34.9	45.4	33.4	37.8
Muslim	-	-	28.9	41.3
School Funding				
Community	-	-	28.9	30.3
City Technology Coll.	-	-	36.9	69.5
Voluntary Controlled	-	-	36.9	46.6
Foundation	-	-	31.9	35.6
Voluntary Aided	-	-	32.7	36.7
School Ethnic Type				
I	30.9	34.6	32.2	35.6
II	30.5	34.0	31.5	40.9
III	-	-	28.2	29.2
IV	-	-	-	-
V	32.0	37.8	27.2	29.6

Table 4. Analyses of variance for tests at KS3 and GCSE levels (F-values)

KS3

	Leicester		Bradford	
	Score	Value-Added	Score	Value-Added
Gender	0.9	1.8	1.1	1.1
Free School Meals	**138.1**	**68.2**	**148.2**	**28.6**
Special Educational Needs	**822.3**	**102.8**	**1012.0**	**136.7**
Ethnicity	0.3	**8.2**	**25.1**	*4.6*
School Size	**39.5**	**31.5**	**46.1**	**40.3**
School Gender	*4.4*	**8.1**	**5.1**	**12.2**
School Religion	**187.2**	**84.6**	**72.5**	**43.8**
School Funding	-	-	**33.2**	**19.8**
School Ethnic Type	**18.0**	**11.1**	**8.8**	**9.3**
KS2 score		**3960.0**		**9732.5**
R^2	0.32	0.71	0.35	0.78
N	3235	3047	5535	5144

GCSE

	Leicester			Bradford		
	Score	Value-Added		Score	Value-Added	
		KS2	KS3		KS2	KS3
Gender	**48.9**	**93.5**	**145.5**	**63.3**	**89.8**	**190.4**
Free School Meals	**158.1**	**89.3**	**27.2**	**161.1**	**57.7**	**30.7**
Special Educational Needs	**675.4**	**128.4**	**39.3**	**751.6**	**107.1**	**26.6**
Ethnicity	**33.3**	**82.6**	**91.5**	**25.4**	**130.9**	**158.3**
School Size	**34.5**	**23.1**	**60.0**	**38.5**	**27.4**	**44.5**
School Gender	1.4	2.7	**21.7**	**7.7**	**11.3**	**5.9**
School Religion	**204.9**	**103.7**	**34.0**	**44.2**	**13.1**	2.6
School Funding	-	-	-	**100.2**	**95.2**	**116.2**
School Ethnic Type	**23.1**	**14.7**	**5.8**	**9.9**	**14.4**	**12.4**
KS2 score		**1347.8**			**3553.9**	
KS3 score			**4681.0**			**8525.2**
R^2	0.35	0.74	0.74	0.33	0.74	0.74
N	3295	3020	3169	5481	5345	5343

F-levels in bold are significant at the 0.001 level or better; those in italics are significant at the 0.05-0.001 levels

Table 5. Mean scores for the individual- and school-level variables in the secondary school tests, by ethnic group – Leicester.

	KS3	GCSE	KS3	GCSE	KS3	GCSE
	White		*Indian*		*Other Ethnic*	
Gender						
Male	30.3	29.7	32.3	38.7	30.6	32.2
Female	30.7	34.9	32.5	43.4	31.4	37.3
First Language						
English	30.5	32.1	32.8	38.4	31.5	41.1
Other	33.2	42.8	32.3	41.1	31.9	39.1
Free School Meal Entitlement						
Yes	26.5	20.6	29.2	31.8	28.3	28.7
No	31.5	34.8	32.9	42.3	32.8	40.4
Special Educational Needs						
Level 0	32.9	38.6	33.2	42.9	33.1	40.6
Level 1	27.7	23.1	27.1	31.2	27.5	26.6
Level 2	25.4	15.8	24.4	19.0	25.1	14.9
Level 3	24.7	17.2	26.1	22.5	22.4	12.8
Level 4	-	-	-	-	-	-
Level 5	23.1	14.4	23.2	14.1	24.0	15.3
School Size						
<1000	29.9	30.3	31.3	40.2	31.3	34.7
1000-1200	31.5	37.2	31.4	38.7	29.7	35.8
1200<	29.5	25.7	32.8	41.7	31.9	34.0
School Gender						
Mixed	30.1	31.4	32.3	40.5	31.0	34.4
Boys	31.0	34.1	33.4	44.9	30.5	36.6
Girls	33.4	39.2	35.0	45.8	31.8	38.5
Religious Denomination						
None	29.6	29.5	32.4	40.9	30.6	33.6
Roman Catholic	35.2	47.0	37.0	50.0	34.0	34.8
School Ethnic Type						
I	30.8	33.8	31.8	41.8	31.1	36.8
II	30.0	31.2	33.0	44.4	30.0	34.0
III	-	-	-	-	-	-
IV	-	-	-	-	-	-
V	31.5	31.7	32.3	40.1	31.6	34.4

