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An ethnic group specific deprivation index for measuring neighbourhood inequalities in England and Wales

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Abstract

The measurement of deprivation for small areas in the UK has provided the basis for the development of policies and targeting of resources aimed at reducing spatial inequalities. Most measures summarise the aggregate level of deprivation across *all* people in a given area, and no account is taken of differences between people with differing characteristics, such as age, sex or ethnic group. In recognition of the marked inequalities between ethnic groups in the UK, and the distinctive geographies of these inequalities, this paper presents a new ethnic group-specific neighbourhood deprivation measure—the Ethnic Group Deprivation Index (EGDI). This index, using a custom cross-tabulated 2021 Census dataset on employment, housing tenure, education and health by ethnic group, reveals the small area geographies of ethnic inequalities that have to date received scant attention, and yet have profound impacts on life chances and well-being. Drawing on the methodological framework of the widely used English Index of Multiple Deprivation (IMD) and for the same geographies (Lower Layer Super Output Areas), the EGDI measures deprivation for each ethnic group using data from the 2021 Census of England and Wales. The EGDI reveals the complex geographies of ethnic inequality and demonstrates that while one ethnic group in a neighbourhood may have high relative levels of deprivation, another ethnic group in that same neighbourhood may experience very low relative levels. The EGDI explores ethnic inequalities *within* and *between* neighbourhoods, complementing and augmenting existing measures by offering an important means of better understanding ethnic inequalities. The EGDI can be used to help shape locally and culturally sensitive policy development and resource allocation.

KEYWORDS

census, deprivation, ethnicity, inequalities, local, neighbourhood

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1 | INTRODUCTION

Understanding local inequality between neighbourhoods has been the focus of substantial academic effort and policy development, most notably in the now widely used Index of Multiple Deprivation (IMD: Noble et al., 2006, 2019) as the official measure of small area deprivation in UK constituent countries. Yet despite the importance of this measure for targeting central and local government and third sector resources, we know little about inequalities between people of different ethnic groups residing in the same area. Put simply: Do people from different ethnic groups living in the same neighbourhood experience the same levels of deprivation? This paper addresses this question using the recently published 2021 Census data on housing, employment, education and health for ethnic groups in small areas of England and Wales. It conceptualises, creates and operationalises a new ethnic group-specific neighbourhood deprivation index, the Ethnic Group Deprivation Index (EGDI). By seeking to advance scholarship towards better understanding why and with what consequences we see substantially dissimilar geographies of deprivation for different ethnic groups, the results speak to policies on socio-spatial equality more generally.

The focus of this analysis is timely given the UK's socio-demographic, economic, political and health and health-care upheavals over the last decade. These changes, including austerity, Brexit, the COVID-19 pandemic, and the current cost-of-living crisis, have had variable impacts on people from different ethnic groups and between locales. Policy has responded by, for example, placing attention on the measurement and documentation of racial 'disparities' (e.g., CRED, 2021) and promoting the 'levelling up' agenda to reduce spatial inequalities (DLUHC, 2022). These political shifts have been broadly welcomed in their intentions but criticised in terms of their degree of commitment to redressing underlying drivers of social and spatial inequalities (Finney et al., 2023; Fransham et al., 2023; Leyshon, 2021; Martin et al., 2022; Meer, 2022; Wallace & Favell, 2023).

One barrier to tackling social and spatial inequalities is a lack of evidence for how these manifest differently for population sub-groups living together in small areas. Most evidence on ethnic inequalities is either aspatial or derives from a coarse geography such as regions or local authority districts, both of which obscure considerable differences in the experiences between both ethnic groups and places. Analysts and service providers in local authorities and the third sector need to understand the pattern of diversity and inequalities *within* their districts and recognise that granular scales are where inequities in experiences and life chances have the greatest impacts (see Lloyd, 2016). Furthermore, the COVID-19 pandemic has reinvigorated interest in fine-scaled variation in vulnerabilities between people of different ethnic groups, and the role of neighbourhood in differential life chances (Griffith et al., 2021; Harris & Brunson, 2022). This investigation responds by bringing to light the different geographies of deprivation for small areas by ethnic group. The development of the EGDI presented here is part of a wider Economic and Social Research Council funded project on the *Geographies of Ethnic Diversity and Inequalities (GEDI)*.¹

2 | GEOGRAPHIES OF ETHNIC INEQUALITIES

There are several reasons why we might expect variation in the spatial patterns of deprivation among ethnic groups in England and Wales. First, although the overall trend is towards increasing local diversity and dispersal from co-ethnic clusters, we know that ethnic group populations remain unevenly distributed across residential locations in England and Wales (Catney, 2016a, 2016b; Catney et al., 2023) and that people in minority ethnic groups are over-represented in the most deprived neighbourhoods (Jivraj & Khan, 2015). This stems in part from the historic settlement of immigrant groups in places where, at the time of their arrival in Britain prior to deindustrialisation, there were opportunities in employment and housing. These patterns are consolidated in several ways. For example, the heterogeneity in socio-economic disadvantage among ethnic groups means that housing in more wealthy areas is frequently unaffordable to people in ethnic groups with fewer economic resources (Jivraj & Khan, 2015). In 2011 in England, for example, 80% of Bangladeshis, Pakistanis, Black Africans and Black Caribbeans lived in neighbourhoods with above average deprivation, compared with only 46% of the White British population. Uneven ethnic geographies are also consolidated by various forms of racialisation and discrimination. Racial segregation between White people and others has extensive documentation, but forces of separation also operate among people identifying as White. Shankley (2023), for instance, found that native-born residents racialise White (Polish) migrants as 'other', constraining the newcomers' residential decisions.

