

Narrowing down the determinants of between-school segregation: An analysis of the intake to all schools in England 1989 to 2011

Stephen Gorard and Rita Hordosy
School of Education, Durham University
s.a.c.gorard@durham.ac.uk

Abstract

This paper continues an on-going investigation of the social and economic ‘segregation’ of students between schools in England, and of the likely causes of the levels of and changes over time in that segregation. The data presented here come from a re-analysis of the intakes to all schools in England 1989-2011 as portrayed by the official returns to the Annual Schools Census. Using a segregation index it shows how strongly clustered the students are in particular schools in terms of six indicators of potential disadvantage – representing poverty, learning difficulties, first language and ethnicity. It shows again, and with further years than previously, that each indicator has its own level and pattern of change over time. This suggests that there is not just one process of segregation. However, the patterns for primary-age schools (5-10) are exactly the same for most indicators as the patterns for secondary-age schools (11-18). These two findings in combination rule out a large number of potential explanations either for changes in or levels of segregation - including volatility of small numbers, and recent changes in the types of schools and in the ways in which school places are allocated. Instead, based on correlations with other indicators of population, school numbers, and the economy, a new set of determinants are proposed. The long-term underlying level of segregation appears to be the outcome of structural and geographic factors. However, the annual changes in segregation for most indicators can be explained most simply by changes in the prevalence of each indicator. For example, the UK policy of inclusion has considerably increased the number of students with statements of special needs in mainstream schools, and this has resulted, intentionally, in less segregation in terms of this indicator. Segregation by poverty, however, requires something further to explain changes over time, and this is provided at least partly by changes in GDP over time, and partly as a one-off impact of increased parental choice. Some of these factors, such as the global economy or the prevalence of specific ethnic minority groups, are not directly under policy-makers’ control. This means that it is the more malleable factors leading to the underlying levels of poverty segregation that should be addressed by any state wanting a fair and mixed national school system. In England, these controllable factors include the use of proximity to decide contested places at schools, and the continued existence of faith-based and selective schools. The implications are spelt out.

This paper considers the pupil intakes to Academies in England, and their attainment, based on a re-analysis of figures from the Annual Schools Census 1989 to 2012, the Department for Education School Performance Tables 2004 to 2012, and the National Pupil Database. It looks at the national picture, and the situation for local education authorities, and also examines in more detail the trajectories of the three original Academies. It confirms earlier studies in finding no convincing evidence that

Academies are any more (or less) effective than the schools they replaced or are in competition with. The prevalence of Academies in any area is strongly associated with local levels of SES segregation, and this is especially true of the more recent Converter Academies. Converter Academies, on average, take far less than their fair share of disadvantaged pupils. Sponsor-led Academies, on the other hand, tend to take more than their fair share. Their profiles are so different that they must no longer be lumped together for analysis as simply 'Academies'. Academies are not shown to be the cause of local SES segregation. Instead they are merely more likely to appear in areas that already have inequitable school mixes. This means, of course, that Academies are not helping reduce segregation (as was one of their original purposes) or increase social justice in education, and the paper concludes that maintained schools should be preferred for this purpose.

Introduction

This paper concerns the extent to which children and young people are clustered together with others like them by the national school system in England. However, the issues it raises are international concerns, and the paper reveals for the first time a new kind of explanation for this clustering, and its changes over time. This unintended clustering of students within schools in terms their personal characteristics matters for a number of reasons. Put simply, the school mix of students seems to influence how students are treated within each school (McCoy et al. 2012), how well they are taught (Harris and Williams 2012), how well they learn (Goldsmith (2011), the achievement gap between advantaged and disadvantaged (Knowles et al. 2012), wider school outcomes such as students' sense of justice (Gorard 2012a), and longer-term outcomes such as levels of aspiration (Richardson 2012). Students growing up in more socially segregated settings tend to have less qualified teachers, substandard materials, more dilapidated plant, and to experience higher crime, and generally poorer local services (Massey and Fischer 2006). Putting disadvantaged students together in selected schools simply does not work, whereas the most egalitarian systems tend to have the highest average attainment in formal tests and the highest percentage of very skilled students (Condrón 2011). Equity and excellence are completely compatible, while apparently unintentional 'segregation' by race or social class, for example, generally gains nothing for a society and could be considered an affront. Segregation is used as the term here, although clustering and stratification are perfectly proper alternatives, because of its traditional use in this way to describe the visible outcome of a process (rather than necessarily an intention).

Of course, some separation of students between schools is quite deliberate. A school set up to be single-sex will tend to increase the overall national level of segregation between boys and girls. A special school set up to take in children with severe learning difficulties will tend to increase the segregation between such disabled children and the rest. But the subject of this paper is the more widespread phenomenon of unintended clustering within a national state-funded system of mainstream schools. For example, a school that selects its intake in terms of religion may also tend to increase segregation by ethnic origin (Harris 2012), parental income and education (Allen and West 2011), or social class (Shepherd and Rogers 2012). A school that selects students by prior attainment may tend to increase segregation by social class because of the well-established association between the two. However,

examples like these cannot, by themselves, explain the considerable underlying level of social segregation found in previous studies of the system in England (Gorard et al. 2003).

Any analysis also needs to consider new types of schools, such as Academies in England (Exley 2011), Free Schools in Sweden (Lindborn 2010), and Charter Schools in the US (Ni 2012) as perhaps exacerbating segregation. It needs to consider changes in the policy and practice of allocating contested school places, with new Codes for England in 2003 and 2007, which may have tended to reduce segregation slightly (Allen et al. 2012). There is also an on-going policy of integrating children with special educational needs in mainstream schooling, and a parallel increase in the number of children diagnosed as having a special educational need of any kind (Tomlinson 2012). In addition to changes in the types of schools and their admission practices, and changes in the overall school population characteristics, there are geographic factors such as patterns of residential and regional segregation, societal changes due to immigration, and economic issues such as changes in the number defined as living below a poverty threshold. And the most commonly cited explanation of all for social segregation is the expression of parental preferences for schools. Choice or preference has been claimed to worsen between-school segregation because a market in schools tends to privilege the already advantaged. On the other hand, an increase in choice has also been demonstrated to be linked to a decline in social segregation, as it is the most disadvantaged who tend to have most to gain (Gorard et al. 2003).

Different studies in different countries have previously tended to focus on only one kind of between-school segregation at a time. In the US, there has traditionally been a focus on race, in the UK on poverty, and in Spain on recent immigrants for example (Bonal 2012). In each case the concern is with how clustered any potentially disadvantaged group is in comparison to what we would expect from their prevalence in the more general population. In the US, more recent work has also considered poverty and linguistic minorities (Jacobs 2011), and in England, separation by attainment (Harris 2012). Gorard and Cheng (2011) have now proposed, on the basis of differing patterns of change over time for different indicators of disadvantage in England, that these patterns must have different causes. Instead of there being one process of clustering students into specific schools, several processes are needed to explain the patterns. One seems to affect segregation by poverty, another ethnicity and language, with perhaps further distinct processes affecting the distribution of students with special needs (and of course there may be others not covered by the datasets involved). This new paper presents equivalent figures for both primary and secondary schools over 22 years in England for the first time, and uses these figures to help present a possible explanation for these various patterns.

All state-funded schools in England are ‘choice’ schools in the sense that any family can express a preference to attend any of them. This right is enshrined in law by the Education Reform Act 1988, and guaranteed and extended by succeeding case law. In reality, this freedom of choice is curtailed by practicalities such as distance, by bureaucratic rules such as those pertaining to means-tested transport for poorer families, and of course by over-subscription for places at popular schools. All places are allocated on the same day across the country. Local authorities and some individual schools are permitted to decide their own over-subscription criteria within

certain limits (lotteries are permissible, for example, whereas parental interviews are not). This all means that the state system in England since 1989 is an ideal case study of the possible impact of parental choice. Choice policies are explained further in Gorard et al. (2003), and education policy in England more generally is outlined in Harris and Gorard (2009).

Policy-makers worldwide keep creating new kinds of schools that are similar to every other kind (i.e. there is no dismantling or radical re-engineering of the concept of schools), claiming success for electoral or other reasons, and then not allowing these schools to be evaluated properly. Several studies based in the US have reported evidence that attainment can be affected by the type of school attended, such as the Promise Academy charter middle school (Dobbie and Fryer 2009), Knowledge is Power Program (KIPP) middle schools (Tuttle et al. 2010), and more general charter schools (Gleason et al 2010). A recent example in England is the Academies programme, started by one government in 2000, continued by the next government from 2010, and now extended to include 'Free' schools.

City Academies were announced as a new form of secondary school for England in 2000, and the first three opened in 2002. They were independent of local authority control, like the prior City Technology Colleges, and received preferential and recurrent per pupil funding, like the prior Specialist Schools. These early Academies were all replacements for existing schools deemed to be in spirals of decline, with low levels of pupil attainment, set in deprived inner city areas, losing pupil numbers and taking more than their fair share of disadvantaged pupils. They were re-badged and often re-built, with new names, new governance and management, relaxation of National Curriculum requirements, and part-funded by sponsors from the private or third sectors. They were claimed by advocates to be better than their predecessor schools, in terms of pupil performance, and to be a model of a better school for the future. Over time and across political administrations in the UK, their number has grown quickly. By the time of the Schools Census in 2012, there were 1,165 secondary Academies which was more than one third of all state-funded schools in England.

