

ARTICLE

Ethnic diversification and neighbourhood mixing: A rapid response analysis of the 2021 Census of England and Wales

Gemma Catney¹  | Christopher D. Lloyd¹  | Mark Ellis²  |
 Richard Wright³  | Nissa Finney⁴  | Stephen Jivraj⁵  | David Manley⁶ 

¹Geography, School of Natural and Built Environment, Queen's University Belfast, Belfast, UK

²Department of Geography, University of Washington, Seattle, WA, USA

³Department of Geography, Dartmouth College, Hanover, New Hampshire, USA

⁴School of Geography and Sustainable Development, University of St Andrews, St Andrews, UK

⁵Institute of Epidemiology and Health Care, University College London, London, UK

⁶School of Geographical Sciences, University of Bristol, Bristol, UK

Correspondence

Gemma Catney, Geography, School of Natural and Built Environment, Queen's University, Belfast, UK.

Email: g.catney@qub.ac.uk

Funding information

Economic and Social Research Council, Grant/Award Number: ES/W012499/1

Abstract

This paper provides a rapid response analysis of the changing geographies of ethnic diversity and segregation in England and Wales using Census data covering the last 30 years (1991, 2001, 2011 and 2021), a period of significant social, economic and political change. Presenting the first detailed analysis of 2021 Census small area ethnic group data, we find that the growth of ethnic diversity at the national level is mirrored across residential neighbourhoods. Increasing numbers of neighbourhoods are home to a substantial mix of people from different ethnic groups, and this growing neighbourhood ethnic diversity has been spatially diffusing across all regions of England and Wales. We argue that to understand the ethnic mosaic across England and Wales, it is more illuminating to consider mix than majority: places labelled as 'minority-majority' are, in fact, ethnically diverse spaces, home to sizable proportions of people from many ethnic groups. Increasing ethnic diversity is matched by decreasing residential segregation, for all ethnic groups—majority and minority.

KEYWORDS

census, diversity, ethnicity, mixing, neighbourhood, segregation

1 | INTRODUCTION

The population composition of England and Wales has become increasingly ethnically diverse and mixed (Catney et al., 2021; Jivraj & Simpson, 2015; Johnston et al., 2013). This is mirrored within and between regions, in suburban and rural locales with historically smaller ethnic minority populations, in traditionally diverse urban centres, and in residential neighbourhoods (Catney, 2016a; Catney & Lloyd, 2020; Johnston et al., 2015). In conjunction with this growing diversity, segregation has steadily declined over time, for all ethnic groups and across multiple spatial scales, from the local to the regional (Catney, 2016b; Johnston et al., 2013, 2016). The ways in which ethnic diversity has grown and been shaped have, predictably, been subject to considerable public attention since 2021 Census data on ethnic groups were released, on 29 November 2022. Regardless of the editorial direction, the issue of the day was ethnic diversity, and indeed

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2023 The Authors. *The Geographical Journal* published by John Wiley & Sons Ltd on behalf of Royal Geographical Society (with the Institute of British Geographers).

the *geography* of that diversity, with *The Guardian* and *BBC* choosing to report on the ‘super diversity’ (Vertovec, 2019) of the cities of Leicester and Birmingham.ⁱ

While several sample surveys measure ethnic groups in some detail, the Census remains the ‘gold standard’ for research that seeks to understand local level populations (Stillwell, 2018). Only the Census can provide a comprehensive full population coverage (with 19 ethnic groups classified) at a fine spatial scale.ⁱⁱ The publication of 2021 Census data thus represents a unique and important opportunity to explore new or emerging patterns and processes, allowing researchers the possibility of understanding how the nation’s population and its geographies are changing over time. We begin with an overview of changes in ethnic group population numbers and shares for England and Wales from 1991 to 2021. We then turn our attention to geographical variation in these changes at local authority and neighbourhood scales, asking: what are the emerging geographies of ethnic diversity, residential segregation, and inter-ethnic mixing, and in what ways have they changed over time? This rapid response analysis of 2021 Census ethnic group data for England and Wales aims to explore the changing geographies of ethnic diversity and residential segregation for small areas across four time points: 1991, 2001, 2011 and 2021. Within this larger frame, we explore two temporal dimensions of the changing geographies of ethnicity in England and Wales: detailed diversity over the short(er) run (20 years) and broader trends over a longer time period (30 years). We explore ethnic group changes at three different spatial scales: the national (England and Wales), and the subnational scales of town and city districts, and neighbourhoods.

2 | DATA

2.1 | Ethnic groups

Our analysis makes use of ethnic group data for England and Wales. The Census has asked about ethnic group identity since 1991. The inclusion of the Census ethnic group question was, and remains, politically contentious and empirically challenging (Aspinall, 2022; Finney & Simpson, 2009a). Its introduction in 1991 was given imperative by the introduction of anti-discrimination and race relations legislation in Britain from the 1970s, and the desire to understand social inequalities remains a prominent driver of Census ethnic group data collection (ibid.).

In 2021, people were required to tick one box to ‘best describe your ethnic group or background’. Ethnic group is a compulsory question, and completion of the Census form is a legal obligation.ⁱⁱⁱ For the 2021 Census, following a series of user consultations,^{iv} one additional response was added to the range of ethnic groups available, allowing people to self-identify as Roma on their Census form. Additionally, search-as-you-type functionality^v was introduced, to allow respondents who chose one of the ‘other’ ethnic group options to self-identify their ethnic group from a predefined list. A greater number of changes to the ethnic group question were made for earlier Censuses (see Jivraj & Simpson, 2015, for a detailed discussion).

Table 1 shows the ethnic groups that were reported for each Census since 1991. To enable comparison across time, ethnic groups recorded in later periods were combined in the analyses to make them consistent with earlier periods (see Catney, 2016a; Simpson et al., 2016). To investigate change during the four time periods for which we have ethnic group data (1991, 2001, 2011 and 2021), we use an eight group categorisation (see column one) of: White (including, depending on time point: White British, White Irish, Gypsy or Irish Traveller, Roma, Other White), Indian, Pakistani, Bangladeshi, Chinese, Black African, Black Caribbean and Other (including, depending on time point: the four Mixed categories [Mixed White and Black Caribbean, Mixed White and Black African, Mixed White and Asian, Other Mixed], Other Asian, Other Black, Arab and Any Other). For analyses of change between 2001 and 2021, we include greater detail and merge the 16 (2001), 18 (2011) and 19 (2021) ethnic groups into a 16-group^{vi} categorisation of: White British, White Irish, Other White (including, depending on time point: Gypsy or Irish Traveller, Roma, Other White), Indian, Pakistani, Bangladeshi, Chinese, Black African, Black Caribbean, Mixed White and Black Caribbean, Mixed White and Black African, Mixed White and Asian, Other Mixed, Other Asian, Other Black, and Any Other (including, depending on time point: Arab and Any Other). Changes in national level ethnic group sizes are discussed in Section 3.

2.2 | Geographies

Local Authority (LA) districts and Lower Layer Super Output Areas (LSOAs) for 2021 are the base geographies used in our subnational analyses. LAs comprise single-tier unitary authorities and lower tier districts contained within shire counties (ONS, 2016). There are 331 LAs (hereafter districts) for which 2021 Census data have been released. They have

TABLE 1 Ethnic groups reported at each Census 1991–2021, and their population counts and proportion of the total population.

1991 ethnic groups	2001 ethnic groups	2011 ethnic groups	2021 ethnic groups
Total pop: 49,890,277	Total pop: 52,041,916	Total pop: 56,075,912	Total pop: 59,597,542
White (46,937,861; 94.08%)	White British (45,533,741; 87.49%) White Irish (641,804; 1.23%) Other White (1,345,321; 2.59%)	White British (45,134,686; 80.49%) White Irish (531,087; 0.95%) Gypsy or Irish Traveller (57,680; 0.10%) Other White (2,485,942; 4.43%)	White British (44,355,038; 74.42%) White Irish (507,465; 0.85%) Gypsy or Irish Traveller (67,768; 0.11%) Roma (100,981; 0.17%) Other White (3,667,997; 6.15%)
Indian (830,205; 1.66%)	Indian (1,036,807; 1.99%)	Indian (1,412,958; 2.52%)	Indian (1,864,318; 3.13%)
Pakistani (455,363; 0.91%)	Pakistani (714,826; 1.37%)	Pakistani (1,124,511; 2.01%)	Pakistani (1,587,819; 2.66%)
Bangladeshi (161,701; 0.32%)	Bangladeshi (280,830; 0.54%)	Bangladeshi (447,201; 0.80%)	Bangladeshi (644,881; 1.08%)
Chinese (146,462; 0.29%)	Chinese (226,948; 0.44%)	Chinese (393,141; 0.70%)	Chinese (445,619; 0.75%)
Black African (209,589; 0.42%)	Black African (479,665; 0.92%)	Black African (989,628; 1.76%)	Black African (1,488,381; 2.50%)
Black Caribbean (499,030; 1.00%)	Black Caribbean (563,843; 1.08%)	Black Caribbean (594,825; 1.06%)	Black Caribbean (623,119; 1.05%)
Other Asian (192,930; 0.39%)	Mixed White and Black Caribbean (237,420; 0.46%)	Mixed White and Black Caribbean (426,715; 0.76%)	Mixed White and Black Caribbean (513,042; 0.86%)
Other Black (175,755; 0.35%)	Mixed White and Black African (78,911; 0.15%)	Mixed White and Black African (165,974; 0.30%)	Mixed White and Black African (249,596; 0.42%)
Any Other (281,381; 0.56%)	Mixed White and Asian (189,015; 0.36%)	Mixed White and Asian (341,727; 0.61%)	Mixed White and Asian (488,225; 0.82%)
	Other Mixed (155,688; 0.30%)	Other Mixed (289,984; 0.52%)	Other Mixed (467,113; 0.78%)
	Other Asian (241,274; 0.46%)	Other Asian (835,720; 1.49%)	Other Asian (972,783; 1.63%)
	Other Black (96,069; 0.18%)	Other Black (280,437; 0.50%)	Other Black (297,778; 0.50%)
	Any Other (219,754; 0.42%)	Arab (230,600; 0.41%)	Arab (331,844; 0.56%)
		Any Other (333,096; 0.59%)	Any Other (923,775; 1.55%)