The evidence of stark and persistent ethnic minority disadvantage encompassing domains of health, education, housing, labour market and criminal justice in the UK is strong (see Finney et al., 2023; Jivraj & Simpson, 2015). Within this disadvantage, however, there is considerable variation. As a case in point, Pakistani men earn on average £4 less per hour

compared with White British men, whereas Chinese men earn £1 more (Li & Heath, 2020). These differences are not explained by factors affecting pay, such as age and occupational class (ibid). Age standardised poor self-rated health for Bangladeshi women is one and a half times worse than for White British women, whereas Black African men are almost half as likely to report poor health compared with White British men (Bécares, 2015). Questions remain as to whether and why some ethnic groups in some places are faring better than others.

The second reason for expecting variation in the spatial patterns of deprivation by ethnicity is previous research demonstrating that the extent of deprivation is not felt evenly across ethnic groups (Jivraj & Khan, 2015; Longley et al., 2023) and some ethnic groups have different employment outcomes, better and worse, compared with the White British group for the same level of neighbourhood deprivation (Jivraj & Alao, 2023). Analyses using 2001 and 2011 Census data reveal the complexities of ethnic differences in the geographies of inequalities. For example, Lymperopoulou and Finney (2017) examined subnational variation in housing, employment, health and education among nine ethnic groups in local authority districts of England and Wales. Educational inequality was particularly high between those identifying as Other White and those who are White British and was found in two thirds of districts. Ethnic inequalities were most severe in housing and employment, and people identifying as Black were the most deprived on these measures. Across indicators, inequalities were most pronounced in large urban areas but, in terms of change in the geographies of ethnic inequalities, widening ethnic inequalities in the 2000s were greatest in coastal and rural areas (Finney et al., 2014). Catney and Sabater (2015) evidenced district-level geographical variation in labour market experiences between ethnic groups in England and Wales. They found concentrated levels of unemployment: for the Black African group in major urban areas, including London and in the North West region, in the North West region for the Pakistani group, and in parts of London, Birmingham and the north of England for the Black Caribbean and Bangladeshi ethnic groups.

Attempts have also been made to understand the geographies of ethnic inequalities in relation to patterns of ethnic residential segregation. Lymperopoulou et al. (2017), using 2011 Census data for districts of England and Wales, suggest a 'protective effect' of intra-group solidarity driving the association of high ethnic residential segregation with low levels of ethnic inequalities in employment, health and housing inequality. Relatively high levels of ethnic residential segregation, however, were associated with high ethnic educational inequality.

Extant literature thus points to complex patternings of ethnic inequalities across England and Wales. Two major constraints of this scholarship limit interpretation of the geographies of ethnic inequalities: prior work has been based on relatively large sub-national units—local authority districts—and the analyses have not successfully developed a robust multi-indicator measure of disadvantage. This paper seeks to rectify these two major deficits.

Our third rationale for expecting variation in the spatial patterns of deprivation among ethnic groups is the ethnically distinctive characteristics of residential decision-making in the UK and elsewhere, which means that moves from or to more deprived areas may differ in prevalence across ethnic groups (see Finney & Catney, 2012). Knowledge about housing opportunities is networked along ethnic lines and this information asymmetry—operating in a context of legal and housing market changes that have disproportionately disadvantaged ethnic minority populations (Lukes et al., 2019)—contributes to the geographic unevenness of ethnic groups across neighbourhoods (Bader & Krysan, 2015; Manley & Van Ham, 2011; Shankley, 2023). Access may also be (or have been) constrained by racialised steering, exclusion and discrimination by estate agents and housing providers (Lukes et al., 2019; Phillips et al., 2007). Maintaining proximity to religious and cultural centres and to family, as well as neighbourhood belonging and solidarity, and protection from racism, may act as incentives to remain in particular residential areas, despite relatively high levels of deprivation (Frost et al., 2022; Peach, 1996).

Finally, we might expect ethnic variation in the geographies of deprivation because urban change in Britain has affected ethnic groups differently. Some formerly working-class areas, notably in large cities including (central) London, Birmingham and Manchester, have been gentrified. Some people in minority ethnic groups and other long-standing residents in gentrified localities have moved because housing became unaffordable but others, with secure housing, find the area around them has become less deprived. So too there has been a 're-spatialisation of racialised anxieties' such that it is the urban 'peripheral, post-industrial territories' (or the outer-inner cities) rather than the (gentrified) inner cities that 'provide the spatial mooring for many [racialised] contemporary concerns' (Rhodes & Brown, 2019, p. 3254).

This discussion suggests that the neighbourhood geographies of ethnic groups will serve only as a backdrop to more complex patterns of deprivation by ethnicity. The varying geographies of ethnic inequalities, differential experiences in housing regimes, and internal migration and racial distinctiveness of the effects of urban change in Britain mean that it is entirely possible that within a single neighbourhood people in one ethnic group might experience low levels of deprivation while living in close proximity to people from another ethnic group experiencing relatively high levels. The EGDI we introduce here is designed to identify and better understand exactly such places, as well as other small areas where

deprivation does not vary very much by ethnic group. Before turning to the analysis and results, we explain the data we bring to bear on this issue.

3 | DATA AND METHODS

The Census of England and Wales provides an unrivalled opportunity to explore the uneven geographies of ethnic inequalities. Our analyses are based on Census data for 2021 Lower Layer Super Output Areas in England and Wales (n LSOAs = 35,672; mean population [usual residents from Table TS001] = 1671), which are aggregates of output areas (OAs; the smallest census output geography²). LSOAs are nested within local authority districts (LAs), the units of local government in England and Wales. We refer to LSOAs in our analysis as neighbourhoods. For reference, a map showing the boundaries of Wales and the nine English regions, plus selected cities and towns, is provided in [Supporting Information S1](#).

