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Une exploration de la ségrégation scolaire et résidentielle en Angleterre

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Segregation at school and at home: an English exploration

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- 1 Few national societies are comprised of a single ethnic group; most populations contain at least one ethnic minority, and in many cases there are tensions between the majority and minority groups (Mikesell and Murphy, 1991). Studies often link those tensions to their spatial structuring, especially to the levels of segregation – both residential and between schools. Such segregation, it is argued, can both stimulate and exacerbate ‘them and us’ group representations. The relative absence of inter-group contact may lead to mutual ignorance and, often, mistrust, with groups developing separate identities that can incorporate conflicting value systems. Whereas residential segregation is frequently associated with such developments – and the tensions that occasionally generate inter-group violent conflict – segregation between schools is considered potentially more damaging; if young people have little contact with other groups during their formative childhood years, the seeds of mutual ignorance and mistrust sown then may be difficult to overcome in adult life. Furthermore, studies – of Danish and Dutch cities, for example (Rangvid, 2007; Boterman, 2013) – have shown that ethnic segregation tends to be greater in a city’s schools than in its residential neighbourhoods, probably as a consequence of parental choices for their children’s education. Similar concerns have been raised in Great Britain, where the ethnic minority populations have expanded substantially in recent decades (Hamnett, 2012) and parental choice has apparently exacerbated the intensity of segregation between schools, reflecting either or both of parental preferences for their children to attend schools with their ethnic peers and their preference for particular types of schools (e.g. religious schools); alternatively, the choices available to different ethnic groups may not be equal (West and Hind, 2007; Hamnett *et al.*, 2013).
- 2 The issue of ethnic segregation regularly enters the public consciousness and stimulates political responses, with the latter designed to overcome segregation’s perceived disadvantages, as has recently been the case in Great Britain through a variety of sources, not least media presentations and interpretations of research findings, with some of that

research being responses to events such as ethnic and inter-ethnic unrest. Thus in April 2016 the results of a survey of Muslim residents' attitudes and values conducted for a TV documentary stimulated one tabloid newspaper to carry a story on its front page with the banner headline WARNING ON UK MUSLIM GHETTOS¹. Later in that year, a government-commissioned review into 'opportunity and integration' had a similar impact²; it stimulated newspaper headlines such as 'Ethnic misogyny "fuels social division"' and 'Faith schools encourage a form of apartheid'³.

- 3 The implication – as it was expressed a decade ago – is that Britain is 'sleep-walking towards segregation', that in the absence of any policies to counter that trend Britain will become increasingly divided spatially on ethnic grounds and that such divisions will enhance identified problems of the fabric of society being eroded (Johnston and Poulsen, 2006; Finney and Simpson, 2009); Trevor Phillips (formerly head of the UK Equality and Human Rights Commission) wrote that there are some 'white communities so fixated by the belief that their every ill is caused by their Asian neighbours that they withdraw their children wholesale from local schools ... We really need to worry about whether we are heading for USA-style semi-voluntary segregation in the mainstream system'⁴. And yet, recent analyses of census data all suggest that the opposite is the case with regard to residential segregation. The degree of ethnic minority concentration into relatively-exclusive enclaves has declined recently rather than increased, with many neighbourhoods becoming ethnically more diverse in their composition – although there has not been a similar decline in the spatial separation of the ethnic minority groups from the majority White population (Johnston *et al.*, 2015, 2016; Catney, 2016; Cattle and Kaufmann, 2016).
- 4 But there is a paradox associated with that conclusion. In a newspaper article linked to the April 2016 TV documentary, Phillips claimed that more than half of Britain's ethnic minority children attend schools where White British children are in a minority⁵, a claim buttressed by a further press article stating that in a number of British schools a quarter or more of pupils do not speak English as their first language; two primary schools in one city – Peterborough – were reported as having no pupils whose first language is English⁶. The 2016 UK government-commissioned Casey review presented similar findings, noting higher levels of segregation in schools than in neighbourhoods and drawing the conclusion that

When children being educated in segregated schools are also growing up in an area where all [sic] of their neighbours are from the same ethnic and/or faith background, it vastly reduces opportunities for them to mix with others from different backgrounds. It deprives them of the benefits – individually and to society as a whole – that are known to derive from mixing with people from different backgrounds (p.49)⁷.

- 5 How can these two findings be reconciled, that residential segregation is neither intense nor increasing but that the opposite appears to be the case in at least some of the country's schools. One possibility is that whereas members of the various ethnic minority groups as a whole may not be highly segregated into particular districts and neighbourhoods their children – especially their younger children who attend primary schools (between the ages of 5 and 11) – are (a suggestion previously addressed in Johnston *et al.*, 2006). If that were the case, then the two apparently conflicting patterns could be reconciled. Alternatively, it may be that schools are more segregated than the neighbourhoods that they serve through a combination of parental choice – which schools they apply to send their children to – and school admissions criteria. This paper

explores the validity of those interpretations, using data derived from the annual survey of all pupils at state-funded schools in England held in the National Pupil Database (NPD) for the year 2011 – the same date as the most recent census from which some ancillary data have been taken⁸. We focus entirely on students at primary schools; these are much more likely to attend a school in or close to their home neighbourhood than their contemporaries attending secondary schools – of which there is a much wider choice reflecting, among other things, whether they take students from a single gender only, whether they operate selection based on academic ability/potential, and whether they specialise in particular subject matter. Because primary schools are smaller, and there are more of them it is, in principle, possible to get greater ethnic sorting of their intakes but only if choice and admissions systems are being used to facilitate such an outcome, otherwise their intakes should simply reflect the ethnic composition of the neighbourhoods around them. Whether they do is the focus of our analysis.

The basic pattern

- 6 The basic patterns of residential and school separation by ethnic group are shown in Table 1. The first column shows the percentage of each ethnic group's members living in neighbourhoods where those identified as White British formed only a minority of the population. (Ethnic identity is self-assessed in the UK Census. In the NPD a similar classification is applied by teachers to their students, and their allocation is checked by parents. White British – those who identify themselves as both White and one of English, Northern Irish, Scottish, Welsh, or British – comprise the majority population.) The data are taken from the 2011 Census and neighbourhoods are defined using the Census-designated Lower Layer Super Output Areas (LSOAs), which of the available data units are closest in size to the average catchment area of a primary school: they had a mean population of 1,600. Across England as a whole, the first column of Table 1 shows that only 12.8 per cent of the population lived in areas where White British residents were in a minority, and only 4.8 per cent of those self-identifying as White British lived in such areas. But with the exception of those identifying as Asian Chinese, a majority of each of the named non-White ethnic minority groups lived in neighbourhoods where White British people were in a minority (this excludes the heterogeneous Other Asian group and also those claiming a Mixed ethnicity). It is this separation of the White British from other groups that is often used to argue that England is ethnically segregated (for which the actions of the White British rather than the 'minority' groups may be responsible⁹).

Table 1. Percentages of members of the defined ethnic minorities living in neighbourhoods where White British form a minority of the population, of primary school pupils (aged 5-11) attending schools where White British form a minority of the pupils, and of primary school catchment areas where White British pupils form a minority.

