



Primary Schools, Markets and Choice: Studying Polarization and the Core Catchment Areas of Schools

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- Full paper
 - **Applied Spatial Analysis and Policy (2008), Vol. 1, pp. 59-84.**
- Companion papers
 - **<http://rose.bris.ac.uk/>**

School “choice” in England



School choice 'misleads parents'

School leaders are calling on politicians to end what they call "the misleading rhetoric" of school choice - which, they say, cannot be delivered.

The challenge has been issued by the Association of School and College Leaders (ASCL) and Foundation and Aided Schools National Association (FASNA).



Schools say admissions appeals consume hours of their time

100,000 miss first-choice school

Almost half of parents in some parts of England did not obtain their first choice of secondary school for their children, official figures reveal.

A breakdown of last year's admissions, obtained by the Conservatives, show success rates ranged from 100% to 51%.



This year's admissions placing letters are about to be sent out

Social segregation?



Parents 'would move for school'

Parents are prepared to move house or lie to win a place for their child at a good school, a study has suggested.

Half of the 1,255 adults polled for the Children's Society said they would move home to get into a good state school's catchment area.



Poorer children tend not to have good schools close by

And one in seven said they would give a false address or fib about their faith to escape the "schools lottery".

Shock over schools 'breaking law'

A "significant minority" of schools in England are breaking new laws that were designed to make the admissions system fairer, the government has said.

In a sample three areas - Manchester, Northamptonshire and Barnet - it found parents were illegally being asked for money or there was other malpractice.



More than 500,000 children have been allocated school places



Ethnic polarization?

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Parents 'choosing segregated schools'

By Julie Henry, Education Correspondent
Last Updated: 10:40am BST 07/10/2007

Primary schools are becoming increasingly segregated because parents want their children to be educated with their own ethnic groups, new research has shown.

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The study shows that the over-concentration of some ethnic groups in state schools cannot be explained by the social make-up of catchment areas alone. Instead, parents are actively choosing to segregate their children from other groups of pupils, sending them to predominately "black" or "Asian" schools.

Researchers from Bristol University who analysed more than 300 primaries in Birmingham found that from the age of four, children in some schools are being taught in near isolation of their ethnic backgrounds.

presented to a major conference on school segregation in London presided over by Trevor Phillips in 2005 that the country is "sleepwalking into a crisis". Mr Phillips, who was then chairman of the Commission for Racial Equality, said that the existence of "fully-fledged ghettos" in the UK is leading to "chronic social exclusion".

leading for the Government whose response to the spectre of racial segregation has been little more than to direct schools to teach about diversity and to provide opportunities for children to visit other schools with a different racial composition.

School choice 'means classroom ghettos'

By Mark Easton
Home editor, BBC News

Giving consumers choice in public services - and particularly in schools - is causing acute risks to racial equality.

That, at least, is the view of the Commission for Racial Equality which warns that Tony Blair's commitment to increasing choice undermines that other current political mantra of increasing integration.



Critics says faith schools are divisive

Indeed, it's feared that choice will encourage racial segregation in an already highly segregated country.

BBC NEWS



Point of entry

- There is ethnic segregation between schools
- But then there is segregation between neighbourhoods
- Schools Vs neighbourhoods (post-residential sorting)
- e.g. Johnston et al. (2006)
 - ‘It has been shown herein that not only is there ethnic segregation in the country’s primary and secondary schools, but also in addition – for both the South Asian populations and for the Black Caribbean and Black African populations – that school segregation is very substantially (and significantly) greater than is the case with residential segregation.’



More geographical perspective

- Economic theory and government policy suggest schools operate within local markets to attract pupils and funding.
- However, there is a deficit of understanding about the scales and configurations of those admission spaces.
- Whilst competition for pupils and for school places is assumed to operate at some localised scale, the actual geographies of the markets, where they overlap and where they might be changing are generally unknown.
- **Aim: To understand processes of polarization in the context of the local markets within which schools operate.**



Local markets

- The geography which matters is the local, not the national or regional, and the scale of analysis should be commensurate with the **local markets** within which schools (and parents faced with placement decisions) actually operate.

(Gibson & Asthana, 2000a: 304).



Why does this matter?

- Econometric models which incorporate census-based (or other) exogenous understandings of neighbourhood to define and to describe a school's social context may, in fact, be misspecified.
- Studies that measure the differences between a school's actual social composition and that of "its catchment" [assumed catchment] are potentially vulnerable.



Evidence of polarisation

- Are particular social (ethnic) groups travelling further to school 'than they need to'?
- Are there (primary) schools with an intake not representative of the local community?
- Are there (primary) schools with shared admission spaces but where one has a very different intake to the other?
- Study regions: Birmingham and London





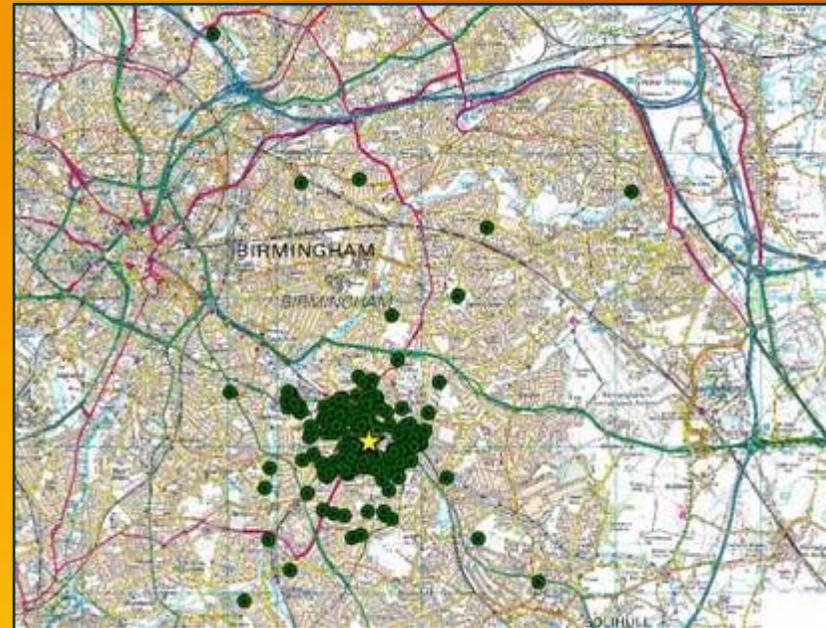
An example

- There is a primary school in Birmingham
- Within its 'core catchment area'
 - **15% of *all* pupils are Black Caribbean, 38% are Pakistani, and the rest are of other ethnic groups**
- From the area and attending the school
 - **23% Black Caribbean and 15% Pakistani.**
- The complete intake to the school
 - **27% Black Caribbean and 13% Pakistani**
- Its catchment area overlaps with another school. That school's intake
 - **40% Black Caribbean and 0% Pakistani**



Mapping School Catchment Areas

- Schools neither have *de jure* catchment areas
- nor unlimited capacity
- so parental choice is constrained, ultimately by admissions criteria.
- Pupils tend to attend local primary schools
- and so there is a clustered geography of attendance.
- That geography is revealed by mapping the home address of each pupil attending any given school (from PLASC micro-data)
- The task is to define that pattern.





