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# Population Dynamics: The Roles of Natural Change and Migration in Producing the Ethnic Mosaic

Nissa Finney and Ludi Simpson

*This paper builds on an emerging literature that focuses on processes of population change as a means of understanding geographies of ethnicity. It argues that persistent assumptions of segregation being the result of divisive separation of ethnic groups are mistaken. The paper takes a demographic approach, presenting analyses of original estimates of natural change and net migration for eight ethnic groups in Britain over the period 1991–2001, at national and district levels. Major results are the greater significance of natural change than migration for minority ethnic population change, and the accordance of population dynamics with theories of counter-urbanisation and dispersal from areas of minority ethnic concentration. The importance of natural change is illustrated through the presentation of its effects on the index of isolation. The paper concludes that ethnic group population change in Britain can to a large extent be explained by benign and unexceptional demographic processes and ethnically undifferentiated migration patterns.*

*Keywords: Ethnic Group; Segregation; Natural Change; Migration; Demography; Britain*

## **Introduction: Race, Migration and Segregation**

The changing ethnic make-up of Britain's population has become characterised in popular assumptions as fast growth and segregation of minority ethnic populations with accompanying 'White-flight' from concentrations of minority population. This paper argues that patterns of minority and White migration need to be understood in relation to the other components of population change, births and deaths. The significance of natural change—a relatively benign process—for the growth of

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minority ethnic populations is demonstrated at national and local levels, raising a challenge to interpretations of divisive clustering.

The recent origins of concerns about ethnic group population change can be located in 2001, a year that was something of a watershed in debates on race in Britain and elsewhere in Europe and North America (Kalra and Kapoor 2009). The urban disturbances in English towns in the summer of that year and the terrorist attacks on US cities in September changed the national and international terrain for thinking about integration, segregation, migration and multiculturalism. In Britain, a swing was observed from an era of concern about discrimination and racism, to an era of concern about extremism and separateness.

The independent review of the disturbances in Oldham, Bradford and Burnley concluded that communities living 'parallel lives' was at the heart of the issue (Cantle 2001). Segregation was identified as the problem and policies of multiculturalism were seen as contributing to a state of separation between ethnic and religious communities (Modood 2007). The message was reinforced by prominent actors, not least the then Chair of the Commission for Racial Equality, Trevor Phillips, who claimed that Britain was 'sleepwalking to segregation' (Phillips 2005). Segregation was said to be a combination of self-segregation by minority ethnic groups and 'White-flight' from areas of large minority ethnic populations.

Similar concerns about segregation are evident elsewhere in Europe, Australasia and North America and there are numerous studies that have measured segregation and attempted to understand its meaning and consequences, with some attempts at international comparison (Musterd 2005; Peach 1996, 2009).

Findings about segregation are conditional on the conceptualisation and measure of segregation that are employed. Douglas Massey and Nancy Denton have been influential in setting the research agenda by identifying five conceptual dimensions: evenness, exposure, concentration, centralisation and clustering (Massey and Denton 1988). Although Asian and Hispanic segregation increased in the USA during the 1980s and 1990s when the exposure dimension of segregation is measured using the isolation index (Johnston *et al.* 2004), other measures show no change or decrease in segregation (Iceland *et al.* 2002). In the UK different indices show ethnic residential segregation increasing or decreasing (Simpson 2007).

One consequence of this renewed debate about segregation has been a call for the emphasis to be shifted from measures based on ethnic composition to an understanding of the processes of population change that are creating the ethnic mosaic (Simpson 2004). Little previous work has examined internal migration by ethnic group in Britain, though some studies, notably by Champion (1996), made use of the arrival of an ethnic group question in the census to demonstrate the differing migration experiences of ethnic groups. Recently, in both the USA and Britain, work focusing on migration patterns of immigrant origin populations has begun to challenge established theories about residential dispersion indicating social integration (Ellis and Goodwin-White 2006) and has demonstrated increased residential mixing and dispersal from concentrations as results of migration (Simpson *et al.*

2008a). Indeed, counterurbanisation is evident for all ethnic groups and, when socio-economic and demographic factors are taken into account, there are few differences in how likely different ethnic groups are to migrate (Finney and Simpson 2008). Similarly, White and minority groups have shared housing aspirations for affordable, good-quality homes in safe, ethnically diverse neighbourhoods not too distant from friends and family (Phillips 2006).

This paper builds on this emerging body of work that is concerned with processes of ethnic group population change. It contends that a demographic approach is essential for understanding structural changes to populations, but is relatively underdeveloped for understanding ethnic geographies.

Since international migrants are predominantly young, each ethnic group's current age structure is dependent on the periods in which it migrated to Britain—as we shall show later. Both natural change and migration are closely associated with life stage, migration and fertility being most common among young adults and mortality among older adults; consequently different rates of population change can be expected for each ethnic group. In this paper such demographic patterns and explanations are explored as a way of understanding Britain's ethnic mosaic. The paper first explains the derivation of a new set of migration estimates for Britain for the period 1991–2001, before using it to describe the population dynamics of ethnic groups both nationally and locally. The insights gained by separating the impacts of migration and natural change are then applied to the measurement of segregation.