Originally, the Academies were set up both to stop the spiral of decline and to improve pupil results. The schools selected at the outset were among the most disadvantaged and so where they changed their intake as a result of Academisation, this was no threat to local levels of socio-economic segregation between schools. For example, where new Academies ended up taking a smaller share of local free-school-meal (FSM) eligible pupils, this meant that neighbouring schools had to take more and so the local clustering of poorer children into specific schools would reduce. However, the Academies programme more recently has only been driven by the purported school improvement agenda, and the social justice element is now largely ignored, meaning that almost any school is eligible to convert. Private fee-paying schools, ex-grammar schools, Foundation schools and many others (including primary) have become Academies. And the even newer Free Schools have been set up as Academies from fresh. All of these are clearly nothing like the most disadvantaged schools in their area, and were not in anything like a spiral of decline beforehand. This raises the very real danger of increased local SES segregation between schools, especially if the new Academies also begin to take a smaller share of FSM eligible pupils like the early ones did.

So this paper updates those published earlier (Gorard 2005, 2009), to address three related questions:

- What is the link between the prevalence of Academies and local levels of segregation between schools?
- Are Academies performing better than other schools, with equivalent pupils?

and so:

- Is the gain in pupil attainment from Academies worth the possible risk of increased segregation?

Method

The new analysis presented here is based on figures from the Annual Schools Census (ASC) for all schools in England from 1989 to 2011. The analysis involves all mainstream state-funded schools taking students of compulsory school age. This is as long as records exist for any individual measures of student disadvantage, and includes around 93% of all school students (the other 7% in fee-paying and special institutions are accounted for in the analysis). The ASC includes the number of full-time equivalent students in each school, the number taking free school meals (labelled FSMt in figures and graphs below), the number known to be eligible for free school meals (FSMe), the number known to have a statement of special educational needs (SENs), or special needs without a statement (SENn), the number known to have English as a second or additional language (ESL), and the number of each known ethnic origin. The precise operational definition of each of these changes very slightly over time, and this affects the perceived prevalence of these indicators (a point picked up later in the paper). FSM is only available for families legally defined as living below a poverty threshold (Gorard 2012b). Some students are legally eligible for FSM (FSMe) but only some of these choose to take the meal (FSMt). Ethnic origin is converted for the purposes of this paper into a binary variable based on the number known not to have reported White UK ethnicity (NW). This aggregation is used because many of the minority ethnic groups are very small. Each of the above is an indicator of potential disadvantage in education.

The relevant figures for each school in each year were used to calculate what has been termed the Gorard Segregation Index (GS) and the Dissimilarity Index (D) at a national level but for primary and secondary schools separately. Both GS and D indices gave the same substantive answers (as they always do when there is no abrupt change in the level of the underlying indicators). Therefore, only the GS results are presented here (for a full comparison see Gorard 2009). GS is effectively the same thing as the Hoover Index, often used for looking at residential population concentrations, which according to some commentators is ‘computationally equivalent to the index of dissimilarity’ anyway (Long and Nucci 1997, p.431). It is the same as halving the Women in Employment or WE index used to measure occupational segregation by the OECD and other bodies (OECD 1980). It is based on the Lorenz curve and closely tied to the Gini Coefficient, and appears in yet another guise in economics as the Robin Hood Index (Maxi-pedia 2012).

Each school's residual for GS is the absolute value of the result of subtracting the population proportion of all students in each school from the population proportion of potentially disadvantaged students (such as those eligible for FSM) in each school. GS itself is the sum of these residuals for all schools, then divided by two. More formally, $GS = 0.5 * (\sum |F_i/F - T_i/T|)$

Where:

F_i is the number of disadvantaged children in school i

T_i is the total number of children in school i

F is the total number of disadvantaged children in England

T is the total number of children in England.

This provides the proportion of all disadvantaged students who would have to exchange schools in order for all schools to have their 'fair share' of disadvantaged students.

The resulting twelve GS results, one for each indicator of disadvantage and for both primary and secondary age schools, are compared graphically. They are compared in terms of Pearson R correlations, and linked to other relevant indicators such as changes in the numbers of children with each indicator of disadvantage, the number of schools, the number of children taught outside mainstream schools or in the small fee-paying sector, and to the annual gross domestic product (GDP). The findings are used to draw robust substantive conclusions about the trends over time. The findings make some commonly accepted explanations for levels of, and changes in, segregation highly implausible.

The data in this paper are all for populations. The analysis excludes fee-paying schools (7% of total) and young people taught long-term in hospitals and offender institutions. These are systematic exclusions for pragmatic reasons based on the quality of available data. There is no random selection of cases, nor any randomisation of cases to groups. Therefore, and obviously, none of the derivatives from random sampling theory such as significance tests or confidence intervals are used in this paper. Despite this, reviewers of the paper and members of the journal's editorial board wanted to know why significance tests were not used in the paper. This is worrying. Put simply, significance tests, standard errors, confidence intervals and the like are intended for use under strict conditions including a full and truly random sample (Gorard 2006). In the absence of a random sample, such as when the data are for a population, these tests are irrelevant, the probabilities generated are meaningless, and the results would be misleading to anyone advocating their use in this situation. In point of fact, and even with a random sample, such techniques can never be used anyway for the purpose that was proposed by the reviewers and board members (Gorard 2010).

The dataset is based on 36 local authority areas. These were selected to be the areas with the highest, lowest and median levels of segregation for each of the six indicators of potential disadvantage (FSMe, FSMt, SENs, SENn, NW, ESL), and the areas with greatest, lowest and median growth in those levels of segregation 1999 to 2012 (for ESL measures from 2000 are used instead of 1999). The dataset contained 18

measures of segregation (for 2000, 2012 and the growth over time), and 145 potential explanatory variables (such as local unemployment figures).

‘Selective’ schools in 2000 include grammar and secondary modern schools, and the small number of City Technology Colleges. ‘Community’ schools in 2000 include Comprehensives with any age range, and Middle deemed secondary schools.

For model-based estimates of unemployment, several figures are missing for Shropshire. These were replaced with the mean of the figures available.

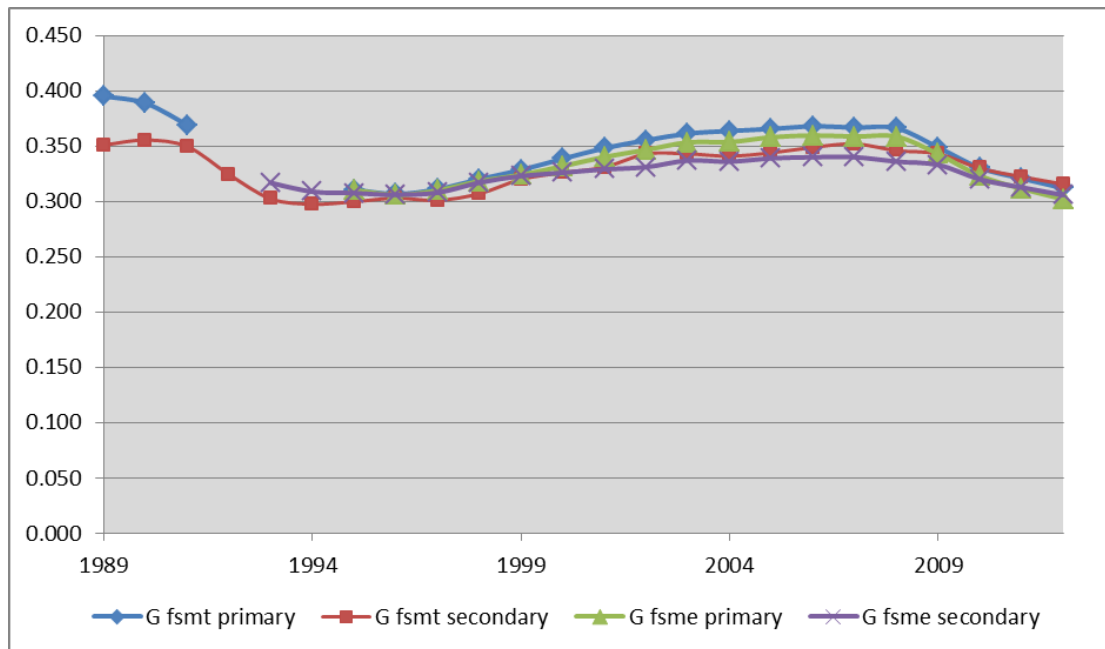
Segregation was calculated using both GS and D. Only the figures for GS are shown here.

Correlation coefficients (Pearson’s R) were calculated for six measures of segregation with those 145 variables. Only 45 variables were retained, as having a correlation of |0.3| or higher.

Findings

A key but unexpected finding from this new analysis is that the pattern of between-school segregation over time, when considered in terms of free school meal eligibility and take-up, is the same for both the primary and secondary school sectors (Figure 1). There is no time lag, such that secondary schools subsequently reflect the school mixes of the primary schools that feed them. Whatever it is that determines the level of between school segregation in each year, and whatever determines the pattern of change over time, it applies to schools for both age groups of students at the *same* time. When school intakes become more mixed, as they did in 2011 for example, it happens to approximately the same extent in both sectors. The same applies when school intakes become less mixed by poverty, as they did in 1998. And the same pattern applies if another index of unevenness is used, such as the Dissimilarity Index (see above).