	Neighbourhoods	Schools	Catchments
White British	4.8	5.2	12.0
White Irish	24.4	*	*
White Gypsy/Traveller	14.2	*	*
White Other	34.6	42.8	60.7
Asian Indian	52.0	62.9	68.2
Asian Pakistani	64.3	81.0	78.6
Asian Bangladeshi	68.6	81.8	85.4
Asian Chinese	31.6	27.3	46.5
Other Asian	48.4	*	*
Black African	56.7	73.6	83.4
Black Caribbean	59.6	79.0	88.3
Black Other	63.8	66.1	78.6
Arab	54.5	*	*
Mixed	29.9	34.8	51.5
Other	52.5	62.9	74.6
TOTAL	12.8	19.6	34.3

* no data

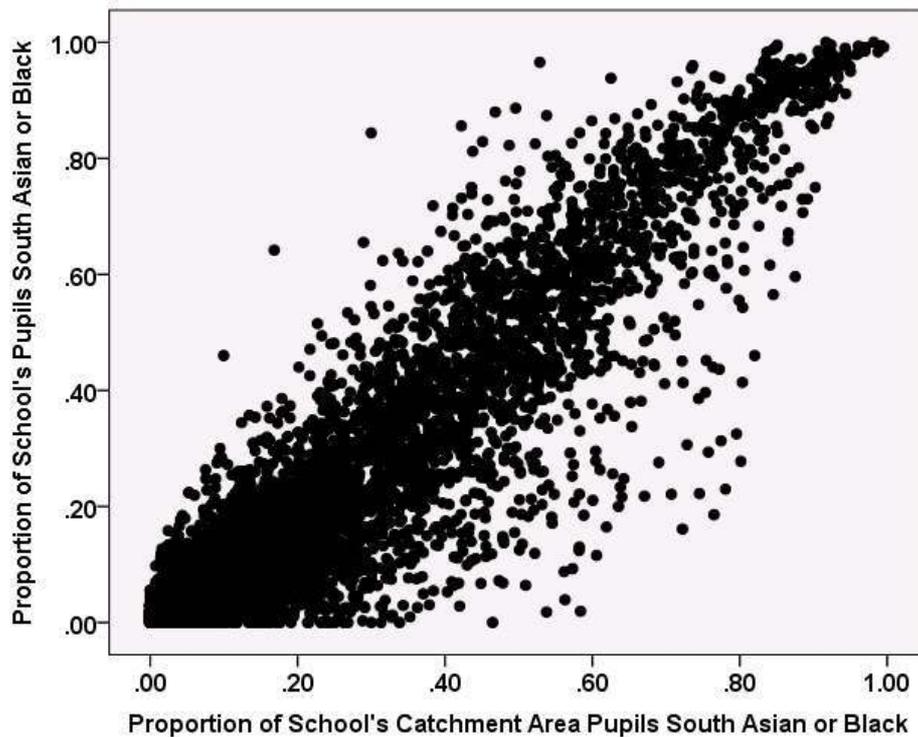
- 7 The second column of Table 1 uses data from the 2011 NPD, and shows the percentage of all pupils at state-funded English primary schools where White British pupils were in a minority. (The NPD data refer to England only; some 5 per cent of all primary school pupils there attend independent schools, which are excluded from the NPD and these analyses.) The same general pattern emerges as in the first column. Almost one-fifth (19.6 per cent) of all primary students attended a school where White British students were in the minority, but this was the case for only 5.2 per cent of White British pupils (of whom there were 1.5 million, 74 per cent of the national total). Among the minority ethnic groups, whereas only 27.3 per cent of Chinese pupils attended schools with a White British minority presence, by comparison in each of the three named South Asian groups (Indian, Pakistani and Bangladeshi) and the three Black groups (Black African, Black Caribbean and Black Other) – on which six almost all research and public attention focuses – more than 60 per cent of their primary-school-age children attended schools where White British were in a minority, as many as 81.2 per cent for Pakistani and Bangladeshi pupils.
- 8 These initial data in the first two columns of Table 1 clearly imply that in 2011 England's primary schools were more segregated ethnically than the neighbourhoods that they served – for all of the non-White ethnic groups except the Chinese a smaller proportion of their populations lived in neighbourhoods with White British minorities than had their children attending primary schools with non-White British minorities only. But a comparison of pupils with the (all-age) Census population is not exact because it is not clear whether this simply reflects differences in the age composition of the different ethnic groups; primary school-age children comprised just 5.2 per cent of the total White British population in 2011, for example, but 11 per cent of those claiming either Bangladeshi or Pakistani ethnicity and 12 per cent in the Black Other group. The median

age for the White British was 40-44 years in 2011; for the Bangladeshi population it was some twenty years younger.

- 9 The third column in Table 1 provides some circumstantial evidence that age differences are indeed the reason for this difference. Under a system offering a degree of choice for parents, schools do not have fixed, spatially-defined catchment areas; most children can apply to attend most schools, albeit that their likelihood of receiving a place is affected by factors such as whether they have a sibling in a school applied to and how close to the school they live. How to define the catchment areas of schools has been an area of academic debate (Pearce, 2000; Harris and Johnston, 2008, 2011; Singleton *et al.*, 2011; Harris *et al.*, 2015). In general, however, we can work backwards to identify each school's core and empirically observed recruitment space. From the NPD we identify the postcodes of those who attend each school and draw a boundary around the central 80 per cent (the remaining 20 per cent is omitted to exclude spatial 'outliers', individuals who for a variety of reasons live at most distance from the school relative to other pupils). Once the catchments are defined, the ethnic make-up of the pupils that live in them can be revealed (whether or not they attended that school).
- 10 In all cases, comparison of the first and third columns of Table 1 shows that the percentage of pupils living in a catchment where White British are in a minority (the third column) is larger than the percentage of neighbourhoods with White British minorities (the first column) – very substantially so for the six main ethnic minority groups (the three claiming South Asian ethnic identities – Indian, Pakistani and Bangladeshi – and the three claiming Black identities – African, Caribbean and Other); 56.7 per cent of all Black Africans live in neighbourhoods with White British minorities, for example, but 83.4 per cent of their children aged 5-11 attend a school with a White British minority. In part this will be because the catchments are modelled on the intakes into the schools so if schools are segregated then the catchments are likely to be so too. Consider a situation where each pupil attends her or his nearest school and that nearest school is the same for all pupils in a neighbourhood. In this circumstance the composition of the school, the composition of the catchment, and the composition of the neighbourhood will all be the same because the catchments are defined in terms of the entries into the school and the catchments are made-up of neighbourhoods. In practice, and especially in urban areas (where the minority groups are more likely to live), there is much greater fluidity: in England less than half of pupils attend the nearest primary school. The catchments therefore enclose a wider mix of pupils than just those who attend the school.
- 11 The strong suggestion arising from these summary data is that ethnic minority children of primary school age are spatially more concentrated across residential areas than all members of their groups and that this could be a major reason for any observed greater segregation in schools than their surrounding neighbourhoods. To address that issue further, the next section presents analyses of aggregate data – at the school level – derived from the NPD which examine differences between the ethnic composition of schools and their catchment areas.

The ethnic composition of primary schools and their catchment areas

Figure 1. The relationship between the proportion of a primary school's modelled catchment area pupils with either a South Asian or Black ethnicity and the proportion of the school's population with those ethnicities: all Local Education Authorities with more than ten per cent of their primary school pupils claiming those ethnicities.