### **Method for Estimating Components of Population Change**

Although the UK censuses provide migration data for ethnic groups and sub-national areas (see Finney and Simpson 2008 for a review), these data are for the one year before each census only, while birth and death registrations in the UK do not record ethnic group. This research used well established demographic techniques for decomposing population change over the inter-censal decade 1991–2001 into estimates of births, deaths and net migration (Edmonston and Michalowski 2004; Rowland 2002). These techniques were developed for application to ethnic groups, small areas and the data available in the UK. The resultant dataset is particularly original in its estimation of the age structure of the net impact of migration over a decade with emigration included. Such information is not available directly from the UK censuses. The method also has the advantage of being applicable at all geographical scales. A disadvantage of the method, however, is that it provides statistics of net migration; details of inflows, outflows, origins and destinations are lacking. This section provides a brief overview of the estimation procedures; for full technical details see Simpson *et al.* (2008b).

Migration is that part of population change which is not due to births or deaths, which together constitute natural change. The demographic balancing equation, that population change is the sum of natural increase and net migration, can be rearranged to express net migration as a residual:  $(arrivals - departures) = Population$

*change—(births—deaths)*. Population change is easily obtained from censuses and other population estimates in the UK. The challenge to estimate net migration during the period is thus reduced to measuring natural change and deducting it from population change.

Vital statistics of recorded births and deaths are not available for ethnic groups in Britain as they are in some other countries (e.g. in the USA, Voss *et al.* 2004). However, estimates can be made by the survival method which deducts from the population an estimate of the number of people in each age/sex/ethnic-district category who survived over the defined period (1991 to 2001 in this case) to estimate deaths. Survival ratios from life tables can be applied from the starting population (forward survival) or the end-point population (reverse survival), as described in standard texts such as Rowland (2002). Fertility rates are used to estimate births.

An adaptation of the survival approach was used in this research, and applied to each ethnic group in each of the 408 local authority districts of Britain, for each sex and single year of age. Districts in Britain on average have a population of 130,000. The estimation involved five stages that take into account differences between ethnic groups and localities. First, the number of births into each age cohort that will be aged between 0 and 9 at 2001 was estimated using child–woman ratios in 1991 and the number of children in 2001. Second, these birth estimates were scaled so that, when summed across ethnic groups, they are consistent with official vital statistics data by district, age and sex for the relevant year. Third, an initial estimation of the number of deaths was made using an average of the forward and reverse survival methods. Fourth, these death estimates were scaled so that, when summed across ethnic groups, they are consistent with total deaths from official vital statistics for each district for the period 1991–2001. Fifth, final estimates of migration were generated using the demographic balancing equation above. This procedure gives an estimate of births, deaths and net migration for each ethnic group/district/sex/age combination.

The success of this method depends partly upon the quality of the measure of population change. The research presented here used estimates produced by Albert Sabater (see Sabater and Simpson 2009), which give populations for districts of England, Wales and Scotland by sex, single year of age and ethnic group for 1991 and 2001. Each estimate is based on census data but takes into account the problems of non-response, alteration to the enumeration of students, timing adjustment between census day and mid-year, boundary changes, and changes to the ethnic group census categories.

For the purposes of comparison over time the populations of published ethnic groups at each of the two time points have been aggregated to eight compatible categories: White, Caribbean, African, Indian, Pakistani, Bangladeshi, Chinese and Other, with the 2001 Mixed groups being included in the residual Other category. The first seven of these groups are the most coherent and stable classification from 1991 to 2001 (Office for National Statistics 2006; Simpson and Akinwale 2007). The

residual eighth category is used for completeness but is very diverse and of different composition in the two census years.

The validity of aggregating whole groups is supported by comparison when net migration and natural change are re-calculated using an alternative construction of ethnic group categories (Table 1). This alternative uses a matrix of transitions of people's ethnic group in 1991 and 2001, developed by Simpson and Akinwale (2007) from the Longitudinal Study. The matrix shows, for example, that 0.6 per cent of those recorded as Caribbean in 1991 were recorded as African in 2001, and 2.4 per cent of 1991 Africans moved to Caribbean in 2001. Discounting the residual Other category, comparison of population change for the country as a whole suggests that the classification using whole groups is reliable but that we should bear in mind potential under-estimation of natural change and over-estimation of net out-migration for the Caribbean group; over-estimation of net in-migration for the African group; and under-estimation of net migration for the Indian group. The alternative classification is not used in this paper because its application is complex in comparison to the method chosen, and the matrix of transitions between groups from 1991 to 2001 is unlikely to apply equally to each district of Britain and each age.

### **Ethnic Group Population Dynamics**

The following two sub-sections explore the estimates of natural change and net migration for ethnic groups 1991–2001 for districts in Britain. The first sub-section explores the national picture, examining the roles that natural change and net migration play for each ethnic group. The contributions of each component and the relationships between them are explored. This part also presents the differing international migration-age profiles for each ethnic group. The second sub-section asks whether the national patterns are consistent at a local (district) scale. Population dynamics are analysed for types of district, and a case study of net migration and natural change for ethnic groups in Bradford and its surrounding districts is presented.

#### *A National View of Components of Change for Ethnic Groups*

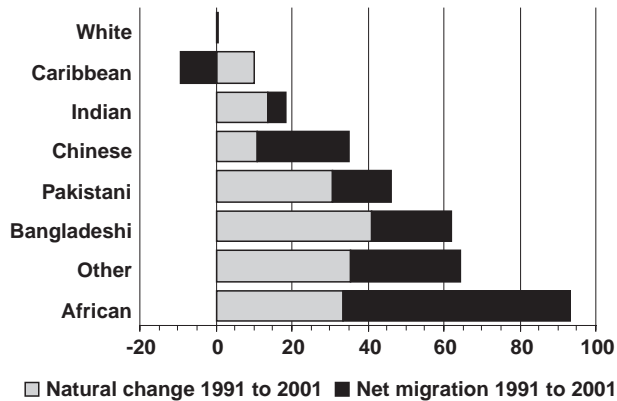
Quite different dynamics of population change are revealed for the eight ethnic groups (Table 1 and Figure 1). The population of all groups increased over the decade (by 2.8 per cent overall), though at differing rates. The African population grew at the fastest rate (93 per cent increase on 1991 population) followed by Bangladeshi (62 per cent) and Pakistani (46 per cent). Chinese (35 per cent) and Indian (18 per cent) grew less; and Caribbean and White the least (1.1 per cent and 0.5 per cent respectively).