Census 2021 cross-tabulations can be accessed using the Office for National Statistics (ONS) 'Create a Custom Dataset' (CACD).³ Our analysis uses data on economic activity, general health, age (to standardise the general health measure), highest level of qualification, and occupancy rating. It is important to note that a statistical disclosure control approach is used by the ONS to adjust small counts to prevent the identification of individuals in Census outputs,⁴ and can result in differences in population and housing totals between tables.⁵

The standard Census tables report data for 19 ethnic groups (for more details on these ethnic groups, see Catney et al., 2023). However, using the CACD, data from areas are only returned from queries if the risk of disclosure of personal information for that area is very low. Therefore, extracting data for smaller geographical areas often leads to only a subset of areas being available. To overcome this issue, there is a necessary compromise between spatial scale (e.g., the choice of OAs, LSOAs, Middle layer Output Areas [MSOAs—amalgamations of LSOAs], or LAs) and the number of ethnic and other (housing, education, employment, health, age) groups that can be included. A core requirement of our current analysis was to ensure we had data for all areas across all four sets of variables (economic activity, general health, highest level of qualification, occupancy rating, plus age for standardising the health measure) by ethnic group. Thus, any combination of area type (e.g., LSOA) and number of ethnic groups and other categories must result in values being returned for *all* areas and not just a subset, however large. It is possible to extract cross-tabulations for seven ethnic groups for MSOAs, some LSOAs and indeed some OAs, but even at the MSOA scale increasing the number of ethnic groups to 19 results in a loss of some areas. Given the constraints on data available via the CACD, ONS instead provided tables for LSOAs for 19 ethnic groups via a specific request. As with all user requested datasets produced by ONS, the four sets of cross-tabulations are freely available.⁶

The data provided were subject to the 5/10 rule for statistical disclosure control. This approach suppresses any counts below 10 and rounds those that are 10 and above to the nearest 5. For example, in the case of economic activity, if the count of employed people in the Bangladeshi group is 10 or more in a given LSOA, that count is provided, but is rounded to the nearest 5. If the count of unemployed Bangladeshi people is less than 10, no data are provided. In addition, we apply a threshold of 30 or more⁷ people per ethnic group for the denominators for the four input variables on housing, employment, education and health. That is, a group is excluded from an LSOA, and thus from the analysis, if it does not have a denominator—the total number of people in an ethnic group in an area for which there are data for the variable—that is 30 or more across *all four* domains. As an example, if the four denominators for the Pakistani group in a given LSOA are, respectively, 23, 31, 33, 39, then the minimum is less than 30 and the rates for the Pakistani group are dropped for this area (thus, no EGDI score is returned). This process was followed so that the number of retained cases was the same for all four variables. It is important to note that this is distinct from dropping LSOAs (as is the case with the ONS CACD where many categories are used): our method enables retention of data for an area for some ethnic groups even when other ethnic groups are dropped due to small counts. A threshold of 30 people allowed for the inclusion of as many ethnic groups in as many LSOAs as possible without very small counts disproportionately influencing the analysis. We recognise that this is a balance, and that it might be that individuals in a given ethnic group and neighbourhood that did not meet this threshold, and thus who were omitted, might have a different experience of deprivation (relative to their wider group) than in neighbourhoods with more people in their group. An important caveat to the use of the EGDI is that population sizes for LSOA–ethnic group combinations are highly variable and any application of the index should consider these differences.

Table 1 details how many LSOA–ethnic group combinations were included in the creation of the EGDI and the total population size of each ethnic group across these LSOAs. Less geographically dispersed and/or populous ethnic groups

TABLE 1 Number of people in each ethnic group and number of Lower Layer Super Output Areas (LSOAs) included in the Ethnic Group Deprivation Index (EGDI).

Ethnic group	Number of LSOAs meeting the 30 person threshold	Number of people in each ethnic group across LSOAs included
White British	35,506	44,344,363
Other White	11,365	2,484,448
Pakistani	3593	1,199,284
Indian	4700	1,194,142
Black African	3489	799,232
Bangladeshi	1332	392,793
Any Other	2884	356,673
Other Asian	2448	348,695
Black Caribbean	2478	321,925
Arab	307	52,110
White Irish	497	34,912
Chinese	246	34,272
Other Black	132	14,369
Mixed White and Black Caribbean	64	7179
Other Mixed	37	3026
Roma	10	1692
White Gypsy or Irish Traveller	13	1394
Mixed White and Asian	8	833
Mixed White and Black African	5	514
Total	69,114	51,591,856

Note: The table is ordered by the final column. Data for the Roma population are from the tick-box option under the 'White' category.

Source: Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

have larger populations and more LSOAs included than smaller groups or those that are more geographically dispersed (and are thus less likely to meet the threshold in a given neighbourhood). Despite this process of elimination, we were able to include over 86% of the total population of England and Wales in the EGDI. [Table 2](#) details the 2021 Census tables and variable categories used in the creation of the EGDI.

It is worth bearing in mind that the 2021 Census took place in the midst of the coronavirus (COVID-19) pandemic and as such there are potential implications for many Census questions, notably those on place of work and commuting. The Census asked people on furlough to record themselves as employed, but some people may have still said they were out of work. There are some differences between Census 2021 data on employment and those from regular labour market statistics based on the Labour Force Survey (ONS, 2023). Previous research suggests that job losses following the national lockdowns were strongly related to existing geographical trends in unemployment (see Lloyd et al., 2023) and so we can be confident that the 2021 Census provides a sufficiently robust measure of local unemployment levels for the EGDI.

