

# **Demographic Explanations for Changes in Ethnic Residential Segregation across the Life Course**

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## **Abstract**

The aim of this paper is twofold. First, it provides an analysis of the level and direction of change on ethnic residential segregation by taking into consideration a life-stage perspective. Methodologically, the approach takes into account the importance of age and other aspects of the life course as a new window to examine the changing levels of ethnic segregation over time. The second part of the paper examines these results in more detail, exploring changes in segregation for sub-national areas and ethnic group separately. Since the segregation indices do not describe the various factors which contribute to local population change such as migration patterns, ethnic residential segregation is examined alongside population movement at different life-stages. For this purpose the paper uses census-based information for small areas linking the 1991 and 2001 censuses in England and Wales.

Keywords: ethnicity; residential segregation; age cohorts; census; England and Wales.

## 1. Introduction

The fear of ethnic ghettos has been established over centuries, although the modern idea which has dominated the topic both theoretically and quantitatively was developed during the first decades of the twentieth century by the ecological paradigm of the Chicago School of Sociology. Since the seminal work on the subject by Robert Park (1924) on *The Concept of Social Distance* and Ernest Burgess (1928) on *Residential Segregation in American Cities*, the study of separation of groups has drawn from the political and intellectual idea of how elites have generally viewed the relationship between ethnicity and poverty in the city (Ward, 1989).

In his classic book *The Ghetto*, Louis Wirth (1928: 6) incorporates the ‘Little Sicilies, Little Polands, Chinatowns, and Black Belts in our large cities’ as the equivalent Jewish ghettos of medieval Europe. In the classical paper of Duncan and Lieberson (1959), the authors demonstrate an inverse relationship between residential segregation and assimilation of immigrants, a landmark publication which gave rise to the development of dissimilarity indices as well as a quantitative framework based on the idea that high levels of segregation are problematic, because these imply that a subgroup of the population is isolated from different opportunities, resources and amenities (Kaplan and Holloway, 1998; Massey, Condran and Denton, 1987; Logan, 1978). Such correlation between segregation and social and economic well-being has also become a public debate in Europe, generally associated with the African American model of inner-city segregation (Fortuijn et al, 1998). Although these ideas have influenced thinking about race relations in Europe, considerable literature has challenged the ‘straight line’ view of integration (Alba and Nee, 1997) and the notion that residential segregation represents both negative causes and negative consequences (Peach, 1996a, 1996b, 2009).

Residential integration may not have occurred as quickly or straightforwardly as early theories suggested; decreasing residential segregation has been a characteristic of European cities (Musterd, 2005). Nonetheless, the topic of residential ethnic segregation has resumed a position high on the agenda in both academic and policy circles over the last decade in Britain and elsewhere. Initial reaction was quick to assume ‘bad’ segregation but more recent debate has turned to understandings of the processes of population change that underpin ethnic geographies. Demographic work has shown that the underlying processes of residential patterns of ethnic groups represent common experiences of migration and expected patterns of natural change (Simpson et al, 2008; Simpson and Finney, 2009; Finney and Simpson,

2009a). There is little evidence that continued clustering represents retreat and ethnic division. However, the first decade of the twenty first century has seen a shift in political rhetoric in Britain and elsewhere, from concern with multiculturalism and anti-discrimination back to concern with residential segregation with the emergence of the community cohesion agenda (Cantle, 2001; Kalra and Kapoor, 2009). The centuries-old myths about ethnic segregation have returned to shape political responses (Finney and Simpson, 2009a). In response there has been renewed interest in research on ethnic group population change which has tried to understand in greater depth the causes and meanings of residential clustering and dispersal. This paper builds on the demographic body of work in this area. Simpson et al (2008) and Finney and Simpson (2009a) found that patterns of clustering and dispersal in Britain were the result of the combined effects of natural change, immigration and internal migration and ethnic differences could be understood in terms of the demographic structures of immigrant origin groups.

This paper brings the concepts of age and life course into debates about ethnic segregation and the processes of ethnic group population change. The paper first outlines methods, data and definitions. It then presents results of changes in ethnic residential segregation by age cohorts nationally and locally and relates these to components of population change. It then focuses on the young adult age group and the specific migration patterns in relation to ethnic concentrations that have led to de-segregation of this group. Finally, the paper demonstrates how migration's partner demographic process, natural change, can alone bring changes in residential segregation. The paper concludes that demographic explanations are key to understanding changes in ethnic residential segregation in Britain and that incorporation of an age perspective reveals complexities of local population change that are overlooked in the debates.

In summary, the purpose of this paper is to address three questions which are not to date investigated by the literature:

1. How has segregation changed over time for different age cohorts and ethnic groups and in different places?
2. Has migration resulted in decreased segregation for young adults, and if so, is this the case for White and minority ethnic groups?
3. How have demographic population dynamics affected ethnic group residential segregation?

## 2. Data and methods

The data used in this research are population counts derived from both the 1991 and 2001 Census of Population and complete mid-1991 and mid-2001 population estimates for sub-national areas in England and Wales. Even though many users of demographic statistics will find census data sufficiently useful to compare the geographical patterns of settlement of ethnic groups over time, such comparisons are subject to four types of bias that make comparisons of populations over time difficult (Simpson et al, 1997; Sabater, 2008; Sabater and Simpson, 2009): (1) the population definition, which defines who is a resident, has changed between the 1991 and 2001 Censuses; (2) the treatment of non-response in the census in 1991 and 2001 was different, and varied between ethnic groups, areas and ages; (3) key classifications changed between 1991 and 2001, including ethnic group and age in standard outputs; and (4) geographical boundaries used for standard census outputs changed, after local government reviews between 1991 and 2001.