Figure 1 - Segregation indices for free school meals, all schools, England 1989 to 2012



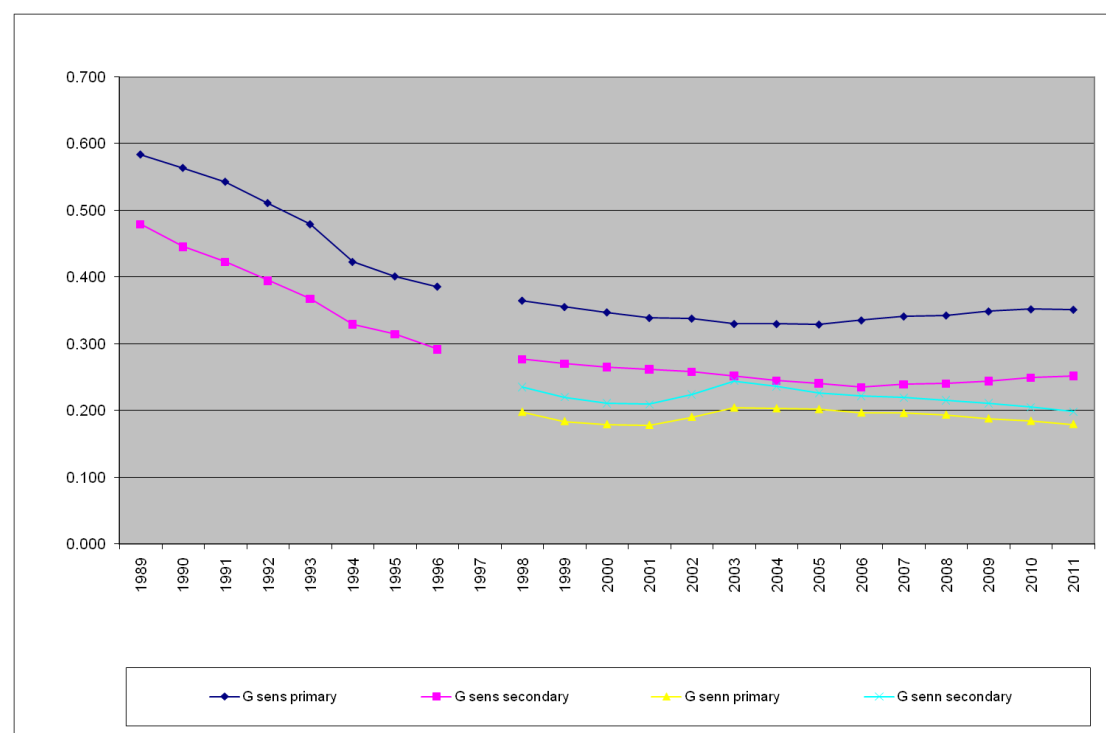
Note: the data points for each indicator appear only when data is available for that year. For example, eligibility for free school meals (FSMe) was not recorded until 1993.

This simple result is very useful, because it eliminates from consideration a lot of otherwise plausible explanations. Annual changes in segregation by poverty are not caused by anything that could be specific to, or differentiated by, the age range of the schools involved. For example, the changes over time are unlikely to have been caused by the introduction of new types of schools. The new Free Schools, set up by local parents and other interested bodies and based on the Swedish model and US Charter Schools, were introduced in 2010 and are just getting going. This is too early. Academies, which are similar to both Free and Charter Schools but were set up initially as a national intervention to deal with ‘failing’ schools, have been around since 2002 (Gorard 2005). So Academies could be involved in more recent changes to segregation. But until very recently they only affected the secondary school sector. There is no conceivable way that their onset could have created an instantaneous and equivalent change in the primary sector. Instead, the causes must be sought in somewhat slower societal or economic developments, such as changes in the levels of residential segregation, which could affect both school sectors equivalently and in parallel.

The same situation applies to changes in segregation in terms of two other possible indicators of disadvantage (Figure 2). There has been a considerable decline in the segregation of young people with statements of special educational needs (SENs), followed by a more recent stasis and slight rise since 2007. This is the same in both primary and secondary age schools. So again, the determinants of the changes over time cannot be sector specific. The figures for special educational needs without statements (SENn) have only been collected nationally since 1998, but these again show the same patterns over time for primary and secondary, but a slightly different pattern to SENs, and of course to FSM in Figure 1. It is also noticeable that there is no consistent, abrupt or delayed change in the patterns here following changes in the legislation about school admissions in 2003 and in 2007 (see above). Whatever

difference these changes in policy made it seems to be have been marginal in comparison to the other determinants of segregation.

Figure 2 - Segregation indices for SEN students, all schools, England, 1989-2011

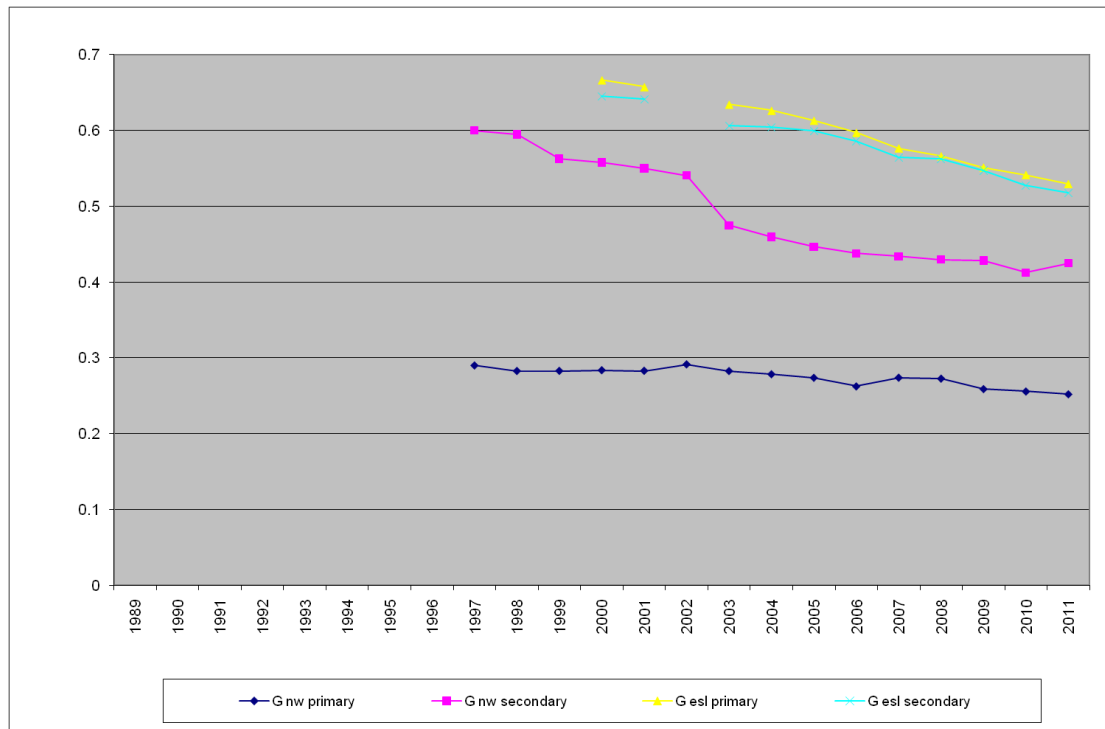


The results in Figures 1 and 2 combined yield even more information about the possible determinants of segregation. We must assume that whatever is producing the annual changes it is the same process for primary and secondary schools. This is the principle of parsimony (Gorard 2013). But the annual changes in FSMe or FSMt do not match those for SENs which in turn are different to those for SENn. This means either that the determinants of between school segregation are specific to each indicator (i.e. there are at least three processes of segregation in play) or that the same determinant(s) is producing a different effect for each indicator. Either characterisation leads to the elimination of further candidates for determinants that would be plausible otherwise. For example, it is unlikely that market forces as represented by parental preferences for schools could lead to these very different trajectories for different indicators but the same trajectories for both sectors. The exception is the period 1990 to 1995 in which all school slowly filled with students who had arrived since the onset of the 1988 Education Reform Act. As previously demonstrated elsewhere, it is likely that increased parental choice as provided by this Act had a brief role in driving down socio-economic segregation between schools (Gorard 2003). This is so because families in the neighbourhood of desirable schools had no reason to move, whereas families in disadvantaged areas now had the right at least to request a place elsewhere.

Figure 3 shows the results for two further possible indicators of disadvantage. The between school segregation of young people for whom English is a second or additional language (ESL) has declined substantially since figures were first collected in 2000. And like the other four indicators discussed so far, the pattern is the same for

primary and secondary schools. And also like the indicators so far, ESL has a distinctive trajectory of change over time, unrelated to the others. This again means either that the determinants of between school segregation are specific to each indicator or that the same determinant is producing a different effect for each indicator.