The net migration figures in Table 1 and Figure 1 show the balance of *international* migration for each ethnic group over the decade 1991–2001. For all ethnic groups apart from the Caribbean, there was population increase over the decade as a result of both positive natural change and positive net migration. The Caribbean group

**Table 1.** Components of population change for ethnic groups in Britain 1991–2001

Ethnic group	Popula- tion 1991	Popula- tion 2001	Population change 1991–2001	Births 1991–2001	Deaths 1991–2001	Natural change 1991–2001	Net migration 1991–2001	Natural change 1991–2001 as % of 1991 population	Net migration 1991–2001 as % of 1991 population	Natural change 1991–2001 as % of 1991 population	Net migration 1991–2001 as % of 1991 population
										Alternative allocation of ethnic groups (see text)	
White	52,441,709	52,709,827	268,119	6,136,459	6,018,735	117,724	150,395	0.22	0.29	0.35	0.60
Caribbean	570,751	573,990	3,239	86,952	30,003	56,949	–53,710	9.98	–9.41	12.67	–5.24
African	258,746	499,790	241,044	94,024	7,775	86,249	154,795	33.33	59.82	31.32	47.96
Indian	903,024	1,068,343	165,319	162,250	39,434	122,816	42,503	13.60	4.71	14.36	12.55
Pakistani	519,115	759,540	240,425	177,798	18,151	159,647	80,778	30.75	15.56	30.22	17.40
Bangladeshi	178,195	288,673	110,478	78,712	5,679	73,033	37,444	40.99	21.01	40.26	22.70
Chinese	184,788	249,666	64,879	27,143	7,242	19,901	44,978	10.77	24.34	11.20	23.01
Other	775,035	1,274,346	499,311	302,695	26,731	275,963	223,348	35.61	28.82	25.44	–1.67
<i>All Groups</i>	<i>55,831,363</i>	<i>57,424,176</i>	<i>1,592,813</i>	<i>7,066,033</i>	<i>6,153,751</i>	<i>912,282</i>	<i>680,531</i>	<i>1.63</i>	<i>1.22</i>	<i>1.63</i>	<i>1.22</i>

Source: CCSR Components of Population Change Estimates.



**Figure 1.** Natural change and net migration 1991–2001 for ethnic groups in Britain, per cent of 1991 population

Source: CCSR Components of Population Change Estimates

differed in that it lost population from Britain between 1991 and 2001 as a result of emigration.

Natural change—an excess of births over deaths—varied from 0.2 per cent for Whites, a small impact on the population, to 41 per cent growth in the Bangladeshi population over the decade. Population growth due to natural change was around one third for African and Pakistani groups, and one tenth for Chinese, Indian and Caribbean. Natural change, therefore, played a very significant role in population growth nationally for minority ethnic groups.

Population change due to net migration in relation to 1991 population size varied from 0.3 per cent for Whites (marginally higher than the impact of natural change) to 60 per cent for Africans. Pakistani, Bangladeshi, Chinese and Other populations grew due to migration by between 16 and 29 per cent, and the Indian group by a smaller 5 per cent. The Caribbean group lost 9 per cent of its 1991 population as a result of migration and was the only group to experience net emigration.

Migration had a greater impact on population increase over the decade for the Chinese, African and White groups; for all other groups—Caribbean, Indian, Pakistani, Bangladeshi and Other—and for the population as a whole, natural change had the greatest impact.

The timing and type of immigration and their consequence for the demographic structure of the groups explain many of these population dynamics (Table 2). The African group, whose migration to Britain has been predominantly for work or refuge, is yet to reach its peak of immigration to Britain during the modern era of migration. It thus has a very young age structure which results in a high rate of natural increase. In comparison, the Chinese group has a much older age structure, thus a smaller proportion of the population in reproductive ages. Although the Chinese immigration rate has recently been high, this is largely accounted for by student migrants who are less likely to start families.

**Table 2.** Ethnic group age structures and main period of arrival in Britain

Ethnic Group	% GB population aged 15–40 in 2001	% GB population aged 60+ in 2001	Main period of arrival in Britain
White	35.0	22.0	Pre-1900
Caribbean	44.5	16.1	1955–1964
African	53.1	4.0	Since 1991
Indian	46.3	10.1	1965–1974
Pakistani	47.1	6.5	1965–1979
Bangladeshi	47.9	5.8	1980–1988
Chinese	53.8	7.6	Since 1991
Other	44.8	5.1	-

*Source:* for period of arrival, Peach (1996).

The stability of the White population is clear: there was little population growth and the population age structure is mature. The population change for the White group in the 1990s was smaller than for minority groups both in absolute numbers and as a percentage. Among the South Asian groups, natural change was greatest for the Bangladeshi group and then for Pakistanis and least for Indians. This is to be expected by the younger age structures of the first two groups, which in turn is a result of their more recent arrival in Britain. That the Bangladeshi and Pakistani groups also have higher levels of immigration than the Indian as a percentage of their populations can again be interpreted as a result of their more recent arrival and the greater significance therefore of immigration for family reunification (Salt 2006).