Note: ‘High-level’ ethnic group categories reported in the 2021 Census of England and Wales: Asian, Asian British or Asian Welsh = Bangladeshi, Chinese, Indian, Pakistani, Other Asian; Black, Black British, Black Welsh, Caribbean or African = African, Caribbean, Other Black; Mixed or Multiple ethnic groups = White and Asian, White and Black African, White and Black Caribbean, Other Mixed or Multiple ethnic groups; White = English, Welsh, Scottish, Northern Irish, or British, Irish, Gypsy or Irish Traveller, Roma, Other White; Other ethnic group = Arab, Any other ethnic group.

Source: 1991 Census, Table SAS06 (Crown Copyright); 2001 Census, Table KS006 (Crown Copyright); 2011 Census, Table KS201 (Crown Copyright); 2021 Census, Table TS021 (Crown Copyright). Authors' own calculations.

a mean population of 180,053 and range in size from 2055 (Isles of Scilly) to 1,144,922 (Birmingham). LSOAs are a statistical geography built up from clusters (usually numbering four to six) of Output Areas (OAs)—small areas intended to have similar population sizes and also to be as socially homogeneous as possible based on housing tenure and dwelling type (see Martin et al., 2001 for an account of the procedures used in construction of these areas). LSOAs were selected in preference to coarser statistical geographies (e.g., Middle Layer Super Output Areas) which would lead to a loss of detail in our assessment of diversity, and also administrative geographies (e.g., wards), which are not designed to account for the underlying population characteristics (Martin et al., 2001). LSOAs offer a compromise between spatial detail and granularity that obscures the key spatial patterns. One of the challenges in using Census data over time are the changing boundaries. To overcome this issue, counts for 1991 Enumeration Districts (EDs), 2001 LSOAs and 2011 LSOAs were transferred to 2021 LSOAs using areal weighting, as detailed in the Technical Appendix ([Supporting Information](#)). There were 35,672 LSOAs in 2021, with a mean population of 1,671 people. LSOAs will be referred to as neighbourhoods from hereon in. All analysis and data processing were undertaken using the R computing environment (R Core Team, 2022).

Figure 1 shows the nine regions of England, plus Wales, and selected towns and cities that are useful references for the analysis sections. This map is a cartogram (Dorling, 1996), created by scaling LSOAs using the square root of their original geographical area (Harris et al., 2017). This means that geographically smaller LSOAs (which have higher population densities) appear relatively larger, while geographically larger LSOAs (with lower population densities) appear relatively smaller. The boundaries of distorted LSOAs allocated to a specific region/nation were dissolved to retain the region/nation boundary in cartogram space; the end result is as shown in Figure 1. The boundaries of Wales and the regions of England are superimposed on later maps (Figure 6) to aid interpretation.

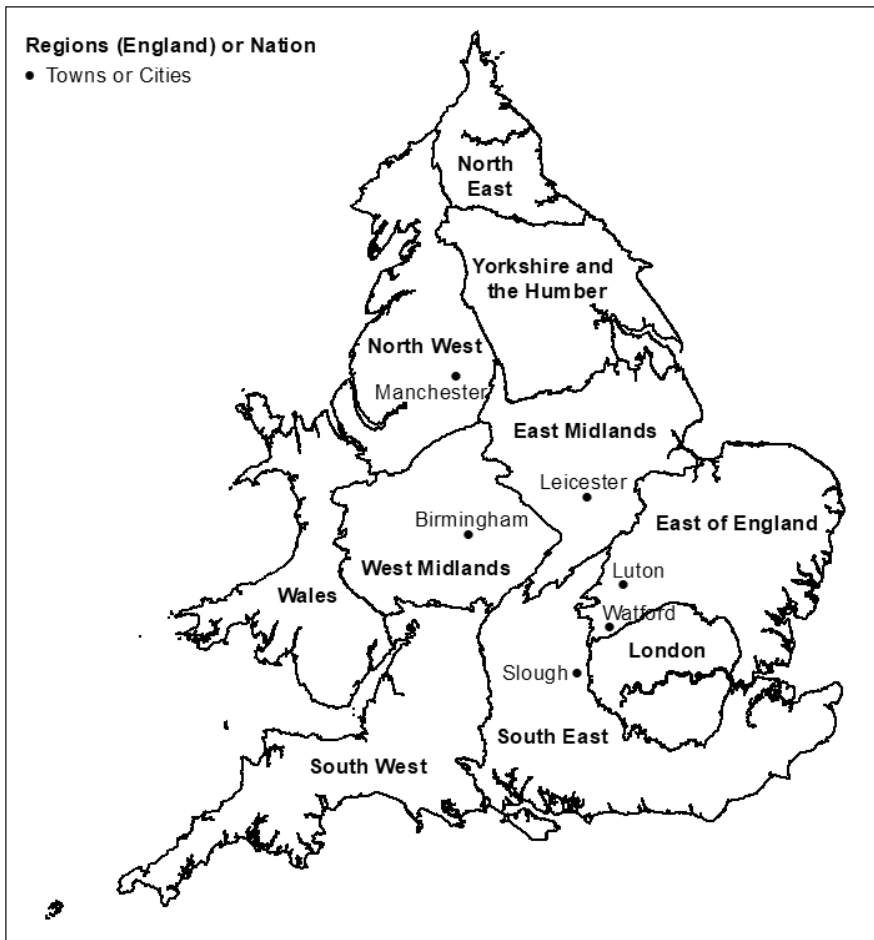


FIGURE 1 Area cartogram showing regions of England, Wales, and selected towns and cities referred to in the analysis.

3 | THE CHANGING ETHNIC DIVERSITY OF THE ENGLAND AND WALES POPULATION

Table 1 tells us about the relative proportions of each ethnic group at the most recent Census, but also allows us to explore how the populations in each group have changed over time. The total number of people living in England and Wales in 2021 was 59,597,542 (Table 1, column 4). Of this total, 74.42% identified as White English/Welsh/Scottish/Northern Irish/British (hereafter White British). The White British population has decreased since 2011, in a continuing trend of gradual decline since 2001. The White Irish population similarly experienced a decrease in group size. These declines may be explained by more deaths than births for these ethnic groups as a result of older age structures and ageing populations, from greater emigration than immigration, and, for the White Irish, changes in self-identification (Simpson & Jivraj, 2015). People who identified as 'Other White' accounted for slightly more than 6% of the England and Wales population in 2021. This is a diverse group and includes people with recent origins in, for example, mainland Europe (including Poland and Romania: the second and fourth highest non-UK countries of birth in England and Wales; ONS, 2022b). Growth of the Other White group constituted the largest proportional increase of all ethnic groups, an increase which ONS (2022c) suggest partly reflects the introduction of the search-as-you-type functionality, which assists people in self-defining their ethnic group by writing it in when completing their Census form online. Over 100,000 people identified with the newly added Roma ethnic group.^{vii} The aggregated White group remains by far the largest ethnic group category, and continued to grow numerically, while experiencing a proportional decline since 1991.

