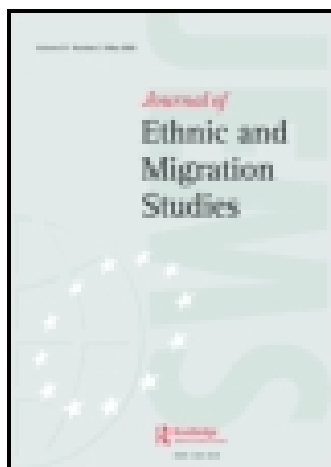


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### Moving On from Indices, Refocusing on Mix: On Measuring and Understanding Ethnic Patterns of Residential Segregation

Ron Johnston <sup>a</sup> , Michael Poulsen <sup>b</sup> & James Forrest <sup>b</sup>

<sup>a</sup> Geography , University of Bristol ,

<sup>b</sup> Department of Environment and Geography , Macquarie University ,

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## Debate

# Moving On from Indices, Refocusing on Mix: On Measuring and Understanding Ethnic Patterns of Residential Segregation

Ron Johnston, Michael Poulsen and James Forrest

*In a recent special issue of JEMS, Peach challenged the authors' work on the measurement of ethnic segregation and the use of their proposed approach in studies of British cities. Peach argued for the continued deployment of single-number indices—especially those of unevenness (dissimilarity and segregation). This response highlights the major disadvantages of those and other indices, especially in the contemporary context where most members of ethnic minorities live in urban neighbourhoods with varying degrees of ethnic mix rather than in relatively exclusive areas where they are largely separated from the rest of the population. If mix is the dominant situation, methods are needed that identify rather than obscure it.*

*Keywords:* Ethnic; Segregation; Mixed Neighbourhoods; Indices

Segregation is defined in the *Oxford English Dictionary* as 'The separation or isolation of a portion of a community or a body of persons from the rest'. It thus represents both a condition and a process.

In 1998 we began research into measuring that condition, focusing on whether the commonly deployed methods were consistent with the *OED* definition and illuminated both the multi-dimensional nature of segregation and the ethnic mix that characterises many contemporary urban residential areas. We soon concluded that in five countries (Australia, Canada, New Zealand, the United Kingdom and the

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Ron Johnston is Professor of Geography at the University of Bristol; Michael Poulsen and James Forrest are Associate Professors in the Department of Environment and Geography at Macquarie University. Correspondence to: Prof. R. Johnston, School of Geographical Sciences, University of Bristol, Bristol BS8 1SS, UK. E-mail: R.Johnston@bristol.ac.uk.

United States) the single-number indices preferred by many analysts provided little insight into contemporary patterns; most members of ethnic minorities there lived in residential areas with different degrees of population mix. We proposed an alternative approach which focused on that situation.

### What Do Indices Tell Us—And Not Tell Us?

Indices of unevenness are the most-used measures. The *index of dissimilarity* ( $ID_{xy}$ )—varying between 0 and 100—compares two ethnic group ( $x$  and  $y$ ) distributions and is interpreted as the percentage of  $x$  to be redistributed in order to make their distribution identical to  $y$ 's (Duncan and Duncan 1955: 494). The related *index of segregation* ( $IS_x$ ) compares  $x$  with the remainder of the population ( $\Sigma - x$ ).

These summaries of differences between two maps are not direct measures of the OED concept of segregation. If  $IS_x$  is large it is *inferred* that most of  $x$ 's members live in areas where other groups' members are largely absent. However, a relatively large  $IS_x$  may indicate considerable unevenness but not substantial separation also, especially for small groups. The 2006  $IS_x$  for Koreans in Auckland was 51—which would indicate moderately high segregation—but Koreans comprised not even one-fifth of the population in any of the city's 333 areas. They were relatively concentrated in some areas, but certainly not isolated from the rest of the population, exemplifying a general problem that 'potentially large values of the segregation index [may occur] when unit sizes and/or minority populations are small, even if there is no underlying systematic segregation' (Allen *et al.* 2009: 1). With large groups, however, high index values probably indicate that the great majority of group  $x$  live in areas where their co-ethnics predominate.