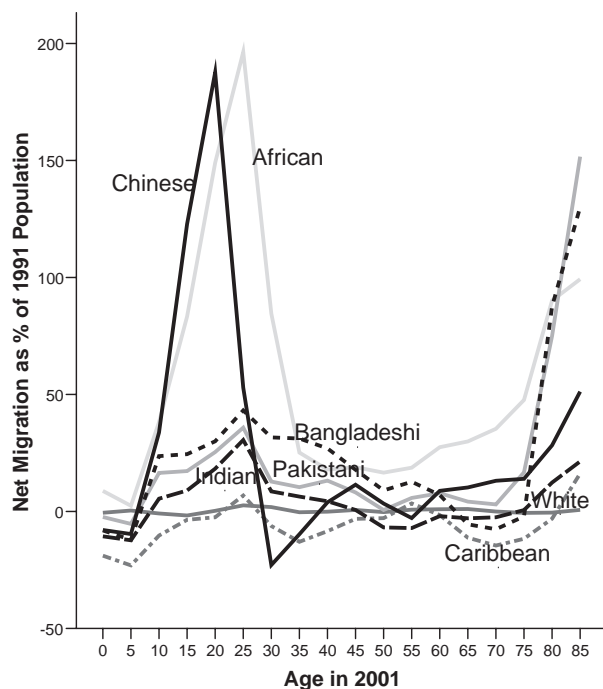
The Caribbean group has only slight growth due to natural change, second lowest only to Whites, as would be expected from the relatively early timing of the major Caribbean immigration. The emigration, which persists when transitions between ethnic groups are considered in the alternative estimates of Table 1, is likely to be a reflection of return migration to the Caribbean, largely for retirement.

These interpretations are corroborated by Figure 2 which shows estimated net international migration over the decade for ethnic groups by age at the end of the decade. In particular, the immigration of young Africans and Chinese is striking. Immigration of ages 10–50 (in 2001) of the South Asian groups is also notable. The Caribbean group showed immigration only at ages 20–30 and at ages 50–60. There was emigration both of working ages 30–50 and retirement ages 60+.

#### *Natural Change and Net Migration Locally*

The previous sub-section has demonstrated the significance of natural change for minority ethnic groups at a national level and shown differing relationships between natural change and net migration, putting forward explanations based on the age structure of migrants and the population, and the known timings and motivations for migration.

The local dynamics of natural change and net migration are explored in two ways in this sub-section. First, natural change and net migration are compared for districts



**Figure 2.** Age profile of net migration to Britain 1991–2001 by ethnic group as a % of 1991 population

of differing urban density and role in immigrant settlement. Second, a case study of Bradford and its bordering districts is presented to explore how the broader patterns play out for one particular locality.

### Local Population Dynamics According to Urban Density and Immigrant Settlement Experience

In Table 3, districts are first categorised according to their urban density using a classification initially devised by OPCS (1989) and used in many studies of internal migration. For the population as a whole we expect migration patterns to demonstrate counterurbanisation (Champion 2005) and natural growth to be greatest in urban areas. Is this evident for all ethnic groups?

It is clear from Table 3 that the pattern of natural change across the spectrum of urban to rural areas was quite different for the White group compared to the other ethnic groups. Natural change was relatively small for Whites in both urban and rural areas; it was greatest in mixed urban and rural areas and in London, both inner and outer. The single district with greatest natural growth for Whites over the decade was the new town of Milton Keynes (7.2 per cent of its 1991 population). The White population was the only group that experienced natural decrease—more deaths than births—in any of the area categories.

**Table 3.** Net migration and natural change for area types and ethnic groups

	Natural change 1991–2001 as % of 1991 population						
	White	Caribbean	African	Indian	Pakistani	Bangladeshi	Chinese
Inner London	1.0	11.9	36.4	12.0	27.4	45.7	10.0
Outer London	1.0	13.0	39.9	13.2	28.5	32.5	10.5
Metropolitan and City Districts	0.0	6.5	18.8	13.7	30.9	38.1	9.0
Other Urban	−0.1	7.7	28.0	15.4	32.7	39.3	13.0
Mixed Urban and Rural	1.5	8.6	23.0	13.7	32.4	38.4	13.3
Rural	−1.3	8.0	19.3	16.2	35.1	34.4	14.5
Settlement	0.2	10.6	35.5	13.6	31.0	41.6	9.6
Dispersal	0.9	8.3	28.8	13.1	30.0	38.3	11.8
Other	−0.2	5.9	18.2	13.9	31.0	40.0	11.3

	Net migration 1991–2001 as % of 1991 population						
	White	Caribbean	African	Indian	Pakistani	Bangladeshi	Chinese
Inner London	−0.6	−15.0	44.3	−0.5	14.5	25.2	15.1
Outer London	−5.4	12.5	104.8	11.6	34.2	33.0	28.4
Metropolitan and City Districts	−3.2	−20.8	35.0	−3.5	10.8	15.4	19.8
Other Urban	1.7	−3.0	112.0	6.5	16.0	15.5	27.5
Mixed Urban and Rural	2.4	−3.3	40.2	18.7	26.1	10.4	36.3
Rural	7.0	*8.4	*−1.2	*30.4	*57.0	*25.3	*38.8
Settlement	−4.2	−9.5	59.0	2.1	16.2	22.5	21.1
Dispersal	1.8	−4.0	99.1	18.6	25.9	22.6	32.3
Other	1.4	−18.3	22.3	3.3	10.9	13.5	21.2

Source: CCSR Components of Population Change Estimates.