Some Criteria

- We don't want the modelled catchment areas to be over-dispersed.
 - **Some pupils live far from their schools**
- But we also don't want them to be over-fitted to one specific set of pupils.
 - **If a postcode is near to a school and contains a pupil attending that school then it likely belongs in the (potential) catchment area.**
 - **But so too does a neighbouring postcode even if it does not contain a pupil attending that school – potentially the school could have recruited from there too.**
- Compact and unbroken
- 'optimised' to areas where attendance at any particular school is prevalent



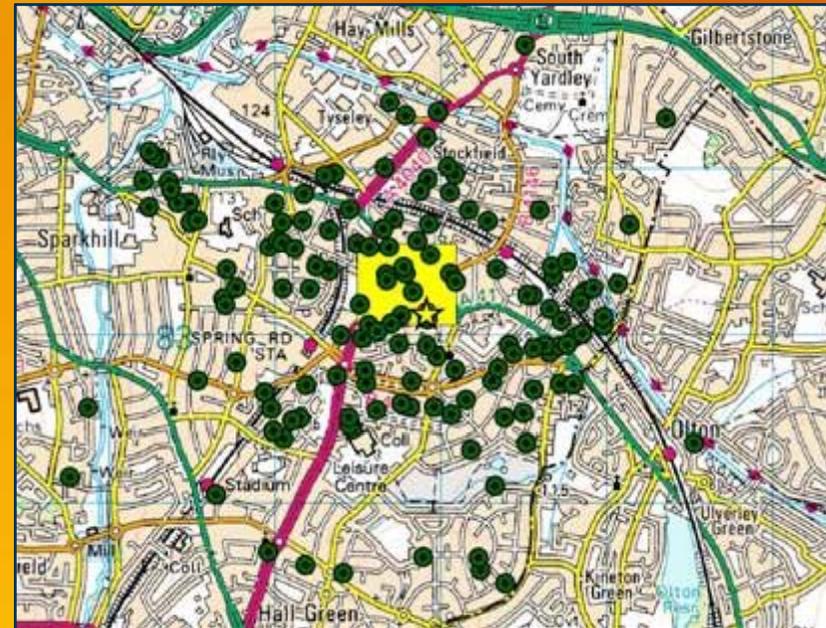
About the data

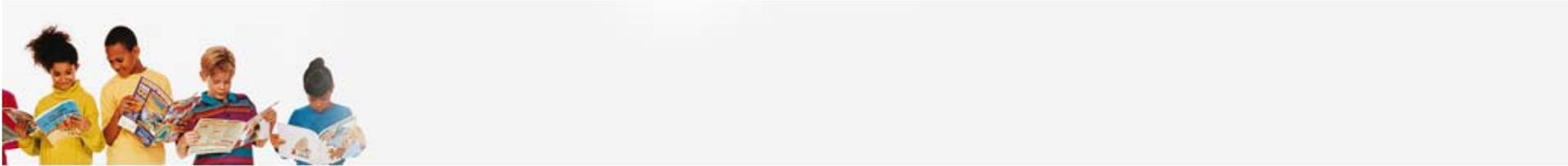
- **PLASC**
 - **Pupil Level Annual Census Returns**
- **Data on all pupils in primary (and secondary) schools in England**
- **2001/2 and 2005/6 data**
 - **Information on state educated primary school students (5-11 years old)**
 - **'Self-identified' ethnic category collected from parents when students enrol**
 - **Also records postcode unit of pupils' homes**
 - **Which they school they attend**
 - **School type (selective? Faith school?)**
 - **Measure of deprivation (take a free school meal)?**



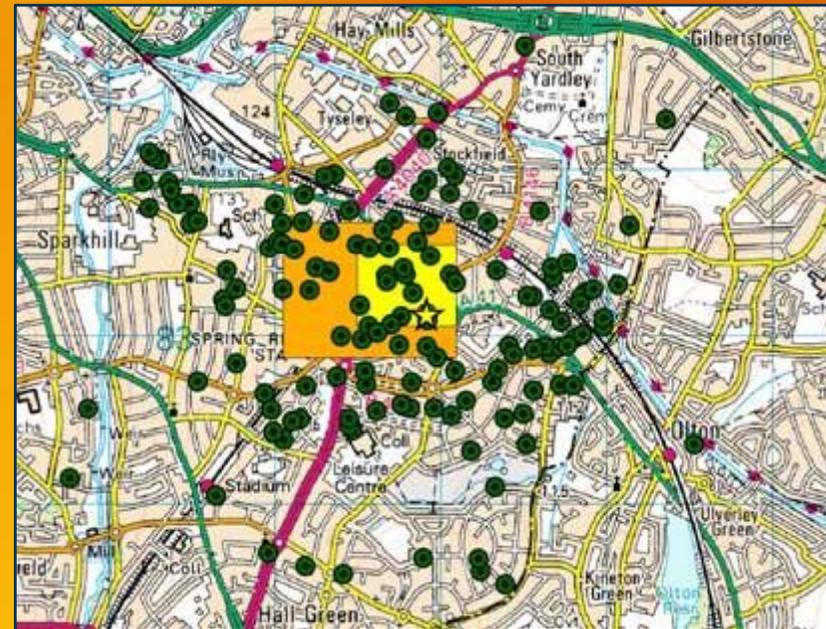
Defining 'core catchments'

- Imagine centring a rectangle at (mid-x, mid-y) based on the residential postcodes of pupils attending a school



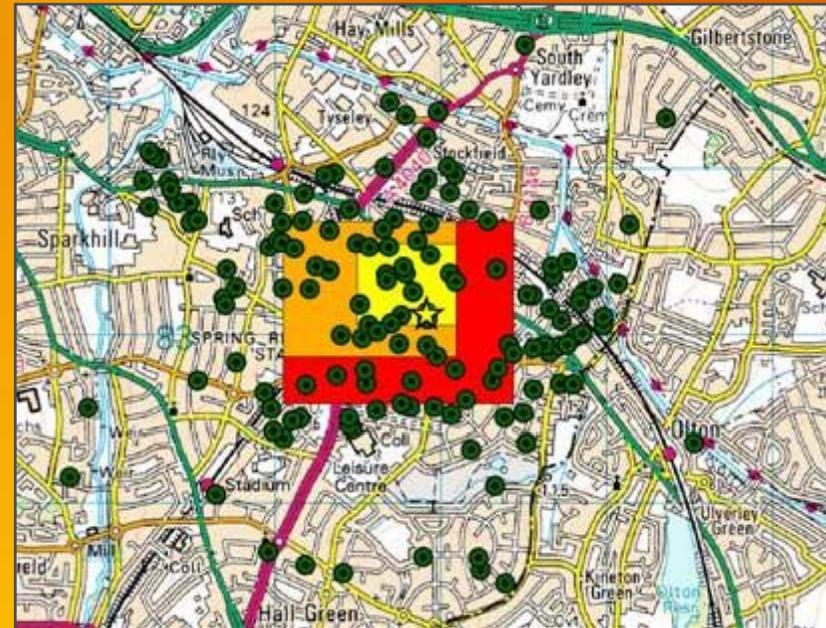


- Imagine centring a rectangle at (mid-x, mid-y) based on the residential postcodes of pupils attending a school
- Let the rectangle grow outwards



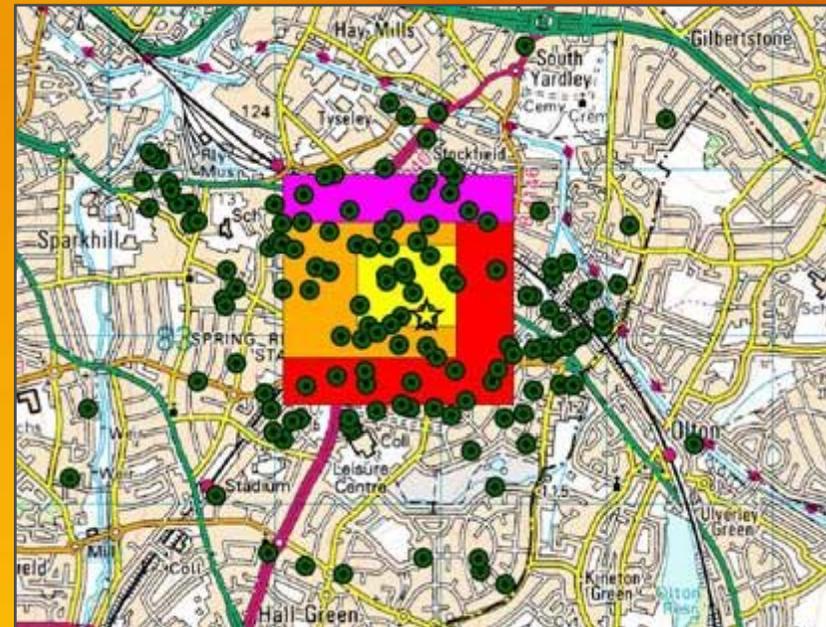


- Imagine centring a rectangle at (mid-x, mid-y) based on the residential postcodes of pupils attending a school
- Let the rectangle grow outwards
- Until it encloses a certain proportion of all pupils who attend the school...