3.1 | Creating the EGDI

A first iteration of the EGDI transformed each variable for each group (e.g., unemployment for a given ethnic group) to a z-score using the mean and standard deviation rate for all groups (e.g., unemployment rates for all groups). This approach has been applied in several Census-based composite deprivation indices, including the Townsend deprivation index (Townsend et al., 1988). However, we rejected the z-scores approach, in part due to the uncontrolled cancellation effects inherent in this method. We decided to instead use transformed ranked data as the basis of the EGDI. Such an approach mirrors the framework used in the creation of each of the four UK indices of multiple deprivation and so is familiar to analysts. This ranking-based approach was adopted for the first English IMD (see McLennan et al., 2019; Noble et al., 2006). A review of alternative methodologies for constructing deprivation measures is provided by Senior (2002).

TABLE 2 Deprivation-related variables used to construct the Ethnic Group Deprivation Index (EGDI).

EGDI domain	Table	Numerator category(/ies)	Denominator categories	Age group(s)
Employment	Economic activity status by ethnic group	Unemployed	Employed plus unemployed	16+
Health	General health by ethnic group by age	Not good health	Good health plus not good health	≤15 years; 16–64; ≥65
Education	Highest level of qualification by ethnic group	No qualifications plus Level 1	Sum of no qualifications and Levels 1–4 ^a	16+
Housing	Ethnic group by occupancy rating (bedrooms)	Occupancy rating –1 ^b	Sum of occupancy rating –1, 0, +1, +2 or more	All people ^c

Note: Data were provided via a special request to ONS and do not have a distinct table number(s). The equivalent Census 2021 table numbers (for standard release tables) are: Economic activity status by ethnic group: RM018; General health by ethnic group by age: RM043; Highest level of qualification by ethnic group: RM049; Ethnic group by occupancy rating (bedrooms): RM028. Here, general health was indirectly standardised using counts of the three age groups for all ethnic groups combined.

Source: Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

^aApprenticeships and other are not included. The numerator comprises: no qualifications; Level 1 and entry level qualifications defined as '1 to 4 GCSEs [General Certificate of Secondary Education] grade A* to C, Any GCSEs at other grades, O levels or CSEs (any grades), 1 AS level, NVQ level 1, Foundation GNVQ, Basic or Essential Skills' (see <https://www.ons.gov.uk/datasets/TS067/editions/2021/versions/2>).

^bAs per ONS guidance (<https://www.ons.gov.uk/census/2021dictionary/variablesbytopic/housingvariables/census2021/occupancyratingforbedrooms>): overcrowded: –1 or less indicates that a household's accommodation has fewer bedrooms than required; under-occupied: +1 or more indicates that a household's accommodation has more bedrooms than required (under-occupied); 0 indicates that a household's accommodation has an ideal number of bedrooms.

^cNote that this table is for all usual residents (individuals), rather than for households.

Three of the EGDI deprivation domains are based on rates: employment, education and housing. Again mirroring the IMD, we applied shrinkage to all of these three sets of rates to account for uncertainty in rates derived using small denominators. Shrinkage draws strength from counts at a higher geographical level (Noble et al., 2006). For our purposes, these are LA districts within which LSOAs nest. More information on this process is provided in the Technical Appendix (Supporting Information S2).

In the case of the health domain, we used an age-standardised self-rated health ratio without shrinkage, derived using indirect age standardisation given three sets of age categories (0–15 years; 16–64 years; 65 years and older; see Plane & Rogerson, 1994, p. 73). Indirect age standardisation requires data on (1) ethnic group by age by LSOA, (2) ethnic group by poor health by LSOA, and (3) age by health (good and poor) for England and Wales (thus expected rates of poor health refer to the whole population). For the health domain, the denominator used to determine exceedance of the threshold of 30 is the sum of people by age group within each ethnic group. Initially, direct age standardisation (see Plane & Rogerson, 1994, p. 72) was applied, firstly with eight age groups and then three age groups. For direct age standardisation, the requirement for cross-tabulations by ethnic group *and* age *and* health status by LSOA meant that many cells (especially poor health for ethnic groups with smaller counts) were not reported, and thus poor health for some ethnic groups was under-represented. This was the case even when using only three age groups. The relatively relaxed requirement of indirect age standardisation is, in this context, crucial, and this approach was considered to be the only viable option. Most importantly, assessment of the age-standardised self-rated health rates indicated that they were consistent with previous research (for example, Bécares, 2015).⁸

Given the subjective assessment of self-rated health, which is unlike the other indicators used as part of the EGDI, it is important to consider measurement variance across ethnic groups. Evidence from the 1990s in Britain suggests that associations between self-rated health and objective measures of health (for which there are high positive correlations) do not differ by ethnic group (Chandola & Jenkinson, 2000). Some recent evidence using data from the United States suggests that reliability in self-rated assessments is lower among minority ethnic groups and tends to underestimate ethnic health inequalities (Zajacova & Dowd, 2011), while others showed that the association between self-rated health and a set of health indicators do not vary across racial/ethnic and immigrant generation groups (Allen et al., 2016).

The (shrunk) rates were converted into ranks of deprivation components for LSOAs, across all ethnic groups. As indicated previously, ranks were derived only where the minimum denominator exceeds the threshold for all four variables for a given ethnic group in an area. The ranks are computed using the data in long format—taking an example, the shrunk proportion of people in each ethnic group who are unemployed is computed and the number of rows in the dataset is equal to the number of ethnic groups multiplied by the number of LSOAs (where the population threshold is met). The ranks were then computed from these data, where 1 indicates the most deprived and the rank of the least deprived is equal to the number of rows in the dataset. Given this, the rank for one ethnic group in LSOA *i* will be different from the rank for another group in that *same* LSOA if the ethnic groups experience different levels of deprivation in that area. An exponential transformation was next applied to the ranks, which makes it possible to combine the individual sets of transformed ranks (with equal weighting) into a single measure, creating the EGDI. There is, therefore, a *single* index but which can be extracted for each individual ethnic group. Given that it is based on ranks, and not absolute values (e.g., percentages), the EGDI is a measure of *relative* deprivation. In other words, the measure enables the determination of which LSOA–ethnic group combinations are more or less deprived than other LSOA–ethnic group combinations, but it does not measure the magnitude of the differences. The four sets of rates can, however, be examined separately to assess absolute differences by individual domain. All references to deprivation in the text should be taken to refer to relative deprivation, unless otherwise stated.