Table 6. Mean scores for the individual- and school-level variables in the secondary school tests, by ethnic group – Bradford.

	KS3	GCSE	KS3	GCSE	KS3	GCSE
	White		*Pakistani*		*Other Ethnic*	
Gender						
Male	31.7	32.7	27.4	27.9	29.6	35.4
Female	32.5	38.0	27.8	35.2	29.7	41.7
First Language						
English	32.1	35.3	29.6	35.6	32.4	40.7
Other	31.1	37.7	27.6	31.3	30.4	40.4
Free School Meal Entitlement						
Yes	27.9	21.9	26.6	29.0	28.5	33.6
No	33.0	37.8	28.6	33.6	32.0	43.4
Special Educational Needs						
Level 0	33.2	38.0	29.0	35.2	32.0	42.9
Level 1	27.0	20.7	24.3	23.8	24.6	25.3
Level 2	25.6	16.4	22.8	13.5	23.8	18.4
Level 3	26.1	18.4	22.8	15.3	22.4	12.3
Level 4	-	-	-	-	-	-
Level 5	23.0	13.4	18.4	7.9	-	-
School Gender						
Mixed	31.9	34.9	27.8	31.4	30.0	38.6
Boys	34.0	37.5	24.5	20.4	29.1	34.7
Girls	35.0	41.1	27.6	35.9	27.9	40.5
School Funding						
Community	30.2	29.6	27.2	30.3	28.4	35.2
City Technology Coll.	37.3	68.9	33.3	66.2	36.4	73.9
Voluntary Controlled	36.9	46.6	-	-	-	-
Foundation	32.5	36.0	28.6	31.9	30.2	38.7
Voluntary Aided	32.8	36.4	30.7	41.3	31.8	37.3
School Size						
<1250	31.9	35.2	28.0	31.6	30.4	41.7
1250-1600	33.1	37.0	27.6	30.0	28.9	34.5
1600<	31.5	34.0	27.2	32.1	29.5	38.3
Religious Denomination						
Does Not Apply	30.8	31.1	27.4	30.4	28.7	35.3
None	36.4	50.2	33.5	58.6	36.6	69.3
Roman Catholic	33.5	37.4	34.8	45.8	31.8	38.3
Muslim	-	-	28.7	40.8	-	-
School Ethnic Type						
I	32.4	35.5	29.8	35.5	30.7	37.0
II	32.2	40.8	28.0	34.6	32.0	53.1
III	29.1	26.6	27.3	28.9	28.9	40.6
IV	-	-	-	-	-	-
V	27.8	21.3	27.1	30.5	27.3	31.9

Table 7. Analyses of variance for tests at secondary school level, by ethnic group – Leicester (F-levels)

KS3

	White		Indian		Other	
	S	VA	S	VA	S	VA
Gender	3.5	0.8	0.5	*5.2*	0.9	1.2
Free School Meals	**64.5**	**33.6**	**42.8**	**18.7**	**25.5**	**17.3**
English as Second Language	0.0	0.0	0.1	0.1	1.2	3.4
Special Educational Needs	**449.1**	**44.8**	**200.4**	**21.2**	**126.8**	**26.4**
School Size	*6.4*	0.3	**19.6**	**50.6**	**7.0**	**10.0**
School Gender	**6.7**	**10.6**	0.6	2.6	0.1	0.1
School Religion	**84.9**	**20.5**	3.1	1.8	**11.7**	*9.3*
School Ethnic Type	**8.5**	*5.6*	*6.5*	**14.0**	2.0	*4.2*
KS2 score		**2403.4**		**1296.6**		**413.6**
R^2	0.37	0.76	0.23	0.66	0.30	0.62
N	1516	1516	1043	1043	488	488