The growth of ethnic diversity at the national scale is clear from Table 1. The population of all 'minority' ethnic groups apart from White Irish added to their populations between 2011 and 2021. The population in ethnic groups other than White constituted just over 18% of the England and Wales population in 2021 (up from 14.03% in 2011). Indian was the largest ethnic group not in the White category, making up just over 3% of the total population. The next largest were Pakistani (2.66%) and Black African (2.50%). The Black African group experienced particularly notable growth in the period from 2011 to 2021, increasing from approximately 990,000 to nearly 1.5 million people. We have also seen an

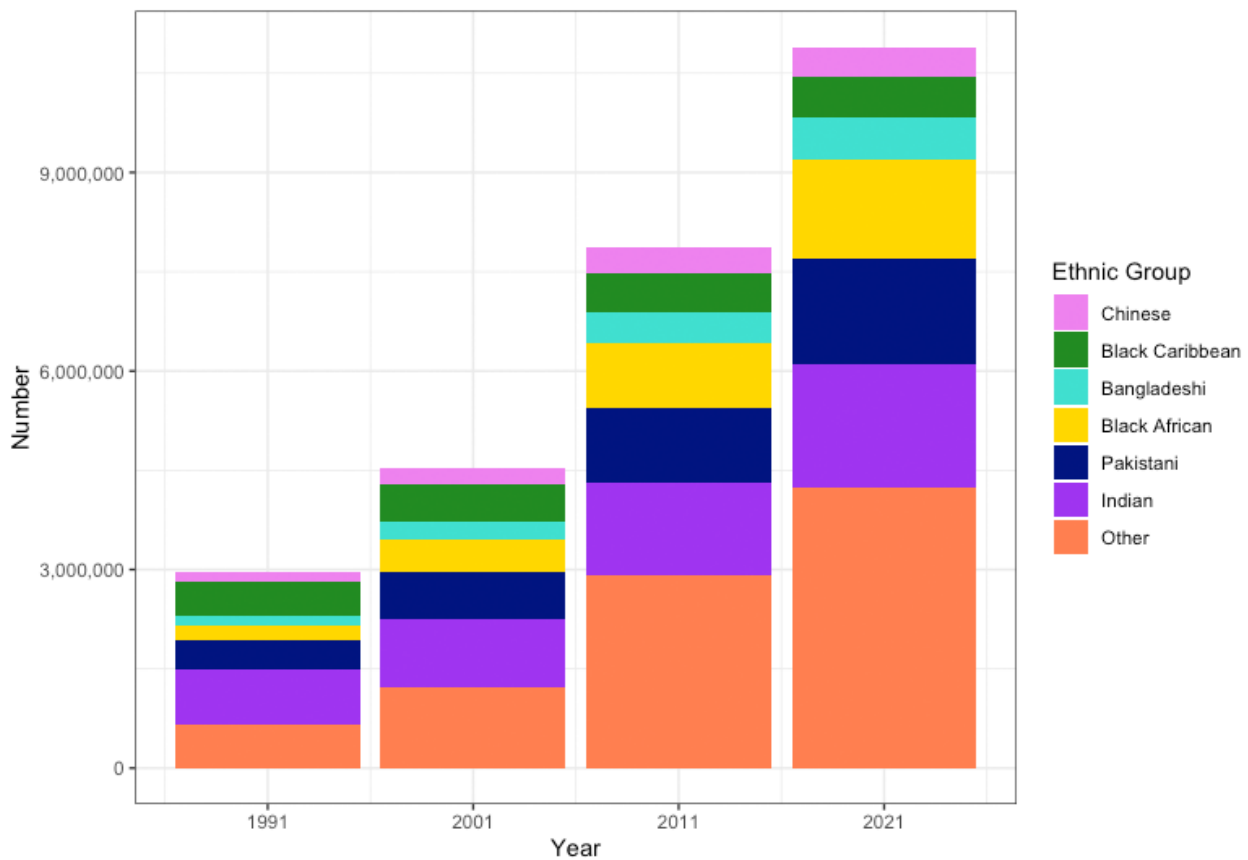


FIGURE 2 Population size of the minority ethnic groups (other than White minority) reported in the 1991, 2001, 2011 and 2021 Censuses of England and Wales. Ethnic groups are ordered by smallest to largest population size in 2021. *Source:* 1991 Census, Table SAS06 (Crown Copyright); 2001 Census, Table KS006 (Crown Copyright); 2011 Census, Table KS201 (Crown Copyright); 2021 Census, Table TS021 (Crown Copyright). Authors' own calculations.

expansion in the count of people identifying with a Mixed ethnic group: more than 1.7 million people self-identified as having a Mixed ethnicity in 2021 (White and Asian, White and Black African, White and Black Caribbean, or Other Mixed)—a considerable increase from just over 661,000 people in 2001, when the Mixed category was first included in the Census. This increase in people identifying with a Mixed ethnic group is expected, and predominantly reflects children born to people in mixed ethnicity partnerships (Lomax et al., 2020).

Several components of population dynamics will have, collectively, shaped these changes in ethnic group populations nationally: the balance of births and deaths which partly relate to the different age structures of ethnic groups; the balance of in and out migration; and changes in the number of people ticking a given ethnic group box, reflecting changes in how we see ourselves, or how we feel others see us (Finney & Simpson, 2009b; Simpson & Jivraj, 2015). Previous research has shown that some people change their ethnic group identification between Censuses (Simpson et al., 2016).

Figure 2 captures the sustained growth of ethnic diversity between 1991 and 2021. It shows the population in each of the six minority ethnic groups that, given changes in reporting (see Table 1), are most comparable across the four Censuses with an ethnic group question. What is most notable is the variation in ethnic diversity since ethnic group data were collected in the 1991 Census. The ethnic groups that have grown fastest since 1991 are groups that accounted for smaller proportions of the population when these data were first collected. Figure 2 also includes the Other category, which can be seen as a heterogeneous group. The considerable growth of this 'Other' group is an indicator of a diversification of diversity, where the pre-prescribed Census groups do not align with the self-identification of increasing numbers of people, despite the addition of new groups at every Census since 1991. The Any Other group, as measured in the 2021 Census, is the sixth largest minority ethnic group, demonstrating a continued mismatch in the predefined categories for almost a million people (see Table 1).

4 | NATIONAL, DISTRICT AND NEIGHBOURHOOD ETHNIC DIVERSITY

4.1 | Growth of ethnic diversity at the national scale

The increasing ethnic diversity of England and Wales indicated in Table 1 and Figure 2 can be measured more formally. The Reciprocal Diversity Index (RDI) allows us to compare levels of ethnic diversity over time (Catney, 2016b; Simpson, 2007). To analyse change in diversity for a greater number of ethnic groups, including a disaggregation of the White category, we restrict our analysis from 2001 onwards at this point, omitting the more limited data for 1991 and using the 16 comparable ethnic groups detailed earlier. RDI is computed with:

$$RDI_i = 1 / \sum_{m=1}^M \left(\frac{N_{im}}{N_i} \right)^2$$

where there are M ethnic groups (here, 16), N_{im} is the number of people in group m in area (e.g., district) i and there are N_i people in total in area i . RDI can be standardised to the range 0,1 by subtracting 1 and dividing by $M-1$ (Simpson, 2007). For ease of interpretation, the product is multiplied by 100. In this case, RDI scores can range from zero (one ethnic group only in an area) to 100 (equal share of all 16 ethnic groups; thus, each group comprises 1/16th of the total population).

As with the period 2001–11, ethnic diversity also increased from 2011 to 2021. The national level (England and Wales) RDI increased from 2.02 in 2001, to 3.56 in 2011, to 5.14 in 2021.

4.2 | Considering mix, rather than majority

This growth of national level ethnic diversity was mirrored across many of the major urban areas of England and Wales. The extent of these changes was a focus in the media at the time of the data release. In particular, the emergence of so-called ‘minority-majority’ cities^{viii} drew substantial attention, as it did at the release of the 2011 Census (for a critique, see Simpson, 2015). These places were labelled as such because more than 50% of their populations were either not White British or not White (the broader grouping including Irish and people claiming another White identity; see Table 1). While the number of ‘minority-majority’ districts increased by the time of the 2021 Census, the results are more nuanced than has largely been reported to date.

The use of the term minority-majority is too blunt for depicting the diversity within districts. We suggest that, rather than emphasis being placed on one ethnic group's threshold (usually White), the absence of White people in a place is better thought of as a signal of ethnic *diversity*. This is what the data show: the smaller the share of a district's White British population, the greater the ethnic diversity of that district. Put another way, districts being characterised as ‘minority-majority’ should instead be thought of as ethnically diverse places.^{ix} This is depicted in Figure 3, which demonstrates that the relationship between the diversity of a district (measured by RDI^x) and the log of the percentage share of the population that is White British is almost perfect (correlation coefficient = -0.98). The log transformation linearises the relationship, which is necessary because the correlation coefficient calculated measures linear association.

For a moment, let us use this lens of diversity measured by RDI and centre the notion of ‘minority-majority’ as an object of inquiry. Figure 4 focuses in on Figure 3 to show only those places where the White British group constitutes less than 50% of the population. These places are mostly in London, but include a few districts outside: Birmingham, Leicester, Slough, Watford, Luton, Manchester. The relationship between RDI and percentage White British, now linear in this subset, weakens a little (correlation coefficient = -0.87). Thus, as the White British population drops below the majority threshold, its power to predict ethnic diversity weakens somewhat, suggesting that other factors (such as the share of other ethnic groups) drive the relationship. To illustrate the variability of the relationship, Leicester, Kensington and Chelsea, Hackney, and Waltham Forest all had approximately the same percentage of White British in 2021 (33%–34%) but had a wide range of ethnic diversity (RDI values of 21–33). All of these districts are diverse, but Leicester is less so (i.e., lower RDI), largely because two-thirds of its population is evenly distributed across two ethnic groups: Indian and White British (see Figure 5). By contrast, Ealing and Tower Hamlets exhibit substantially different RDI values from one another (a difference of around 16), yet both areas had approximately the same shares of White British people. The lower diversity in Tower Hamlets is nevertheless considerably higher than in all places where White British people are in the majority (see Figure 3). To understand the ethnic mosaic across England and Wales it is more illuminating to consider mix than majority.