To summarise, the EGDI procedure is as follows: (i) bespoke cross-tabulation files are sourced from ONS and are downloaded in long format; (ii) compute (shrunk) rates; (iii) rank all (shrunk) rates where population threshold is met for all four domains; (iv) the ranks are scaled so that they range from zero (least deprived) to one (most deprived); (v) exponentially transform scaled ranks by domain; (vi) sum all transformed ranks by domain by LSOA (with equal weights), to give the EGDI; (vii) as required, extract LSOA rankings for ethnic groups (with different numbers of LSOAs for each ethnic group). Analyses and data processing were undertaken using the R computing environment (R Core Team, 2022).

The EGDI enables assessment of spatial inequalities at the micro scale (differences in deprivation levels between members of different ethnic groups living in the *same* LSOA), as well as at larger (regional and national) scales whereby deprivation levels may differ within and between regions, and also between ethnic groups. A region could, for example, have high levels of deprivation (neighbourhoods have high levels of unemployment, high proportion of people with low levels of qualifications, etc.), but low levels of inequality because all areas are similar in terms of their deprivation levels. Thus, we consider spatial inequality to refer to the spatial configuration of deprivation.

While the EGDI reveals new and important information about which groups are subject to different levels of deprivation, its aim is not to create a rarefied EGDI where people are only expected to experience the deprivation level of their ethnic group in a location (for a discussion, see Longley et al., 2023). We recognise that spheres of influences of deprivation will extend beyond the social construct of ethnic group, not least because of instability in the identification of some ethnic groups (Simpson et al., 2016).

4 | NEIGHBOURHOOD GEOGRAPHIES OF ETHNIC INEQUALITIES

4.1 | Highest EGDI ranks

Table 3 provides a count and percentage of LSOAs in which each ethnic group has the highest deprivation levels, ranking groups from high to low counts/percentages. All LSOAs are shown in columns 2 and 3. Columns 4 and 5 indicate only LSOAs where more than one ethnic group meets the threshold of 30. Clearly the second pair of columns are more meaningful as the former includes many LSOAs where only the White British group meets the threshold and, by default, must have the 'highest' deprivation levels in those LSOAs. In 1515 LSOAs (10.5% of the total number of LSOAs where more than one group meets the threshold), the Pakistani group has higher levels of deprivation than any other ethnic group. The Other White and Any Other ethnic groups experience higher deprivation levels than other ethnic groups in 9.8% and 6.4% of LSOAs, respectively. This suggests that people identifying with these 'Other' ethnicities, representing heterogenous ethnic groups with (for the Other White particularly) high proportions of recent immigrants who are geographically dispersed residentially (Catney et al., 2023), are at particular risk of experiencing relatively high deprivation compared with their neighbours (that is, those living in the same LSOA). The White British group has the largest deprivation levels in 52% of LSOAs where more than one ethnic group meets the threshold. This is high, yet lower than might be expected given the group's very large share of the population (note that 74.42% of the population of England and Wales in 2021 identified as White British).

TABLE 3 The number and percentage of Lower Layer Super Output Areas (LSOAs) in which each ethnic group has the highest deprivation levels.

Ethnic group	All LSOAs		LSOAs >1 ethnic group	
	LSOA count	%	LSOA count	%
White British	28,733	80.55	7509	52.04
Pakistani	1522	4.27	1515	10.50
Other White	1414	3.96	1414	9.80
Any Other	919	2.58	919	6.37
Bangladeshi	624	1.75	624	4.32
Black African	615	1.72	615	4.26
Indian	539	1.51	528	3.66
Other Asian	505	1.42	505	3.50
Black Caribbean	491	1.38	491	3.40
Arab	133	0.37	133	0.92
White Irish	69	0.19	69	0.48
Chinese	43	0.12	42	0.29
Other Black	21	0.06	21	0.15
White Gypsy or Irish Traveller	12	0.03	12	0.08
Mixed White and Black Caribbean	11	0.03	11	0.08
Other Mixed	6	0.02	6	0.04
Mixed White and Asian	6	0.02	6	0.04
Total	35,672	100%	14,429	100%

Note: Columns 4 and 5 refer to those LSOAs where more than one ethnic group meets the threshold of 30. The table is ordered by LSOA count. As an example, there are 615 LSOAs in which deprivation is highest for the Black African group and this is 4.26% of all LSOAs with >1 ethnic group.