- 12 The NPD contains individual information on all pupils in the English state-education system, including their home postcode and the school that they attend – for which information about its characteristics are also available. Using this information it is possible not only to discern each school's ethnic composition but also the composition of its catchment area.
- 13 Figure 1 shows the relationship between the proportion of pupils living in a school's catchment area – as defined above – who are in one of the six largest non-White ethnic minority groups (Indian, Pakistani, Bangladeshi, Black African, Black Caribbean, Black Other) and the proportion of that school's pupils who are drawn from those six groups. The data refer only to those Local Education Authorities where more than 10 per cent of their primary school pupils in 2011 came from those six ethnic groups; most of the country's Local Education Authorities have only small proportions of their school pupils categorised as non-White¹⁰. The related regression equation demonstrates a strong, positive relationship – the larger the proportion of the catchment area population drawn from the six largest ethnic minority groups (X) the larger the school's own population drawn from those groups (Y):

$$Y = -0.015 + 1.004X \quad r^2 = 0.857$$

(0.003) (0.007)

- 14 Further, the small value for the constant term and the closeness of the regression slope coefficient to 1.0 indicate that in general there is little difference between the two proportions (the coefficients' standard errors are given in parentheses): where the catchment area had 0.5 of its pupils drawn from the six ethnic minority groups, for

example, the mean proportion for its school derived from that equation was 0.487; and where the former value was 0.9 the latter was 0.889. (Because students lived in a school's catchment area did not necessarily mean that they attended that school; the data for the catchment area population applied to all students living there and recorded in the NPD, irrespective of which school they attended.) There was thus virtually no evidence that schools on average were more segregated ethnically than the primary school-age populations of the neighbourhoods they served. Again, this is in part due to the way that the catchments are defined: the catchments target the areas where the probability of intake into the school is greatest (where there is greatest local concentration of pupils attending the school). A strong correlation between the composition of the catchments and the composition of the schools is to be expected. However, it is not an inevitable outcome. It is entirely possible for the catchments to contain a mix of ethnicities but for those groups to still separate from one another in their school choices¹¹.

- 15 It is notable that Figure 1 includes some substantial outliers from the general trend, and further analysis of these may provide insights into why a few schools have more ethnic minority students than anticipated from the general trend, and others have less. Because a major criterion of admission to a state primary school is distance from it to a pupil's home, most schools predominantly take students who live nearby unless they meet other criteria (such as whether the applicant already has a sibling at the school).¹² Do those outlier schools operate admissions criteria that allow them to take students other than from their immediate catchment?
- 16 State primary schools in England fall into four main organisational categories¹³:
- 17 *Community schools* are those owned and managed by the Local Education Authority – a County Council, London Borough Council, or Metropolitan Borough Council – which apply common admissions criteria, giving substantial weight to the proximity of an applicant's home to the school, and so serve their local area;
- 18 *Voluntary Aided schools* are also state-funded but a foundation (in most cases a religious body) contributes to the capital costs (perhaps owning the land and/or buildings) and appoints a majority of the governors, who have greater autonomy than is the case with Community schools – notably over admissions criteria, which can include, for example, adherence to a particular religious faith;
- 19 *Voluntary Controlled schools*, like Voluntary Aided schools, are state-funded but with a foundation (again, in most cases a religious body) that provides the land and buildings and appoints up to one-quarter of the governors, but they have to apply the Local Education Authority's admissions policy (and so cannot give preference to applicants on faith-based criteria);¹⁴ and
- 20 *Foundation schools* are state-owned and -funded schools established after 1998 when creation of further grant-maintained schools (i.e. voluntary-controlled but not also voluntary-aided) was abolished: their governors (up to one-quarter of whom are appointed by the Foundation's Trust) have slightly greater independence than Community schools; most of the institutions in this category are secondary schools – 15 per cent of all secondary schools compared to only 2 per cent of all primary schools.
- 21 Of these four types, Voluntary Aided schools can use admissions criteria other than the standard ones applied by the Community schools which emphasise serving a local catchment. These separate criteria – notably whether the applicant pupil's family are practising members of the relevant faith – allow them to accept applications for pupils

from outwith the area immediately adjacent to the school. Such criteria allow parents to apply to, and hopefully get their children accepted into, schools with a different religious ethos, academic reputation and, perhaps, ethnic composition than those Community schools close to their homes that otherwise their children would probably attend. No school can accept applicants only on faith-based criteria, however, and so Voluntary Aided schools must ensure some balance in their pupil profiles; there is currently a 50 per cent cap on the number of pupils who can be accepted on faith-based criteria to an over-subscribed school (i.e. one that receives more applications than it has available places), although the current Government has announced plans to remove it¹⁵, a move that some argue will increase social segregation across schools¹⁶.

- 22 Following the descriptions of the various school types, the outlier schools in Figure 1, where the proportion of pupils from South Asian and Black (SAB) ethnic groups is significantly smaller than the proportion in their catchment areas, are likely to be other than Community schools and have a faith foundation, because parents from a wider area have chosen to send their children there; those with substantially more SAB pupils than the catchment area are more likely to be Community schools. To test that hypothesis, the outliers from the regression of the data shown in Figure 1 were defined as those with standardised residuals either less than $-2.0SD$ or greater than $+2.0SD$. Their distributions across the institutional types and denominations are shown in Table 2.

Table 2. The type and denominational affiliation of all schools and the outlier schools from the regression in Figure 1.

	All	+2.0SD<	<-2.0SD
<i>Type of school</i>			
Community	2,572	186	112
Voluntary aided	955	101	217
Voluntary controlled	196	9	18
Foundation	184	14	9
<i>School denomination</i>			
Church of England	572	62	60
Jewish	21	1	17
Muslim	6	4	0
Roman Catholic	542	41	157
Sikh	2	2	0
Other religious	9	0	0
Non-religious	2,754	200	122
TOTAL	3,907	310	356

- 23 Those distributions substantially confirm the hypothesis that schools whose ethnic composition differs substantially from the ethnic composition of their core catchment area differ in their institutional situation, compared to all schools in the selected Local Education Authorities. In particular, those with fewer SAB pupils than expected (the negative residuals in the final column of Table 2) – and thus, by implication, more White British pupils than expected from the general relationship – are much more likely than is the case across all schools to be Voluntary Aided and associated with a Roman Catholic foundation; whereas only 14 per cent of all primary schools in the LEAs studied were affiliated to the Roman Catholic church, that was the case with 48 per cent of those with substantially fewer SAB pupils than expected from the ethnic mix of their catchment

areas. Relative few South Asian families adhere to the Roman Catholic faith, hence those schools are less likely to be chosen by SAB families for their children, even if they are the closest to their home. As a consequence, such schools are more likely to have a large proportion of White British pupils, some of whom may travel greater distances than average in order to attend such a school with its particular religious ethos. By comparison, many more of the schools with unexpectedly large SAB pupil numbers compared to their local catchment (the positive residuals in the second column) are Community schools. A considerable number are Voluntary Aided, however, many of them associated with either the Church of England or the Roman Catholic church, both of which faiths are supported by a substantial number of Black families. Of the schools with substantially more SAB students than predicted by the regression equation associated with Figure 1, of those associated with the Church of England, just under 60 per cent of their pupils are Black; only 2 per cent of the pupils at Roman Catholic schools are South Asian. But of the Community schools in that grouping, 59 per cent of their pupils are South Asian and 13 per cent Black.

- 24 One final piece of evidence confirming the general hypothesis tested here concerns the extent of the schools' catchment areas. If the argument is valid, then the Voluntary Aided, Voluntary Controlled and the small number of Foundation establishments should be drawing students from wider areas than the Community schools. The modelled catchment area of each school has been determined and for the Local Education Authorities included in this analysis the mean values, in square kilometres, are shown in Table 3. In general, Voluntary Aided schools with a mean catchment area of 7.3 square kilometres draw from larger hinterlands than the other types: those with substantially fewer SAB pupils than anticipated – the negative residuals in the final column – draw from even larger areas, with a mean of 9.9km². (Given that all of the Local Education Authorities studied here cover predominantly urban areas, this difference does not reflect a rural concentration of Voluntary Aided Schools¹⁷.)

Table 3. Mean Catchment Areas (square kilometres) for all schools and the outlier schools from the regression in Figure 1.

	All	+2.0SD<	<-2.0SD
Community	2.8	2.9	3.3
Voluntary aided	7.3	8.0	9.9
Voluntary controlled	4.1	4.1	6.8
Foundation	3.4	3.2	4.9

Geographical variations

Figure 2a. The relationship between the proportion of a primary school's modelled catchment area pupils with either a South Asian or Black ethnicity and the proportion of the school's population with those ethnicities: Blackburn with Darwen Local Education Authority.