Additionally, the research has also used 3 per cent microdata sample files from the Individual Sample of Anonymised Records (SAR) and the Controlled Access Microdata Sample (CAMS) from the 2001 UK Census. These datasets provide information on migration with an age and ethnic group breakdown, and with geographic detail in the CAMS. As a result this presents a higher risk of disclosure (i.e. the identification of information about individuals) and, therefore, the use of the CAMS dataset has to be approved and in a secure setting<sup>1</sup>.

For the calculation of residential segregation, two common measures have been used, the Index of Dissimilarity (*ID*) and the Index of Isolation (*P\**). *ID* is a distinct measure which indicates how evenly one ethnic group is spread out geographically compared to the rest of the population (Massey and Denton, 1988). *ID* is conceived to measure an unequal geographical spread and is generally expressed as a percentage with index values between 0 and 100. The original form of *ID* is given by:

$$ID = 0.5 * \sum_i \left| \frac{N_{gi}}{N_{g\bullet}} - \frac{N_{\bar{g}i}}{N_{\bar{g}\bullet}} \right|$$

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<sup>1</sup> For more details on 2001 Census microdata including how to access the data see [www.ccsr.ac.uk](http://www.ccsr.ac.uk)

Where  $N_{gi}$  refers to the population of group  $g$  in locality  $i$ ;  $\bar{g}$  means the rest of the population; and the summation over an index is represented by the dot symbol. The same formulae can be used to compare the spread of any two groups by superseding the second term in the formulae with the area's proportion of a second group  $h$ .

$P^*$  is used to indicate the average local concentration of a group (Liebersohn, 1963).  $P^*$  is also conceived as the probability that members of one group will meet with members of their own group.  $P^*$  can be expressed as follows:

$$P^* = \sum_i \left( \frac{N_{gi}}{N_{g\bullet}} \right) \left( \frac{N_{gi}}{N_{\bullet i}} \right)$$

The interpretation of this index is also straightforward as a percentage. If the index is close to 0, it indicates that the average local concentration of the group being studied is very low. On the contrary, if the index values are close to 100, it highlights a high level of concentration, thus meaning that all members of the group are in areas where no other groups live.

Since  $ID$  and  $P^*$  values do not describe the various factors which contribute to local population change such as migration patterns, ethnic residential segregation has been examined alongside population movement at different life-stages. For this purpose the paper has employed UK census migration data for ethnic groups and sub-national areas based on a question about place of residence one year prior to census day. If this is different from the address on census day, the individual is considered to have migrated in the year prior to the census. However, these data are for the one year before each census only, while birth and death registrations in the UK do not record ethnic group (see Finney and Simpson, 2008 for a review). Therefore, 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 (Rowland, 2002; Edmonston and Michalowski, 2004). 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, Finney and Lomax (2008).

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 were estimated using child-woman ratios in 1991 and the number of children in 2001. Second, these births 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 deaths 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 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 population 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 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. 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 underestimation of natural change and overestimation of net out-migration for the Caribbean group; overestimation of net in-migration for the African group; and underestimation 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.

### **3. Residential segregation across age cohorts**

In this section residential segregation of ethnic groups for different age cohorts between 1991 and 2001 across wards in England and Wales is analysed in conjunction with the population dynamics over the same time. Despite the interest in recent years in the study of geographical mobility over the life course, with particular interest in its motivations and implications (Clark and Withers, 2007; Geist and McMacus, 2008) as well as its specific relationships with, for example, women's economic activity (Dale et al, 2006) or family



change and the need for domestic space (Bonney et al, 1999; Kulu and Milewski, 2007), only in some older studies, specifically in the US context, has residential segregation of Whites and Blacks been examined across the life course (Edwards, 1972; Taeuber and Taeuber, 1965). In Rossi's classic study of residential mobility (1955), residential mobility of Blacks to White neighbourhoods is seen as a spatial expression of vertical social mobility which varies at varying rates depending on their ages and stage in the life course. This relationship between spatial mobility and the life course is also well established through age migration schedules (Rogers et al, 1978; Rogers and Watkins, 1987), a framework based on constant migration which is affected by four peaks of migration over the life course (early childhood, early participation in the labour force, retirement and late old age).

In our paper, we explore first changes in residential segregation for various age cohorts through the index values of *ID* across wards in England and Wales and for selected districts in 1991 and 2001. Within this context, the age cohort change analysis is used as a proxy to examine the relationship between residential segregation over the life course. For example, index values of the resident population aged 0-6 in 1991 are compared with index values for those aged 10-16 in 2001. Similarly, those aged 7-16 in 1991 are compared with the equivalent for those aged 17-26 ten years later. Consequently, the results for these groups will allow us to illustrate changes in the level of segregation for a first age segment focused on preparation and education. Similarly, the index values are analysed by taking into consideration other age segments such as those related to family building and work, and retirement.