Note: \* identifies populations of less than 10,000 in 1991.

For all the minority ethnic groups the excess of births over deaths during the 1990s made a substantial contribution to population growth, irrespective of the urban density of the district; differences between types of area were relatively small. Excepting Bangladeshis, natural growth was greater in outer London than inner London, and slightly more in the mixed urban and rural areas than in the metropolitan and city districts.

Migration patterns for districts classified according to urban density reveal general patterns of greatest net movement to outer London; and counterurbanisation outside London. The White group experienced a cascade of counterurbanisation over the decade with movement out of London and metropolitan cities and into smaller cities, mixed urban and rural areas, and rural areas. The Caribbean, Indian, Pakistani and Bangladeshi groups saw a shift due to migration from inner to outer London, and greatest percentage growth in rural areas, though based on small populations at the start of the period. We know that the Caribbean out-migration from other district types was in part due to emigration. The African group is the exception to these counterurbanising patterns. The African group has the largest growth due to migration for each category of districts apart from rural areas, where it lost population slightly. The growth of the urban African population is characteristic of recent immigration rather than shifts within the UK. Simpson and Finney (2009) give greater detail of migration within the UK for the single year before the 2001 Census, which complements the interpretations of net migration for the 1990s in this paper.

Are these patterns an indication of dispersal within the UK from areas of traditional settlement of immigrant origin populations? The second method of district classification shown in Table 3 conceptualises settlement areas as those that have a continued history of minority ethnic immigration; and dispersal areas as ones to which minority populations move from the settlement areas. This approach to district classification allows us to explore the theory that the mixing of ethnic group populations is a combined result of minority ethnic population growth through immigration, followed by natural change in areas of original immigrant settlement, and out-migration, or dispersal, to areas elsewhere in Britain. High natural change may also be expected in dispersal areas as families establish themselves in their new locations, but at a slower rate than in settlement areas.

In the district classification, settlement areas are defined as the 45 districts of Britain with highest minority ethnic immigration between 1960 and 1971 and 1990–91. These include the districts of Brent, Harrow and Tower Hamlets in London; Manchester, Newcastle, Sheffield, Bradford and Leeds in the north of England; Birmingham, Wolverhampton and Leicester in the Midlands; and Cardiff in South Wales.

Dispersal districts, of which there are 144, are defined as those that are not settlement areas but had minority ethnic in-migration from elsewhere in the UK between 2000 and 2001 greater than or equal to 20, as measured by the census. Some dispersal districts share borders with settlement districts such as Salford (bordering Manchester), Gateshead (bordering Newcastle), Derbyshire (bordering Sheffield),

Oadby (bordering Leicester) and Newport (bordering Cardiff). Other dispersal areas are more distant from settlement districts, such as Bournemouth, Reading, Northampton and Guildford. 'Other districts' are those that meet neither the settlement nor dispersal criteria.

Table 3 shows that population growth due to migration was greater in dispersal areas than in settlement areas for all ethnic groups, even though this migration included immigration. Natural growth was clearly higher in settlement areas than elsewhere for the African population and to a lesser extent for the Caribbean and Bangladeshi populations. Indian and Pakistani natural growth did not differ between settlement and dispersal areas. For the Chinese group, natural growth was greatest in dispersal areas. It can also be seen that settlement areas were growing more through natural change than migration for the White, Caribbean, Pakistani, Indian and Bangladeshi groups. For the Pakistani and Bangladeshi groups, all types of area—settlement, dispersal and other—were growing more through natural change than through migration. This broadly confirms the theory of clustering and dispersal, though it also indicates ethnic group variation and minority ethnic immigration to districts without a previous history of immigration.

### **A Case Study of Bradford and Bordering Districts**

The discussion of local patterns of natural change and net migration has so far demonstrated the different geographies of population dynamics among ethnic groups and has supported theories of counterurbanisation and dispersal from settlement areas. We now examine how these processes played out for Indian and Pakistani ethnic groups for the Yorkshire district of Bradford, and the districts that border it (Figure 3).

Bradford has been chosen as a case study for two main reasons. First, it has been the focus of political concerns since urban disturbances in the city were interpreted as a result of increasing separation of ethnic groups residentially and otherwise (Cantle 2001). Second, Bradford has a high minority ethnic population of 22 per cent (compared to 8.3 per cent for Britain as a whole). The case study will look at the White, Indian and Pakistani populations of Bradford and its bordering districts because these ethnic groups account for the largest proportion of the population (Table 4).

In the urban–rural classification used in Table 3, Bradford, Kirklees and Leeds are metropolitan districts, Calderdale is a city district, Pendle is urban, Harrogate is a mixed urban and rural area and Craven is a rural area. In the settlement–dispersal classification Bradford, Kirklees and Leeds are settlement areas and the other four districts are neither settlement nor dispersal (and therefore classed as Other). Table 4 shows that the ethnic composition of the seven districts varies from 78 per cent White in Bradford to 98 per cent White in Harrogate and Craven. The case study will consider only these seven districts but of course this is not a closed system of population dynamics; each district has numerous interactions with places elsewhere.

The importance of natural change for growth of the Indian and Pakistani populations in each of the districts is clear. In Bradford over the decade 1991–2001, White population was lost, mainly through migration; natural growth of the Indian population cancelled out the loss through migration; and the Pakistani population grew through both migration and natural change. A very similar pattern is seen in Leeds. Both cities show counterurbanisation of Whites, dispersal of Indians, and continued clustering of Pakistani population through natural change and continued immigration.