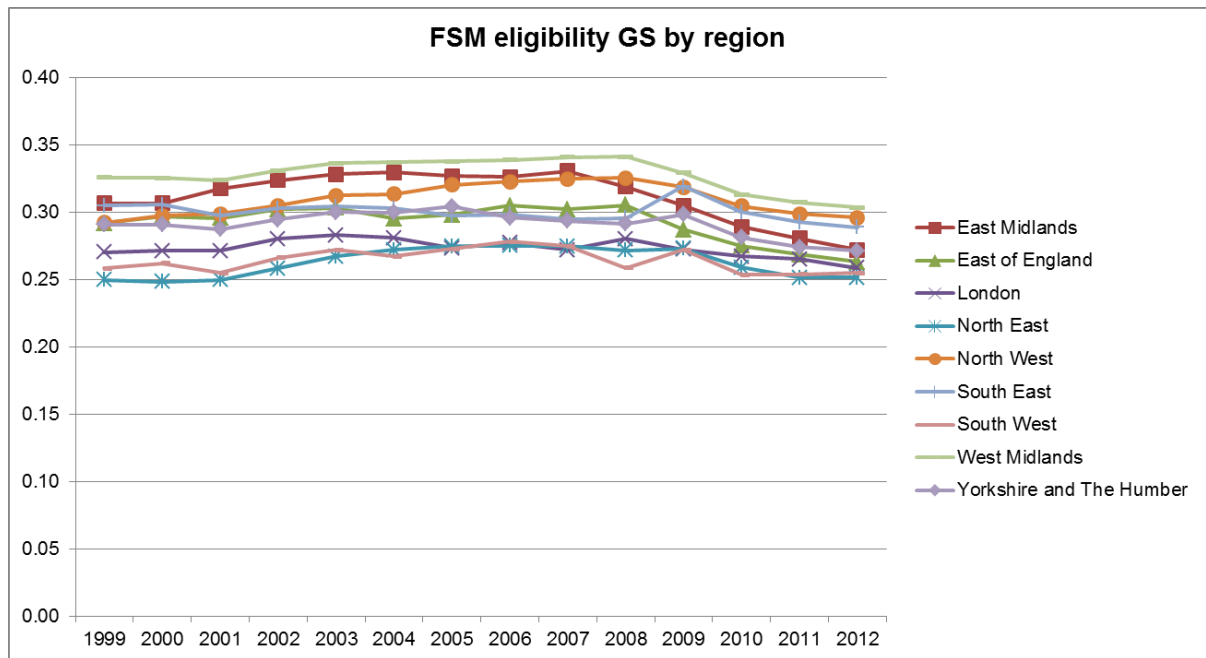
Figure 3 - Segregation indices for ethnicity and language, all schools, England, 1989-2011



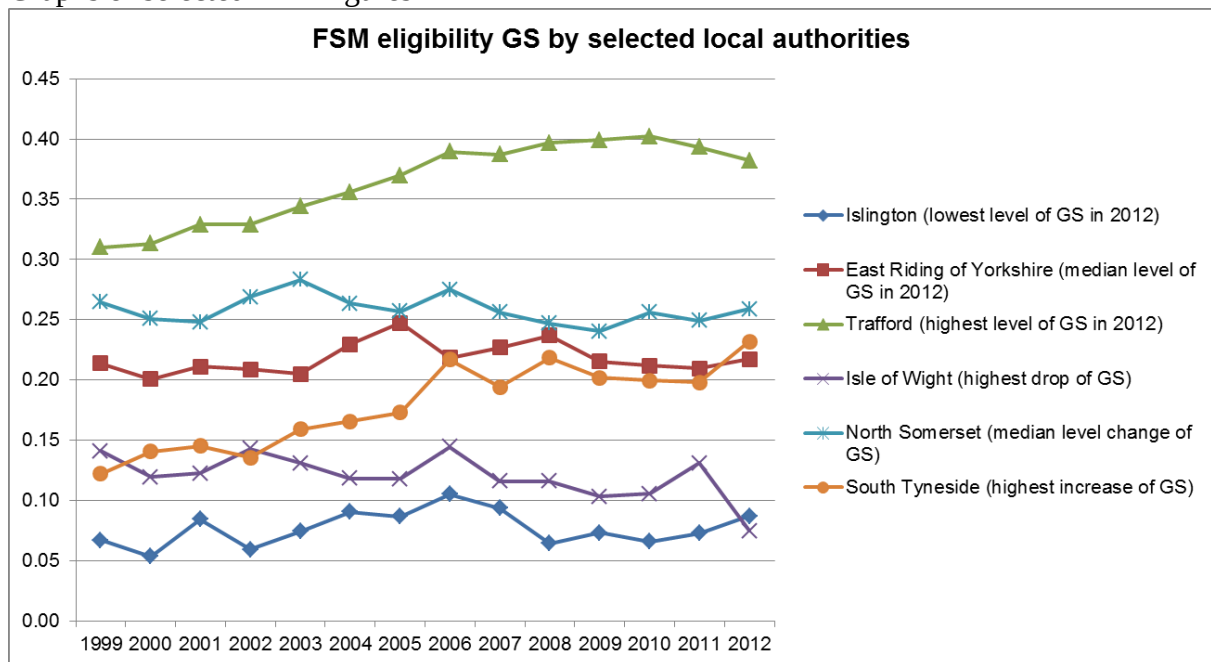
The one indicator that shows a different pattern over time between the two school sectors is segregation by ethnicity (specifically non-white UK). There has been a decline in both sectors since 1997, such that schools show a more mixed ethnic intake overall than they did in the recent past. But the decline has been much steeper and took place earlier in secondary schools than in primary schools. This delay is clearly not a time lag because it took place among the older school students first. Again, this distinctive pattern needs to be taken into account in any satisfactory explanation.

Regional and Local

Graphs of Regions – shows link to prevalence and population density to confirm national picture (e.g. London and North East low segregation but for different reasons).



Graphs of selected LEA figures



The different indicators have different patterns of correlation with the potential determinants, reinforcing the idea of different processes of segregation for each. The level of segregation and its growth over time for any indicator also have different patterns of correlation with the potential determinants. This supports the importance of analysing causes of underlying segregation and causes of annual changes separately.

The number people resident in any LEA is linked to reduced segregation for all three indicators. Populous areas have reduced all forms of segregation faster than other areas. Areas with high population density also have lower segregation, presumably

because families have feasible access to more schools than those in rural areas. Areas with high unemployment or indicators of multiple deprivation have lower levels of FSM segregation, but have tended to increase FSM segregation over time. They also have higher levels of SEN segregation. Areas not controlled by the Labour Party have shown reduced segregation by poverty over time.

Table 1 - Correlation between local resident characteristics and LEA-level segregation figures

	FSM e 2012	FSMeGr owth	SEN s 2012	SENsGr owth	NW 2012	NWGro wth
Population 2001	.26	-.34		-.30		-.26
Population 2011	.22	-.35	-.13	-.30		-.24
Population density 2011	-.35	.21		-.12	-.60	-.16
Unemployment 2011/2012 change	-.21		.12	-.16	-.35	-.15
Unemployment 1999/2000 rate	-.34	.31	.30	-.21	-.14	
Unemployment Jul 2011 to Jun 2012	-.19	.18	.31	-.24		
Unemployment 1999/2000 +/-	-.44	.31	.23	-.12	-.22	
Unemployment growth 1999-2011	.41	-.25		.19		
Education and skills IMD score 2010	-.14	.12	.19	-.23	.35	
IMD SCORE 2010	-.36	.22	.19	-.28	-.21	-.11
Not Labour control	.16	-.34	-.20	.12	.17	

Note: FSMe is level of segregation by eligibility for free school meals, SENs is the equivalent for statements of special education need, and NW for non-White UK pupils. For each indicator the growth is the relative difference between 2012 and 2000.

Note: Tables 1 to 3 only contain variables with a correlation of |0.3| or higher with segregation figures, listed in bold. Correlations of |0.1| or less are removed to simplify the table.

The number of pupils in any area is linked to reduced segregation, perhaps for the same reason as populous areas above. However, areas with greater growth of pupil numbers have higher segregation. The level of segregation in any area is strongly linked to the local percentage of pupils with the relevant indicator of potential disadvantage. The more potentially disadvantaged children in any area the lower the level of segregation in 2012. However, areas with the greatest relative growth in the prevalence of any indicator can be the areas with the greatest growth in segregation over time. This needs some explanation.

Table 2 - Correlation between local pupil characteristics and LEA-level segregation figures

	FSM e	FSMeGr	SEN s	SENsGr	NW	NWGro
--	-------	--------	-------	--------	----	-------

	2012	owth	2012	owth	2012	wth
Number of pupils 2000	.26	-.44		-.30		-.27
Number of pupils 2012	.35	-.38		-.27		-.22
Pupil growth 2000-2012	.30	.25		.26	-.18	.37
FSMe% 2000	-.41	.24	.12	-.19	-.36	-.15
FSMe% 2012	-.41	.24		-.19	-.16	
SENs% 2000	-.41	.26	-.20	.22	-.27	
SENs% 2012		.21	-.35	.30	.13	
SENs growth 2000-2012	.40		.39		.26	
SENnpercent00	-.37	.12			-.16	
Non-White% 2000	-.23	-.11		-.12	-.63	-.26
Non-White% 2012	-.19	-.17	-.11	-.13	-.57	-.18
Non-White growth 2000-2012	.11	.36	.27	.43	.24	.49
ESL% 2000	-.35				-.63	-.21
ESL% 2012	-.27	-.17	-.18	-.12	-.50	-.14

Some of the strongest associations are between segregation and the types of local schools. The proportion of local schools that are LEA-controlled, comprehensive, or at least not selective is strongly linked to lower levels of, and growth in, all types of segregation. Particularly problematic schools for levels of segregation are Converter Academies and Grammar schools systems. But almost any diversity is a problem. Interestingly, areas with initial higher proportions of independent, Foundation, Voluntary-aided and selective schools have increased segregation less (perhaps because fewer local schools have become Academies in those areas).