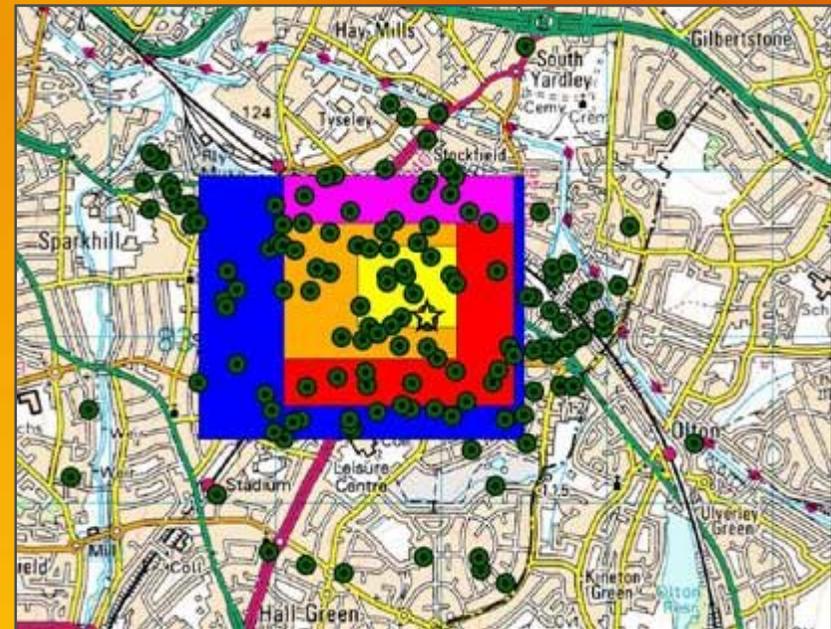


- Imagine centring a rectangle at (mid-x, mid-y) based on the residential postcodes of pupils attending a school
- Let the rectangle grow outwards
- Until it encloses a certain proportion of all pupils who attend the school...
- Here $p = 0.40$





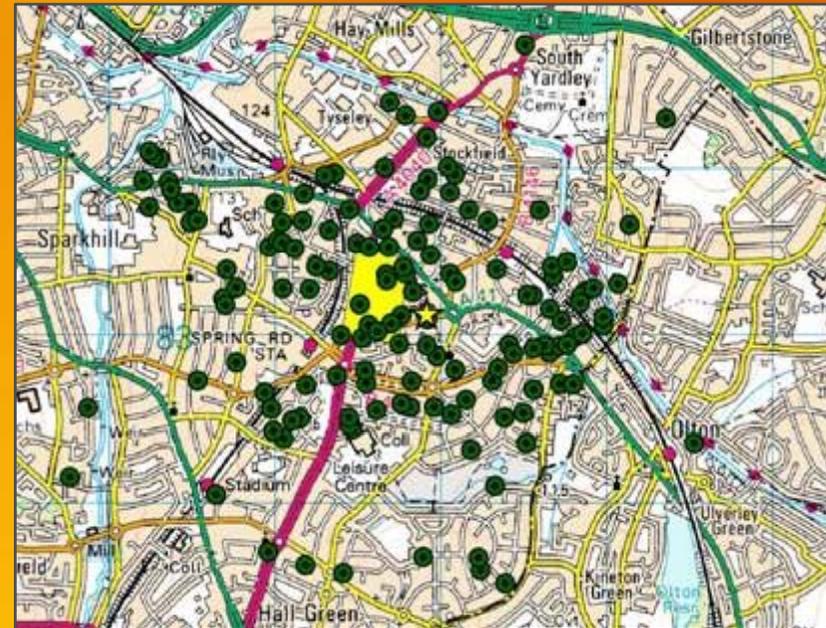
- Imagine centring a rectangle at (mid-x, mid-y) based on the residential postcodes of pupils attending a school
- Let the rectangle grow outwards
- Until it encloses a certain proportion of all pupils who attend the school...
- Here $p = 0.50$

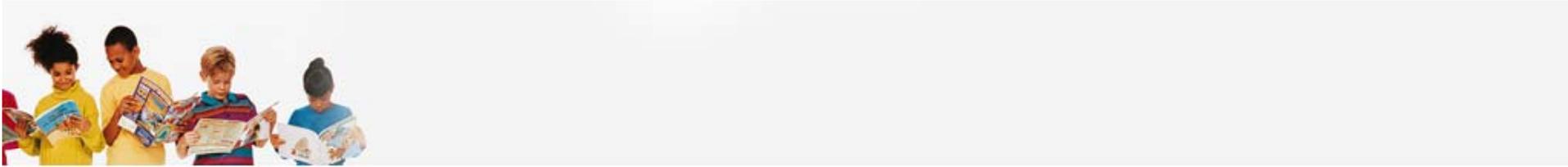




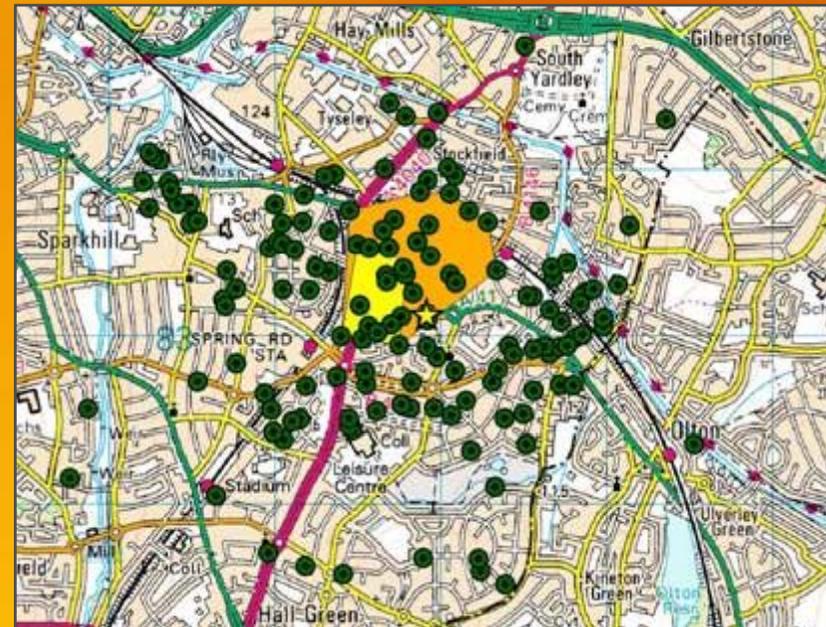
Some Refinements

- Two datasets used simultaneously: one has the postcode grid references rotated by 45°
 - Search is now N, NE, E, SE, S, SW, W, NW, N



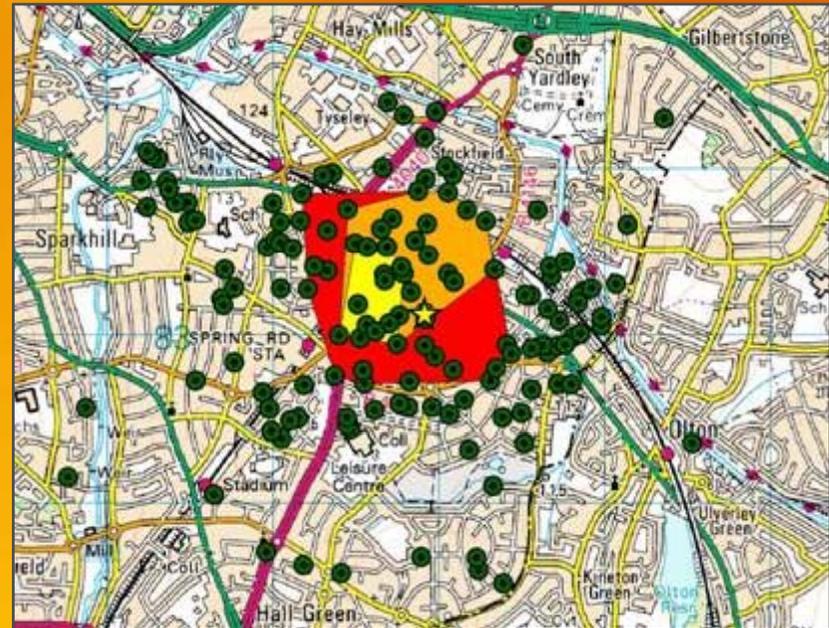


- The direction of growth is determined as that which returns highest $n1 / n2$
 - where $n1$ is number of pupils in area going to the school
 - $n2$ is all pupils in the area (go to any school)
 - Catchment is then defined as the convex hull for pupils of school within the search area.