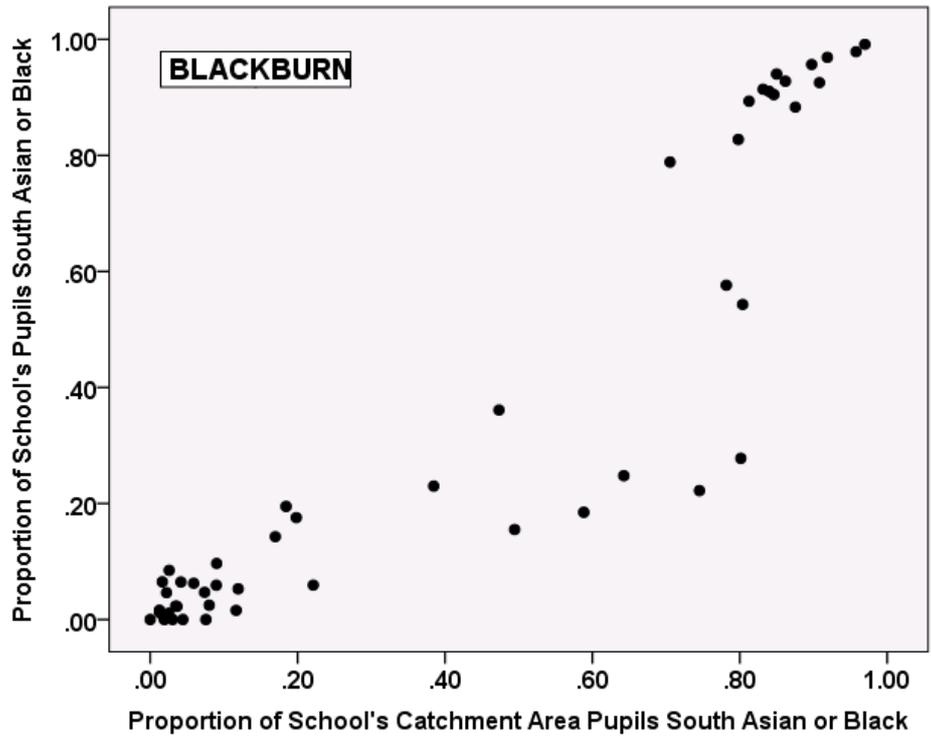


Figure 2b. The relationship between the proportion of a primary school's modelled catchment area pupils with either a South Asian or Black ethnicity and the proportion of the school's population with those ethnicities: Bradford City Local Education Authority.

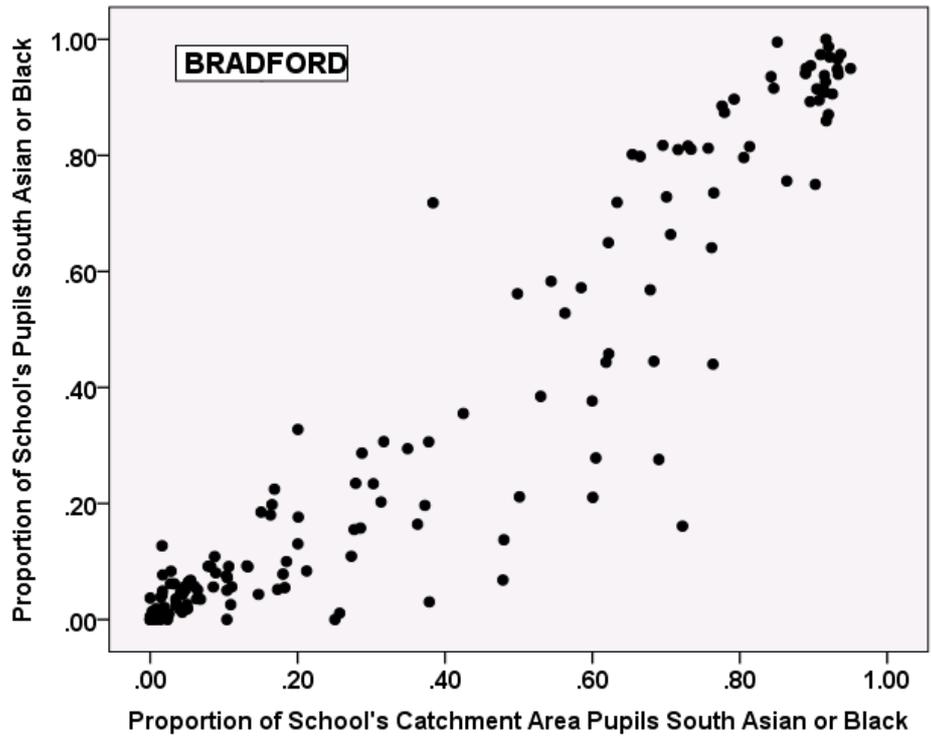


Figure 2c. The relationship between the proportion of a primary school's modelled catchment area pupils with either a South Asian or Black ethnicity and the proportion of the school's population with those ethnicities: Birmingham City Local Education Authority.

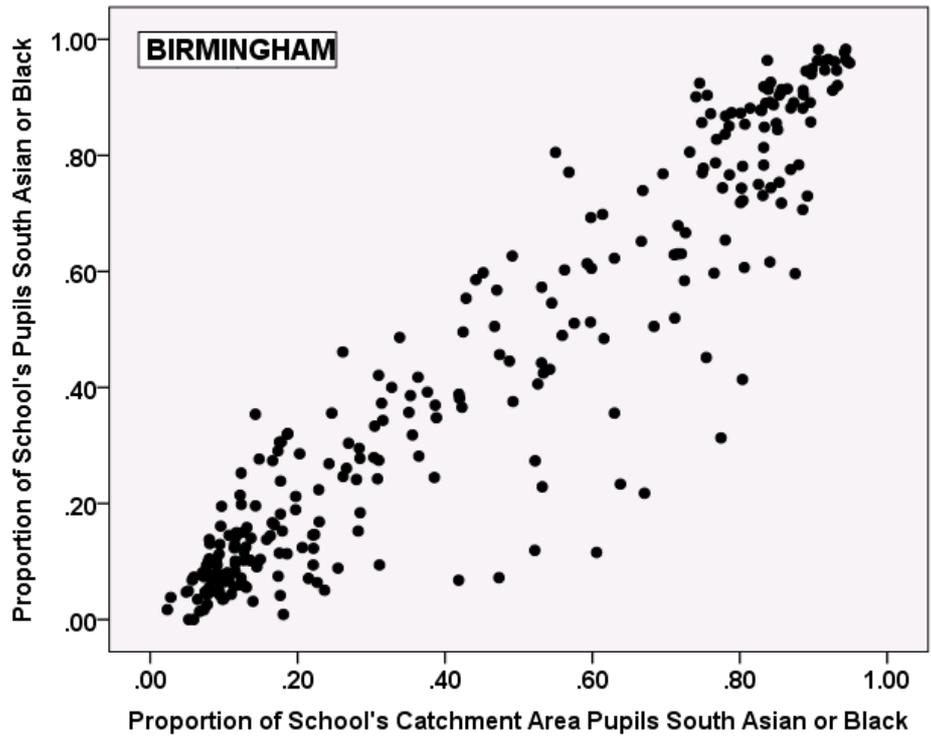
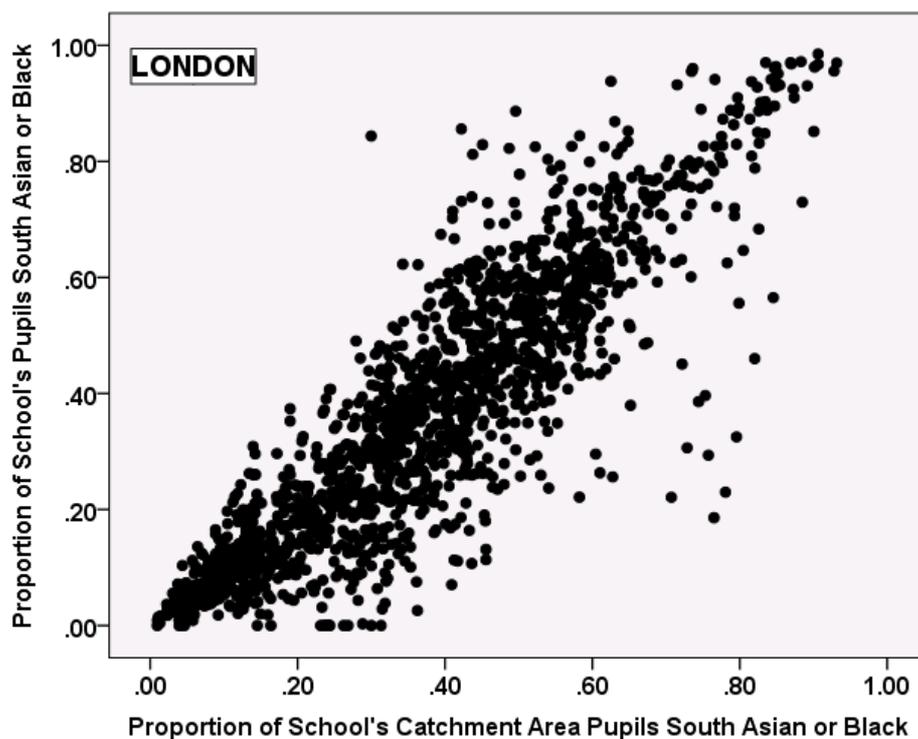