Table 3 - Correlation between local school characteristics and LEA-level segregation figures

	FSM e 2012	FSMeGrowth	SEN s 2012	SENsGr owth	NW 2012	NWGro wth
Total Institutions 2000	.25	-.37		-.21		-.25
Independent schools 2000	.30	-.21		-.12	-.14	-.25
‘Community’ schools 2000	-.25	-.33	-.23	-.16		-.20
‘Special’ schools 2000	.34	-.26		-.24	.12	-.20
‘Selective’ schools 2000	.54	-.20	.26		.12	
‘Community’ schools% 2000	-.67		-.29			

Voluntary Aided schools 2012		-.21		-.20	-.22	-.31
Foundation schools 2012	.28	-.36		-.17		-.20
Academy Converters 2012	.54		.32		.21	
Selective schools 2012	.62	-.22	.30		.09	
Modern schools 2012	.58	-.17	.27			
City Technology Colleges 2012	.34	.15	.18		.31	.31
Community schools 2012		-.11	-.38	-.23	.	-.19
Comprehensives 2012	-.18	-.21	-.31	-.24		-.18
Total 'Community' 2012	-.29	-.21	-.44	-.26		-.28
Total Academies 2012	.43		.28		.11	.25
Total Selective 2012	.51		.24			.31
'Community' growth 2000-2012	.13	-.29	-.25	-.40		-.50
'Community'% 2012	-.56	-.21	-.56	-.28		-.38

On the basis of the widespread available measures, it is clear that levels of segregation in any year such as 2012 are linked to a different set of possible determinants than the change in segregation over any time period such as 2000 to 2012. The different indicators of potential disadvantage, such as free school meals and special needs, are also linked to different sets of possible determinants.

Nevertheless, some general patterns do appear. Segregation on any indicator is lower in areas of high population density. This has been observed before only for FSM (Gorard et al. 2003). Here segregation by pupil ethnicity is even more strongly negatively linked to population density. Big cities like London have better transport than anywhere else in England, schools that are closer together and so easier to walk to, and neighbourhoods with both rich and poor housing adjacent. They may also have higher levels of disadvantage. All of these factors would tend to favour mixed school intakes. Of course, there are exceptions. Birmingham could be like London in many ways, but it has lower population density, no underground and only a weak radial rail service, and more 'ghettoisation' of poverty and ethnicity. It also runs a selective grammar school system. All of these factors would tend to favour segregated school intakes by poverty and ethnicity. Similarly, the North East has much lower population density than London but similar levels of segregation. This could be because the levels of disadvantage there are both higher and more uniformly distributed. There are parts of Middlesbrough, for example, where no school has less than 50% of pupils eligible for FSM.

This is confirmed by the finding that areas of greatest unemployment, and highest indicators of multiple deprivation tend to have lower segregation. But they tend to have higher segregation in terms of SEN and ethnicity. The former could be because they have retained more special schools. The latter could be because areas like Middlesbrough have proportionately fewer non-White pupils than London or Birmingham, which tends to enhance segregation.

Although areas with larger populations have shown a decline in segregation for all indicators 2000 to 2012, areas with higher and growing segregation have also grown in terms of pupil numbers. It may be that accommodating more pupils creates at least a short-term imbalance in school intakes. Prevalence of any indicator of disadvantage is linked to lower segregation, but increase in that prevalence is linked to an increase in segregation. Again, this could be a short term phenomenon, as schools struggle to find local places for the growing population. This is suggested by the strong link between the percentage of local FSM pupils in both 2000 and 2012 with segregation in 2012.

The factors discussed so far are largely fixed in the sense that education policy is unlikely to have any impact on them. To make a difference to populations, areas of residence for recent immigrants, transport and housing might be impossible, could be unethical and would anyway take a long time to impact on the local intakes to schools. The most malleable factors identified as associated with segregation relate to the types of schools in each area (as with Birmingham above). Here there are some differences between the indicators. The simplest pattern is for FSM. It is as simple as that segregation by poverty is highest in areas with fewest 'bog standard' schools, and lowest in areas with fewest independent, special, selective, faith-based, Foundation, CTC or Academy schools. The data here, even though looked at over a period of 13 years, cannot demonstrate a causal relationship. But unlike population density the types of schools in existence are directly under policy-makers control. Given that almost any type of diversity of schooling is linked to substantially greater local segregation by poverty, it is probably the diversity itself rather than the specific type of school that is related to segregation.

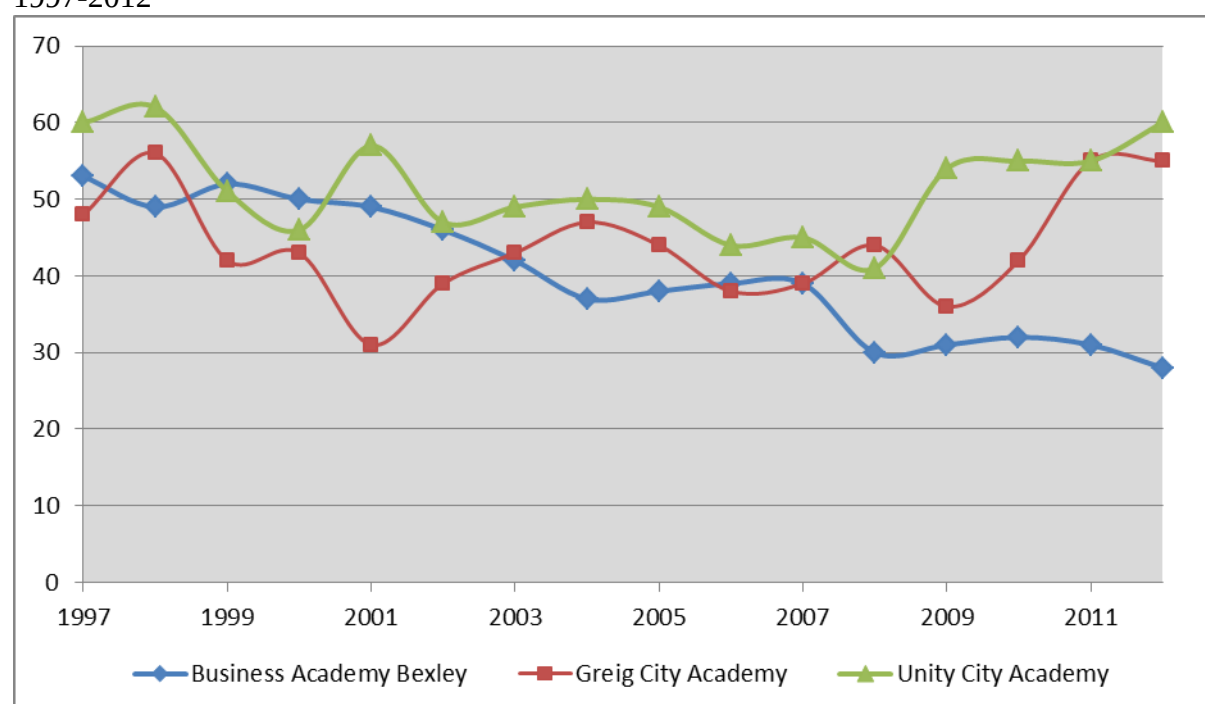
The change in segregation by poverty over time is intriguing because areas with more bog standard schools tend to have reduced segregation, as expected. Areas with CTCs and Academies have increased or maintained their segregation over time, as expected. However, areas with special, selective, faith-based, or Foundation schools have decreased segregation relative to the overall picture. Perhaps the difference is the latter school types, despite their clear link to segregation, all pre-existed in 2000, whereas Academies are new and have changed the situation and not for the better. The 15 CTCs, although set up in the 1990s, have mostly converted to become Academies in the 2000s. Perhaps also the areas with selective systems, for example, have been slower to embrace the Academies programme. At least at the outset, the Academies programme was focused on schools in spirals of decline, and at that time these did not include any grammar, Foundation or independent schools.

Academies and SES segregation

The earliest three Academies were set up in 2002. One of these, the Business Academy Bexley, continued a pre-existing rapid reduction in the proportion of FSM-

eligible children in their intake (Figure 1). The school now takes nearly half as many FSM children as its predecessor did in 1997. This change could have implications for how easy the school is to run, the barriers that the children face in attending and learning, and for the school outcomes in terms of examination results. However, in other respects not much has changed for this school. In 2002, it had a FSM segregation ratio (SR) of 2.88 meaning that it took nearly three times its fair share of FSM children. This was the highest SR in the LEA by some margin, and some schools had SRs as low as 0.01 (the local grammar school was taking just over 1% of its fair share of FSM children). By 2012, the SR for the Business Academy had fallen to 1.82. But this was still clearly the highest in the LEA and for much the same reasons. What seems to have happened is that the whole area has reduced levels of relative poverty over time.

Figure 1 – Percentage of pupils eligible for free school meals, first three Academies, 1997-2012



The Unity City Academy in 2002 was like the one in Bexley in having the highest SR in its LEA by some margin (3.39). It took over three times its fair share of FSM children, in an area in which all school intakes had high levels of deprivation. Unity City reduced its FSM intake in absolute terms over the period 2002 to 2008, but the subsequent economic downturn was associated with a return to the higher levels of poverty recorded in 1997. In some ways the situation is worse. Unity City still has the highest SR in its LEA (4.01) but this has risen to mean that the school is now taking just over four times its share of FSM pupils. Long term, neither Bexley nor Unity Academy has managed to meet one of the original objectives for these schools deemed to be in a spiral of decline, by becoming more like the other schools around it. Both are still clearly the most deprived.

As reported by Gorard (2005), Greig City Academy was never the most deprived school in its LEA and was therefore perhaps the wrong target in terms of policy at that time. In 2002, it had high levels of FSM and an SR of 2.97. However, the FSM intake

of its predecessor had been falling for three years, and there were several other local schools with higher proportions of FSM. Again nothing much has changed over time. By 2012, levels of FSM were back to those of 1998, and the school had an SR of 3.67. However, this is still not the school with the most FSM children, and there are several other local schools with considerably higher proportions.

In summary, all three early Academies had a period of falling FSM following their rebadging and in parallel with their early claims to improved examination outcomes (see below). But there has been little long-term beneficial impact on SES segregation between schools in their LEAs.