Declining index values suggest greater residential mixing. As an average condition that is undoubtedly so, but a declining index does not discriminate between whether all members of  $x$  are living in less exclusive areas at time  $t$  than they were at  $t - 1$ ; or whether, although some are, others are still living in relatively exclusive areas. We learn nothing about variation around the average condition—and none may fit the average.

In his recent review in a special issue of *JEMS* on measuring segregation, Peach (2009) favours  $ID_{xy}$  and  $IS_x$  because they have provided substantial insights into changing inter-ethnic relations in the USA. Most of the literature he cites relates to Blacks, who have experienced hyper-segregation (Massey and Denton 1993). If other groups have never been as spatially separated—with index levels not exceeding, say, the 60s (a reasonable inference from Duncan and Lieberson 1959; Peach 2005)—the information provided is relatively slight. Unevenness indices are surrogate measures of the key concept only; sometimes informative, in perhaps the majority of cases less so.

Lieberson (1981) promoted another set of indices.<sup>1</sup> The *index of isolation* ( ${}_xII_x$ ), varying between 0.0 and 1.0, measures separation between group  $x$  and the remainder of the population; the *index of exposure* ( ${}_xIE_y$ ) measures the exposure of group  $x$  to group  $y$ . When two individuals are selected at random in area  $i$ , if the first is from group  $x$ ,  ${}_xII_x$  is the probability that the other is also;  ${}_xIE_y$  is the probability that the

second person selected is in group  $y$  given that the first is in group  $x$  ( ${}_xIE_y$  need not be the same as  ${}_yIE_x$ ). These indices are closer to the OED definition of segregation; if  ${}_xII_x$  is, say, 0.9, it can safely be inferred that almost all members of group  $x$  live in areas where their co-ethnics predominate (whereas  $IS_x$  for Koreans in Auckland in 2006 is a fairly high 51,  ${}_xII_x$  is 0.07).

As with  $ID$  and  $IS$ , however, there is no indication of variation around  $II$  and  $IE$ ; knowledge of the average situation may not be particularly informative if values are close to neither 0.0 nor 1.0. An  ${}_xII_x$  of 0.5 could show that all members of  $x$  live in areas where there is a 0.5 probability that another resident of the same area selected at random is also in group  $x$ . Or the probability might be 0.9 in some areas and only 0.1 in others. We cannot discriminate between a wide range of possible scenarios and identify the degree to which various portions of group  $x$  live in different ethnically mixed situations.

Peach (2009: 1384) terms  $II$  and  $IE$  'slippery and highly context-bound', because the larger  $x$ 's percentage of the city population, the larger  ${}_xII_x$  must be, even if members are uniformly distributed there (if  $x$  forms 40 per cent of the population,  ${}_xII_x$  cannot be less than 0.4). However, modifications (ignored by Peach) take size into account (e.g. Cutler *et al.* 1999; Noden 2000). Whereas  ${}_xII_x$  indicates the absolute level of isolation, the modified version— ${}_xMII_x$ —indicates the relative amount, the degree to which group  $x$  is more isolated than if its members were uniformly distributed across the city's areas ( ${}_xMII_x$  also varies from 0.0 to 1.0: the larger the value, the greater the degree of separation relative to the absolute level).  $II$  and  $IE$  (and  $MII$  and  $MIE$ ) are therefore closer approximations of the OED definition of segregation than  $ID$  and  $IS$  and more valuable in comparative studies (Johnston *et al.* 2004).

Too frequently, scholars have used the US experience as the norm against which to compare residential patterns. With very few exceptions—*apartheid* South Africa and cities in Israel and Northern Ireland—that norm is not replicated elsewhere. Ethnic group members concentrate into certain parts of many cities, but are not, and never have been, as separated from the rest of the population as American Blacks (van Kempen and Murie 2009). Thus whichever index is used, it is unlikely to be very large. Not only do you just get a statement of the average situation with no indication of associated variation, but in addition you know nothing about the milieux within which a group's members live—which can be crucial for various aspects of life chances (Condrón 2009), the formation of attitudes and behaviour patterns (Bowyer 2009; Letki 2008; Stolle *et al.* 2008), and the resolution of inter-group conflict (Hewstone 2009).  $ID$ ,  $IS$ ,  $II$ ,  $IE$ ,  $MII$  and  $MIE$  provide some insights into segregation, but leave a lot unsaid, as do many other indices.