GCSE

	White		Indian		Other	
	S	VA	S	VA	S	VA
Gender	*9.8*	**57.3**	**24.2**	**67.6**	**18.0**	**32.6**
Free School Meals	**74.1**	**22.0**	**41.7**	*8.3*	**25.7**	1.3
English as Second Language	*4.2*	*8.2*	3.5	**13.6**	**15.3**	**32.8**
Special Educational Needs	**341.7**	**18.1**	**160.8**	*4.7*	**130.1**	**18.4**
School Size	**33.3**	**70.3**	**31.2**	*6.0*	*5.6*	*5.8*
School Gender	0.3	**12.3**	2.9	**10.4**	1.3	*3.2*
School Religion	**69.5**	*3.9*	*4.2*	0.6	**15.6**	0.7
School Ethnic Type	*6.5*	1.9	**21.8**	**13.0**	*4.1*	1.0
KS2 score		**2104.5**		**1868.9**		**692.9**
R^2	0.38	0.75	0.23	0.72	0.33	0.72
N	1465	1465	1102	1102	516	516

F-levels in bold are significant at the 0.001 level or better; those in italics are significant at the 0.05-0.001 level.

S – original score as the outcome variable; VA – value-added analysis

Table 8. Analyses of variance for tests at secondary school level, by ethnic group – Bradford (F-levels)

KS3

	White		Pakistani		Other	
	S	VA	S	VA	S	VA
Gender	0.2	0.5	1.0	0.3	0.6	2.3
Free School Meals	**68.7**	**10.3**	**14.2**	*6.8*	3.8	0.0
English as Second Language	0.1	0.2	0.1	1.3	0.5	0.7
Special Educational Needs	**683.5**	**51.9**	**228.6**	**76.9**	**47.2**	**11.4**
School Size	**38.6**	**38.6**	**12.6**	**8.9**	0.4	*5.2*
School Gender	**9.9**	**18.6**	**11.8**	*3.1*	0.1	0.4
School Religion	**49.4**	**25.5**	**6.2**	2.0	2.6	2.0
School Funding	**31.5**	**18.1**	0.8	0.6	0.3	0.7
School Ethnic Type	**8.4**	**9.1**	1.0	1.5	0.4	0.2
KS2 score		**7348.0**		**1812.3**		**574.1**
R^2	0.33	0.77	0.23	0.72	0.24	0.75
N	3971	3778	1225	1073	353	308

GCSE

	White		Pakistani		Other	
	S	VA	S	VA	S	VA
Gender	**39.8**	**114.2**	**21.7**	**65.5**	**10.7**	**22.8**
Free School Meals	**92.4**	**26.8**	*9.1*	0.3	4.2	0.1
English as Second Language	1.2	*8.6*	0.2	0.1	1.5	**12.4**
Special Educational Needs	**465.6**	*7.5*	**218.1**	**25.8**	**36.6**	0.1
School Size	**27.0**	**8.2**	5.6	**49.3**	1.7	2.1
School Gender	2.8	1.6	*5.7*	**18.2**	0.5	1.0
School Religion	**40.3**	*6.0*	1.9	1.9	2.4	0.3
School Funding	**85.6**	**83.5**	*5.7*	**15.7**	*3.0*	**6.3**
School Ethnic Type	**6.7**	0.8	**6.3**	**12.5**	1.9	2.5
KS2 score		**6183.6**		**1809.0**		**635.7**
R^2	0.36	0.76	0.25	0.71	0.34	0.77
N	3866	3798	1257	1204	358	343

F-levels in bold are significant at the 0.001 level or better; those in italics are significant at the 0.05-0.001 level.

S – original score as the outcome variable; VA – value-added analysis

Table 10. Regression coefficients for analyses of variance of GCSE and GCSE value-added scores: Bradford