Turning to the national picture for Academies, what is clear in Table 1 is that talk of ‘Academies’ in general is no longer appropriate, even ignoring CTCs and the newer Free Schools. Converter Academies generally take far less than their fair share of FSM pupils, while Sponsor-led Academies generally take far more than their share. They have very different profiles. For example, 51% of Converter Academies take less than half their ‘fair share’ of FSM pupils, whereas only 3% of Sponsor-led Academies do.

Table 1 – Percentage of secondary schools within specified range of SRs, by school type, England, 2012

Segregation ratio	All Maintained	All Academies	Converter	Sponsor-led
<0.2	3	11	15	1
<0.5	21	27	36	2
<0.67	12	12	15	4
0.67-1.5	39	26	25	27
>1.5	11	11	5	28
>2	13	13	3	38
>5	0	0	0	0
N	2095	1165	827	330

Note: ‘All Academies’ includes CTCs and Free schools

Note: An SR of 5 is the inverse equivalent of 0.2, an SR of 2 is equivalent to 0.5 etc.

The difference between Converter and Sponsor-led Academies then manifests itself in their association with local levels of SES segregation between schools (Table 2). Whereas, in 2012 the existence of Converter Academies in any LEA was strongly positively linked to local levels of SES segregation between schools (Pearson’s R of around +0.4), the existence of Sponsor-led Academies was weakly but negatively linked to SES segregation (R of around -0.15). However, LEAs with both types of Academies were linked to higher levels of segregation than LEAs with a higher proportion of Maintained schools (R of around -0.3). Before this is taken as evidence that Academies cause higher segregation it should be noted that exactly the same pattern holds for 2002 when the first three Academies were created. And the same pattern even holds for 1999 before Academies had been conceived. It makes more sense to view the association the other way around, and state that areas with higher levels of SES segregation since 1999 are now more likely have high percentages of Academies, especially Converter Academies.

Table 2 – Correlation between percentage of each type of local school with local level of segregation, England, 1999, 2002 and 2012

LEA-level segregation FSM	GS	Percentage of Maintained schools 2012	Percentage of Sponsor-led Academies 2012	Percentage of Converter Academies 2012
1999		-0.31	-0.13	+0.38
2002		-0.29	-0.19	+0.40
2012		-0.33	-0.14	+0.41

Discussion of the findings

In England, between 20% and 50% of students would have to exchange schools for there to be no clustering of similar students. The level varies from the segregation of students with special needs not stated – the lowest – to students having English as a second language – the highest. There are a number of reasons why this clustering exists (Gorard et al. 2003). Under Meehl's (1967) conjecture, we should not expect perfect distribution of student characteristics across a real-life school system even where there is no systematic bias. This is partly because students themselves are indivisible. For example, a system with only one minority characteristic student is constrained to have only one school with any students having that characteristic. The limitations of travel mean that where the population differs in different regions of the country this will also be reflected in the local school intakes. However, it is important to note that this natural level of segregation is not random in nature, and that it appears *equally* in primary schools that are generally quite small and in secondary schools that are much larger. Therefore, commentators such as Leckie et al. (2012) who want to treat the underlying segregation as a sampling issue exacerbated by the volatility of small numbers are wrong on two counts. We do not need the complexity of analysis that they propose, based on their misunderstandings.

The unintended 'natural' low level of segregation will be exacerbated by the existence of artificial bureaucratic boundaries making it slightly harder for students to be educated in adjacent local education authority (LEA) schools. Although the law allows families to express a preference for a school outside their local area, this rarely happens in practice except for some specific religious or language-based preferences. During the period covered in this paper, a small number of LEAs retained grammar schools which are selective at age 11. This division by purported ability also tends to divide students in other ways, such as by poverty and special educational needs. However, the number of such LEAs and grammar schools has not changed significantly, and anyway this issue only relate to secondary schools, whereas the same changes in segregation appear also in primary schools. The same applies to faith-based schools, which tend to exacerbate local levels of segregation where they appear, but which have not changed much in prevalence since 1989. The changes in segregated are not correlated with the proportion of students educated in the small private sector (around 6% in England), nor are they correlated with changes in the tiny proportion educated in hospitals or Student Referral Units.

All of these, and other, factors are relatively permanent. They can help explain why the segregation index for any student characteristic is not zero, and perhaps why it is never exactly the same year on year. We have segregation because of residential

segregation, compounded by travel limitations and policies such as catchments and feeder schools, because of limited overt selection by ability in some areas, and because of the existence of faith-based schools, for example. But these are not very plausible explanations for why the index changes annually by quite large amounts on occasion, and why there are some trends in the changes that last ten years or more.

A sharp change in segregation, such as occurred in 2003 for non-White UK students, really needs an explanation relying on another change in society, and that is one-off in nature. One possibility is a change in the way in which students are allocated to schools. As outlined earlier, national policies evolved both in 2003 and 2007 to try and make admissions fairer and clearer. All admission authorities (even individual schools) now decide on places at the same time, and parental interviews are not permitted, for example, in case they lead to covert selection. But these changes are not reflected in subsequent spikes or drops in the segregation index for any indicators. This may be because the changes in procedure were implemented slowly with some schools still apparently not quite following the new rules (West et al. 2011). Or it may be because such changes in policy generally make little discernible difference to the kinds of structural issues discussed in this paper. Another possibility is change in the type and diversity of schools, with the introduction of new school types such as Academies and Free Schools perhaps affecting the school mix in areas where they emerge. But this is unlikely to be the chief cause of change, because the numbers involved are still relatively small, the changes are too recent for some of the abrupt annual differences in segregation, and most tellingly until very recently these changes took place almost exclusively in the secondary sector. They cannot be the reason why the primary sector segregation changed in the same way at the same time (for most indicators).

However, the changes in segregation for any indicator *are* quite strongly correlated to changes in the level of that indicator in the state-funded school system as a whole. This is because, generally, the indicators have grown in frequency while their dispersal across schools has also grown (creating lower levels of calculated segregation). For example, the on-going inclusion of students with statements of special needs in mainstream schools coupled with greater sensitivity in spotting special educational needs has increased the number of SENs students in many schools. This appears also to have had the effect of spreading them more evenly between schools. The correlation between the number of SENs students in the system and their level of segregation is -0.94. This is capable of explaining, by itself, the vast majority of change over time for this indicator. The equivalent correlation for SENn students is also substantial, at -0.90. To a great extent, we need look no further for an explanation. The different trends in segregation can be largely explained by different trends in the prevalence of each indicator of disadvantage. This cannot be an issue of compositional variance in the index involved, since the same pattern appears also with the Dissimilarity Index (Gorard 2009), and anyway the unique advantage of GS is its strong compositional invariance (Gorard and Taylor 2002).

The same kind of explanation could also hold for changes in segregation for students reported as being non-White UK in origin. As their number increased non-White students have appeared more mixed between schools. The correlation is -0.93 between changes in segregation and the percentage of students reporting non-White ethnicity. This may be partly a historical increase in in-migration, but it may also be

due to increased sensitivity in the census about the definitions of ethnic minority categories (with many more sub-categories appearing over time, especially for those students originally deemed 'White'). It could be a growth in reporting as well as a growth in 'reality'. And the same applies to students with English as a second language. The percentage of ESL students and their segregation between schools correlates at -0.96. As their number has grown, for both of the same reasons as above, they have become more evenly spread across the system as a whole. Again, we need look no further for an explanation of most of the changes over time, as opposed to why there is a stubborn underlying level of 25% segregation or more.

The situation for FSM is more complex, because segregation here has gone in cycles of decline, stasis, growth and now decline again. Nevertheless, at least part of the explanation surely lies in changes in the indicator itself. For example, the level of segregation for FSM take-up is correlated with the percentage of FSMt students at -0.80. In order to assess the amount of variation common to both variables it is necessary to square the correlation coefficient (R) to yield an effect size (R^2). And doing so, clarifies the difference between the situation for ESL and FSM. The R for ESL prevalence and segregation is -0.96 giving an R^2 of 0.92 or 92%. There is very little variation left over to be explained by anything else (such as parental choice). The R for FSMt prevalence and segregation is -0.80 giving an R^2 of 0.64 or 64%. This leaves 36% unexplained. As previously reported, this is then partly linked to the economic cycle as measured by GDP (Cheng and Gorard 2010). When the economy is good, segregation tends to be higher perhaps partly because fewer families live in poverty. When the economy falters, there is more 'equality of poverty' and levels of FSM students rise (Gorard et al. 2003). However and uniquely, in the period 1990-1995 the level of FSM segregation declined while GDP grew considerably. This is one reason why the decline in segregation in that brief period has been attributed to influence on increased parental preference. This followed the 1988 Education Reform Act (operational from 1989/90), and lasted for five or six years until all of the students had entered their current school in the new era of choice. In retrospect it seems obvious that choice, as such, could only have a one-off impact.

This all means that historical changes in the levels and reporting of levels of indicators of potential disadvantage could explain almost all of the changes over time in between school segregation. As immigration has increased over this period and existing immigrants have raised families, both ESL and NW students have increased, and have permeated both society and the school system in the way that geographical models show. Similarly, as SENs students have been better diagnosed and increasingly taught in mainstream schools so segregation has declined in the long term. SENn figures have simply grown from nowhere, perhaps partly as middle-class and aspirant parents want the classification for their child in order to be part of the resource-rich 'industry' that stemmed from SENs growth (Tomlinson 2012). FSM numbers on the other hand have varied, to some extent with the economic cycle, and their level of segregation between schools has varied also. This leaves very little of the variation to be explained by other possible factors such as parental choice (other than noted above). Despite successive rounds of legislation and case law in the UK, parental choice has mostly been limited by access to schools and by the widespread use of distance or residential catchment criteria to decide on contested places at over-subscribed schools. As far as it is possible to tell, parental choice in itself has not worsened segregation. In fact, the limited evidence available from imaginative

schemes, such as that in New Zealand in 1991 where contested places were allocated by ballot, suggests that choice advantages the otherwise disadvantaged and so would tend to reduce segregation *ceteris paribus* (Gorard and Fitz 1998). But the effects are limited and short-term, and might be dwarfed by structural, economic and geographical factors.