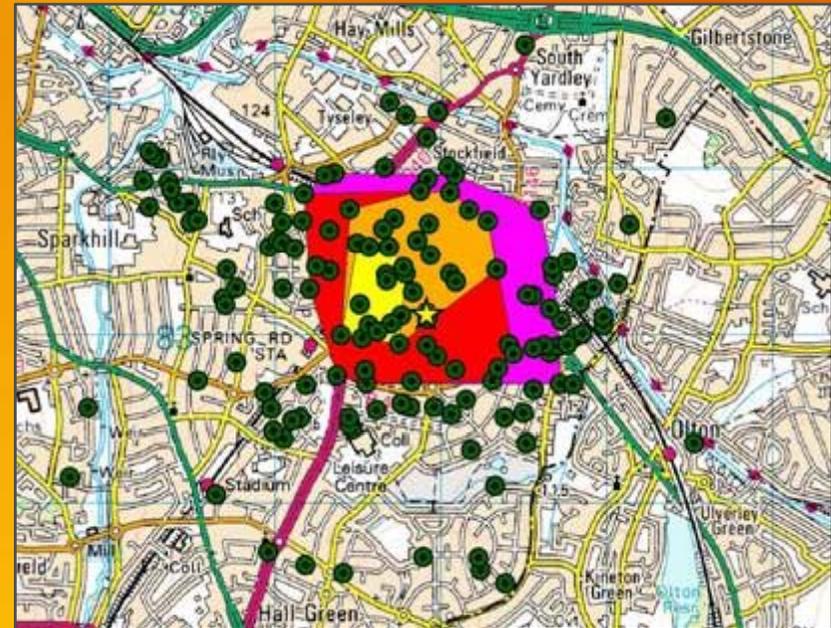


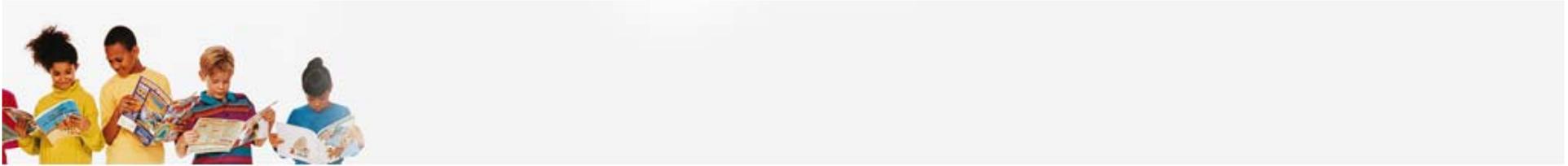
- Continues until a certain proportion of all pupils who attend the school are enclosed...
- $p = 0.30$



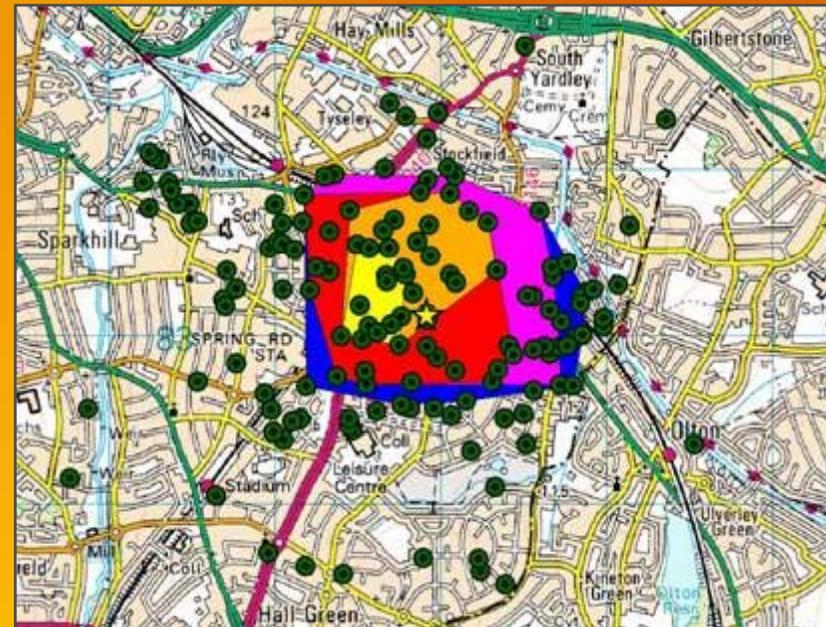


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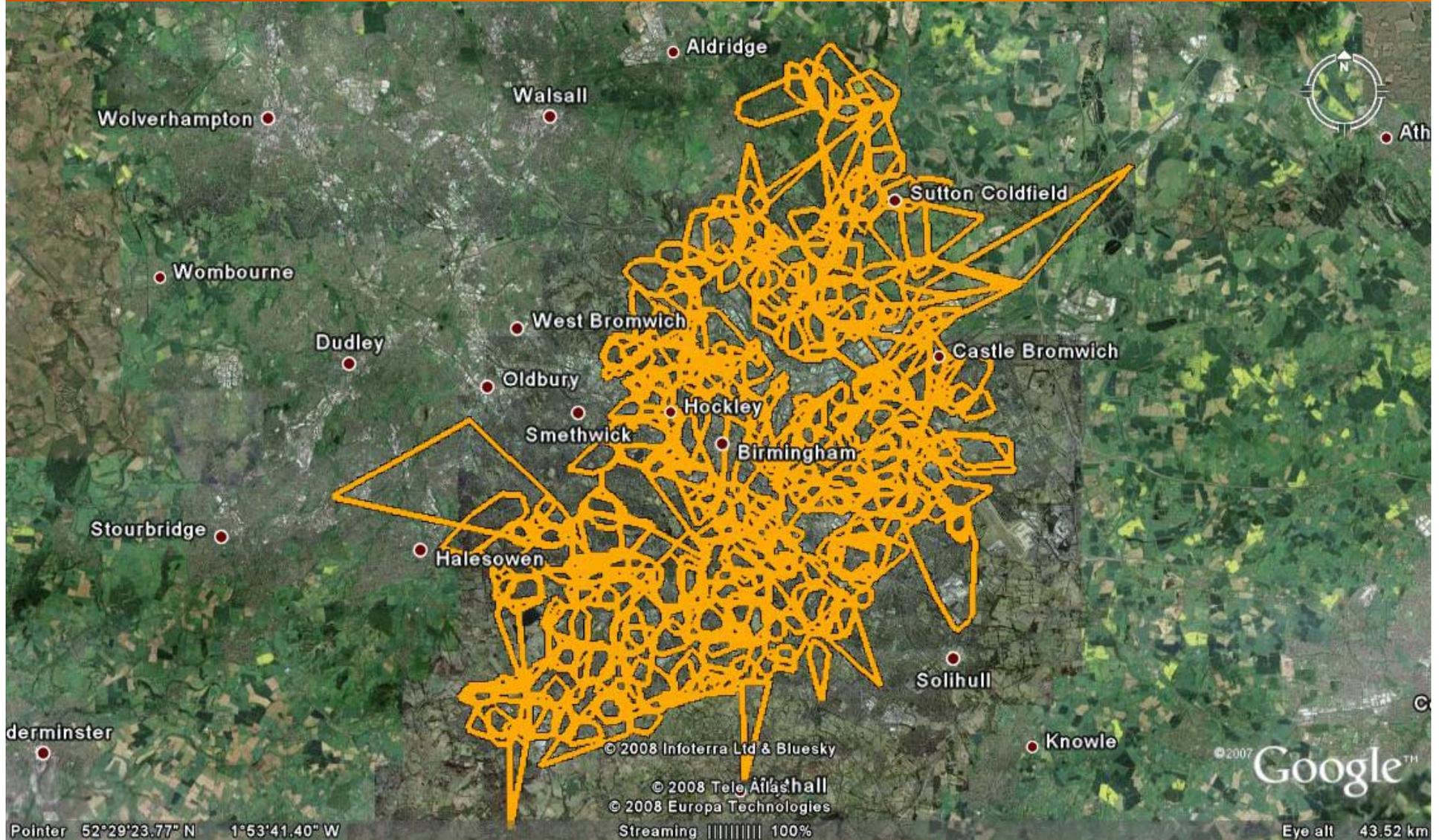