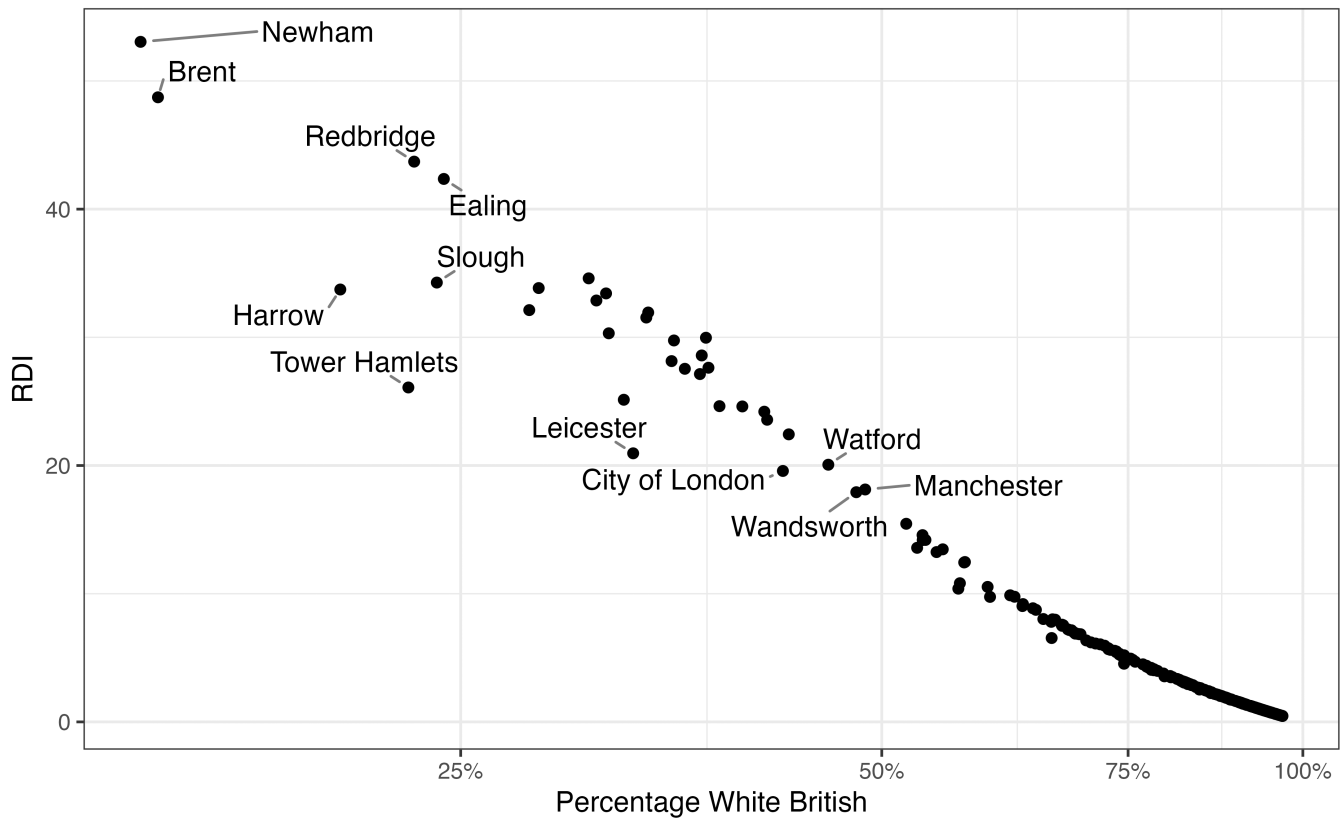


FIGURE 3 Ethnic diversity (measured by the Reciprocal Diversity Index [RDI]) and proportion of White British population in districts in England and Wales, 2021. *Source:* 2021 Census, Table TS021 (Crown Copyright). Authors' own calculations.

To dive deeper into the ethnic mix of these diverse places, Figure 5 shows the ethnic composition in the six most diverse LA districts within and outside London in 2021. The selection of districts is based on the 16 group RDI; the charts show, for each of these districts, the percentage of people in each of the 19 ethnic groups reported in the 2021 Census. For London this is a subset of the diversity apparent in the city because 25 (of the 32 districts in London) are among the 30 most diverse districts of England and Wales. Outside of London, Slough (South East region) and Luton (East region) were respectively the sixth and ninth most diverse districts. It is also notable that of this group of districts, Watford and Slough are very much satellites of the London urban area, with Watford LA lying within the M25 ring road area. Luton is within the commuter hinterland of London as well. Increasing ethnic diversity in these locales is likely due to in situ growth of minority ethnic groups, and internal migration from districts in London (see Catney, 2016a, for earlier time points).

These rainbow charts challenge the problematic minority-majority binary and confirm that these spaces are in fact highly diverse, home to a number of ethnic groups. England and Wales' most-diverse district, Newham, is remarkable, with no group accounting for more than a sixth of the population. The high level of diversity in Newham and Brent is also notable in that the White British group is not the largest, while in the other four London districts it comprises between 23% and 31%. The significance here is that the compositions of Newham and Brent represent distinct outliers among districts of England and Wales, in terms of the form their ethnic diversity takes. The relative (in many cases substantial) dominance of the White British group in several of the example places outside London illustrates how, for most districts, diversity is anchored in the context of historical ethnic structures.

4.3 | Growing neighbourhood ethnic diversity

Progressing from these large-scale patterns of ethnic diversity, this section focuses on neighbourhood-level geographies of ethnic diversity, and how these have changed over time. Here, diversity is again measured using the RDI. Figure 6 shows the RDI for the 16 comparable ethnic groups between 2001 and 2021 for LSOAs across England and Wales. The maps illuminate several important patterns of change. Ethnic diversity has grown, in some cases markedly, across much of England and Wales.