Therefore, a society that wishes to gain all of the proposed advantages of mixed school intakes needs to do more than offer choice. Nor can it rely solely on the most powerful influence on segregation – the prevalence of student characteristics – since this is not under its control. Of course, a government can act to encourage or control immigration, and it should act to reduce levels of and numbers in poverty whatever the impact of this on segregation in schools. But to cut into the existing underlying permanent levels of segregation requires more than this. It requires the more radical step of dismantling the apparatus that creates the underlying segregation in the first place. A national school system, intended to have mixed intakes, should be comprehensive in nature. It should not select by attainment or aptitude. It should not select by student background, or by faith. Policy-makers must realise that choice and diversity are very different things. The former may be neutral or even beneficial in terms of segregation, whereas the latter is almost inevitably a cause of further segregation. It must offer free travel for those entitled to any feasible school rather than simply to the nearest available. In the short term it could offer incentives to schools taking students from disadvantaged backgrounds (the student premium in England), ensure via banding or similar processes that school intakes represent the variation in the local population, and it could decide contested places by lottery not distance. Such measures will reduce social segregation between schools and will slowly reduce the purchase premium on houses near desirable schools creating a backwash on residential segregation and so a virtuous circle of inclusion and integration.

To say that struggling Academies are doing no better than their non-Academy peers or predecessors is not to denigrate them. They are doing no worse than their peers either, with equivalent pupils. Nor does it mean that good work has not been done in and by Academies. But it does demonstrate that the Programme is a waste of time and energy at least in terms of this rather narrow measure of outcomes. There is no success specific to Academies that might not also have come from straightforward increased investment in ‘failing’ schools. Of course, one can argue that the schools have been a success in maintaining numbers and reducing the proportion of disadvantaged students. And this is certainly true for two of the first three Academies, which were selected as among the most deprived schools in England. But the Programme now includes Academies that had been private or selective schools and which had been among the least deprived in their areas. So this is no longer a sensible way of assessing success for the Programme. There are also opportunity costs. The money involved since 2002 could have been used differently – spent on refurbishing the most deprived schools or used to follow the most deprived students to whichever school they attend. The same is true for all recent new school schemes in England, such as the Specialist schools, and will almost certainly be true for as yet untested schemes like Free schools, and their equivalents worldwide.

Academies, especially the newer Converter Academies, are strongly linked to local levels of SES segregation between schools. The risk that this poses for societal

cohesion and social justice is being run for no reason. The school system in England was designed through its funding, its laws about when and how school places are allocated, regulations about teacher development, inspections, national curriculum, and standard attainment in key stages, to try and make as little difference between schools as possible. England had built a system of maintained schools that was loosely comprehensive, and funded on a per-student basis adjusted for special circumstances. The curriculum was largely similar (the National Curriculum) for ages 5 to 14 at least, taught by nationally-recognised teachers with Qualified Teacher Status, inspected by a national system (OFSTED), and assessed by standardised tests up to Key Stage 3. Education is compulsory for all, and free at the point of delivery. In a very real sense it sounds as though it would not matter much which school a student attends, in terms of qualifications as an outcome. And this is how it ought to be, in a democratic, developed country with an education system like that in England designed to promote equality of opportunity.

The quality of education available in a national school system should not depend upon where a student lives or which school they attend. Therefore, new school types or schemes for only some schools are not the way forward. The poverty gap will be reduced by reducing differences between schools, opportunities and treatments, not by celebrating them. There should be no state-funded diversity of schooling. If, for example, Academies in England are really a superior form of school to the 'bog-standard' local comprehensives then why are only some schools made into Academies? Surely, all students are entitled to this better form of education, rather than the state wilfully continuing to provide what they claim is an inferior experience for some. In fact, it is not clear that Academies are better than other schools and so the money invested in them could have been used more fruitfully elsewhere. Again, the same could be said about most initiatives that tinker with the types of school available. For the same reason there should be no 11-16 age schools alongside 11-18 schools, or indeed any variation in age range. One of these ranges will be the better for any nation or region as a whole, and should be adopted universally. If it is argued that we do not know which is best then that means we have no reason to vary them (unless for the purposes of a genuine attempt to find out). Similarly, there should be no single-sex and co-educational schools in the same system. Again, one of these forms of schooling will be better for the region as a whole and should be adopted. It means there should be no selection by aptitude or prior attainment within a system that is also compulsory. There should be no differences between schools in terms of their faith-basis, or more simply no faith-basis at all. There should be no private investment (as opposed to welcome charitable giving to the system as a whole), and no curricular specialisms in the compulsory phase (there should be a truly National Curriculum). All young people should be included in mainstream institutions as far as possible. Controlling the school mix like this is one of the most important educational tasks for central and local governments.

References

- Allen, R. and West, A. (2011) Why do faith-based schools have advantaged intakes? The relative importance of neighbourhood characteristics, social background and religious identification amongst parents, *British Educational Research Journal*, 37, 4, 631-655

- Allen, R., Coldron, J. and West, A. (2012) The effect of changes in published secondary school admissions on student composition, *Journal of Education Policy*, 27, 3, 349-366
- Blackburn, R. (2012) The measurement of occupational segregation and its component dimensions, *International Journal of Social Research Methodology*, 15, 3, 175-198
- Bonal, X. (2012) Education policy and school segregation of migrant students in Catalonia, *Journal of Education Policy*, 27, 3, 401-421
- Condron, D. (2011) Egalitarianism and educational excellence: compatible goals for affluent societies?, *Educational Researcher*, 40, 2, 47-55
- Exley, S. (2011) Seven out of 10 academies fail to meet admission procedures, *Times Educational Supplement*, 3/6/11, p.6
- Garcia, D. (2011) The Achilles' heel of school choice policies: the obstacles to reporting school accountability results to parents, *Journal of School Choice*, 5, 1, 66-84
- Glenn, W. (2011) A quantitative analysis of the increase in public school segregation in Delaware: 1989-2006, *Urban Education*, 46, 4, 719-740
- Goldsmith, P. (2011) Coleman revisited: School segregation, peers, and frog ponds, *American Educational Research Journal*, 48, 3, 508-535
- Gorard, S. (2005) Academies as the 'future of schooling': is this an evidence-based policy?, *Journal of Education Policy*, 20, 3, 369-377
- Gorard, S. (2006) Towards a judgement-based statistical analysis, *British Journal of Sociology of Education*, 27, 1, 67-80
- Gorard, S. (2010) All evidence is equal: the flaw in statistical reasoning, *Oxford Review of Education*, 36, 1, 63-77
- Gorard, S. (2012a) Experiencing fairness at school: an international study in five countries, *International Journal of Educational Research*, 3, 3, 127-137
- Gorard, S. (2012b) Who is eligible for free school meals?: Characterising FSM as a measure of disadvantage in England, *British Educational Research Journal*, 38, 6, 1003-1017
- Gorard, S. (2013) *Research Design: Robust approaches for the social sciences*, London: Sage
- Gorard, S. and Cheng SC (2011) Student clustering in English secondary schools: One pattern or several?, *International Journal of Research and Method in Education*, 34, 3, 327-339
- Gorard, S. and Fitz, J. (1998) Under starters orders: The established market, the Cardiff study and the Smithfield project, *International Studies in Sociology of Education*, 8, 3, 299-314
- Gorard, S., Taylor, C. and Fitz, J. (2003) *Schools, Markets and Choice Policies*, London: RoutledgeFalmer
- Harris, D. and Williams, J. (2012) The association of classroom interactions, year group and social class, *British Educational Research Journal*, 38, 3, 373-397
- Harris, N. and Gorard, S. (2009) Education policy, law and governance in the United Kingdom, *Trends in Bildung International*, 32, 32 pages, August 2009 <http://www1.dipf.de/publikationen/tibi/tibi.htm>
- Harris, R. (2010) *Segregation by choice? The debate so far*, Bristol: CMPO Working Paper 10/251
- Harris, R. (2012) Geographies of transition and the separation of lower and higher attaining students in the move from primary to secondary school in London, *Transactions*, 10.1111/j.1475-5661.2012.519.x