Figure 1 shows the index values of *ID* by age cohorts across wards in England and Wales and for selected districts between 1991 and 2001. The analysis of the index values nationally clearly indicates a decrease in the level of residential segregation for each age cohort, a reduction that appears to be generally greater among ethnic groups other than White, with the exception of the Chinese group, whose settlement pattern is generally more uniformly distributed partly as a result of their numerous links to restaurants and takeaways nationwide. The analysis across age cohorts indicates a decrease in the level of unevenness during the decade for all ethnic groups in a similar fashion: the youngest group (which refers to children living with their parents) and adult ages show similar changes, whilst a significant decrease is found among young adults. It is readily understood that the lower levels of residential segregation for the latter group come about as a consequence of the change in the residential distribution of schoolchildren and young adult ages (some of them university students) during the early adulthood phase. Nonetheless, other movements such as international migration can

also affect residential segregation as exemplified by the Chinese group, whose overseas migration to UK universities would explain the reverse trend in the index values of *ID* compared to other groups. The interplay of demand and supply in metropolitan areas -from housing to education to language instruction to efficient public transportation for accessing jobs- would explain the relative differences between groups in the middle aged phase. Generally, those age cohorts 17-26, 27-36, 37-46 in 1991 and ten years later who can afford to move from big urban concentrations to less urban environments are likely to do so, thus following the suburbanisation process and contributing to the deconcentration of young adults in big cities (Champion, 1989, 1996, 2005; Finney and Champion, 2008). Since older age cohorts of ethnic minority groups are affected by a significant number of neighbourhoods with small numbers of ethnic groups, not much should be made of the changes for these ages.

In the analysis of ethnic residential segregation by age cohorts for selected districts, results tend to replicate the index values of *ID* obtained nationally for England and Wales despite the clear impact of population movement of all groups between small areas. However, some districts also reveal situations of greater unevenness locally during the decade. For example, during the early adulthood phase, some ethnic groups such as the Black African in Southwark and the Chinese in Manchester appear to be less evenly distributed, most likely as a result of international migration between 1991 and 2001. During the middle adulthood phase, an increase in unevenness is noted for all ethnic minority groups. The young age structure of ethnic minorities can significantly affect population dynamics in some local areas, thus contributing to growth *in situ* and the promotion of clusters in absence of out- migration.

Figures 2 and 3 show the index values of *ID* of non-White groups during the early adulthood and middle adulthood phases across wards in 2001 districts of England and Wales. Both maps clearly illustrate how the two age cohorts (7-16 and 17-26 in 1991 and ten years later) have become more evenly spread across districts, particularly from districts where non-White groups were most clustered. Although ethnic minority groups in the UK have very different locations in terms of time and place due to the timing and reasons for migration (Dale et al, 2006), those districts with traditional industrial areas in the North-West, Yorkshire and Lancashire and the West Midlands appear to have the largest decreases in the index values of *ID*. This would go in line with the idea that whilst the demographic consequences of immigration initially lead to greater isolation and segregation, the impact of growth and the unavailability of housing leads to dispersal from settlement areas to other parts of the country (Simpson et al., 2008).

In Britain the concern with concentrations of Muslim populations has been politically evident since riots in northern British cities in 2001 (Cantle, 2001; Phillips, 2005). The historical concentration of South Asian groups in the inner areas with the cheapest private housing of cities such as Bradford originates from international migration to fill the unpopular night shift of textile industries in response to competition after the Second World War. Considering the demography of immigration,  $ID$  and  $P^*$  are expected to change after significant streams of immigration. Figure 4 is used to define the behaviour of  $ID$  and  $P^*$  for the White and Pakistani groups by age cohorts across Output Areas (the smallest census areal unit employed in 2001) in Bradford. As expected after the early years of immigration and the strong urban pattern of their natural growth in existing areas of Pakistani settlement, the index values of  $ID$  of the Pakistani group for all age cohorts show greater unevenness compared to the White group. This tendency is characteristic where the influence of the kinship ties is strong, thus reflecting the settlement pattern of international migration around the family, cultural and religious support given by social networks. Also as expected,  $P^*$  shows how all the age cohorts of the White group are by far the most exposed. The results of the  $ID$  and  $P^*$  change between 1991 and 2001 reveal, however, how, despite a greater exposure for the majority of age cohorts of the Pakistani group, a similar pattern of evenness is seen for these two groups, which also replicates the analysis undertaken for England and Wales. This similarity allows us to establish the connection between residential segregation and movement at different life-stages, which is explored further in the following section.

#### **4. The role of young adult migration**

Residential segregation, measured using two commonly used indices, has been shown to have decreased over the 1990s for young adults in Britain of all ethnic groups with the exception of the Chinese. It has been suggested that migration patterns of young adults can explain this desegregation. This section explores this contention directly using census migration data and estimates of local net migration during the 1990s.

Political concern has focused on movement of minorities towards areas in which they are most concentrated, a process that has become described as a combination of ‘self-segregation’ of minorities and ‘White flight’ of the majority population. However, analysis of internal migration patterns has revealed a process of dispersal from settlement areas to other types of area is occurring not only for the White group but also for non-White groups (Simpson and Finney, 2009). In conjunction with this evidence, research based on surveys of households

repeatedly finds that many South Asians, particularly young adults, would like to move, with others, to areas outside the current settlements (Ratcliffe, 2000; Phillips, 2002, 2006).

“Contrary to the popular perception that South Asians, especially in places like Bradford, prefer to self-segregate, we found evidence of the desire for more mixing on the part of all ethnic/religious groups. Almost all respondents who talked about mixing characterised this as a process of Asian integration into ethnically mixed neighbourhoods rather than dispersal to white areas... Movement to the outer areas of Leeds and Bradford was motivated by a better quality of physical environment,... better housing,... better schools,... a safer environment,... a more independent lifestyle, away from the sanctions and gossip of the ethnic cluster.” (Phillips, 2002: 10)

First it is important to assess whether the migration of young adult is in any way distinct from migration at other ages and whether this holds for each ethnic group. Table 1 presents within-Britain migration rates and shows a peak in migration rates for young adults for each ethnic group. More than for any other age group, therefore, migration has the potential to alter local ethnic group compositions of young adults. The question then arises of whether the migration is re-inforcing ethnic concentrations or dispersing them.