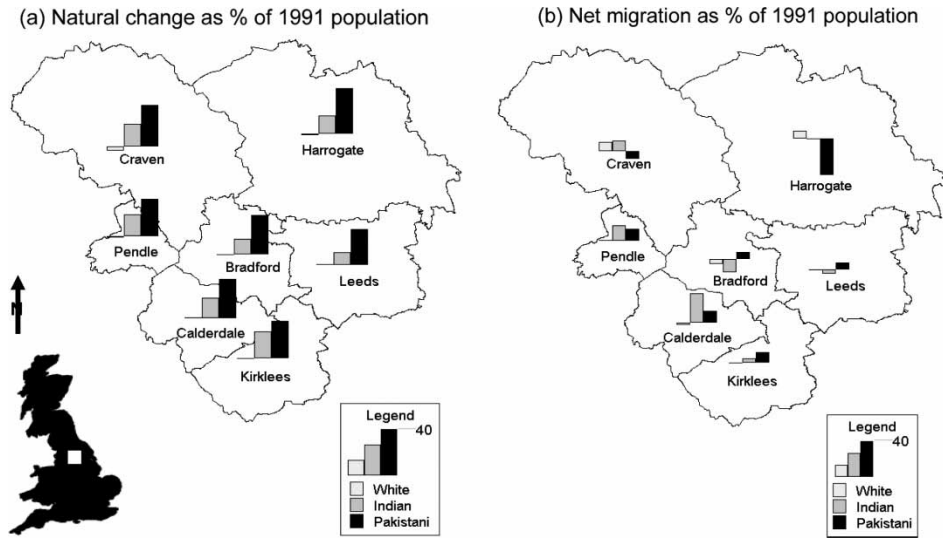
In Calderdale, Kirklees and Pendle there is also White out-migration, while Pakistani and Indian growth derives both from births and from in-migration, the latter being greater than in the more urban districts of Bradford and Leeds. It is likely that this in-migration is partly dispersal from Bradford and Leeds, and the same conclusion may be drawn from Indian migration into Craven. The two most rural districts of Craven and Harrogate have a somewhat different dynamic. White populations gain through in-migration; migration results in Indian population growth in Craven and stability in Harrogate; but the Pakistani group experiences net out-migration from both districts.

The Pakistani out-migration from Harrogate and Craven is an anomalous and therefore interesting result. The first point to note is that the percentages shown in Figure 3 are based on relatively small numbers: in Craven during 1991–2001 Pakistani natural growth of 78 and net out-migration of 18 resulted in overall population growth of 60 on a 1991 population of 222; in Harrogate Pakistani natural change of 25 and net out-migration of 25 resulted in a stable population of 64. There are several possible interpretations for this disruption of the general picture of *in-situ* natural change, dispersal and counterurbanisation: these are two high status districts with a volatile Pakistani population due to mobility of professional people; it is the young adults who are moving out, probably for work in urban centres; Pakistani populations may have experienced prejudice in these politically Conservative districts. Despite the migration losses, Harrogate and Craven are still areas for family building for the Pakistani population.

### **Natural Change and Segregation**

The previous sections have illustrated the importance of natural change for minority ethnic population growth in Britain locally and nationally, driven predominantly by the young age structure of the minority populations. This section returns to the issue of segregation and asks what impact natural growth over the decade 1991–2001 has had on the segregation of Britain's minority ethnic populations; in doing so we question some interpretations that have been made of measures of segregation.

One of the most commonly used indices of segregation is the Index of Isolation, or  $P^*$ , developed by Lieberman (1980). This index is used here because it is the one index of segregation that has increased in Britain in the 1991–2001 period (Simpson 2007) and because it has been used to make the case for the persistence of the problem of



**Figure 3.** Natural change and net migration 1991–2001 for Bradford and bordering districts for White, Indian and Pakistani groups

Source: CCSR Components of Population Change Estimates

segregation (Johnston *et al.* 2005). The formula for  $P^*$  is  $100 \cdot \sum_i (N_{gi}/N_g) \cdot (N_{gi}/N_i)$ , where  $N_{gi}$  is the number of people of group  $g$  in area  $i$ , and  $\cdot$  indicates summation over the index.

The Index of Isolation ( $P^*$ ) measures the lack of exposure of one group to another and can be interpreted as the probability that a member of an ethnic group will not meet someone of another group locally. It is the ethnic group's proportion of the population averaged across areas where that group lives.  $P^*$  takes values between 0 and 100, where 100 indicates greatest isolation (no exposure to other ethnic groups). Table 5 shows  $P^*$  calculated for each of eight ethnic groups for 1991, and for 2001 in two different ways: the population as it then was, and the population as it would have been without the effect of natural change over the preceding decade. One of the major criticisms of the Index of Isolation is that it is highly dependent on population size.

**Table 4.** Ethnic composition of Bradford and surrounding districts, 2001 (per cent of district population)

District	White	Pakistani	Indian	Other ethnic groups
Bradford	78.2	14.6	2.7	4.6
Pendle	84.9	13.4	0.3	1.5
Kirklees	85.6	6.8	4.1	3.5
Leeds	91.8	2.1	1.7	4.4
Calderdale	93.0	4.9	0.4	1.7
Harrogate	98.4	0.0	0.1	1.4
Craven	98.5	0.5	0.1	0.9

Source: after Sabater and Simpson (2009).