Figure 2d. The relationship between the proportion of a primary school's modelled catchment area pupils with either a South Asian or Black ethnicity and the proportion of the school's population with those ethnicities: London Local Education Authorities.

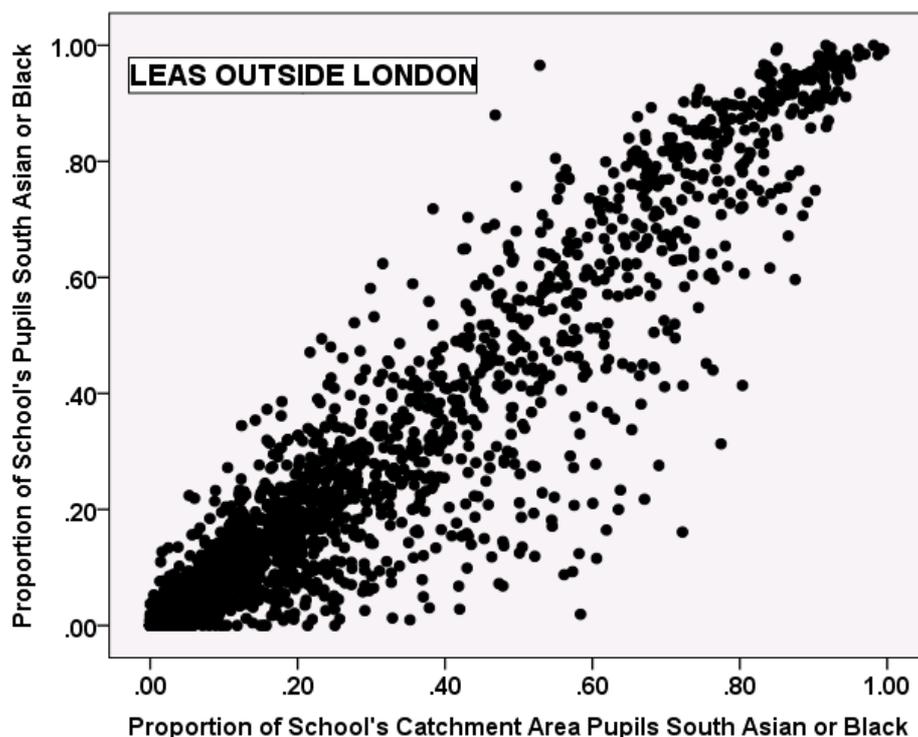


- 25 These results suggest a general pattern across all of the Local Education Authorities (LEAs) with large SAB components to their primary school populations. But are there geographical variations? Figure 2 shows the comparable graphs to that in Figure 1 for three separate urban LEAs plus all of London's LEAs, and indicates a clear difference between the first three and the last. In Blackburn and Bradford, two northern cities where residential segregation of SAB households (predominantly South Asian) is relatively high (Johnston, Poulsen *et al.*, 2016), there is a clear dichotomy reflecting that residential segregation (Figures 2a and 2b). The great majority of schools there have catchments that are either predominantly SAB in their ethnic composition or contain very few SAB pupils and the schools reflect that situation: most of them are in either the upper right or lower left corner of the graph. Few schools and few catchment areas lie between those two extremes, although in both cities there is a small number of cases where the catchment areas' proportions of SAB pupils are much larger than those of the enrolled school population; six of the thirteen in Bradford with substantially fewer SAB pupils than expected were Voluntary Aided schools affiliated with the Roman Catholic church.
- 26 The third graph (Figure 2c) shows a somewhat similar situation in Birmingham, whose large ethnic minority population is much more mixed than either Blackburn's or Bradford's (Birmingham has many more Blacks alongside its South Asian population than do the other two cities¹⁸). Again, there is a clustering of schools in the upper right and lower left quadrants of the graph, and although there are relatively more schools lying between those two extremes than in Blackburn and Bradford the general impression is of a fairly polarised city: residential areas (as represented by the modelled school catchment

areas) either have large proportions of their pupils drawn from the SAB groups or have very few (and are, by implication, dominated by White British). Their local schools reflect that – with a few exceptions where the proportion of pupils from SAB minorities is much smaller than that of their catchment area (thirteen of the fifteen are Voluntary Aided and associated with the Roman Catholic church).

- 27 Finally, London (Figure 2d) is very different, reflecting the greater diversity of its neighbourhoods compared to virtually all of the other Local Education Authorities examined and the greater density of schools there: whereas in Blackburn and Birmingham 44 and 40 per cent of all pupils respectively attended their nearest primary school, for example, the percentage was much lower in most London Boroughs, falling to 24 per cent in Hammersmith & Fulham. Compared to Blackburn, Bradford and Birmingham relatively few London schools have catchment areas where 90 per cent or more of the pupils are from the SAB ethnic minority groups and few schools there have as many as 90 per cent of their pupils drawn from those groups. There is a clustering of schools in the lower left quadrant, reflecting that many parts of London remain predominantly White. There are also some schools where there are many fewer SAB pupils enrolled than living in the catchment area, but there is also a large number of schools – many more relatively than in the other three LEAs shown in Figure 2 – with a mixed ethnic composition. Indeed, the situation in those three is typical of all of the non-London LEAs (shown in Figure 3). The towns and cities with large SAB populations outside London (especially those with large South Asian populations) are residentially more segregated than the capital city (Johnston, Poulsen *et al.*, 2016), and their schools reflect that situation: many more London neighbourhoods and schools have mixed ethnic populations than is the case elsewhere in the country.

Figure 3. The relationship between the proportion of a school's modelled catchment area pupils with either a South Asian or Black (SAB) ethnicity and the proportion of the school's population with those ethnicities: Local Education Authorities outside London with more than 10 per cent of their pupils SAB.