Other methods?

- Why not just find the 'n' nearest neighbours to a school
 - Because that does not consider prevalence
 - The 'at risk' population
 - And it assumes the school is at 'the centre' of its catchment
- Why not use some sort of 'hot spot' analysis
 - Could do but it would likely over-calibrate on a specific set of pupils rather than revealing the schools' potential catchment areas

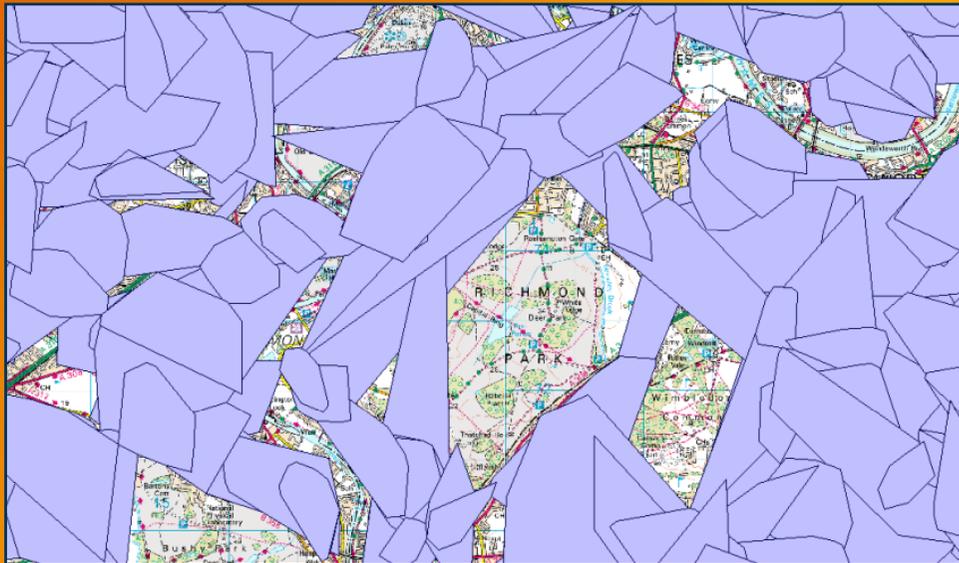
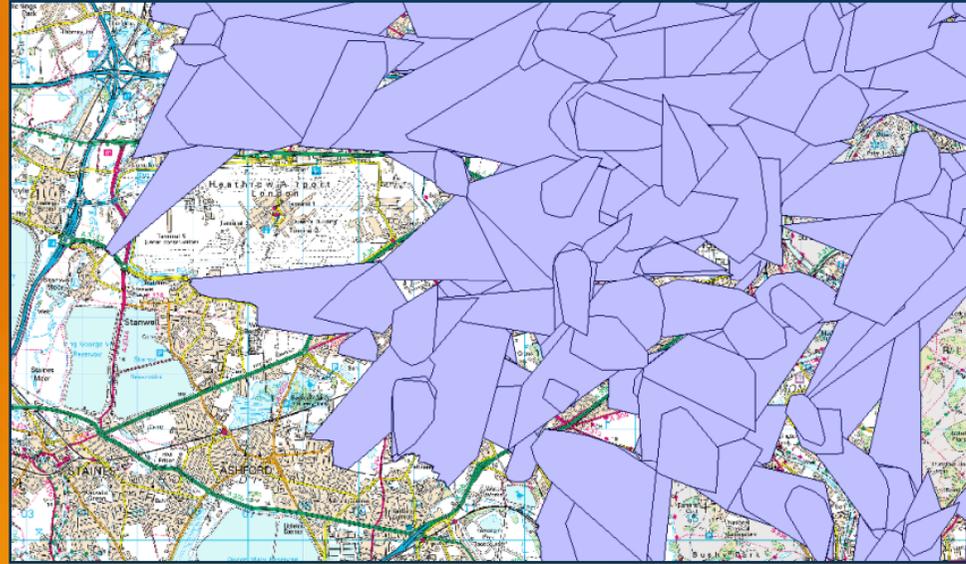


Birmingham





Does it work?





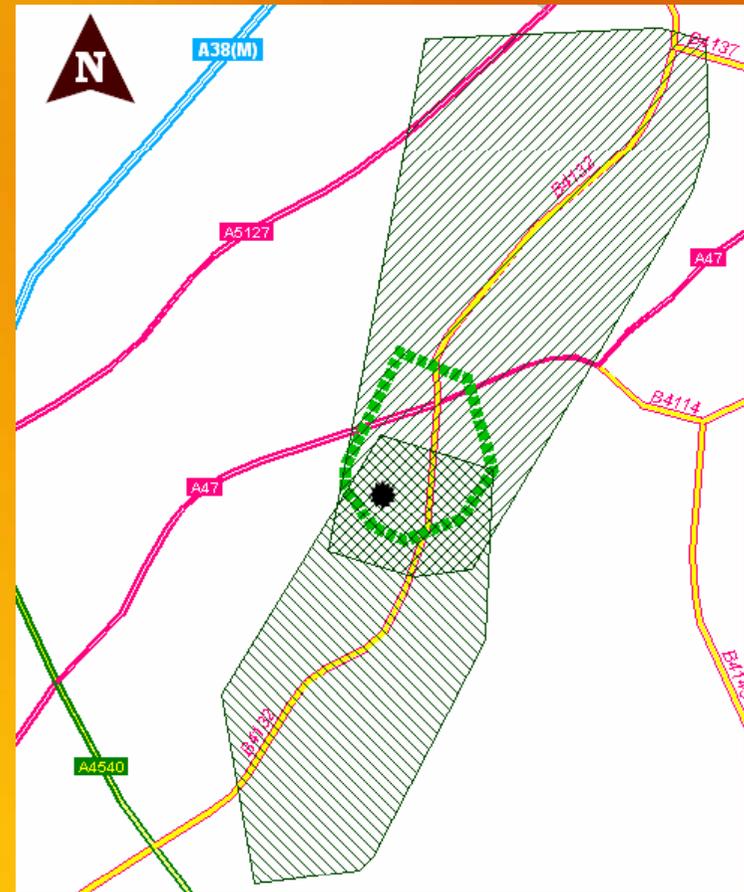
Processes of polarisation (1)

- Friction of distance / 'least cost' perspective
 - **identify any pupils that appear to be travelling further to school than they need to**
 - pupils that live within the core catchment of at least one primary school but are outside of the core catchment of the school actually attended.
 - **May not be a matter of choice**
 - some schools will be over-subscribed
 - catchments are defined to contain only 50% of the pupils at the school.
- Is the propensity to attend any one of the 'near schools' consistently lower for some ethnic groups?