If a group comprises 90 per cent of the population and their  $P^*$  is 90, they would be evenly distributed; if they comprise 1 per cent of the population and their  $P^*$  is 5, they are five times more isolated than they would be with an even population distribution. The Index has been calculated using the improved population estimates for the 408 districts of Britain, and the results therefore differ slightly from (and are an improvement upon) previously published measures.

Table 5 shows that, for all ethnic groups apart from the White and Caribbean groups, the isolation from other groups increased from 1991 to 2001. The increase is particularly high for the groups that have grown most in size over the decade—African, Bangladeshi and Pakistani. However, when natural change is taken into account,  $P^*$  in 2001 is less for all groups apart from the White group. The reduction in the index when natural change is removed is particularly marked for the Bangladeshi and Pakistani groups, the groups for whom natural change had greatest impact, and also the groups which have been central in segregation concerns in recent years.

Two points can be made from these patterns. The first is to confirm the inadequacy of  $P^*$  for drawing conclusions about trends in segregation. The index reflects changes in population size and composition. For the Indian, Pakistani and Bangladeshi groups the majority of the increase in  $P^*$  over the decade is the result of natural population growth. Arguments of divisive segregation that are based on  $P^*$  should therefore be questioned. Secondly, we are led to the question of what accounts for the remaining increase in the Index of Isolation between 1991 and 2001 for minority ethnic groups. There are two possibilities: immigration to areas of large minority ethnic populations and internal migration towards these concentrations. We have seen above that the second possibility is not demonstrated by the data; there is dispersal within Britain from settlement areas of minority ethnic concentration (confirmed also by Simpson and Finney 2009). This suggests that immigration, both in its geography and in its ability to increase population, accounts for the increase in  $P^*$  that is not due to natural change. Again, this interpretation causes problems for stories of minority groups retreating into their own areas.

## Conclusion

‘Ethnic geography’ has become a contentious issue, based on notions of segregation as a negative phenomenon, notions which have in turn been challenged as unhelpful or irrelevant. How and why the population geography of ethnicity is changing can be better understood through basic demographic analysis. A focus on processes of population change—on migration and natural change—challenges the emphasis on segregation as problematic and reveals the dynamics of *in-situ* natural growth with dispersal and immigration, together creating Britain’s ethnic mosaic.

New estimates of net migration and natural change for the latest intercensal period have uncovered the dynamics of population change for ethnic groups in Britain nationally and sub-nationally. Nationally, natural growth is the dominant component

**Table 5.** Index of Isolation for Districts in Britain by ethnic group: the effect of natural population change

Ethnic Group	% GB population 2001	P* 1991	P* 2001	P* 2001 without natural change 1991–2001
White	91.8	94.71	93.12	94.06
Caribbean	1.0	5.47	5.36	5.03
African	0.9	3.52	6.39	5.46
Indian	1.9	8.09	8.94	8.24
Pakistani	1.3	4.32	6.09	4.90
Bangladeshi	0.5	6.20	9.48	7.53
Chinese	0.4	0.63	0.79	0.77
Other	2.2	3.60	4.92	4.03

Source: after Sabater and Simpson (2009).

of population growth for the Pakistani, Bangladeshi, Indian and Caribbean populations. For Bangladeshis, for example, there was population growth in Britain of 41 per cent due to natural change between 1991 and 2001 compared to growth of 21 per cent as a result of migration. The age structure of international migration reveals the prominence of young African and Chinese immigrants, and of family and retirement-age Caribbean emigrants that resulted in net emigration (return migration) of that group over the decade. This paper has interpreted these patterns in terms of recency of immigrant arrival, type of international immigration and age structure of immigrant-origin groups.

Subnationally, both the relationship between natural change and net migration and their geography are more complex. However, if districts are classified into types, the patterns can be more easily interpreted. There was counterurbanisation for all ethnic groups and, when considered in terms of settlement and dispersal, there was greatest growth due to migration in dispersal areas. Settlement areas grew more through natural change than migration for the Pakistani, Bangladeshi, Indian and Caribbean groups.

This paper represents an initial exploration of ethnic-group population dynamics through new estimates of natural change and migration. As the Bradford case study illustrates, general processes of natural growth, dispersal and counterurbanisation are evident but a great deal more investigation is needed for a full understanding of local ethnic-group population dynamics. Social policy will gain from demographic knowledge about the relationships between migration and natural change for smaller areas than those treated in this paper, because of the significance of movement within district boundaries; differentiating between the effects of international and internal migration will allow within-country choices of residence to be distinguished; analysis of flow data will further test hypotheses of dispersal and avoidance; relating demographic processes of population change to measures of socio-economic change will provide evidence about the extent to which lack of social mobility limits geographic mixing of ethnic group populations; and studies of migrant decision-making will reveal how discrimination and prejudice shape ethnic geographies.

This initial exploration has, however, clearly demonstrated that the growth of minority ethnic clusters is to a great extent the result of natural change, the cause of which is benign and the results of which are unexceptional given the demographic maturity of Britain's immigrant-origin groups. In addition, there are common elements to ethnic migration experiences after immigration, which generate a picture of dispersal and urban de-concentration. Calculation of the Index of Isolation has shown how an apparent increase in a segregation index can be largely the result of population growth from an excess of births over deaths. This paper therefore provides a warning against any assumption that clustering is the undesirable result of wilful separation of ethnic groups.