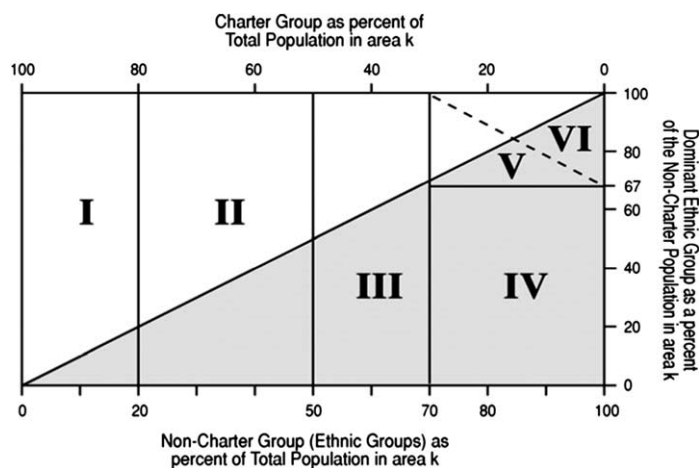
### An Alternative?

After experimentation and the discovery that various degrees of ethnic mixture within local areas were the norm across the five countries mentioned at the start of this article, we presented an alternative portrayal of segregation (Poulsen *et al.* 2001,

2002). Based on a seminal typology developed by Boal (1999) and the concept of thresholds that Peach (1996) derived from Philpott (1978), this argued that identifying the types of neighbourhood in which members of group  $x$  lived according to their ethnic composition would be more much informative than indices. Areas, such as census tracts, within a city are classified along two continua (Figure 1) according to: (a) the proportion of their population from the charter group (or host society); and—where the charter group forms a small minority—(b) the proportion of the non-charter population drawn from the largest minority ethnic group.

All the scheme's boundaries are subjective. Very few areas in cities outside the USA had over 70 per cent of their populations drawn from a single ethnic minority. Thus we placed the boundary identifying ethnic enclaves as 70 per cent non-charter (i.e. the III–IV boundary in Figure 1) and within that category separated mixed from polarised enclaves (Types IV and V—the latter being those where one minority group dominated) as 67 per cent of the non-charter population. Peach (2009: 1389) identifies a major failing in this scheme because it provides no information on who are mixed together in particular areas. In cities with more than one large minority group, we separately identify those Type V areas where each is dominant (Johnston *et al.* 2008); where needed, it would be straightforward to create greater detail—e.g. areas where Indians are the largest group and Pakistanis the second largest. The scheme is open to improvement and/or modification (as in Brimicombe 2007).

This scheme worked well apart from the extremes of segregation typical of Blacks in US cities (and currently to some extent Hispanics: Johnston *et al.* 2006). Thus we added a sixth category (VI), which we termed 'ghetto' following common US usage. Some members of  $x$  live in a ghetto-like situation (i.e. extreme isolation from all other groups) if at least 30 per cent of them are in Type V areas where they predominate: such Type V areas were thus relabelled as Type VI (Peach 2009: 1387 is



**Figure 1.** The typology of residential areas according to their ethnic mix

Source: Johnston *et al.* (2007).

wrong in his calculations<sup>2</sup>). Peach argues that the major difference between ghettos and enclaves is that, in the former, nearly all members of the group concerned are 'forced' to live in the ghetto (a definition at odds with the *OED*'s!<sup>3</sup>). We probably set the threshold too low at 30 per cent but, as our initial two-city and later five-country comparative studies found virtually no Type VI examples outside the USA (Johnston *et al.* 2002, 2007), it did not present an important problem, although use of the name—which we dropped from later versions of the typology description—potentially did. Ghettos are a spatial phenomenon of previous eras in the countries we study. Ethnic concentration varies widely over time and space and the key contemporary issue is the degree of spatial mixing—'How many of group  $x$  share residential spaces with which other groups at different levels of mixture?' is the question our approach was designed to answer.

### Mapping Ethnic Group Separation

A long-recognised problem with the single-number indices discussed here is that they are aspatial. Massey and Denton (1988) identified three other dimensions to segregation: clustering, centralisation and concentration. Group  $x$  will record the same degree of separation, using either  $IS_x$  or  ${}_xII_x$ , whether the areas into which it is concentrated be either contiguous or randomly distributed through the city. Some have addressed this problem by indices with a contiguity component. Most replicate and extend the problems discussed here; if you combine two concepts, then with an index increasing from 0.4 to 0.5, how do you know if the group is more isolated or more clustered?