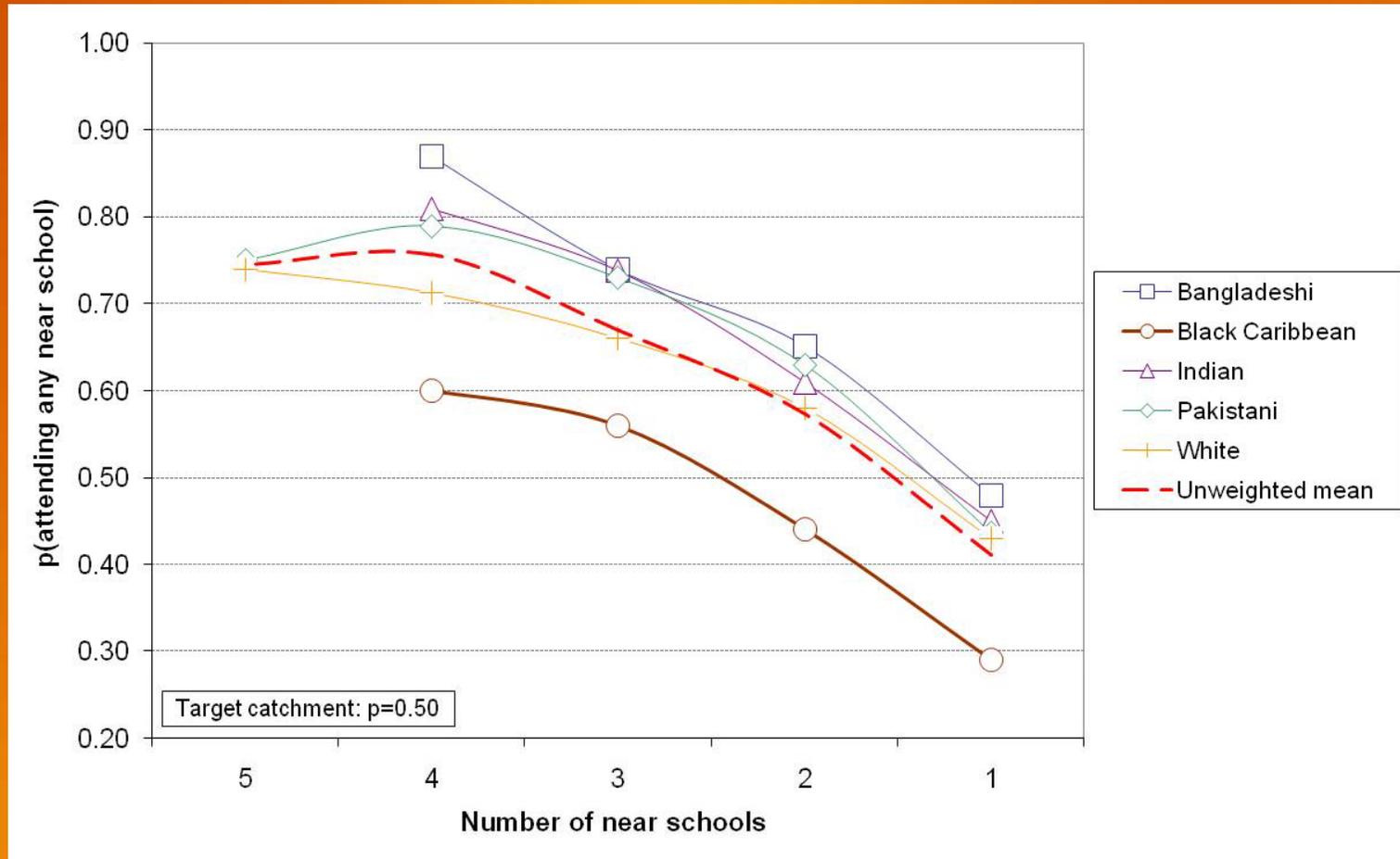
Defining 'Near'

- Define as being near to a pupil any primary school that has a core catchment that includes the pupil's residential postcode
- Here the pupil has three near schools



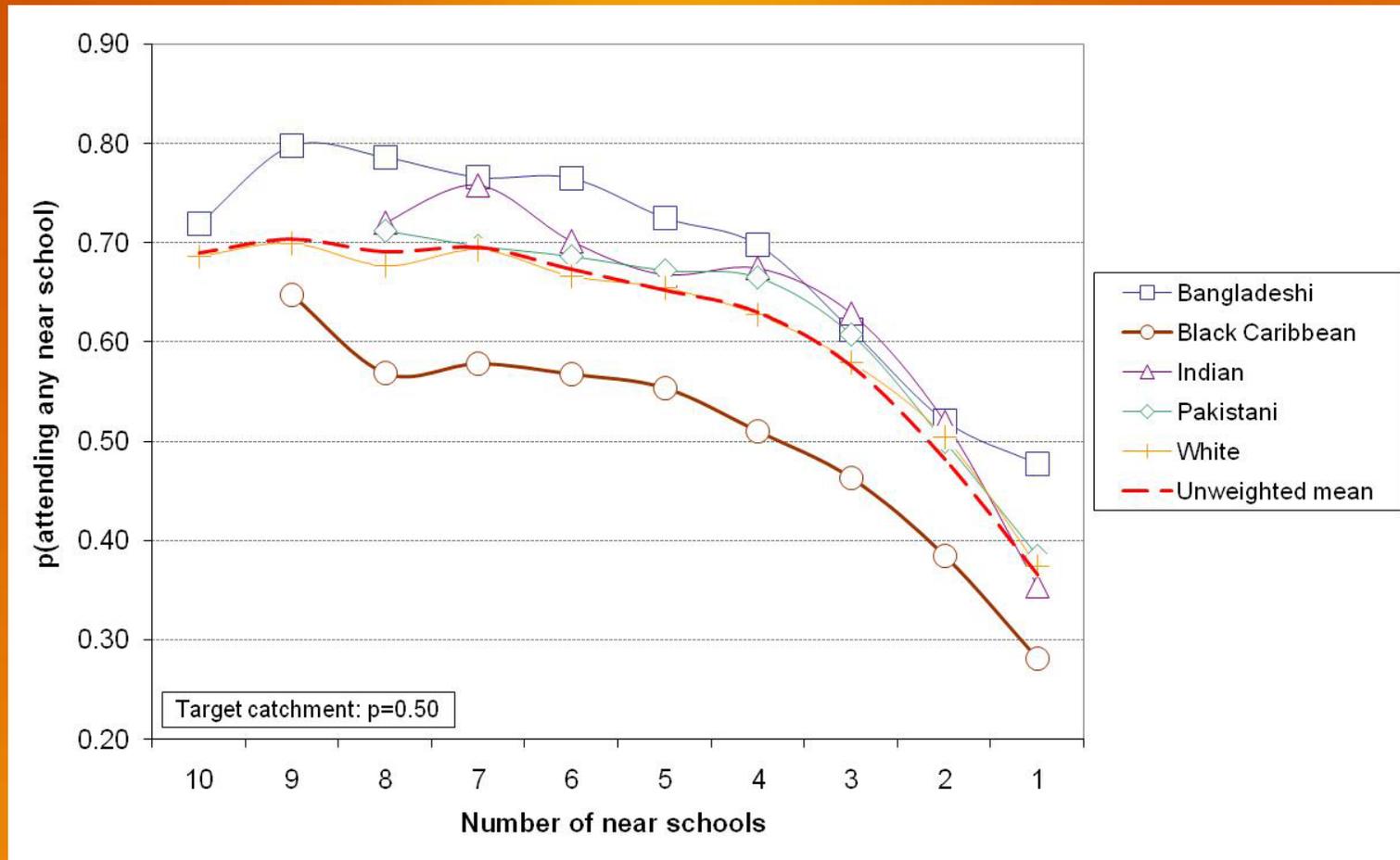


Proportion attending any near school (target catchment $p=0.50$) BIRMINGHAM





Proportion attending any near school (target catchment $p=0.50$) LONDON





Processes of polarisation (2)