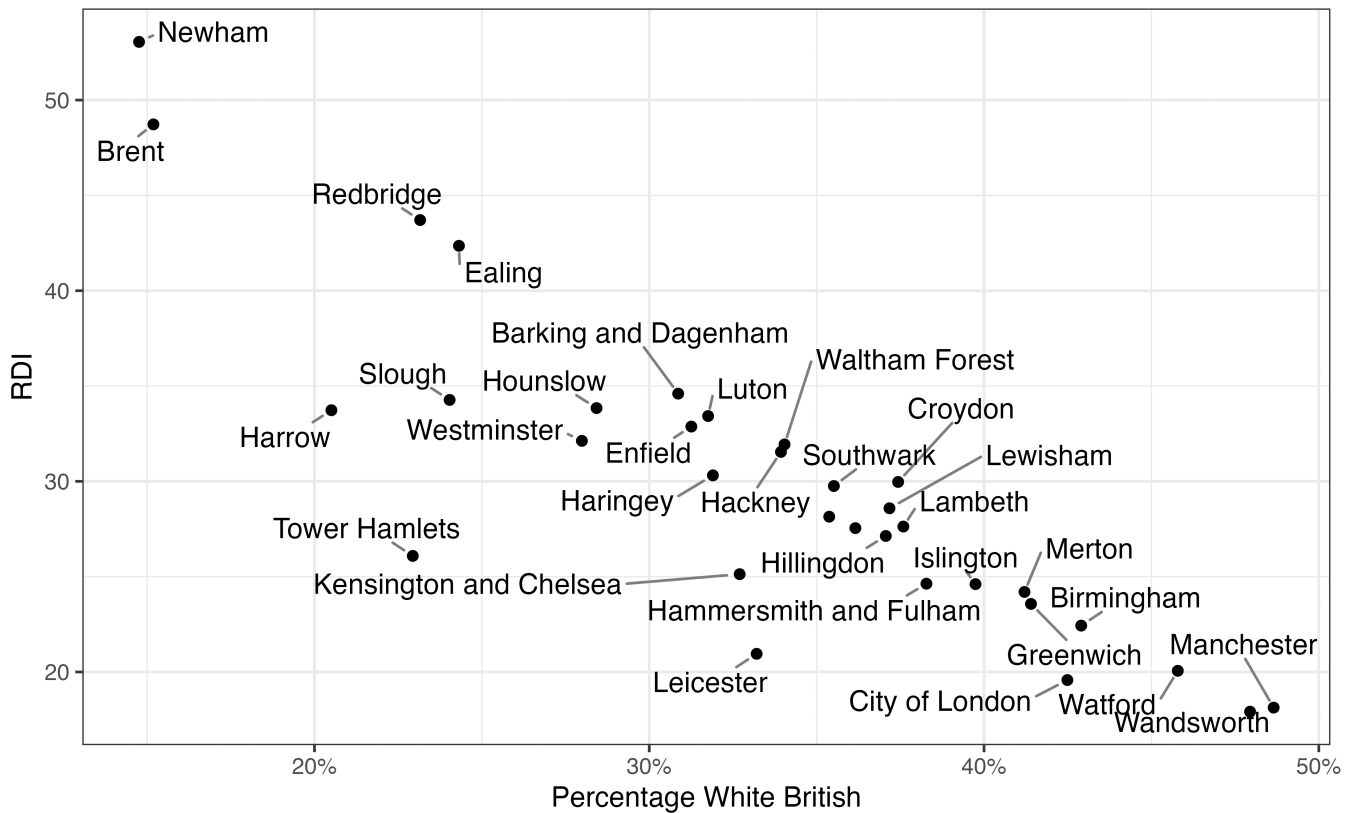
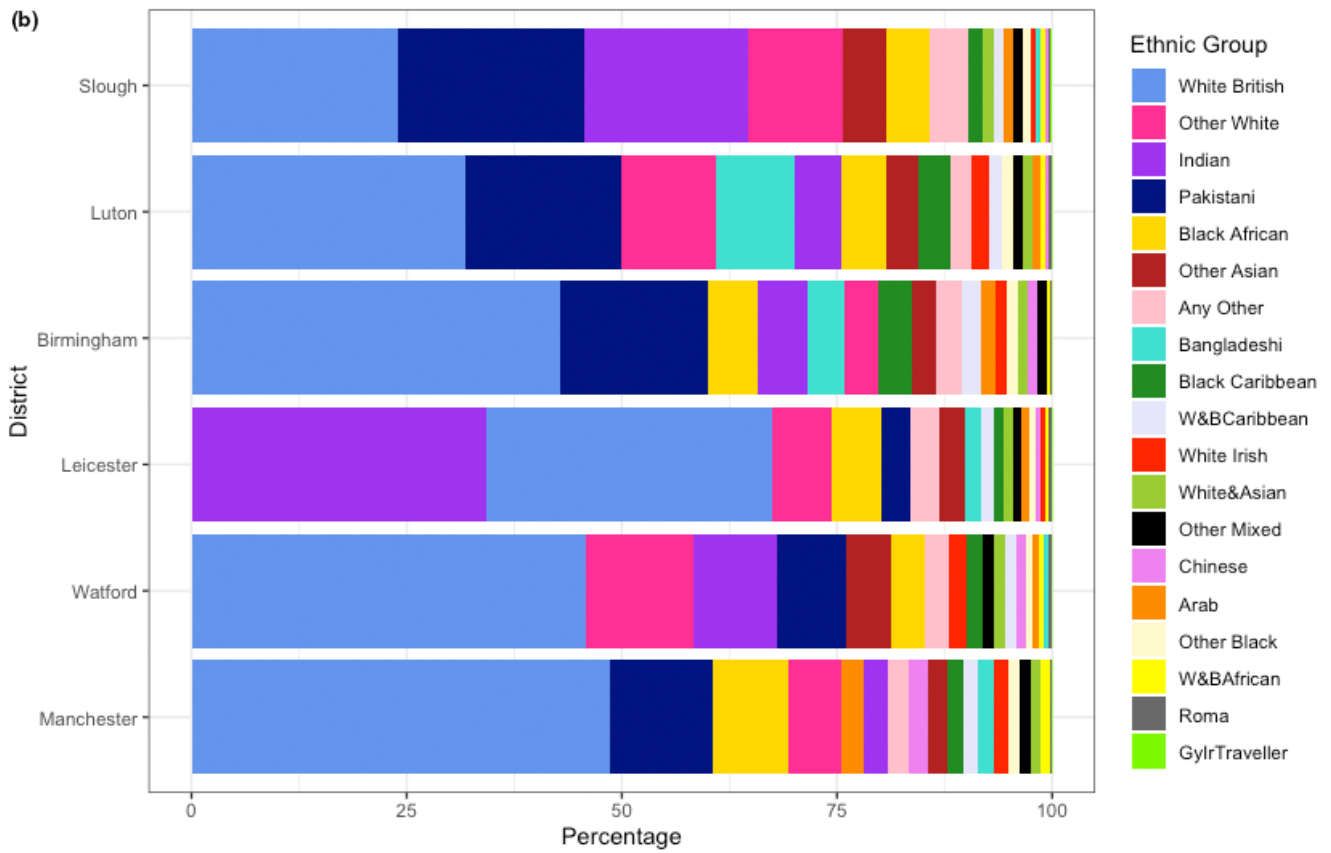
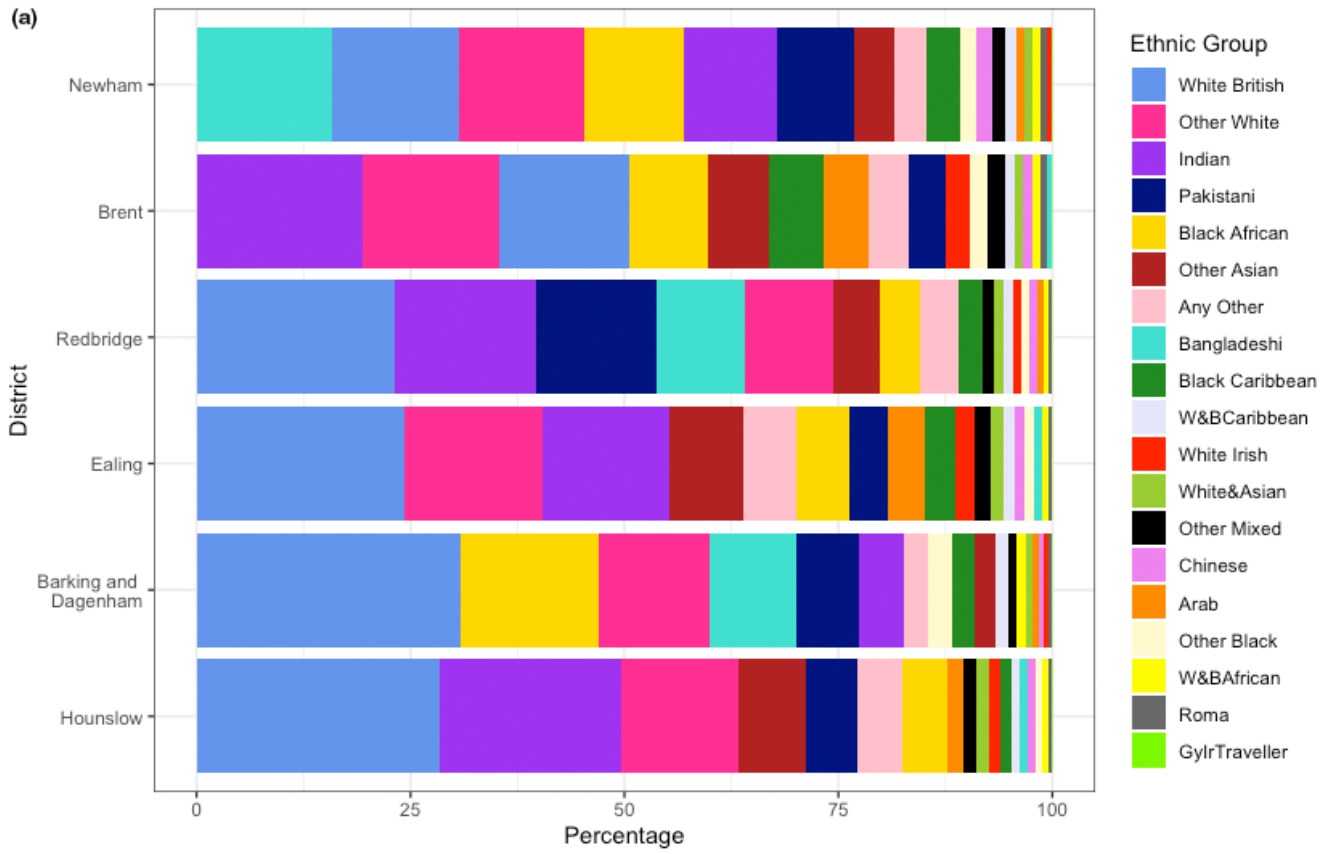


FIGURE 4 Ethnic diversity (measured by the Reciprocal Diversity Index [RDI]) and proportion of White British population in districts where the White British population is below 50% (England and Wales, 2021). *Source:* 2021 Census, Table TS021 (Crown Copyright). Authors' own calculations.

Figure 6 makes clear the increased spatial complexity of ethnic diversity. By 2021 (Figure 6c), fewer neighbourhoods than ever have low levels of ethnic diversity. By far the greatest number of neighbourhoods with high levels of ethnic diversity can be found in large cities, particularly in London, but also across the country, from Birmingham to Bristol, Manchester to Cardiff, and Nottingham to Southampton. In Birmingham, we see considerable increases in the number of neighbourhoods in the highest category of ethnic diversity. A similar pattern can be observed for other parts of the Midlands, and for cities in the North West of England. In London, a 'doughnut' pattern of growth is evident (Figure 6d), with greater increases in ethnic diversity in outer London, and slightly lower increases in inner London, perhaps reflecting minority dispersal away from immigrant settlement areas (Catney, 2016a), and housing (un)affordability/availability in the capital which disproportionately impacts Black and other minority ethnic Londoners (Gleeson, 2022).

The maps also tell a story of change outside urban spaces. Between 2001 and 2021 there was a clear diffusion of ethnic diversity beyond city boundaries. This expansion of diversity occurs across many parts of England where many formerly non-diverse neighbourhoods are now home to people from several ethnic groups. Decreases in ethnic diversity (Figure 6d) tend to have occurred in the most diverse districts. These decreases will partly be a function of how the index operates; even a small increase in one (relatively larger) ethnic group compared with other (smaller) groups will lead to a decrease in RDI. It remains for further investigation to examine how changes in diversity may be the result of local changes in housing provision across population groups.