Table 2 presents the balance of migration (net migration) between districts grouped according to level of concentration of either White or ethnic minority (non-White) population. The migration is within Britain between 2000 and 2001 using data from the 2001 Census Controlled Access Microdata Sample. The top panel of the table is movement of non-Whites between districts classified by concentration of non-White population; the lower panel is movement of Whites between districts classified by concentration of White population. The left hand section presents results for young adults (aged 18-29); the right hand section gives the equivalent for all other ages taken together. The net migration figures for the White group are expected to be higher than for the non-White group because of their larger population size and hence greater number of migrants. A negative value means loss on balance for the destination group of districts. This indicates dispersal from co-ethnic concentration i.e. migration from areas of more to less co-ethnic concentration.

Non-White young adults are on balance moving away from areas of highest non-White concentration to other areas and at the same time moving from areas of low minority ethnic concentration to areas of moderate and high concentration. Thus, for non-White young adults there could be said to be a convergence to the ‘middle ground’ of areas of moderate to high ethnic diversity. The pattern for young adult Whites is clearer: they are dispersing from White concentrations and therefore moving into more ethnically diverse districts.

For both non-White and White populations aged under 19 and over 30 the direction of movement differs from that for young adults: families and older adults are moving to more

White areas. The different geographical patterns can be understood in terms of urbanisation of young adults and counterurbanisation of families and older adults (Champion, 1989). In terms of residential integration, Whites and non-Whites of young adult and other ages are moving to the same types of districts thereby creating ethnic mixing.

Table 3 presents net migration in the 1990s for wards classified by concentration of ethnic minority population for Whites and minorities, for young adults and people of other ages taken together. Net migration from the components of change estimates has been decomposed into internal migration and international migration in the final two columns of Table 3. This decomposition should be read as indicative because of discrepancies in the three measures of migration used in the table.

The table reveals two important findings. First, the pattern of dispersal/suburbanisation which has been seen for the White and minority populations as a whole is evident for children and older adults but not for young adults. Second, there is not a clear pattern of international migration contributing to the growth of minority populations in areas in which they are concentrated more than other areas and for young adults both White and minority, immigration is greatest to the areas of least ethnic minority concentration.

The areas of lowest ethnic minority concentration, which can be alternatively seen as the most White areas and also the most rural areas, overall lost White young adults, gained Whites of other ages and gained minorities of all ages due to migration. This was a result of young adults, White and minority, moving from the lowest minority concentration neighbourhoods to elsewhere in Britain whilst those areas gained young adults, both White and minority, from abroad. At the same time, the lowest minority concentration areas gained Whites and Minorities of ages under 18 and over 29 as a result of migration from elsewhere in Britain (suburbanisation) and from abroad.

Highest minority concentration areas gained White and minority young adults. For Whites, this was a result of net in-migration from elsewhere in Britain (internal urbanisation) and net emigration. For minorities this was a result of net out-migration to elsewhere in Britain together with net immigration. For non young adult ages, areas of highest minority concentration lost Whites and gained minorities. This resulted from out migration of Whites and minorities to elsewhere in Britain and net gain of whites and minorities from abroad.

## 5. Population dynamics and changes in segregation

Migration, as we have seen, is the major contributor to local population change, particularly for the very mobile young adult age group. However, its partner demographic process of natural change (births minus deaths) can also affect the composition of an area's population, including in terms of ethnicity. The impact of natural change varies across the lifecycle with births increasing the child population and deaths diminishing the elderly population. By altering the ethnic composition of a neighbourhood this *in situ* population change can impact on ethnic residential segregation and can do so differently for each ethnic group.

This is illustrated in Table 4. The table 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. If a group comprises 90% of the population and their  $P^*$  is 90, they would be evenly distributed; if they comprise 1% 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 4 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 who 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 and subsequent processes of chain migration, both in its geography and in its ability to increase population, account 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.

## 6. Summary

This paper has analysed UK census data and population estimates to address the three questions posed in the introduction which have not to date been investigated by the literature.

The first question is concerned with whether segregation has changed over time for different age cohorts and ethnic groups and in different places. The analysis across age cohorts has revealed how residential segregation between 1991 and 2001 has decreased for all age cohorts, with the largest gains in evenness among young adults. The analysis has also provided evidence that the pattern of residential segregation across age cohorts does not differ significantly between ethnic groups. Despite the differences between individual ethnic groups in the level of their clustering, a similar tendency of de-segregation is found across ages for all groups. In addition, further evidence has been given for Bradford where, despite a greater exposure for the majority of age cohorts of the Pakistani group, a decrease in residential segregation has also been observed.