Student flows: a case study

- 28 The results of the aggregate analyses reported above suggest that in the great majority of cases the ethnic composition of English primary schools reflects that of their modelled catchment areas; most of the exceptions where the school's population comprises many fewer SAB pupils than its catchment area are Voluntary Aided institutions with faith-based foundations. The implication is that most pupils attend a nearby school but because in a dense urban environment most homes have several primary schools within easy reach parents do not necessarily apply to – or have their children allocated to – the nearest. So how do the areas in which they live and the schools to which they send their children differ in terms of their ethnic composition?
- 29 To address that question we use the data on all children living in and attending state primary schools in Birmingham – there were just under 50,000 of them in 2011. There were on average 4.4 schools within one kilometre of each home and 27.3 within seven kilometres. Among those pupils, only 33 per cent of Blacks, 37 per cent of White British and 50 per cent of South Asians attended a school that was the nearest to their home.
- 30 Each school has been placed into one of four categories, according to the share of its pupils who were either South Asian or Black. Table 4 contrasts the ethnic composition of the nearest school to each pupil's home to that of the school attended, also using that fourfold classification. Thus, for example, among White British students whose nearest school had less than 25 per cent of its pupils from the SAB minorities (the first row in the

first block of data) 92 per cent of them attended a school with a similar percentage drawn from the SAB groups whereas only 0.1 per cent of them attended a school where 75 per cent or more of the students were SAB. By contrast, for White British students whose nearest school was 75 per cent or more SAB (the final row in that block) only 31.5 per cent of them attended a school that was 75 per cent or more SAB and 18.2 per cent attended a school (clearly not the one in whose catchment they lived) that was less than 25 per cent SAB. Among South Asian and Black students (the second block of data in the table), of those whose nearest school was 75 per cent or more SAB (the final row in that block) 89.2 per cent attended a school that was 75 per cent or more SAB. Of those living in catchment areas of schools that were less than 25 per cent SAB, on the other hand (the first row in that block of data), only 64 per cent attended a school with a similar ethnic composition.

Table 4. Percentage of pupils in Birmingham attending primary schools with different South Asian and Black (SAB) percentages, according to the SAB percentage in their nearest school.

SAB Percentage Nearest School	School Attended			
	<24	25-49	50-74	75<
<i>White British</i>				
<24	92.0	7.1	0.7	0.1
25-49	39.2	55.6	4.1	1.2
50-74	25.7	29.5	41.0	3.9
75<	18.2	27.9	22.5	31.5
<i>South Asian and Black</i>				
<24	64.0	19.9	7.1	9.1
25-49	9.5	55.8	13.4	21.3
50-74	1.8	8.3	58.1	31.8
75<	0.6	3.1	7.1	89.2

- 31 This table shows a marked difference between Birmingham's White British and SAB pupils. Among the former, the great majority (92 per cent) of those whose nearest school was less than 25 per cent SAB attended a school with a similar non-SAB population. Of those whose nearest school had a higher SAB percentage, the great majority attended either a school with the same or one with a lower percentage. Few White British pupils attended a school whose SAB percentage was greater than that of their nearest. The reverse was the case with South Asian and Black pupils, however; they were much more likely to attend a school with a higher SAB percentage than that of their nearest establishment. This suggests a polarisation – White British pupils gravitating towards schools with lower SAB percentages than their nearest, and SAB pupils moving in the opposite direction.
- 32 If we analyse just those pupils who didn't attend their nearest school, this difference comes into sharper focus in Table 5, which is constructed in the same way as Table 4. Of Birmingham's White British pupils who did not attend the nearest primary school to their home, the great majority went to one with a smaller percentage of SAB pupils than their nearest school. Indeed of those whose nearest school was 50-75 per cent SAB (the third row of the first block of data in the table) only 16 per cent attended a school with the same percentage range and fully 78 per cent went to another school with a smaller percentage SAB – over one-third of them to a school where South Asians and Blacks made up less than one-quarter of the complement. On the other hand, of Birmingham's South Asian and Black pupils who attended a school other than that closest to their home, most

went to a school where the SAB percentage was larger than that for the one nearest to their home; of those where their nearest school had less than 25 per cent of its students SAB (the first row in the second block of data), for example, over half attended schools with a larger percentage of their student population than 25 drawn from the SAB groups.

Table 5. Percentage of pupils in Birmingham attending primary schools with different SAB percentages, according to the SAB percentage in their nearest school – pupils who didn't attend the nearest school to their home.

SAB Percentage Nearest School	School Attended			
	<24	25-49	50-74	75<
<i>White British</i>				
24	86.6	12.0	21.2	0.2
25-49	61.3	30.5	6.3	1.9
50-74	36.5	41.8	16.2	5.5
75<	22.2	34.0	27.4	16.4
<i>South Asian and Black</i>				
24	48.4	28.5	10.1	13.0
25-49	15.3	29.0	21.5	34.2
50-74	2.9	13.7	30.9	52.4
75<	0.6	3.1	7.1	89.2

- 33 Finally, Table 6 looks at those White British pupils whose nearest school was more than 75 per cent SAB and who did not attend that school; it shows the percentage of pupils in the schools that they attended who were South Asian or Black and its institutional type. Those who attended a school very different in its ethnic composition from that nearest their home – i.e. less than 25 per cent SAB – were very likely to attend a Voluntary Aided school, associated with the Roman Catholic Church. The greater the similarity between their nearest school and that attended in terms of their SAB percentage, the more likely it was that they attended a Community school with no associated faith foundation.

Table 6. Percentage of White British pupils in Birmingham whose nearest primary school was more than 75 per cent South Asian and Black who didn't attend that school, by the South Asian and Black percentage of the school attended and its type.

SAB Percentage	School Attended			
	<24	25-49	50-74	75<
<i>Type of school</i>				
Community	36.2	55.7	74.5	58.9
Voluntary Aided	62.5	44.2	24.5	25.9
Voluntary Controlled	1.3	0.0	1.0	15.2
<i>Denomination of foundation</i>				
Church of England	1.3	1.3	2.7	26.8
Roman Catholic	62.5	42.9	22.3	8.0
None	36.2	55.8	75.0	76.2

Conclusions

- 34 The core conclusion to be drawn from these analyses is that across those parts of urban England that have relatively large ethnic minority populations there is no clear evidence

that primary schools are more segregated ethnically than the neighbourhoods that they recruit from. In general, the ethnic composition of a school's catchment area – defined as the core area from which it draws 80 per cent of its pupils – is very similar to that of the school itself. The schools reflect their local neighbourhoods even though, as the Birmingham case study shows, a majority of pupils do not attend the nearest school to their home. Most parts of those towns and cities have several primary schools within easy reach and most parents, it seems, either apply for their children to attend one of those nearby or, given the operating constraints (in particular the number of applications for each school relative to the number of places available), have their children allocated to a local, if not the closest, Community school. Not surprisingly, with such a density of schools it is likely that virtually all of them have a catchment area with a similar ethnic composition to their nearest neighbours.