Source: Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

4.2 | Domains of deprivation by ethnic group

Figure 1 shows the top 50 rates for each domain of deprivation by ethnic group, labelled with the LA in which each LSOA sits. These graphs include just a very small proportion of rates by deprivation domain by ethnic group, but are provided to illustrate how the highest levels of deprivation are patterned by both ethnic group *and* place. The graphs clearly demonstrate the diversity of deprivation by ethnic group and neighbourhood. Many ethnic groups are represented in each of the four domain charts and a wide array of LAs are included. Thus, very high levels of deprivation are not restricted to one or two ethnic groups, or places. Nevertheless, some notable patterns can be observed. For the education domain of deprivation, the highest 50 rates are dominated by the Other White and Any Other ethnic groups. By contrast, a high proportion of the highest rates of housing deprivation belong to the Bangladeshi and Pakistani groups and this is particularly the case for the very highest levels of housing deprivation. The relative absence of the White British group in these charts indicates that the highest levels of employment, education, housing and health deprivation in neighbourhoods across England and Wales are being experienced by people in minority ethnic groups, bearing in mind the caveats noted above about differing population sizes and also the potential effect on intra-group heterogeneity. The complex geographies of

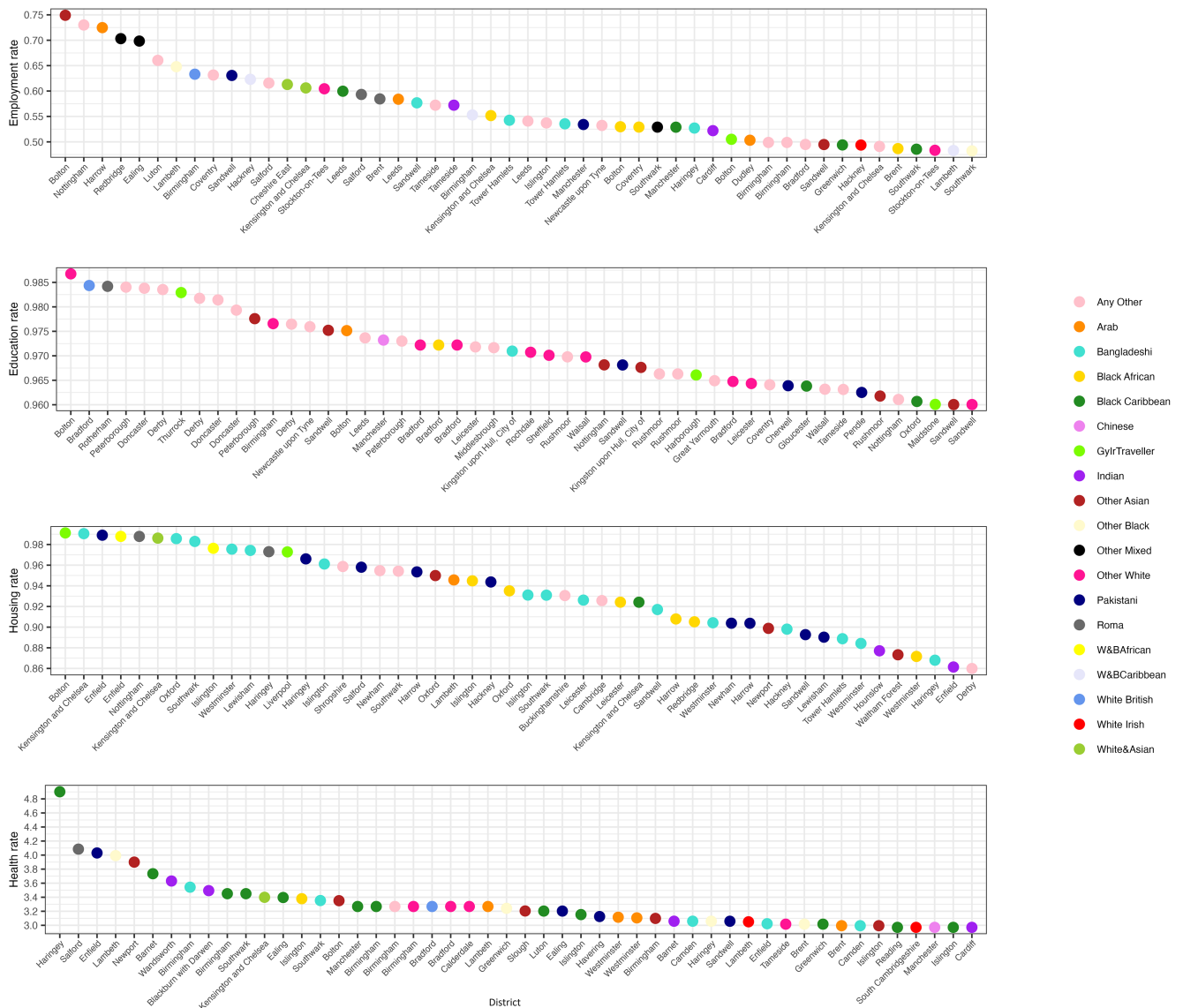


FIGURE 1 Top 50 rates by deprivation domain by ethnic group, labelled with LA in which each LSOA sits. LAs may appear multiple times. *Source:* Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

these inequalities of experience are also made clear by these graphs—LSOAs in LAs from across the breadth of England and Wales are represented.

Table 4 shows the percentages of LSOA-ethnic group combinations in the top deprivation decile (the most deprived 10%) by domain and by the EGDI (ordered by the final column). Thus, we take all LSOA-ethnic group combinations on a domain then split this into 10 equally sized groups. As an example, 7.34% of LSOAs (which reach the $n > 30$ threshold) have unemployment values for the White British group that are in the top decile (the 10% of LSOAs with the highest unemployment levels). If deprivation levels were equal for every ethnic group, then all groups would have 10% of their LSOAs in the most deprived 10%; deviation away from this expected distribution indicates the presence of ethnic group inequality.

Table 4 indicates that the groups with the highest deprivation levels overall (that is, most within the top 10% on the EGDI that incorporates all four domains) are the White Gypsy or Irish Traveller (100% of LSOA-ethnic group combinations in the top decile), Roma (80%), Bangladeshi (50.53%), Mixed White and Black African (40%), Arab (39.09%), Mixed White and Asian (37.5%), and Pakistani (26.91%). The large values for the White Gypsy or Irish Traveller and Roma groups and for the mixed groups should be considered in the context of the relatively small size of these groups. Many groups are represented in fewer than 100 LSOAs in the EGDI (see Table 1) and/or there are fewer than 15 LSOAs where the group has the highest deprivation level (see Table 3), and it is important to bear this in mind in interpreting the results. The White British group has a share of LSOA-ethnic group combinations in the top 10% lower than most minority ethnic groups (at 8%). There is notable variation between domains with very large differences in the shares for occupancy rating (housing), reflecting geographical concentrations of members of some ethnic groups (including, for example, the Bangladeshi, Black African, and Pakistani ethnic groups; see Catney et al., 2023).