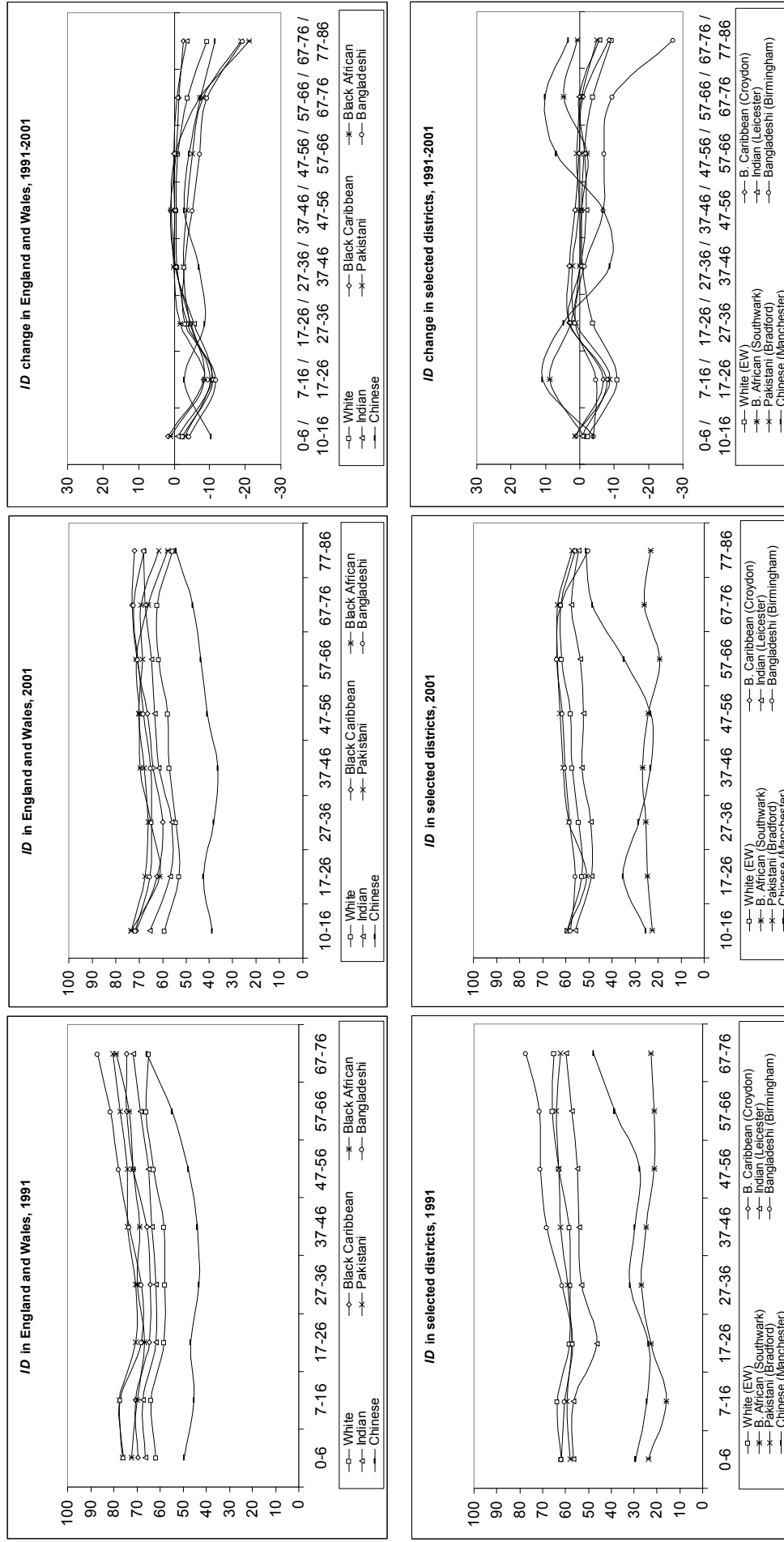
Second, the paper has investigated whether migration has resulted in decreased segregation for young adults, and whether this is the case for White and minority ethnic groups. It has found contrasting migration experiences of young adults and other ages both in terms of the level and direction of movement. Young adults tend to migrate towards diverse urban areas and are highly mobile whereas other ages demonstrate counterurbanisation. In terms of residential integration, Whites and non-Whites of young adult and other ages are moving to the same types of districts thereby creating ethnic mixing. In addition, there is not a clear pattern of international migration contributing to the growth of minority populations in areas in which they are concentrated more than other areas and for young adults both White and minority, immigration is greatest to the areas of least ethnic minority concentration.

The third question of the paper was how demographic population dynamics have affected ethnic group residential segregation. It has been shown that although migration is the main process of population redistribution, the impact of *in situ* natural change should not be overlooked, particularly for ethnic groups with young age structures and resulting high natural growth.

These findings demonstrate that demographic explanations are key to understanding changes in ethnic residential (de)segregation in Britain. Incorporation of an age perspective and analysis of processes of population change reveal complexities of local ethnic group population dynamics that have previously been overlooked. This paper adds further weight to the evidence countering claims of ethnic division and retreat.