FIGURE 5 Ethnic group composition of the most ethnically diverse districts of England and Wales in (a) London and (b) outside of London, 2021. Ethnic groups are, for each district, ordered left to right by largest to smallest population size in 2021. Ethnic groups in the legend are ordered by population size in England and Wales in 2021. W&BCaribbean = Mixed White and Black Caribbean; White&Asian = Mixed White and Asian; W&BAfrican = Mixed White and Black African; GyIrTraveller = Gypsy or Irish Traveller. Ranks by Reciprocal Diversity Index out of all districts in England and Wales (331) are as follows: Newham = 1, Brent = 2, Redbridge = 3, Ealing = 4, Barking and Dagenham = 5, Hounslow = 7, Slough = 6, Luton = 9, Birmingham = 28, Leicester = 29, Watford = 30, Manchester = 32. *Source:* 2021 Census, Table TS021 (Crown Copyright). Authors' own calculations.



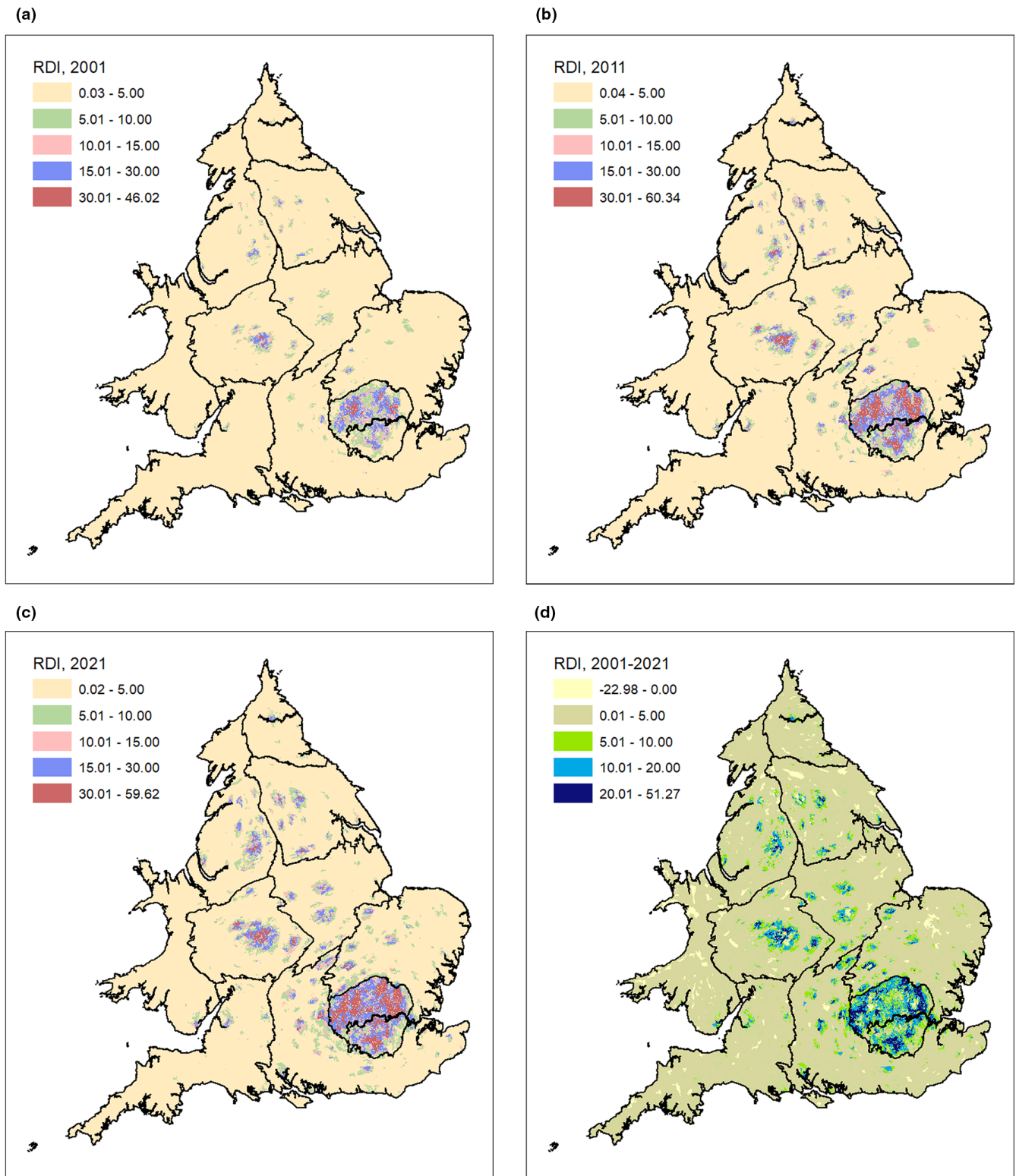


FIGURE 6 Ethnic diversity (measured by the Reciprocal Diversity Index [RDI]) for LSOAs in England and Wales for (a) 2001, (b) 2011, (c) 2021 and (d) change 2001–21. *Source:* 2001 Census, Table KS006 (Crown Copyright); 2011 Census, Table KS201 (Crown Copyright); 2021 Census, Table TS021 (Crown Copyright). Authors' own calculations.

5 | ETHNIC RESIDENTIAL SEGREGATION

Patterns of ethnic and racial residential segregation are important indicators of spatial integration and spatial inequality. The former—the extent to which there is mixing of ethnic groups in residential neighbourhoods—has received by far

the most attention in academic research. In the UK context, residential segregation has consistently declined over time, with increasing ethnic mixing in neighbourhoods for White and other groups (Catney, 2016b; Johnston et al., 2016). The relationship between spatial integration and ethnic inequalities across life domains is considerably less well understood. This partly reflects the hitherto inadequate focus on *geographical* variation in the experiences of people from different ethnic groups, which illuminate the intersections between social and spatial inequalities (for exceptions for the UK context, see Catney & Sabater, 2015; Jivraj & Khan, 2015; Lymperopoulou & Finney, 2017). Indeed, in many senses, segregation is a spatial expression of social (and economic) inequalities within urban areas, with a reinforcing relationship between the residential distribution of people of different ethnicities and spatialities of opportunity structures in housing and employment (Peach, 1996).

The Index of Dissimilarity (D), which captures the evenness of the spatial distribution of two groups, is one of the most commonly used measures of segregation (Massey & Denton, 1988). Here, each named group is compared with all others (for example, people in the Pakistani ethnic group compared with all people other than Pakistani). Values of D can range from zero to one, where zero indicates a completely even distribution (all areas have the same proportion of the two groups compared) and one indicates a completely uneven distribution (all areas comprise 100% of one group or the other). D is computed with:

$$D = 0.5 \times \sum_{i=1}^{N_I} \left| \frac{N_{im}}{N_m} - \frac{N_{in}}{N_n} \right|$$

where N_I are the number of zones (here, 2021 LSOAs), N_{im} are the number of people in group m in LSOA i and there are N_m people in group m in England and Wales. N_{in} and N_n are the equivalent for group n .

D is computed here across neighbourhoods for eight ethnic groups (see Table 1) to facilitate analysis of change over 30 years; the results are shown in Figure 7. The Other group is included in the population total for the analysis, but the group's D value is not reported in Figure 7 given its heterogeneity (as discussed earlier). The largest values for 1991, at greater than 0.8, reflect historic immigrant settlement patterns.

The decline in neighbourhood ethnic residential segregation observed for previous periods continued in the most recent decade. For all ethnic groups, there was a pronounced decline in spatial unevenness between 1991 and 2021. Taking the most recent period first (2011–21), we observe the greatest reductions in segregation for the Black African and Black Caribbean ethnic groups. White segregation from minority groups also declined in the period. Looking across all four time points, we see steady declines in segregation for all ethnic groups: White and minority. The largest proportional decline in residential segregation between 1991 and 2021 was for the Black African group, with a decrease of 0.17. The Bangladeshi, Black Caribbean and Indian ethnic groups also experienced large decreases in neighbourhood residential segregation between 1991 and 2021. Data constraints preclude exploring trends in residential segregation between 1991 and 2021 for disaggregated White groups. White British segregation (not shown) remained the same between 2001 and 2011 (0.55), and decreased between 2011 and 2021 (to 0.53).

6 | SUMMARY AND CONCLUSIONS

This paper provides a first analysis of the changing geographies of ethnic diversity and segregation in England and Wales, spanning 30 years and four Census time points (1991, 2001, 2011 and 2021). The 2021 Census shows that the population of England and Wales is becoming increasingly mixed and diverse, continuing a trend of the past three decades. Residential segregation of all ethnic groups—White and minority—is declining. At the local level, many more neighbourhoods are ethnically diverse, and diversity has been spreading out to new locales. Our analysis challenges the ‘minority-majority’ binary that hinges on White/White British presence or absence in a place, centring instead on its mixture of ethnic groups. In doing so, we find ethnic *diversity* where the ethnic majority is less populous.