- Have evidence of a ‘migratory’ process
- But also local processes of polarisation?
 - When the intake from the local area is not representative of the local population
 - when two or more schools strongly overlap in terms of their potential spaces of recruitment but attract different ethnic groups
- Disentangle
 - migratory and local processes of polarization
 - residential and post-residential sorting

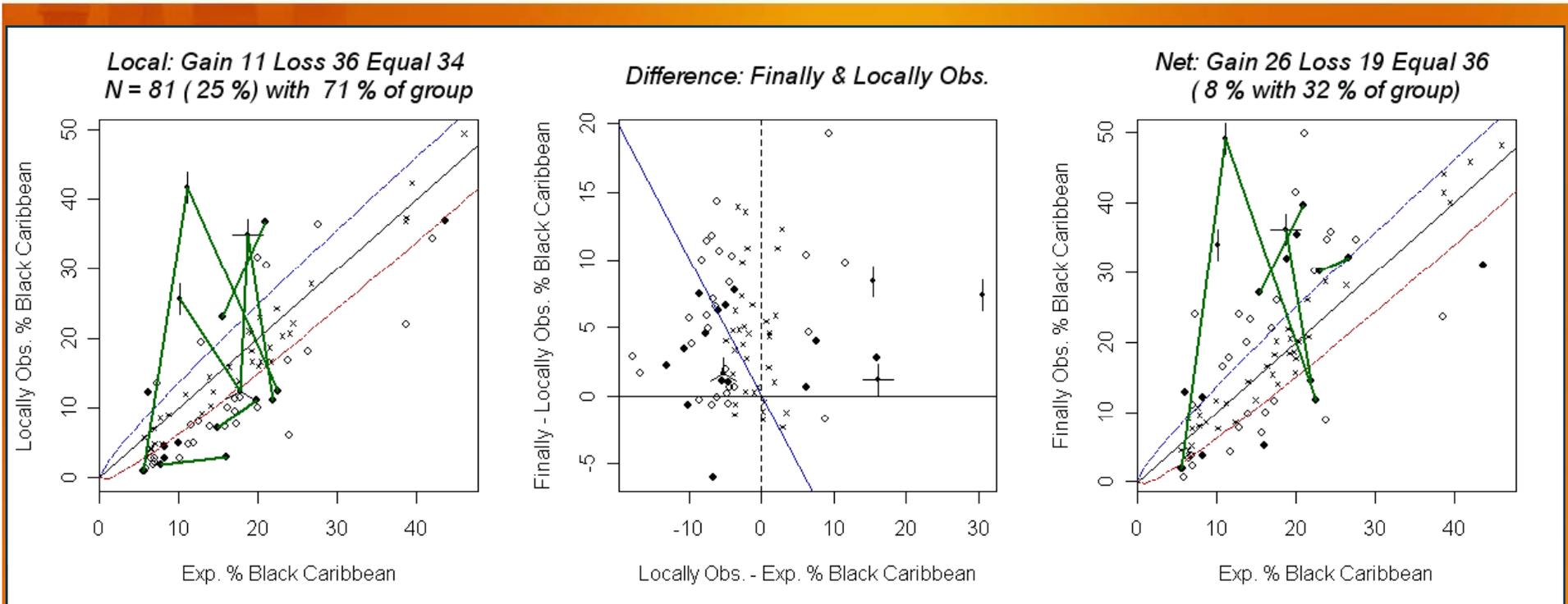


Pairwise Comparisons

- Looking inside the catchments
 - Expected intake Vs
Locally observed intake
- Looking also at the final profile of each school
 - Expected intake Vs
Fully observed intake
- Can also compare the profiles of locally 'competing schools'
 - ones that overlap (strongly) in terms of their core catchment areas



Visual Summary (Birmingham)



- Shows only those schools with highest expected % Black Caribbean



Polarisation within the local market

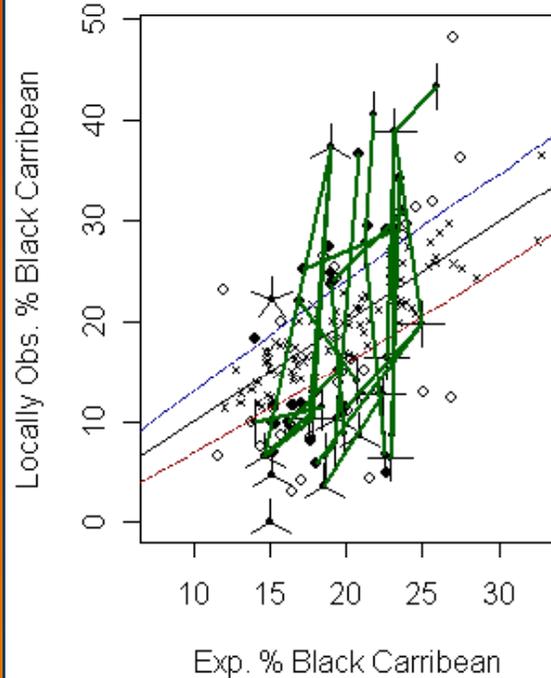
Sch. Type	Expected			Observed			Competitor (observed)		
	Black Caribbean	Indian	Pakis-tani	Black Caribbean	Indian	Pakis-tani	Black Caribbean	Indian	Pakis-tani
Faith	11.1	16.0	36.8	49.1	8.18	1.82	1.87	31.2	44.1
Faith	20.9	8.37	36.5	39.6	3.05	0.00	27.0	23.5	12.5
Faith	20.0	2.38	26.0	41.4	2.63	10.2	-	-	-
Faith	10.1	3.39	28.8	34.0	3.92	8.50	26.0	0.87	7.79
Faith	6.07	3.28	41.0	12.8	9.23	17.9	3.11	1.78	0.89
Faith	21.1	18.9	18.2	49.7	22.3	6.09	-	-	-
Community	15.4	12.9	38.1	27.0	23.5	12.5	39.6	3.05	0.00

Ethnicity profiles of the seven schools with significantly higher than expected percentages of Black Caribbean pupils and a significant segregation index

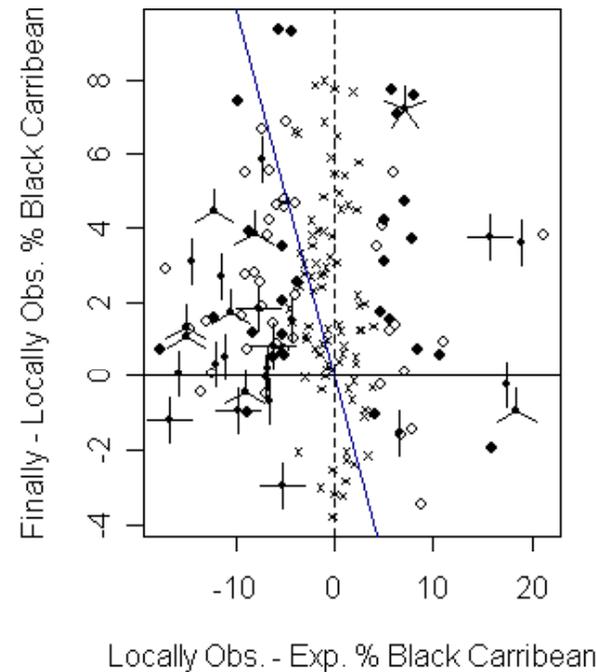


Visual Summary (LONDON)

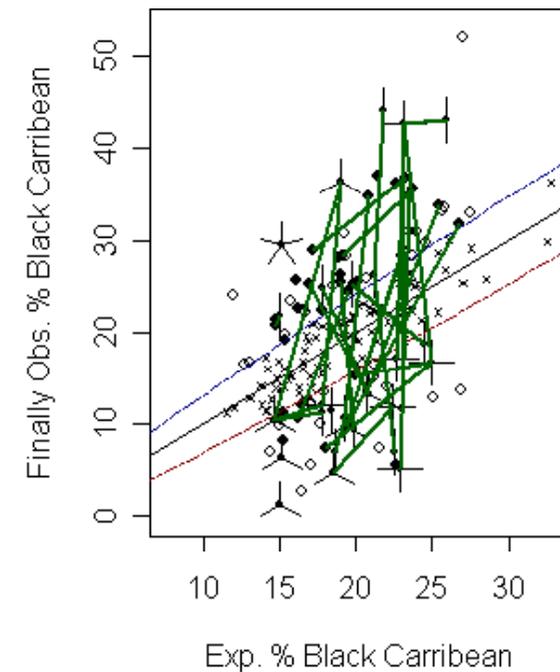
Local: Gain 31 Loss 63 Equal 83
N = 177 (10 %) with 33 % of group



Difference: Finally & Locally Obs.