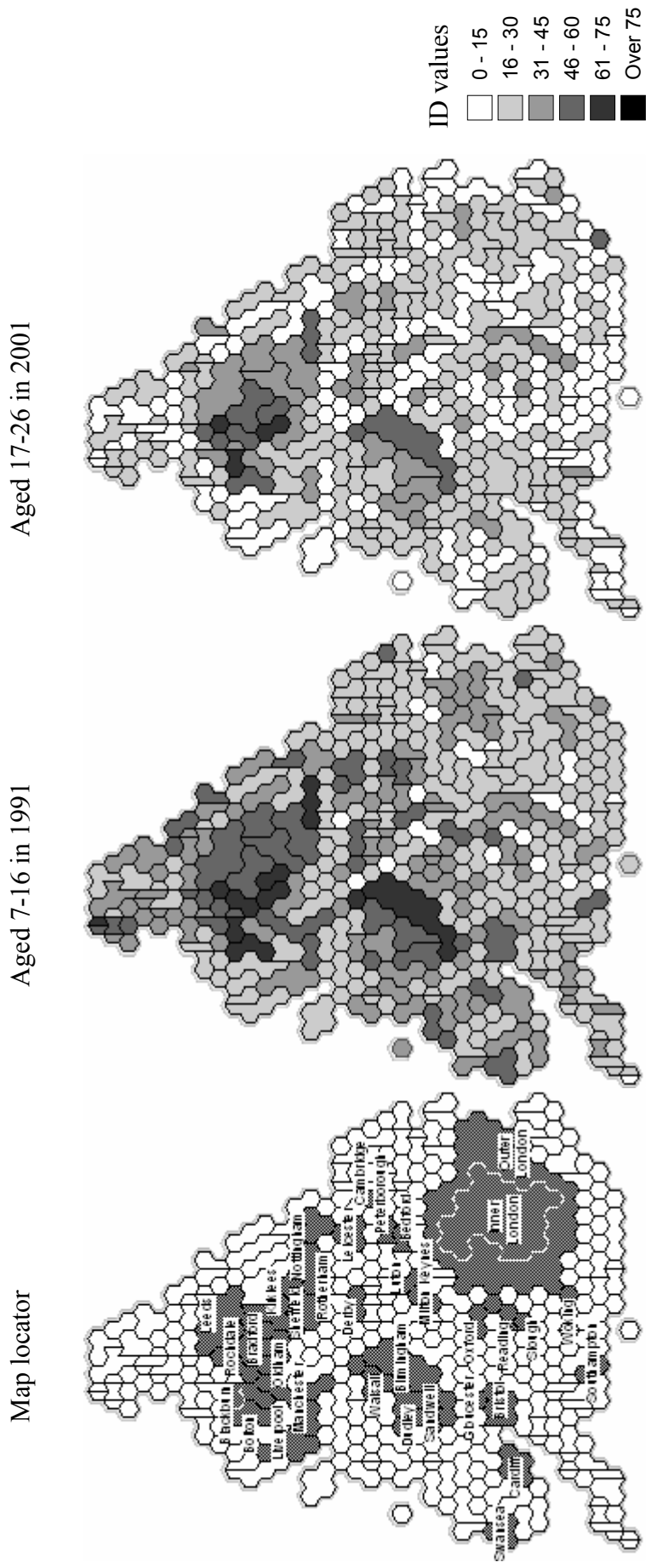


**FIGURE 1: ID values of ethnic groups by age cohorts across wards in England and Wales and for selected districts, 1991-2001**



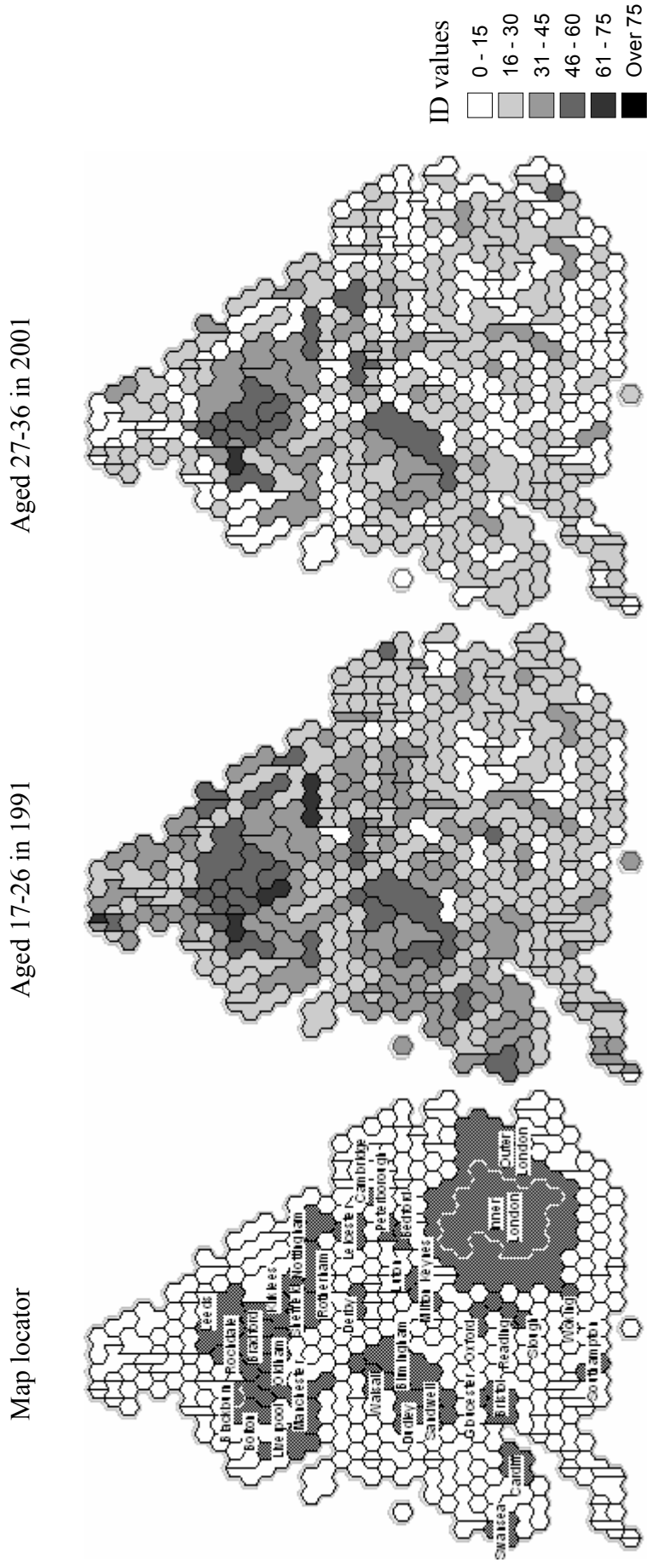
Source: CCSR Components of Population Change Estimates and Full Population Estimates (Sabater and Simpson, 2009).