TABLE 4 Percentages of Lower Layer Super Output Area (LSOA)-ethnic group combinations in the top 10% most deprived by domain and Ethnic Group Deprivation Index (EGDI).

Ethnic group	Domain				EGDI
	Unemployed	Highest qualification	Occupancy rating	General health	
White Gypsy or Irish Traveller	30.77	100.00	46.15	38.46	100.00
Roma	40.00	60.00	70.00	20.00	80.00
Bangladeshi	31.31	21.02	61.71	33.41	50.53
Mixed White and Black African	0.00	60.00	40.00	20.00	40.00
Arab	21.50	25.08	39.74	36.16	39.09
Mixed White and Asian	37.50	12.50	25.00	50.00	37.50
Pakistani	21.18	18.26	34.65	16.84	26.91
Any Other	7.77	30.76	27.67	22.12	22.26
Other Black	18.94	3.79	47.73	30.30	21.97
Mixed White and Black Caribbean	26.56	7.81	15.63	28.13	20.31
Black African	37.78	3.35	57.38	2.98	13.56
Black Caribbean	23.53	4.72	6.26	26.76	13.52
Other Asian	4.25	18.42	29.08	11.68	11.93
Other Mixed	10.81	5.41	18.92	16.22	8.11
White British	7.34	7.86	0.08	9.65	8.00
Chinese	2.03	12.20	4.07	14.63	7.72
Indian	4.79	6.09	6.85	4.49	3.94
Other White	4.74	10.06	5.24	2.16	2.53
White Irish	1.41	8.25	0.80	12.88	1.21

Note: Note that the 10% most deprived LSOAs is ethnic group and domain specific. The table is ordered by the final column (EGDI).

Source: Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

4.3 | Spatial variation in EGDI values by ethnic group

Figure 2 maps the EGDI deciles for selected ethnic groups.⁹ The maps are cartograms (see Dorling, 1996), where the LSOAs are rescaled according to the square root of their original area. This approach highlights smaller LSOAs in urban areas by increasing their size relative to large, more sparsely populated, LSOAs (see Harris, 2016; Harris et al., 2017). ‘1’ shows the LSOAs in the most deprived 10%; ‘10’ shows the LSOAs in the least deprived 10%. Given that the deciles are derived according to LSOA–ethnic group combinations, the proportions of places in each decile vary between ethnic groups. Overall, the maps highlight a similar pattern of higher deprivation levels in urban areas and lower levels in more rural locales for some ethnic groups. However, there are marked differences. As was shown in Table 4, the representation of ethnic groups in the top decile by domain, and by the EGDI as a whole, is highly variable. As specific examples, there appears to be an inversion of deprivation between, on the one hand, the White British group with low levels of deprivation in parts of central London and, on the other hand, the Black Caribbean group with high levels of deprivation in the same locales. Moving to parts of outer London, many LSOAs fall into the most deprived categories for the White British, Other White and Black African ethnic groups, yet are among the least deprived locales for the Pakistani group. There are other obvious differences with, for example, low deprivation levels in many areas of the North West and the East of England for the Other White ethnic group and relatively high levels in parts of the same areas for the White British group.

Figure 3 drills further into these complexities by comparing for London alone scaled ranks for (a) the White British and Black Caribbean, and (b) White British and Bangladeshi ethnic groups. In both cases, LSOAs are only shown where both groups compared meet the threshold of 30. This bivariate map allows us to observe the spatial distributions of scaled ranks for two ethnic groups simultaneously. The spectrum of deprivation goes from low to high deprivation in the colour ramp. Taking Figure 3a as an example, LSOAs with low scaled ranks (here indicating low relative deprivation) for the White British group and high scaled ranks (high relative deprivation) for the Black Caribbean group are shown with light blue (bottom right square in legend). High deprivation for both groups is represented by dark purple areas (top right). At the other end of the spectrum, low levels of deprivation are experienced by both the White British and Black Caribbean groups in neighbourhoods shaded light pink (bottom left).

There are many localities within central London and large expanses of outer London where the Black Caribbean group has high deprivation levels, but levels are low for the White British group (Figure 3a). There are also many places, mostly in more central areas, where the inverse is true. The equivalent map for the White British and Bangladeshi ethnic groups (Figure 3b) shows a strong east to west pattern, with higher deprivation for the White British group in more central areas and higher deprivation for the Bangladeshi group in the east. There is a notable concentration of neighbourhoods with high levels of deprivation for both groups in between these two areas. The population denominators for each group should be borne in mind as many areas with large differences between groups have small denominators for one of the groups compared.

Returning to Figure 2, there is some indication of clustering of least-deprived (as well as most-deprived) areas for ethnic groups across England and Wales. For example, for the Other White group, the South East of England, outside London, is dominated by neighbourhoods that are the least deprived (as indicated by the yellow shading). For Pakistanis, in the North West of England areas that are least deprived for this group lie in close proximity to areas that are the most deprived.