The 2021 Census provides a unique and important opportunity to understand the changing ethnic landscape of England and Wales. Our rapid response analysis of recently published data illuminates several key trends, but also raises many questions in need of urgent attention. What can be learnt from these new data about how neighbourhood ethnic diversity evolves? How do internal and international migration shape these changes in ethnic diversity? What are the geographies of ethnic inequalities (e.g., in housing or employment), and how do they relate to residential segregation? This article has focused on England and Wales^{xi}: are the trends we see here reproduced across the rest of the UK, or do they have their own unique characteristics?

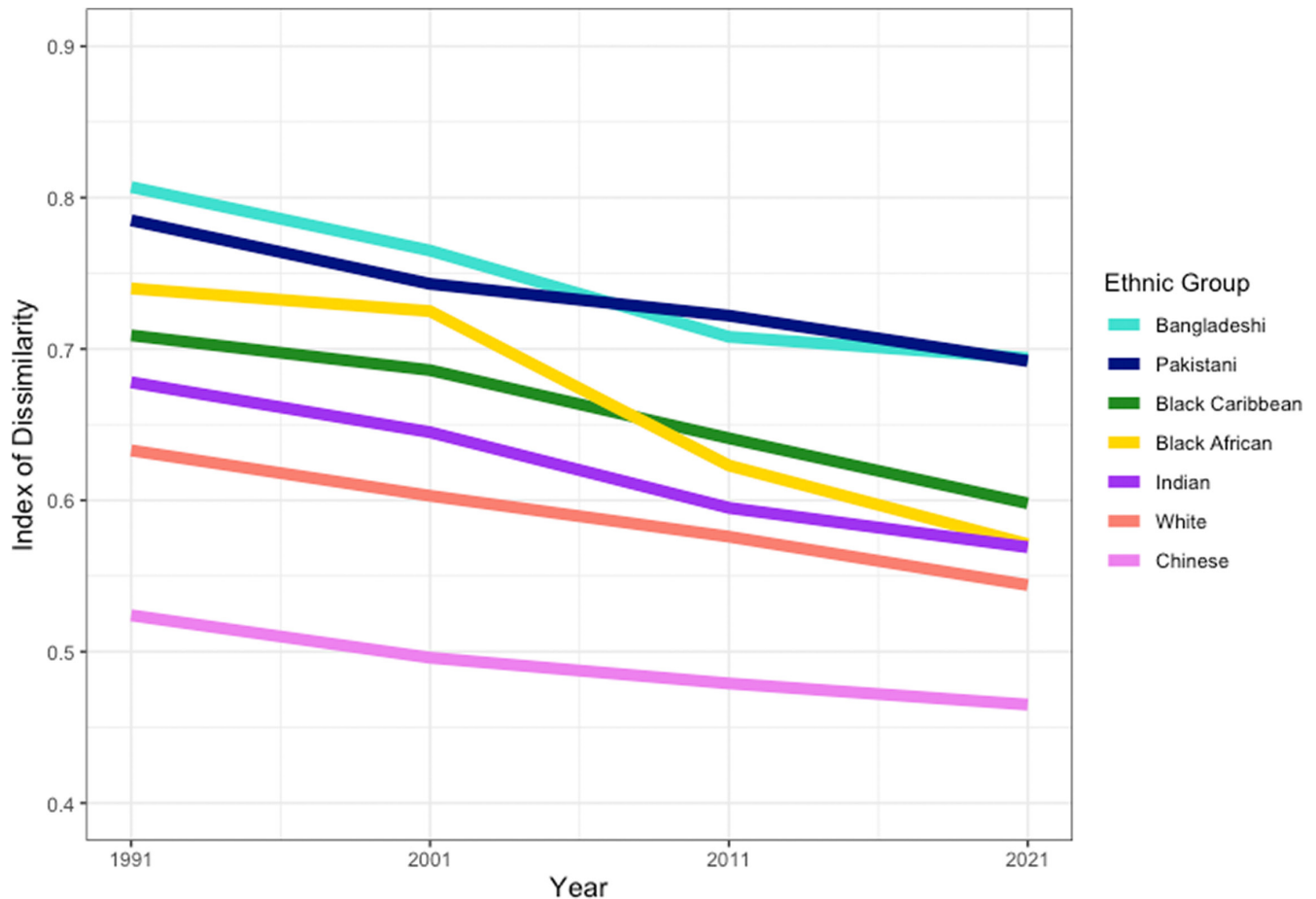


FIGURE 7 Change in ethnic residential segregation (Index of Dissimilarity), for neighbourhoods in England and Wales, 1991, 2001, 2011 and 2021. Ethnic groups are ordered by highest to lowest D values in 2021. *Source:* 1991 Census, Table SAS06 (Crown Copyright); 2001 Census, Table KS006 (Crown Copyright); 2011 Census, Table KS201 (Crown Copyright); 2021 Census, Table TS021 (Crown Copyright). Authors' own calculations.

The authors of this article will collaborate on a major UK-wide programme of research aimed at providing timely and impactful evidence on the ways in which ethnic diversity has grown, and the nature of the differing—and persistently unequal—neighbourhood experiences of people from different ethnic backgrounds. The Economic and Social Research Council funded project *Geographies of Ethnic Diversity and Inequalities (GEDI)*^{xii} will achieve this through the innovative integration of hitherto disparate research strands on ethnic diversity, residential segregation, internal migration, and socio-spatial inequalities, to create a novel and comprehensive understanding of how the UK's population, and its neighbourhoods, are changing.



ACKNOWLEDGEMENTS

Funding from the Economic and Social Research Council (ESRC) is acknowledged gratefully, for the project 'Geographies of Ethnic Diversity and Inequalities (GEDI)' (award ES/W012499/1). The Office for National Statistics is thanked for the provision of data. The authors wish to sincerely thank Phil Emmerson and the Editors of *The Geographical Journal*, in particular Darren Smith, for supporting this rapid response analysis.

DATA AVAILABILITY STATEMENT

Census data for 1991 and 2001 are available from Casweb (<https://casweb.ukdataservice.ac.uk/>). Census data for 2011 and 2021 are available from Nomis (<https://www.nomisweb.co.uk/>). 2021 LSOA and LA boundaries are available from the Office for National Statistics (ONS: <https://geoportal.statistics.gov.uk/>).

ORCID

Gemma Catney  <https://orcid.org/0000-0002-9799-6355>
 Christopher D. Lloyd  <https://orcid.org/0000-0003-0575-7793>
 Mark Ellis  <https://orcid.org/0000-0002-0435-1348>
 Richard A. Wright  <https://orcid.org/0000-0002-9884-7343>
 Nissa Finney  <https://orcid.org/0000-0001-6602-9920>
 Stephen Jivraj  <https://orcid.org/0000-0001-5751-983X>
 David Manley  <https://orcid.org/0000-0003-1864-5141>

ENDNOTES

- ⁱ *The Guardian* (2022) England and Wales now minority Christian countries, Census reveals: <https://www.theguardian.com/uk-news/2022/nov/29/leicester-and-birmingham-are-uk-first-minority-majority-cities-census-reveals> and *BBC* (2022) Leicester one of first cities in UK with no ethnic group majority: <https://www.bbc.co.uk/news/uk-england-leicestershire-63743309>.
- ⁱⁱ The ongoing sample surveys require the Census in order to develop their recruitment, collection and data adjustment (weighting) strategies to ensure representativeness of ethnic groups.
- ⁱⁱⁱ The 2021 Census response rate was 97% overall, exceeding ONS's target of 94% (ONS, 2022a).
- ^{iv} <https://www.ons.gov.uk/census/censustransformationprogramme/questiondevelopment/2021censustopicresearchupdatedecember2018> and <https://www.ons.gov.uk/census/censustransformationprogramme/questiondevelopment/nationalidentityethnicgrouplanguageandreligionquestiondevelopmentforcensus2021>.
- ^v See endnote iv and, for technical details, see <https://www.ons.gov.uk/census/censustransformationprogramme/questiondevelopment/searchasyoutypeandaddresslookupfunctionalityforcensus2021>.
- ^{vi} Simpson et al. (2016) note the lower reliability of comparing the four residual 'Other' categories (Other Mixed, Other Asian, Other Black, Any Other) between 2001 and 2011. We thus avoid direct comparison over time of the populations of these ethnic groups. In analysing diversity, the Reciprocal Diversity Index (RDI) was also computed for the 12 comparable groups recommended by Simpson et al. (2016), plus Other so that RDI is derived for the total population. Comparing RDI for 13 and 16 groups yields a correlation coefficient of greater than 0.99 for 2001, 2011 and 2021. We therefore proceed with an analysis of 16 groups, in order to represent as many ethnic groups as possible.
- ^{vii} As this paper focuses on 30-year (1991–2021) and 20-year (2001–21) comparisons, trends in the size and geographical distribution of the Gypsy/Irish Traveller population (which can be depicted for 2011–21) are not presented. Given emerging evidence on the stark disadvantages faced by Gypsy/Irish Traveller (and Roma) groups in Britain (Finney et al., 2023), it will be important for further analysis of Census data for 2021 (and 2011–21) to retain ethnic group detail for new Census categories.
- ^{viii} See endnote i and *The Telegraph* (2022) White British people now minority in UK's two largest cities, Census reveals: <https://www.telegraph.co.uk/news/2022/11/29/uk-census-results-2021-white-ethnicity-london-birmingham/> and *BBC* (2022) Why Nigel Farage is wrong about London being 'minority white': <https://www.bbc.co.uk/news/63806518>.
- ^{ix} For a critique of the segregation/diversity binary, see Holloway et al. (2012).
- ^x For consistency, RDI is measured for 16 ethnic groups for all analyses.
- ^{xi} At the time of writing, Northern Ireland 2021 Census ethnic group data were only available for much coarser geographies (Local Government Districts; $n = 11$), and Scottish 2022 Census data were yet to be published.
- ^{xii} <https://gedi.ac.uk>.