**FIGURE 2: ID values of non-White groups during the early adulthood phase across wards in 2001 districts, England and Wales, 1991-2001**



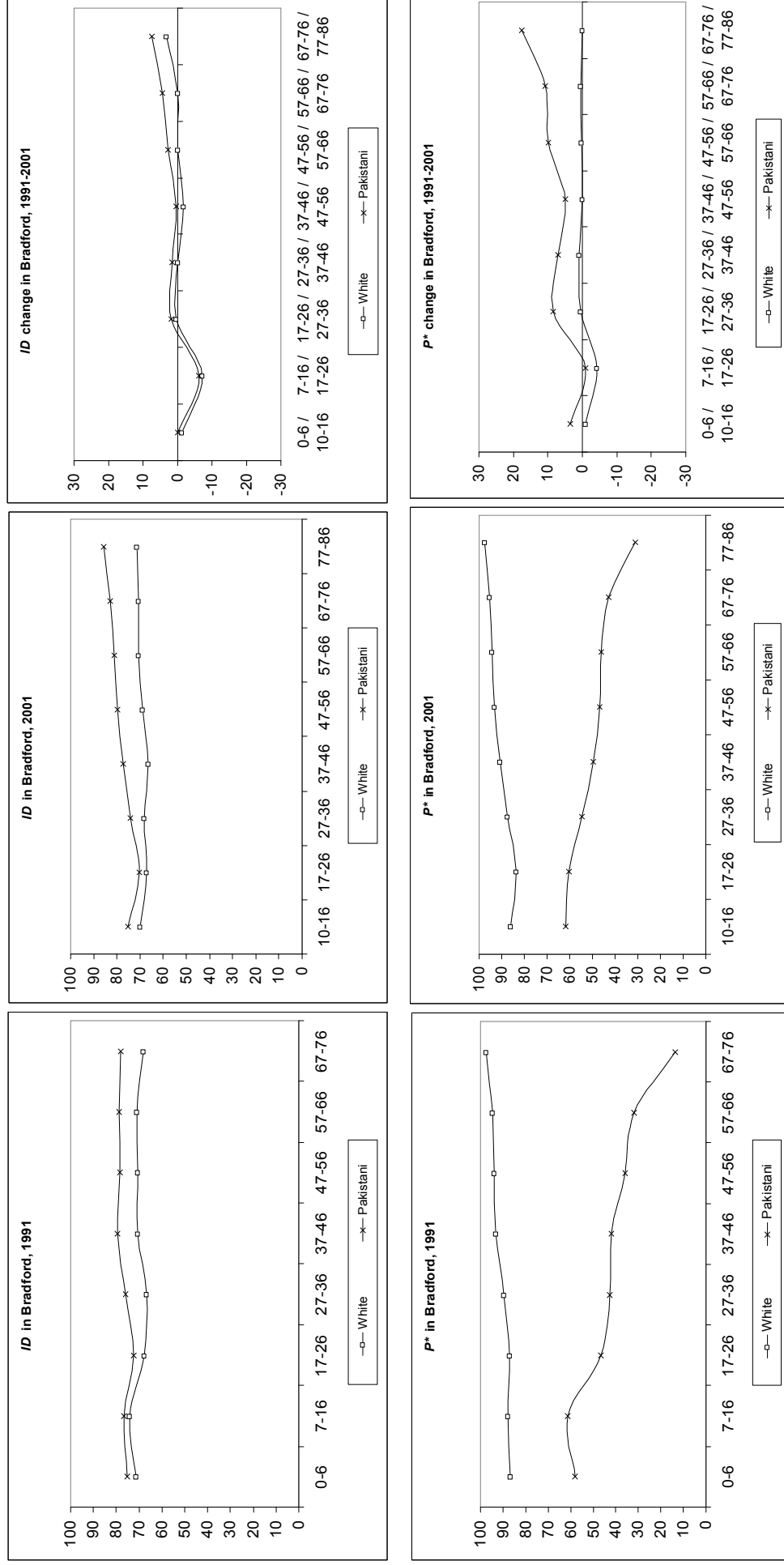
Source: CCSR Components of Population Change Estimates and Full Population Estimates (Sabater and Simpson, 2009). The areas in these cartograms are districts represented in proportion to the population size in 2001 maintaining the topology wherever possible. The shapefiles for the cartogram were created by Dorling and Thomas (2004).

**FIGURE 3: ID values of non-White groups during the middle adulthood phase across wards in 2001 districts. England and Wales, 1991-2001**



Source: CCSR Components of Population Change Estimates and Full Population Estimates (Sabater and Simpson, 2009). The areas in these cartograms are districts represented in proportion to the population size in 2001 maintaining the topology wherever possible. The shapefiles for the cartogram were created by Dorling and Thomas (2004).