	White		Pakistani		Other	
	S	VA	S	VA	S	VA
Gender (comparator – male)						
Female	**3.4**	**3.1**	**4.8**	**4.6**	**6.5**	**6.6**
Free school meal entitlement (comparator- yes)						
No	**9.7**	**4.7**	**2.7**	**1.7**	**4.5**	-0.5
Special educational needs (comparator – yes)						
No	**15.9**	**3.6**	**16.8**	**9.3**	**17.1**	**6.2**
School gender (comparator – mixed)						
Boys	2.3	2.1	**-4.5**	2.5	4.0	-2.8
Girls	**3.4**	**2.4**	3.8	**7.3**	2.8	-1.2
School funding (comparator – voluntary-aided)						
Community	1.1	0.5	-7.9	-7.5	5.6	2.7
City Technology College	**33.4**	**25.5**	**31.1**	**29.8**	**24.3**	**23.6**
Voluntary-controlled	**-2.9**	**-2.6**	-7.6	-9.2	-12.0	-5.6
Foundation	**6.1**	**3.2**	-	-	4.5	4.7
School religion (comparator – Roman Catholic)						
Does not apply	**-9.9**	**-3.5**	-9.2	1.4	-10.5	-3.4
None	**4.6**	**4.9**	-6.0	-1.2	14.5	7.7
Muslim	-	-	**-13.6**	-5.8	-3.8	-0.6
School size (comparator – large)						
Small	**-3.2**	**-2.7**	**-4.9**	**-7.4**	-6.3	-1.1
Medium-size	**4.4**	**2.2**	0.5	-1.4	0.2	2.2
School ethnic type (comparator – type V)						
I	2.4	1.0	-3.1	**-4.9**	-3.6	-5.0
II	-1.3	-1.4	**-4.4**	**-5.6**	-1.0	-2.6
III	0.0	-1.5	**-5.4**	**-5.8**	5.7	4.2
KS2 score		**2.8**		**2.5**		**2.8**

S – raw score regression; VA – value-added regression
All coefficients in bold are significant at the 0.05 level or better

Table 9. Regression coefficients for analyses of variance of GCSE and GCSE value-added scores: Leicester

	White		Indian		Other	
	S	VA	S	VA	S	VA
Gender (comparator – male)						
Female	**2.9**	**3.9**	**4.6**	**5.6**	**6.2**	**6.3**
Free school meal entitlement (comparator- yes)						
No	**10.4**	**6.6**	**8.1**	**5.5**	**8.3**	**5.9**
Special educational needs (comparator – yes)						
No	**17.2**	**6.7**	**19.3**	**6.1**	**21.0**	**12.2**
School gender (comparator – mixed)						
Boys	-1.0	0.3	**9.1**	**9.2**	1.9	4.3
Girls	0.9	1.1	4.5	**5.7**	6.3	5.0
School religion (comparator – Roman Catholic)						
None	**-15.3**	**-7.0**	**-15.3**	-12.4	**-15.2**	**-7.8**
School size (comparator – large)						
Small	-0.3	**4.2**	**-21.6**	**-16.2**	**-8.0**	-5.8
Medium-size	**8.7**	**9.8**	**-10.9**	**-9.8**	**-5.0**	-2.4
School ethnic type (comparator – type V)						
I	**-6.7**	**-4.3**	4.4	3.5	-4.7	-1.0
II	-4.6	**-5.2**	**19.9**	**16.8**	2.2	4.6
KS2 score		**2.5**		**2.3**		**2.2**

S – raw score regression; VA – value-added regression
All coefficients in bold are significant at the 0.05 level or better

Table 11. The percentage distribution of secondary school students with special educational needs and qualifying for free school meals, by ethnicity and school ethnic composition.

	School Ethnic Type				
	I	II	III	IV	V
Special educational needs					
Bradford					
White	14	18	26	-	37
Pakistani	11	12	17	-	35
Other	9	15	19	-	25
Leicester					
White	34	32	-	-	28
Indian	21	8	-	-	10
Other	31	15	-	-	13
Free school meals					
Bradford					
White	15	18	31	-	38
Pakistani	33	48	46	-	55
Other	16	12	35	-	56
Leicester					
White	18	18	-	-	24
Indian	14	11	-	-	14
Other	15	32	-	-	32

Table 12. Expected values for KS3 and GCSE performance by the stereotypical individuals in Leicester and Bradford, by ethnic group

Leicester

	White		Indian	
School ethnic type	KS3	GCSE	KS3	GCSE
I	32.4	33.9	35.2	56.8
II	33.8	36.0	39.3	71.7
V	34.4	40.2	34.4	51.9

Bradford

	White		Pakistani	
School ethnic type	KS3	GCSE	KS3	GCSE
I	31.5	35.1	36.9	37.3
II	30.0	31.4	36.0	36.0
III	31.1	32.7	36.1	35.1
V	30.5	32.6	36.7	33.9