We did not originally address this problem but early applications of spatial statistics indicated a way forward (Brown and Chung 2006; Logan *et al.* 2002). Local statistics identify those sections of a city where group  $x$  is relatively concentrated (Johnston *et al.* 2010a). Our typology characterises the population mix of areas within those concentrations (Johnston *et al.* 2009) at a variety of scales (Poulsen *et al.* 2010).

This approach has considerable potential for studies of a newly emerging form of ethnic group concentration largely associated with relatively affluent Asian groups in Pacific Rim cities. Ethnoburbs (Johnston *et al.* 2008; Li 1998, 2006) are low-intensity suburban clusters where ethnic group  $x$  typically forms only a small percentage of the local population (like Auckland's Koreans). None of the single-number indices illuminate such patterns, but the spatial statistics approach does (Johnston *et al.* 2010b)—it can elucidate new situations of population mix.

### So What is Happening in Britain—and How is it Reported?

Methodological improvement is a major element of social science progress. Greater quantitative sophistication provides both improved descriptions and means to better explanations. For ethnic residential segregation, the original methods have substantial

disadvantages—hence continued searches for improvements (as in seminal papers by Reardon *et al.* 2008, 2009). In only portraying the average situation, the indices favoured by Peach not only waste much of the available quantitative information but also fail to reveal important aspects of the urban residential mosaic; they do not indicate what proportions of group  $x$  live in different types of area—such as those where they dominate, where there is a substantial mix of different ethnic groups, and where the charter group predominates. Our alternative addresses those issues and offers a way forward consistent with contemporary patterns of minority settlement in multi-ethnic cities.

Peach (2009: 1393) concedes that our approach is ‘a useful addition’ but ‘not a replacement’. He declines to recognise the considerable failings of single-number indices, which he deploys to show that segregation is decreasing in Britain (those in his Table 1 are presented as *ID*; they are probably *IS*—a confusion also found in Simpson 2007). *On average* Peach is correct, but averages can conceal a great deal of variability, as demonstrated by the published version of the paper cited (Poulsen and Johnston 2008). Peach’s *IS* value for Bangladeshis fell between 1991 and 2001; we showed that a smaller percentage of them lived in white-majority areas (Types I–II in Figure 1) in 2001 than in 1991 (50.4 and 59.0 respectively), and a larger share lived in Type V–VI areas (an increase from 13.9 to 16.3). Within London, the general trend in the boroughs with the largest minority populations was for an increase—both absolutely and relatively—living in the more segregated areas (Types IV–VI): in Tower Hamlets, for example, 19,030 Bangladeshis (37.9 per cent of the borough’s total) lived in such areas in 2001, compared to only 7,337 (25.4 per cent) in 1991. Change did not involve a uniform move away from the original settlement enclaves during the decade; instead it simultaneously resulted in both greater diversity in some parts of the city and greater separation in others—a complexity that single-number indices conceal rather than reveal.

When these findings were presented at a conference they were mis-represented by the media, and the chair of the Commission on Racial Equality used those mis-interpretations to suggest that Britain was ‘sleepwalking towards segregation’—towards a New Orleans-type situation—with other media suggesting that ghettos were emerging. We have *never* said that there are ghettos in Britain or that future ghettoisation is possible; nor have we even implied that ‘cities like Bradford and Leicester were comparable in their levels of ghettoisation to Chicago’ (Phillips, cited by Peach 2009: 1381; see also Johnston and Poulsen 2006).<sup>4</sup> To imply in a paper’s title that we have been ‘manufacturing ghettos’ is misleading and disingenuous—there is no substance to his claim that one of us said that ‘segregation was increasing and ghettos had formed’ (Peach 2009: 1391).