- Harris, R. and Johnston, R. (2008) Primary schools, markets and choice: studying polarization and the core catchment areas of schools, *Applied Spatial Analysis*, 2008, 1, 59-84
- Hobbs, G. and Vignoles, A. (2010) Is children's free school meal 'eligibility' a good proxy for family income, *British Educational Research Journal*, 36, 4, 673-690
- Jacobs, N. (2011) Racial, economic and linguistic segregation: Analyzing market supports in the District of Columbia's Public Charter Schools, *Education and Urban Society*, xx, doi 10.1177/0013124511407317
- Leckie, G. , Pillinger, R., Jones, K. and Goldstein, H. (2012) Multilevel modelling of social segregation, *Journal of Educational and Behavioural Statistics*, 37, 1, 3-30
- Lindborn, A. (2010) School choice in Sweden: effects on student performance, school costs and segregation, *Scandinavian Journal of Education*, 54, 6, 615-630
- Long, L. and Nucci, A. (1997) The Hoover Index of Population Concentration: a correction and update, *Professional Geographer*, 49, 4, 431-440
- Massey, D. and Fischer, M. (2006) The effect of childhood segregation on minority academic performance at selective colleges, *Ethnic and Racial Studies*, 29, 1, 1-26
- Maxi-pedia (2012) *Robin Hood Index*, <http://www.maxi-pedia.com/Robin+Hood+index>, accessed 25/5/12
- McCoy, S., Banks, J. and Shevlin, M. (2012) School matters: how context influences the identification of different types of special educational needs, *Irish Educational Studies*, iFirst 10.1080/03323315.2012.669568
- Meehl, P. (1967) Theory - testing in psychology and physics: A methodological paradox, *Philosophy of Science*, 34, 103-115
- Ni, Y. (2011) The sorting effect of charter schools on student composition in traditional public schools, *Educational Policy*, 26, 2, 215-242
- Richardson, H. (2012) *Segregated UK school 'toxic for poor'*, BBC News, 4th April 2012
- Rudd, P., Gardiner, C. and Marson-Smith, H. (2010) *Local authority approaches to the school admission process*, Slough: NFER
- Shepherd, J. and Rogers, S. (2012) Church schools shun poorest students, *The Guardian*, 5th March 2012
- Smithers, A. and Robinson, P. (2010) *Worlds apart: social variation among schools*, University of Buckingham
- Tomlinson, S. (2012) The irresistible rise of the SEN industry, *Oxford Review of Education*, 38, 3, 267-286
- West, A., Barham, E. and Hind, A. (2011) Secondary school admissions in England 2001 to 2008: changing legislation, policy and practice, *Oxford Review of Education*, 37, 1, 1-20
- Boliver, V. and Swift, A. (2011) Do comprehensive schools reduce social mobility?, *British Journal of Sociology of Education*, 62, 1, 89-110
- Bradbury, A. (2011) Equity, ethnicity and the hidden dangers of 'contextual' measures of school performance, *Race, Ethnicity and Education*, 14, 3, 277-291
- Burgess, S., Wilson, D. and Lupton, R. (2005) Parallel lives? Ethnic segregation in schools and neighbourhoods, *Urban Studies*, 42, 7, 1027-1056
- Cheng, SC. and Gorard, S. (2010) Segregation by poverty in secondary schools in England 2006-2009: a research note, *Journal of Education Policy*, 25, 3, 415-418

- Clotfelter, C. (2001) Are whites still fleeing? Racial patterns and enrolment shifts in urban public schools, *Journal of Policy Analysis and Management*, 20, 2, 199-221
- Coleman, J., Hoffer, T. and Kilgore, S. (1982) Cognitive outcomes in public and private schools, *Sociology of Education*, 55, 2/3, 65-76
- Dobbie, W. and Fryer, R. (2009) Are high-quality schools enough to close the achievement gap? Evidence from a social experiment in Harlem, *National Bureau of Economic Research Working Paper* 15473
- Duncan, O., Cuzzort, R. and Duncan, B. (1961) *Statistical geography: problems in analyzing area data*, Glencoe IL: Free Press
- Felouzis, G. and Charmillot, S. (2012) School tracking and educational inequality: a comparison of 12 education systems in Switzerland, *Comparative Education*, 49, 2, 181-205
- Gleason, P., Clark, M., Tuttle, C. and Dwyer, E. (2010) *The Evaluation of Charter School Impacts: Final Report*, National Center for Education Evaluation and Regional Assistance, ED510574, 259pp
- Glenn, W. (2011) A quantitative analysis of the increase in public school segregation in Delaware: 1989-2006, *Urban Education*, 46, 4, 719-740
- Goldsmith, P. (2011) Coleman revisited: School segregation, peers, and frog ponds, *American Educational Research Journal*, 48, 3, 508-535
- Goldstein, H. (2001) Using pupil performance data for judging schools and teachers: scope and limitations, *British Educational Research Journal*, 27, 4, 433-442
- Gorard, S. (2000) *Education and Social Justice*, Cardiff: University of Wales Press
- Gorard, S. (2005) Academies as the 'future of schooling': is this an evidence-based policy?, *Journal of Education Policy*, 20, 3, 369-377
- Gorard, S. (2006) Value-added is of little value, *Journal of Educational Policy*, 21, 2, 233-241
- Gorard, S. (2009) What are Academies the answer to?, *Journal of Education Policy*, 24, 1, 1-13
- Gorard, S. (2010) Serious doubts about school effectiveness, *British Educational Research Journal*, 36, 5, 735-766
- Gorard, S. (2012) Who is eligible for free school meals?: Characterising FSM as a measure of disadvantage in England, *British Educational Research Journal*, 38, 6, 1003-1017
- Gorard, S. and Rees, G. (2002) *Creating a learning society*, Bristol: Policy Press
- Gorard, S. and See, BH. (2013) *Overcoming disadvantage in education*, London: Routledge
- Gorard, S. and Smith, E. (2010) *Equity in Education: an international comparison of pupil perspectives*, London: Palgrave
- Gorard, S., Hordosy, R. and See, BH. (2013a) Narrowing the determinants of segregation between schools 1996-2011, *Journal of School Choice*, 7, 2, 182-195
- Gorard, S., Hordosy, R. and Siddiqui, N. (2013b) How stable are 'school effects' assessed by a value-added technique?, *International Education Studies*, 6, 1, 1-9
- Gorard, S., Taylor, C. and Fitz, J. (2003) *Schools, Markets and Choice Policies*, London: RoutledgeFalmer
- Gray, J., Goldstein, H. and Thomas, S. (2001) Predicting the future: the role of past performance in determining trends in institutional effectiveness at A level, *British Educational Research Journal*, 27, 4, 39-406

- Harris, D. and Williams, J. (2012) The association of classroom interactions, year group and social class, *British Educational Research Journal*, 38, 3, 373-397
- Hoover, E. (1941) Interstate redistribution of population 1850-1940, *Journal of Economic History*, 1, 199-205
- Hoyle, R. and Robinson, J. (2003) League tables and school effectiveness: a mathematical model, *Proceedings of the Royal Society of London B*, 270, 113-199
- Kelly, S. and Monczunski, L. (2007) Overcoming the volatility in school-level gain scores: a new approach to identifying value-added with cross-sectional data, *Educational Researcher*, 36, 5, 279-287
- Knowles, E. and Evans, H. (2012) *PISA 2009: How does the social attainment gap in England compare with countries internationally?*, Research Report DFE-RR206, London: DFE
- Logan, J., Minca, E. and Adar, S. (2012) The geography of inequality: why separate means unequal in American public schools, *Sociology of Education*, 85, 3, 287-301
- Massey, D. and Fischer, M. (2006) The effect of childhood segregation on minority academic performance at selective colleges, *Ethnic and Racial Studies*, 29, 1, 1-26
- McCoy, S., Banks, J. and Shevlin, M. (2012) School matters: how context influences the identification of different types of special educational needs, *Irish Educational Studies*, iFirst 10.1080/03323315.2012.669568
- Palardy, G. (2013) High school socioeconomic segregation and student attainment, *American Educational Research Journal*, 50, 4, 714-754
- Proud, S. (2010) *Peer effects in English primary schools: an IV estimation of the effect of a more able peer group on age 11 examination results*, Bristol: CMPO Working Paper 10/248
- Ready, D. (2012) Associations between student achievement and student learning: implications for value-added accountability models, *Educational Policy*, 27, 1, 92-120
- Ridgway, R. and Ridgway, J. (2011) Crimes against statistical inference, *On-line Educational Research Journal*, www.oerj.org
- Stewart, W. (2010) Call for FOI to be extended to academies as research reveals wide use of 'pseudo' courses, *TES*, 21/5/10, p.12
- Tuttle, C., Teh, B-R., Nichols-Barrer, I., Gill, B. and Gleason, P. (2010) *Student Characteristics and Achievement in 22 KIPP Middle Schools: Final Report*: Washington, DC: Mathematica Policy Research, Inc., 116pp

Data sources

Data.Gov (2010) *English Indices of Deprivation 2010*. Available from: <http://data.gov.uk/dataset/index-of-multiple-deprivation>

DfE (2012) *Schools, Pupils and their Characteristics, January 2012, SFR10/2012*. Available from: <http://www.education.gov.uk/rsgateway/DB/SFR/s001071/>

DfE (2012) *Special Educational Needs in England, January 2012, SFR14/2012*. Available from: <http://www.education.gov.uk/rsgateway/DB/SFR/s001075/>

Local Government (2013) *Local Government Elections, Majority party for all councils – 2 May 2013*. Available from: <http://www.local.gov.uk/local-government-elections> and <https://www.google.com/fusiontables/DataSource?docid=1Cj9VFOlGWoD31EpId55PdhQSlBcoR-od7PmHLOY#rows:id=1>

ONS (Date unknown) *Usual Resident Population 1991 - 2001; Table KS01 Usual resident population – 2001*. Available from: <http://www.ons.gov.uk/ons/rel/census/census-2001-key-statistics/local-authorities-in-england-and-wales/local-authorities-ks01-usual-resident-population.xls>

ONS (2013) *2011 Census: Population Estimates by five-year age bands, and Household Estimates, for Local Authorities in the United Kingdom*. Available from: <http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcn%3A77-294273>

ONS (2013) *Regional Labour Market: M01 - Modelled Unemployment for Local and Unitary Authorities, December 2012*. Available from: <http://www.ons.gov.uk/ons/rel/subnational-labour/regional-labour-market-statistics/december-2012/index.html>