- 35 However, a small number of schools have an ethnic composition very different from that of their local neighbourhoods – and, as the graphs presented here show, these are more likely to have many fewer ethnic minority pupils than the catchment area than to have many more (there are more extreme outliers in the bottom right than the top left quadrants of the scatter diagrams in Figure 2). Many of these are Voluntary Aided schools associated with a religious foundation, particularly the Roman Catholic church. Some families associated with this faith send their children to such schools even though there may be one or more Community schools closer to their home. Indeed, because such Voluntary Aided schools have greater control over their admissions procedures than Community schools, non-Roman Catholic families may find it harder to have their children accepted to such schools near to their homes even if they preferred them to go there. To some extent parents may use a faith-based establishment to ensure that their children attend schools with fewer South Asian and Black pupils than those nearest to their homes, but there is no convincing evidence that this is the case in large numbers; certainly it does not appear to be a major feature of the school system.
- 36 The general pattern is thus of the ethnic composition of schools largely reflecting that of the age group living in the neighbourhoods within which they are situated. Residential segregation – although declining slightly in recent years – is especially intense in many of the older manufacturing towns (most of them in parts of Yorkshire and Lancashire) with substantial concentrations of South Asian ethnic group members. Their schools are similarly segregated; most are either predominantly South Asian and Black in their ethnic composition or are predominantly White British. Elsewhere in urban England, notably in London, neighbourhoods are ethnically more diverse and this is reflected in the composition of the local schools. In such densely populated areas, many children do not attend the primary school nearest to their home but most – through a combination of parental preference and Local Education Authority allocation procedures – attend one of the several that are relatively close by, most if not all of which serve catchments with a similar ethnic composition. Most of England's schools, therefore, mimic and reflect the ethnic composition of the areas they serve: a few – many of them faith-based institutions associated with the Roman Catholic church – differ from the local population's ethnic composition, reflecting their preference for pupils associated with that faith (relatively few of whom are either South Asian or Black¹⁹), and some parents' preference for such schools even if they may be outside their home neighbourhoods. They are minor variants from a general pattern and not in any way evidence that England's primary schools are in general more segregated than England's urban residential mosaics.

- 37 Given the concern expressed, by the Casey Review and other commentaries discussed earlier, regarding the potential negative impacts of ethnic segregation, especially ethnic segregation in schools, on the development of a cohesive, integrated society, it is interesting that neither that review nor the commentaries make proposals regarding possible desegregation policies.²⁰ Casey makes twelve recommendations for a ‘new programme to help improve integration and opportunity’ (pp.167ff.) but none are specific with regard to reducing segregation, either in neighbourhoods or in schools: the only reference is to (unspecified) ‘programmes with a clear focus on reducing segregation identified with local areas’. As the analyses reported here suggest, ethnic residential segregation in English towns and cities could be a function of housing market operations (in which many minority ethnic group members experience disadvantage because of their economic situations, but rarely discrimination) combined with culturally-based choice, and school segregation reflects the operation of those processes, linked to variations in the age profiles of different ethnic groups (see Harris *et al.*, 2015). A problem firmly grounded in urban geographies has been identified, but not its resolution.

BIBLIOGRAPHY

- BOTERMAN W.R. (2013), “Dealing with diversity: middle-class family households and the issue of ‘Black’ and ‘White’ schools in Amsterdam”, *Urban Studies*, 50, pp. 1130-1147.
- CANTLE T., KAUFMANN E. (2016), *Is Segregation Increasing in the UK?*, available at <https://www.opendemocracy.net/wfd/ted-cantle-and-eric-kaufmann/is-segregation-on-increase-in-uk>.
- CATNEY G. (2016), “Exploring a decade of small-area ethnic (de-)segregation in England and Wales”, *Urban Studies*, 53, pp. 1691-1709.
- FINNEY N., SIMPSON L. (2009), “*Sleepwalking to Segregation?*”, *Challenging Myths about Race and Racism*, Bristol, The Policy Press.
- HAMNETT C. (2012), “Concentration or diffusion? The changing geography of ethnic minority pupils in English secondary schools, 1999-2009”, *Urban Studies*, 49, pp. 1741-1766.
- HAMNETT C., BUTLER T. & RAMSDEN M. (2013), “‘I wanted my child to go to a more mixed school’: schooling and ethnic mix in East London”, *Environment and Planning A*, 45, pp. 553-574.
- HARRIS R., JOHNSTON R.J. (2008), “Primary schools, markets and choice: studying polarization and the core catchment areas of schools”, *Applied Spatial Analysis and Policy*, 1, pp. 59-84.
- HARRIS R., JOHNSTON R.J. (2011), “Comments on Singleton *et al.*”, *Computers, Environment and Urban Systems*, 35, pp. 493-494.
- HARRIS R., JOHNSTON R.J. & BURGESS S. (2015), “Featured graphic. Tangled spaghetti: modelling the core catchment areas of London’s secondary schools”, *Environment and Planning A*, doi 10.1177/0308518X15603987.
- HARRIS R., JOHNSTON, R.J. & MANLEY D. (2015), “The changing interaction of ethnic and socio-economic segregation in England and Wales, 1991-2011”. *Ethnicities*, doi: 10.1177/1468796815595820.

- JOHNSTON R.J., BURGESS S., WILSON D. & HARRIS R. (2006), "School and residential ethnic segregation: an analysis of variations across English local authorities", *Regional Studies*, 40, pp. 973-990.
- JOHNSTON R.J., POULSEN M.F. (2006), "Ethnic residential segregation in England: getting the right message across", *Environment and Planning A*, 38, pp. 2195-2199.
- JOHNSTON R.J., POULSEN M.F. & FORREST J. (2015), "Increasing diversity within increasing diversity: the changing ethnic composition of London's neighbourhoods, 2001-2011", *Population, Space and Place*, 21, pp. 38-53.
- JOHNSTON R.J., JONES K., MANLEY D. & OWEN D. (2016), "Macro-scale stability with micro-scale diversity: modelling changing ethnic minority residential segregation – London, 2001-2011", *Transactions of the Institute of British Geographers*, NS41, pp. 389-402.
- JOHNSTON R. J., POULSEN M.F. & FORREST J. (2016), "Ethnic residential patterns in urban England and Wales, 2001-2011: a system-wide analysis", *Tijdschrift voor Economische en Sociale Geografie*, 107, pp. 1-15.
- MIKESELL M.W., MURPHY A.B. (1991), "A framework for comparative study of minority-group aspirations", *Annals of the Association of American Geographers*, 81, pp. 581-604.
- PEARCE J. (2000), "Techniques for designing school catchment areas for comparison with census data", *Computers, Environment and Urban Systems*, 24, pp. 283-303.
- RANGVID B.S. (2007), "Living and learning separately? Ethnic segregation of school children in Copenhagen", *Urban Studies*, 44, pp. 1329-1354.
- SINGLETON A., LONGLEY P.A., ALLEN R. & O'BRIEN O. (2011), "Estimating secondary school catchment areas and the spatial equity of access", *Computers, Environment and Urban Systems*, 35, pp. 241-249.
- WEST A., HIND A. (2007), "School choice in London, England: characteristics of students in different types of secondary schools", *Peabody Journal of Education*, 82, pp. 498-529.

NOTES

1. The programme can be watched on <http://www.channel4.com/programmes/what-british-muslims-really-think/on-demand/62315-001>; the headline appeared in the *Daily Mail* - <http://www.dailymail.co.uk/news/article-3533041/Warning-UK-Muslim-ghettoes-Nation-nation-developing-says-former-equalities-watchdog.html>.
2. Dame Louise Casey, *The Casey Review: a Review into Opportunity and Integration*, published in December 2016 by the Queen's Printer and Controller of Her Majesty's Stationery Office and available at <https://www.gov.uk/government/publications/the-casey-review-a-review-into-opportunity-and-integration>.
3. Both appeared in *The Times* on 6 December 2016: <http://www.thetimes.co.uk/article/ethnic-misogyny-and-patriarchy-fuels-social-division-33vznz6gwj> and <http://www.thetimes.co.uk/past-six-days/2016-12-06/comment>.
4. Trevor Phillips, *After 7/7: Sleepwalking to Segregation*. Speech to Manchester Council for Community Relations, 22 September 2005, https://www.jiscmail.ac.uk/cgi-bin/webadmin?A3=ind0509&L=CRONEM&E=quoted-printable&P=60513&B=-----_%3D_NextPart_001_01C5C28A.09501783&T=text%2Fhtml;%20charset=iso-8859-1&pending=.
5. It appeared in *The Sunday Times* - http://www.thesundaytimes.co.uk/sto/Magazine/Features/article1685107.ece?CMP=OTH-gnws-standard-2016_04_09.