Net: Gain 52 Loss 45 Equal 80
(3 % with 13 % of group)

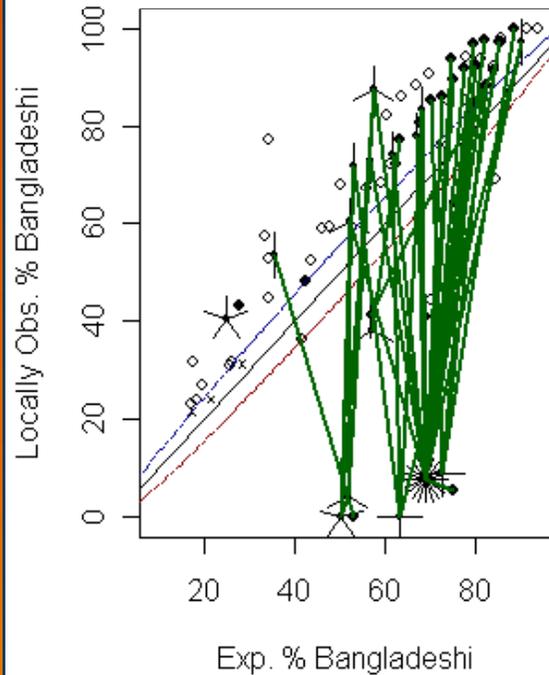


- Shows only those schools with highest expected % Black Caribbean

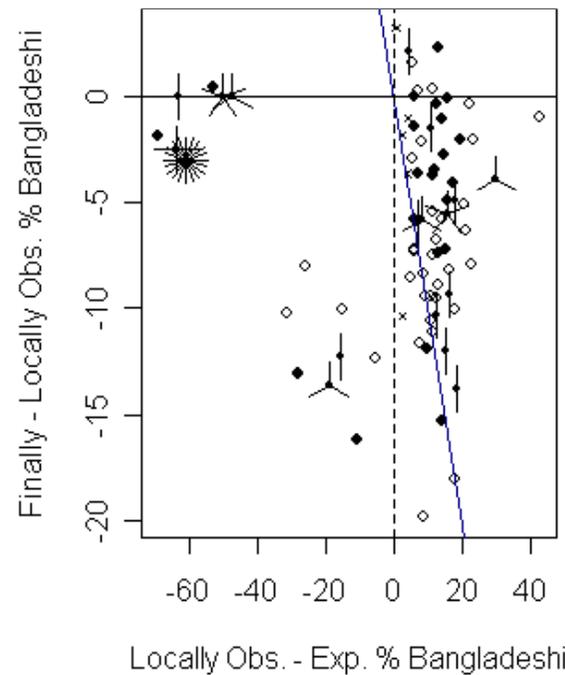


Visual Summary (LONDON)

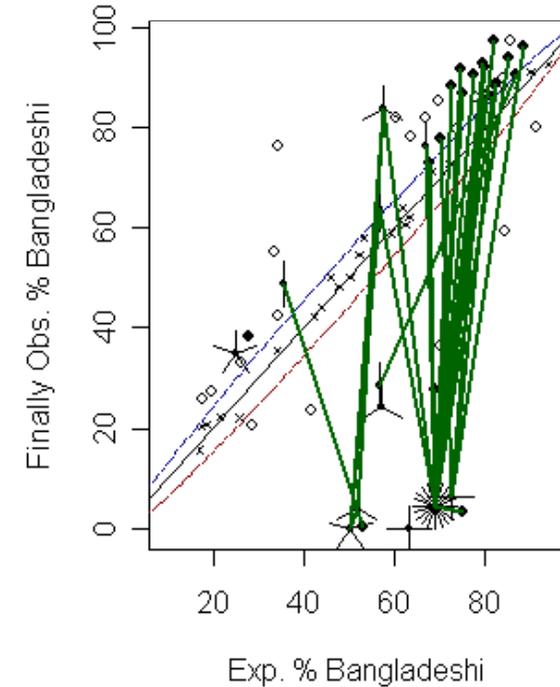
Local: Gain 59 Loss 15 Equal 5
N = 79 (4%) with 52% of group



Difference: Finally & Locally Obs.



Net: Gain 36 Loss 17 Equal 26
(2% with 31% of group)



- Shows only those schools with highest expected % Bangladeshi



Overall segregation Index

- Which schools are least representative of their catchments?

$$S_j = 0.5 \times \sum_1^e |P_{OBSERVED_j} - P_{EXPECTED_j}|$$

- Compared against

$$S^*_j = 0.5 \times \sum_1^e |P_{RANDOM_j} - P_{EXPECTED_j}|$$

- j is a school, e is the number of ethnic groups
- $P_{EXPECTED}$ is the finally observed profile of a school
- P_{RANDOM} is the ethnicity profile obtained for a school if half of its intake is randomly sampled from its core catchment and the other half sampled from outside



Role of 'faith schools'?

School Type	n	p	N	p	Index
Community	10	0.31	234	0.73	43
Voluntary aided	21	0.66	70	0.22	302
Voluntary controlled	1	0.03	15	0.05	67
Other	0		3		
	32		322		

School type of the most segregated schools in Birmingham

10% of all primary schools in Birmingham exhibit significant post-residential sorting.

Rises to 30% for voluntary-aided faith schools (actually Roman Catholic)



Role of 'faith schools'?

Type	Denomination	Segregated schools		All schools		Index	Penetration
		n		n			
Foundation		5	1%	43	2%	55	0.12
Community		157	41%	1284	70%	58	0.12
Voluntary controlled	Church of England	3	1%	17	1%	84	0.18
Voluntary aided	Church of England	67	17%	221	12%	145	0.30
Voluntary aided	Roman Catholic	134	35%	242	13%	264	0.55
Voluntary aided	Other	18	5%	23	1%	373	0.78

21% of all primary schools in London exhibit significant post-residential sorting

The figure rises to an average of 44% for all 'faith schools' but that ranges from 18% to 78%

When debating faith schools need to be careful about treating them as a homogenous group



Summary

- Consistent with previous studies
 - **Black Caribbean pupils appear more likely to travel further to school than they need do**
 - Because they are more geographically dispersed?
 - **Clear evidence of post-residential sorting is found**
 - Role of faith schools?
- Evidence of polarization where locally competing schools draw markedly different intakes.



What the study does *not* Show

- That ethnic separation is a ‘bad thing’
- That polarization would disappear without a system of school choice.
- That recent school reforms have either worsened or improved ethnic separation.
- That ethnic groups actively avoid each other.
- That it is actually ethnicity that drives the processes of separation.



What next?

- Incorporate other measure of social polarization / segregation not based on ethnicity alone.
- to develop longitudinal understanding of whether the core catchment areas are temporally stationary or whether they are dynamically changing, and if so where and why.
- To work with the Centre for Multilevel Modelling at Bristol to assess the evidence for school competition affecting pupils' learning progress



Thank you!