**FIGURE 4: ID and P\* values of White and Pakistani groups by age cohorts across Output Areas in Bradford, 1991-2001**



Source: CCSR Components of Population Change Estimates and Full Population Estimates (Sabater and Simpson, 2009).

**TABLE 1: Within Britain migration rates (%) 2000-2001, by ethnic group and age**

	White British	White Irish	White Other	Mixed	Indian	Pakistani	Bangladeshi	Other Asian	Black Caribbean	Black African	Black Other	Chinese	Other	Total
0-15	10.9	9.6	15.0	11.9	8.6	8.5	8.2	11.4	8.9	13.5	9.4	10.7	15.0	10.9
16-19	15.8	24.0	24.4	15.9	12.3	8.6	9.8	15.2	14.3	17.7	12.7	20.5	24.0	15.8
20-24	32.6	45.4	48.1	33.7	23.7	17.9	15.6	29.4	22.0	33.2	19.6	42.8	37.0	32.4
25-29	24.0	32.6	36.2	28.1	19.5	15.9	15.4	23.7	17.0	28.6	16.2	25.2	32.3	24.3
30-44	11.4	13.5	17.7	14.8	10.3	10.2	9.2	16.7	10.7	16.4	11.4	13.5	18.9	11.7
45-59	5.0	4.7	6.4	7.9	3.7	5.6	5.6	6.4	6.7	9.6	9.2	5.1	7.8	5.0
60-64	3.8	3.1	4.4	4.1	2.9	3.5	5.8	5.0	3.7	6.0	2.0	5.3	6.6	3.8
65+	5.7	7.2	5.1	3.8	8.0	7.0	4.6	8.3	7.7	4.7	9.7	11.1	16.4	5.7
Total	10.5	10.2	18.0	15.0	10.1	10.0	9.7	14.3	9.9	17.0	11.3	16.1	18.7	10.8

Source: 2001 Census SAR, GB. Numerator is population who changed address in the year prior to the census; Denominator is 2001 population in each age/ethnic group.

**TABLE 2 : Young adults' net migration between districts classified by ethnic concentration, 2000-2001, Whites and Non Whites**

<b>Non White Migrants – Net migration for district quintiles of Non White population</b>															
<b>Young Adult ORIGIN</b>		<b>Non Young Adult ORIGIN</b>					<b>Non Young Adult DESTINATION</b>			<b>Young Adult DESTINATION</b>					
		Low	Medium	High	Highest	Fewest	Low	Medium	High	Highest	Fewest	Low	Medium	High	Highest
Fewest		49	48	-5	-18	-23		-64	-37	-73					
Low			12	11	-31			-42	-32	-75					
Medium				28	7				-21	-42					
High					-16					-57					
Highest															
<b>White Migrants – Net migration for district quintiles of White population</b>															
<b>Young Adult ORIGIN</b>		<b>Non Young Adult ORIGIN</b>					<b>Non Young Adult DESTINATION</b>			<b>Young Adult DESTINATION</b>					
		Low	Medium	High	Highest	Fewest	Low	Medium	High	Highest	Fewest	Low	Medium	High	Highest
Fewest		-1173	-597	-131	-298	943		608	452	300					
Low			-116	-65	-100			255	152	117					
Medium				-17	-44				390	0					
High					36					38					
Highest															

Source: 2001 UK Census Controlled Access Microdata Sample (CAMS). Population: GB, age 18-29. Internal migration 2000-2001. Negative values indicate loss on balance for the destination districts (dispersal from co-ethnic concentrations/movement down the hierarchy of quintiles).

**TABLE 3: Net Migration for neighbourhoods grouped by minority ethnic concentration, by ethnic group and age**

	Total Migration		Migration within Britain		International migration (indicative estimate)	
	Whites	Minorities	Whites	Minorities	Whites	Minorities
<b>Young Adults</b>						
Lowest	-65,914	5,883	-73,300	-2,467	7,400	8,400
Low	34,527	7,220	29,733	1,900	4,800	5,300
Medium	25,755	6,787	21,733	833	4,000	6,000
High	10,541	5,255	8,300	1,667	2,200	3,600
Highest	3,258	4,119	13,533	-1,933	-10,300	6,000
<b>Non Young Adult</b>						
Lowest	121,298	12,735	76,767	6,567	44,500	6,200
Low	-36,942	2,168	-13,967	4,200	-23,000	-2,000
Medium	-31,162	-2,465	-15,767	-1,433	-15,400	-1,000
High	-21,728	219	-31,867	-1,100	10,100	1,300
Highest	-12,353	132	-15,167	-8,233	2,800	8,400

Sources: For Total Migration: Components of change estimates, 1991-2001 divided by ten to approximate a yearly figure. Based on wards of England and Wales. White is all Census White groups ; Minorities are all others.

For Migration within Britain: 2001 Census CAMS, 2000-2001 scaled to 100% from figures for 3% sample. Based on districts of Britain.

White is White British; Minorities are all non-White groups

Young adults are aged 18-29; Non young adults are all other ages taken together.

International migration has been estimated by subtracting migration within Britain from total migration and is only indicative of patterns due to the discrepancies in the total and internal migration measures as described above. Figures have therefore been rounded to the nearest 100.

**TABLE 4: Index of Isolation for Districts in Britain by ethnic group: the effect of natural population change**

Ethnic Group	% GB population		P* 2001 without natural change	
	2001	1991	2001	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: CCSR Components of Population Change Estimates and Full Population Estimates (Sabater and Simpson, 2009).



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