6. <http://www.theguardian.com/education/2013/feb/28/school-20-languages-gladstone-primary>.
7. But see Simon Burgess's refutation of that conclusion: <http://www.integrationhub.net/are-we-headed-to-integration-or-segregation-for-englands-pupils/>.
8. The NPD only covers England and comparable data are not available for Northern Ireland, Scotland and Wales.
9. On which see <http://www.integrationhub.net/what-about-the-whites-saggar/> and <http://www.integrationhub.net/majority-avoidance-one-of-the-few-holes-in-caseys-strong-report/>.
10. The authorities were all of the 32 London Boroughs and the City of London, plus Bedford, Birmingham, Bradford, Bristol, Coventry, Derby, Dudley, Kirklees, Leeds, Leicester, Luton, Manchester, Milton Keynes, Nottingham, Oldham, Peterborough, Reading, Rochdale, Sandwell, Sheffield, Slough, Southampton, Stoke-on-Trent, Tameside, Trafford, Walsall, and Wolverhampton.
11. It is also possible that the segregation patterns are in part a function of socio-economic differences between the ethnic groups and especially between them and the White British; the NPD provides little data allowing this to be explored in depth, however.
12. For a discussion of the criteria generally applied, see document *Admission Criteria* on the Department for Education's website - <https://www.gov.uk/schools-admissions/admissions-criteria>; for Birmingham (the case study discussed in detail below) see the booklet at <http://www.birmingham.gov.uk/online-admissions>.
13. A fifth category has been added since 2011 (the date for which all of the data analysed here apply): academies that are state funded but independent of Local Education Authorities with considerable freedom over their admissions procedures. By April 2016 17 per cent of English primary schools had opted for academy status: <https://fullfact.org/education/academies-and-maintained-schools-what-do-we-know/>.
14. This is explained in <http://derby.anglican.org/education/wp-content/uploads/2013/07/whats-the-difference-leaflet.pdf>.
15. For fuller details see the relevant House of Commons Library Briefing Paper 06972 on *Faith Schools*: <http://researchbriefings.files.parliament.uk/documents/SN06972/SN06972.pdf>. The references therein to Academies and Free Schools refer to changes in the English school system since 2011, the year for which the data analysed here refer to. Academies are state-funded schools outwith the control of a Local Education Authority: their funding comes directly from the central Department for Education and by 2016 2,440 of 16,766 primary schools (almost all of them previously community schools) had opted for this status. Free Schools are new schools, also centrally state-funded, established by parents and other local groups outwith Local Education Authority controls and with greater freedoms than Academies: there are currently 118 primary Free Schools.
16. R. Johnes and J. Andrews, 'Increasing the number of faith schools could also increase social segregation and lower social mobility', *LSE British Politics and Policy Blog*, 28 December 2016, http://blogs.lse.ac.uk/politicsandpolicy/faith-schools-and-social-mobility/?utm_source=feedburner&utm_medium=email&utm_campaign%20=Feed%3A+LSEGeneralElectionBlog+%28General+Election+2015%29 and R. Johnes and J. Andrews, *Faith Schools, Pupil Performance and Social Selection*, Education Policy Institute, 2 December 2016, <http://epi.org.uk/report/faith-schools-pupil-performance-social-selection/>.
17. Indeed, Voluntary Aided schools are more common in urban areas: they formed 29 per cent of all London primary schools in 2011, for example, and 38 per cent in the Northwest region, compared to 23 per cent nationally and just 15 and 17 per cent in the less-urbanised East Midlands and East of England regions. Similarly, Roman Catholic schools formed 11 per cent of the national total, but 20 and 21 per cent respectively in the more-urbanised Northwest and Northeast regions (many of the schools in those areas reflecting the major streams of Irish

immigrants to the towns specialising in different aspects of the textile industries in the nineteenth and early twentieth centuries).

18. According to the 2011 census 66.5 per cent of Blackburn's population was White British, 13.4 per cent Indian and 12.1 per cent Pakistani; Bradford's population was 63.9 per cent White British and the only substantial ethnic minority were Pakistanis, who formed 20.4 of the total. Birmingham's population was only 53.1 per cent White British; 13.5 per cent were Pakistani, 6.0 per cent Indian, 3.0 per cent Bangladeshi, 4.4 per cent Black Caribbean and 2.8 per cent Black African. In Greater London only 44.9 per cent of the population was White British; Indians, Pakistanis and Bangladeshis comprised 6.6, 2.7 and 2.7 per cent respectively; Black Africans comprised 7.0 per cent of the total, Black Caribbeans 4.2 per cent, and Black Other 2.1 per cent.

19. The 2011 census shows that only 10 per cent of South Asians in England identified as Christians, but the data do not differentiate across the different Christian faiths; 69 per cent of those self-identifying as Black also identified as Christians, but there are no data on how many of them are Roman Catholic.

20. For commentaries on the Casey Review see <http://www.prospectmagazine.co.uk/magazine/louise-casey-review-ill-conceived-intervention-immigration-integration> and <http://www.integrationhub.net/blog/>.

ABSTRACTS

Ethnic segregation, in both neighbourhoods and schools, is an issue regularly raised in the British media, usually associated with arguments that it is growing and generating an increasingly-divided society. Segregation in schools is often presented as particularly problematic, and as greater than neighbourhood segregation – with the implication that a combination of parental choice and Local Education Authority admissions criteria are responsible for that heightened segregation. The validity of such claims is evaluated here for English primary schools using data from the National Pupil Database. Analyses show that for the great majority of schools the proportion of their pupils from South Asian or Black minorities is commensurate with the proportion in their model-defined catchment areas. The main exceptions to this are a relatively small number of Voluntary Aided schools, most with a religious foundation, that can apply faith-based criteria in their admissions policies and tend to draw pupils from wider areas than Community schools lacking that flexibility. A case study of flows in one local authority sustains this general argument – that any greater segregation of schools than neighbourhoods in England reflects the different age profiles of White and non-White populations and is not the result of ethnically-biased schools admissions procedures.

La ségrégation ethnique, tant dans les quartiers qu'en milieu scolaire, est périodiquement évoquée dans les médias britanniques qui observent le plus souvent qu'il s'agit d'un phénomène en expansion qui engendre une société de plus en plus clivée. La ségrégation à l'école est souvent présentée comme spécialement problématique et plus importante que celle des quartiers, en d'autres termes que son augmentation serait le résultat d'une combinaison des critères parentaux et de ceux de l'autorité locale en charge de l'enseignement. Dans cet article nous testons la validité de telles affirmations pour les écoles primaires anglaises sur base des données nationales. Des analyses montrent que pour la grande majorité des écoles, la proportion d'élèves venant d'Asie du Sud ou issus des minorités noires est en adéquation avec leur part dans les

zones de recrutement définies par le modèle. Les principales exceptions que nous avons trouvées viennent d'un nombre relativement faible d'écoles subventionnées, pour la plupart des écoles confessionnelles qui ont les moyens d'appliquer des critères basés sur la foi dans leurs politiques d'admission et tendent à attirer les élèves de zones plus étendues que les écoles communautaires auxquelles manque cette flexibilité. Une étude de cas sur les flux observés au niveau d'une autorité locale soutient l'argument général qu'en Angleterre toute ségrégation scolaire supérieure à une ségrégation résidentielle reflète les différents profils d'âge des populations blanches et non blanches, et ne résulte pas de procédures d'admission ethniquement biaisées.

INDEX

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