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### References

- Cantle, T. (2001) *Community Cohesion: A Report of the Independent Review Team*. London: Home Office.
- Champion, A.G. (1996) 'Internal migration and ethnicity in Britain', in Ratcliffe, P. (ed.) *Ethnicity in the 1991 Census, Volume Three, Social Geography and Ethnicity in Britain: Geographical Spread, Spatial Concentration and Internal Migration*. London: ONS/HMSO, 135–73.
- Champion, A.G. (2005) 'The counterurbanisation cascade in England and Wales since 1991: the evidence of a new migration dataset', *Belgeo*, 1–2: 85–101.
- Edmonston, B. and Michalowski, M. (2004) 'International migration', in Siegel, J. and Swanson, D. (eds) *The Methods and Materials of Demography*. London: Elsevier, 455–92.
- Ellis, M. and Goodwin-White, J. (2006) '1.5 generation internal migration in the US: dispersion from states of immigration?', *International Migration Review*, 40(4): 899–926.
- Finney, N. and Simpson, L. (2008) 'Internal migration and ethnic groups: evidence for Britain from the 2001 census', *Population, Space and Place*, 14(2): 63–83.
- Iceland, J., Weinberg, G. and Steinmetz, E. (2002) *Racial and Ethnic Residential Segregation in the United States: 1980–2000*. Washington DC: Bureau of the Census; <http://www.census.gov/hhes/www/ressegh.html>
- Johnston, R., Poulsen, M.F. and Forrest, J. (2004) 'The comparative study of ethnic residential segregation in the USA 1980–2000', *Tijdschrift voor Economische en Sociale Geografie*, 95(5): 550–69.
- Johnston, R., Poulsen, M.F. and Forrest, J. (2005) 'On the measurement and meaning of segregation: a response to Simpson', *Urban Studies*, 42(7): 1221–7.
- Kalra, V. and Kapoor, N. (2009) 'Interrogating segregation, integration and the community cohesion agenda', *Journal of Ethnic and Migration Studies*, 35(9): 1397–415.
- Lieberson, S. (1980) 'An asymmetrical approach to segregation', in Peach, C., Smith, S.J. and Robinson, V. (eds) *Ethnic Segregation in Cities*. London: Croom Helm, 61–81.

- Massey, D.S. and Denton, N.A. (1988) 'The dimensions of residential segregation', *Social Forces*, 67(2): 281–315.
- Modood, T. (2007) *Multiculturalism. Themes for the 21<sup>st</sup> Century*. Cambridge: Polity Press.
- Musterd, S. (2005) 'Social and ethnic segregation in Europe: levels, causes, and effects', *Journal of Urban Affairs*, 27(3): 331–48.
- Office for National Statistics (2006) *A Guide to Comparing 1991 and 2001 Census Ethnic Group Data*. Titchfield: Office for National Statistics.
- Office of Population Censuses and Surveys (OPCS) (1989) *Key Population and Vital Statistics 1989 No. 14., VS PP1 No. 10*. London: HMSO.
- Peach, C. (1996) 'Does Britain have ghettos?', *Transactions of the Institute of British Geographers*, 21(1): 216–35.
- Peach, C. (2009) 'Slippery segregation, discovering or creating ghettos? Segregation, assimilation and social cohesion', *Journal of Ethnic and Migration Studies*, 35(9): 1381–95.
- Phillips, D. (2006) 'Parallel lives? Challenging discourses of British Muslim self-segregation', *Environment and Planning D: Society and Space*, 24(1): 25–40.
- Phillips, T. (2005) *After 7/7: Sleepwalking to Segregation*. Speech given at Manchester Council for Community Relations, 22 September 2005. Available at: <http://www.cre.gov.uk/diversity/integration.html>.
- Rowland, D. (2002) *Demographic Methods and Concepts*. Oxford: Oxford University Press.
- Sabater, A. and Simpson, L. (2009) 'Correcting the census: a consistent time series of ethnic group, age, sex for small areas in England and Wales, 1991–2001', *Journal of Ethnic and Migration Studies*, 35(9): 1461–77.
- Salt, J. (2006) *International Migration and the United Kingdom*. London: University College London, Migration Research Unit, Report of the UK SOPEMI correspondent to the OECD.
- Simpson, L. (2004) 'Statistics of racial segregation: measures, evidence and policy', *Urban Studies*, 41(3): 661–81.
- Simpson, L. (2007) 'Ghettos of the mind: the empirical behaviour of indices of segregation and diversity', *Journal of the Royal Statistical Society A*, 170(2): 405–24.
- Simpson, L. and Akinwale, B. (2007) 'Quantifying stability and change in ethnic group', *Journal of Official Statistics*, 23(2): 185–208.
- Simpson, L. and Finney, N. (2009) 'Spatial patterns of internal migration: evidence for ethnic groups in Britain', *Population, Space and Place*, 15(1): 37–56.
- Simpson, L., Gavalas, V. and Finney, N. (2008) 'Population dynamics in ethnically diverse towns: the long-term implications of immigration', *Urban Studies*, 45(1): 163–83.
- Simpson, L., Finney, N. and Lomax, S. (2008) *Components of Population Change: An Indirect Method for Estimating Births, Deaths and Net Migration for Age, Sex, Ethnic Group and Sub-Regional Areas of Britain, 1991–2001*. Manchester: University of Manchester, CCSR Working Paper 2008-03, available at <http://www.ccsr.ac.uk/publications/working/>
- Voss, P., McNive, S., Hammer, R., Johnson, K. and Fuguitt, G. (2004) *County-Specific Net Migration by Five-Year Age Groups, Hispanic Origin, Race and Sex, 1990–2000*. Madison: University of Wisconsin.