### **In Summary**

Over the last decade we have conclusively demonstrated that the segregation indices still relied on by some analysts obscure much important detail regarding ethnic group



residential patterns in five countries. We respect what has been achieved since those indices were introduced but argue that much more can be revealed by deploying methods (aided by modern technology; one of our stimuli was literature on supervised classifications in remote sensing) to illuminate ethnic minorities' residential situations. The defence of those indices offered by Peach (2009) and Simpson (2007) fails to recognise, let alone come to grips with, the critiques: simple numbers can sometimes be simplistic. Peach (2009: 1382) is so right in stating that segregation 'is too slippery to pin down in a single figure'—so why continue to promote single-figure indices? If 'It's all in the mix', as one recent paper suggests (Münch 2009), or '[m]ore than American cities, cities in Europe are characterised by mixed neighbourhoods with regard to ethnic origin' (Musterd and van Kempen 2009: 559) then we need to develop methods that illustrate rather than obscure that mix.

Simpson and Peach (2009: 1378) claim that the papers in their *JEMS* special issue, derived from a conference on 'Segregation and integration: what's going on?' (University of Manchester, 16–18 May 2007), addressed the conflict of evidence with the 'beneficial effect of clarifying the key points which are at stake'. To the contrary, Peach's (2009) paper did not clarify; rather he defended a partial approach to measuring the *OED*'s concept of segregation as 'the separation or isolation of a portion of a community . . . from the rest' instead of—as others (e.g. Brama 2008; Brimicombe 2007; Walks and Bourne 2006; see also McGarrigle and Kearns 2009)—exploring an alternative's claimed merits. The *JEMS* special issue is an excellent collection that, like other work (e.g. Raymer and Giuletti 2009; Stillwell 2010; van Ham and Manley 2009), extends our appreciation of this fundamental aspect of contemporary society. But we can learn much more if we appreciate the limited information provided by single-number indices. In general, outwith the US experience with Blacks and, to a lesser extent, Hispanics, the evidence shows that minority ethnic groups initially cluster in certain parts of a city. As the group expands, so does the cluster but—and the time-scale varies according to group, time and place—some members move away, some into adjacent areas, some further afield; some immigrants move to the cluster, others avoid it. Some of those initial clusters never approach the status even of a polarised enclave (our Type V), where the minority group dominates; others do. We need to illuminate such variability, and the varying degrees of mixing in residential milieux that characterise most contemporary situations. *ID* and *IS* cannot do that and, although *II* and *IE* highlight the average situation, they ignore any variation around it. If areas of varying ethnic mix are the norm, identifying their separate characteristics should form the focus of our measurement efforts—which indices cannot do.

Measurement is rarely an end in itself; it is a means to an end—necessary for rigorous descriptive statements and replicable analyses. Descriptions and analyses have been improved by advances in measurement. Over the last decade we have interrogated what has been achieved and invited others to join in finding ways of doing it better. Peach (2009: 1386) gives several quotes from our work on that agenda. This response shows why we stand by all of those claims—put simply, there are much

better ways of measuring and depicting segregation in its many varied forms than those he favours.

## Notes

- [1] Peach (2009: 1384) is wrong in suggesting that Lieberman was the first to use these indices: they were introduced by Shevky and Williams (1949) and modified by Bell (1954).
- [2] If group  $x$ —Pakistanis in his example—are 40 per cent of an area's population and the host society forms 30 per cent, then the area is in Type IV, not Type V: 40 per cent is less than 67 per cent of  $(100 - 30)$ .
- [3] The origins of the word 'ghetto' are in medieval Italian, referring to the dross skimmed off molten iron—i.e. cast out. This traditional view of segregation—even for those in the USA—of Blacks being locked out of prescribed areas has been replaced by one where they are locked in to certain areas, not because they are excluded from others simply by their race but rather because disadvantage in the labour and housing markets and in the educational system precludes them from affording homes in many parts of the city (Goldberg 1998).
- [4] A press release prepared by the conference organisers did not include the word ghetto; journalists were not provided with the text, only the PowerPoint slides. When one of us (Poulsen) was interviewed by a number of journalists after the paper was given, he stressed that it was about changing levels of segregation and population mix, not ghetto formation, and was assured that the word ghetto would not be used! None of the quotes deployed by Peach (2009) are from a formal paper but from notes prepared before its presentation to inform a co-author. Simpson and Peach (2009: 1378) and Peach (2009: 1381) are wrong in stating that Trevor Phillips based his claims on Poulsen's (2005) conference paper: he based them on the media reports.

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