REFERENCES

- Aspinall, P.J. (2022) Do conceptualisations of 'mixed race', 'interracial unions', and race's 'centrality to understandings of racism' challenge the UK's official categorisation by ethnic group? *Genealogy*, 6(2), 52. Available from: <https://doi.org/10.3390/genealogy6020052>
- Catney, G. (2016a) The changing geographies of ethnic diversity in England and Wales, 1991–2011. *Population, Space and Place*, 22(8), 750–765. Available from: <https://doi.org/10.1002/psp.1954>
- Catney, G. (2016b) Exploring a decade of small area ethnic (de-) segregation in England and Wales. *Urban Studies*, 53(8), 1691–1709. Available from: <https://doi.org/10.1177/0042098015576855>
- Catney, G. & Lloyd, C.D. (2020) Population grids for analysing long-term change in ethnic diversity and segregation. *Spatial Demography*, 8(3), 215–249. Available from: <https://doi.org/10.1007/s40980-020-00071-6>
- Catney, G. & Sabater, A. (2015) *Ethnic minority disadvantage in the labour market*. York, UK: Joseph Rowntree Foundation.
- Catney, G., Wright, R. & Ellis, M. (2021) The evolution and stability of multi-ethnic residential neighbourhoods in England. *Transactions of the Institute of British Geographers*, 46(2), 330–346. Available from: <https://doi.org/10.1111/tran.12416>
- Dorling, D. (1996) *Area cartograms: Their use and creation. Concepts and techniques in modern geography series no. 59*. Norwich, UK: Environmental Publications, University of East Anglia.

- Finney, N., Nazroo, J., Becares, L., Kapadia, D. & Shlomo, N. (2023, forthcoming) *Racism and ethnic inequality in a time of crisis: Findings from the evidence for equality National Survey*. Bristol, UK: BUP/Policy Press.
- Finney, N. & Simpson, L. (2009a) 'Sleepwalking to segregation'? *Challenging myths about race and migration*. Bristol, UK: Policy Press.
- Finney, N. & Simpson, L. (2009b) Population dynamics: The roles of natural change and migration in producing the ethnic mosaic. *Journal of Ethnic and Migration Studies*, 35(9), 1479–1496. Available from: <https://doi.org/10.1080/13691830903125935>
- Gleeson, J. (2022) *Housing and race equality in London: An analysis of secondary data*. London, UK: Greater London Authority.
- Harris, R., Charlton, M., Brunson, C. & Manley, D. (2017) Balancing visibility and distortion: Remapping the results of the 2015 UK general election. *Environment and Planning A: Economy and Space*, 49, 1945–1947. Available from: <https://doi.org/10.1177/0308518X17708439>
- Holloway, S.R., Wright, R. & Ellis, M. (2012) The racially fragmented city? Neighborhood racial segregation and diversity jointly considered. *The Professional Geographer*, 64(1), 63–82. Available from: <https://doi.org/10.1080/00330124.2011.585080>
- Jivraj, S. & Khan, O. (2015) How likely are people from minority ethnic groups to live in deprived neighbourhoods? In: Jivraj, S. & Simpson, L. (Eds.) *Ethnic identity and inequalities in Britain: The dynamics of diversity*. Bristol, UK: Policy Press, pp. 199–213.
- Jivraj, S. & Simpson, L. (2015) Introduction: The dynamics of diversity. In: Jivraj, S. & Simpson, L. (Eds.) *Ethnic identity and inequalities in Britain: The dynamics of diversity*. Bristol, UK: Policy Press, pp. 1–15.
- Johnston, R., Jones, K., Manley, D. & Owen, D. (2016) Macro-scale stability with micro-scale diversity: Modelling changing ethnic minority residential segregation—London 2001–2011. *Transactions of the Institute of British Geographers*, 41(4), 389–402. Available from: <https://doi.org/10.1111/tran.12142>
- Johnston, R., Poulsen, M. & Forrest, J. (2013) Commentary: Multiethnic residential areas in a multiethnic country? A decade of major change in England and Wales. *Environment and Planning A*, 45(4), 753–759. Available from: <https://doi.org/10.1068/a4688>
- Johnston, R., Poulsen, M. & Forrest, J. (2015) Increasing diversity within increasing diversity: The changing ethnic composition of London's neighbourhoods, 2001–2011. *Population, Space and Place*, 21(1), 38–53. Available from: <https://doi.org/10.1002/psp.1838>
- Lomax, N., Wohland, P., Rees, P. & Norman, P. (2020) The impacts of international migration on the UK's ethnic populations. *Journal of Ethnic and Migration Studies*, 46(1), 177–199. Available from: <https://doi.org/10.1080/1369183X.2019.1577726>
- Lymperopoulou, K. & Finney, N. (2017) Socio-spatial factors associated with ethnic inequalities in districts of England and Wales, 2001–2011. *Urban Studies*, 54(11), 2540–2560. Available from: <https://doi.org/10.1177/0042098016653725>
- Majeed, F.A., Cook, D.G., Poloniecki, J. & Martin, D. (1995) Using data from the 1991 census. *British Medical Journal*, 310(6993), 1511–1514. Available from: <https://doi.org/10.1136/bmj.310.6993.1511>
- Martin, D., Nolan, A. & Tranmer, M. (2001) The application of zone-design methodology in the 2001 UK census. *Environment and Planning A: Economy and Space*, 33(11), 1949–1962. Available from: <https://doi.org/10.1068/a3497>
- Massey, D.S. & Denton, N.A. (1988) The dimensions of residential segregation. *Social Forces*, 67(2), 281–315. Available from: <https://doi.org/10.1093/sf/67.2.281>
- ONS. (2016) *Local government restructuring*. Office for National Statistics. Available from: <https://www.ons.gov.uk/methodology/geography/ukgeographies/administrativegeography/ourchanginggeography/localgovernmentrestructuring>
- ONS. (2022a) *Maximising the quality of census 2021 population estimates*. Office for National Statistics. Available from: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/methodologies/maximisingthequalityofcensus2021populationestimates>
- ONS. (2022b) *International migration, England and Wales: Census 2021*. Office for National Statistics. Available from: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/bulletins/internationalmigrationenglandandwales/census2021>
- ONS. (2022c) *Ethnic group, England and Wales: Census 2021*. Office for National Statistics. Available from: <https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/ethnicity/bulletins/ethnicgroupenglandandwales/census2021>
- ONS. (2022d) *Quality Assurance of Census 2021: How we check the quality of the data*. Office for National Statistics. Available from: <https://www.ons.gov.uk/census/planningforcensus2021/qualityassuranceofcensus2021>
- Peach, C. (1996) Good segregation, bad segregation. *Planning Perspectives*, 11(4), 379–398. Available from: <https://doi.org/10.1080/026654396364817>
- R Core Team. (2022) *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. Available from: <https://www.R-project.org/>
- Simpson, L. (2007) Ghettos of the mind: The empirical behaviour of indices of segregation and diversity. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 170(2), 405–424. Available from: <https://doi.org/10.1111/j.1467-985X.2007.00465.x>
- Simpson, L. (2015) Does Britain have plural cities? In: Jivraj, S. & Simpson, L. (Eds.) *Ethnic identity and inequalities in Britain: The dynamics of diversity*. Bristol, UK: Policy Press, pp. 49–63.
- Simpson, L. & Jivraj, S. (2015) Why has ethnic diversity grown? In: Jivraj, S. & Simpson, L. (Eds.) *Ethnic identity and inequalities in Britain: The dynamics of diversity*. Bristol, UK: Policy Press, pp. 33–47.
- Simpson, L., Jivraj, S. & Warren, J. (2016) The stability of ethnic identity in England and Wales 2001–2011. *Journal of the Royal Statistical Society, Series A*, 179(4), 1025–1049. Available from: <https://doi.org/10.1111/rssa.12175>
- Stillwell, J. (Ed.). (2018) *The Routledge handbook of census resources, methods and applications*. Abingdon, UK: Routledge.
- Vertovec, S. (2019) Talking around super-diversity. *Ethnic and Racial Studies*, 42(1), 125–139. Available from: <https://doi.org/10.1080/01419870.2017.1406128>

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

How to cite this article: Catney, G., Lloyd, C.D., Ellis, M., Wright, R., Finney, N., Jivraj, S. & Manley, D. (2022) Ethnic diversification and neighbourhood mixing: A rapid response analysis of the 2021 Census of England and Wales. *The Geographical Journal*, 00, 1–15. Available from: <https://doi.org/10.1111/geoj.12507>