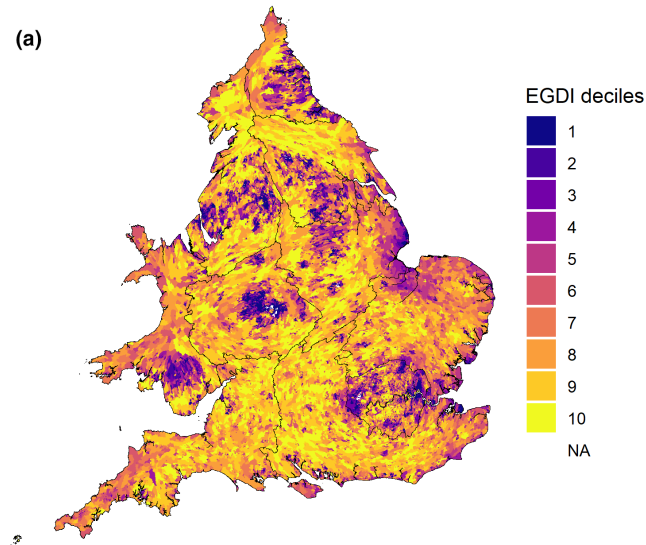
As a simple means of assessing the correlation between group size and deprivation level, Spearman's rank correlation coefficients were computed for each set of EGDI scaled ranks and the corresponding percentage of residents by ethnic group.¹⁰ Overall, there is only a weak correlation between EGDI rank and a given ethnic group's percentage share of the population. The largest positive correlation coefficient for the larger ethnic groups¹¹ was for the Pakistani ethnic group (0.45), followed by the Bangladeshi group (0.42), the White Gypsy or Irish Traveller group (0.34), and the Mixed White and Asian group (0.33). Of course, correlation coefficients cannot capture cases where deprivation levels for a given ethnic group are always high and/or the ethnic group is geographically evenly spread.

4.4 | Differences in EGDI ranks within neighbourhoods

Figure 4a offers a different view of the spatial variation in deprivation by depicting the *differences* (expressed as ranks scaled to take values between 0 and 1) within LSOAs by ethnic group. The map excludes those LSOAs where only one ethnic group is represented in the dataset. In LSOAs marked in red, deprivation is experienced roughly equally by all the ethnic groups present in those places. At the other extreme, in LSOAs portrayed in blue (and, to a lesser extent,

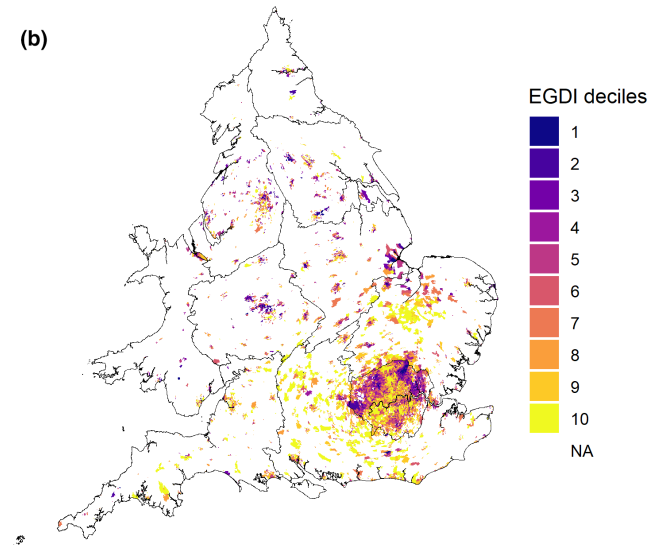
White British

(a)



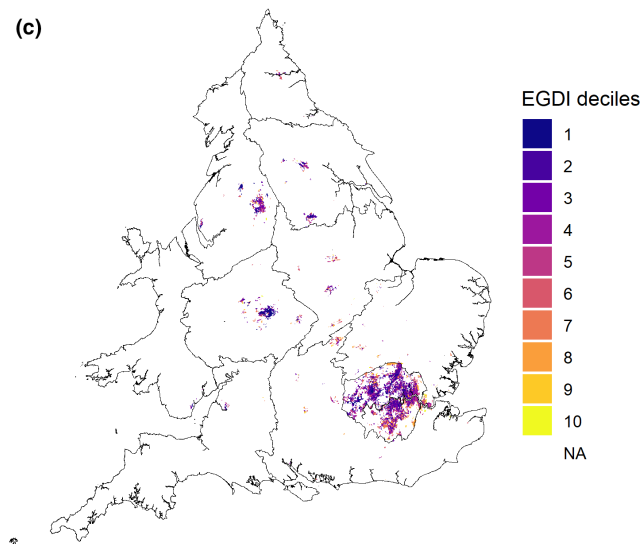
Other White

(b)



Black African

(c)



Black Caribbean

(d)

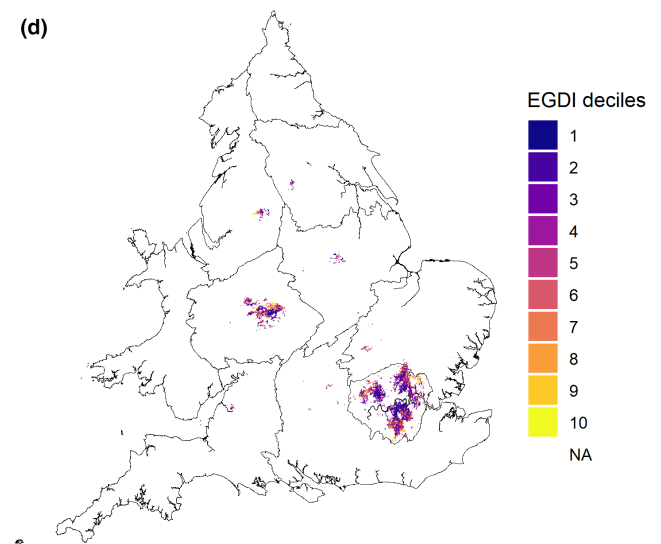
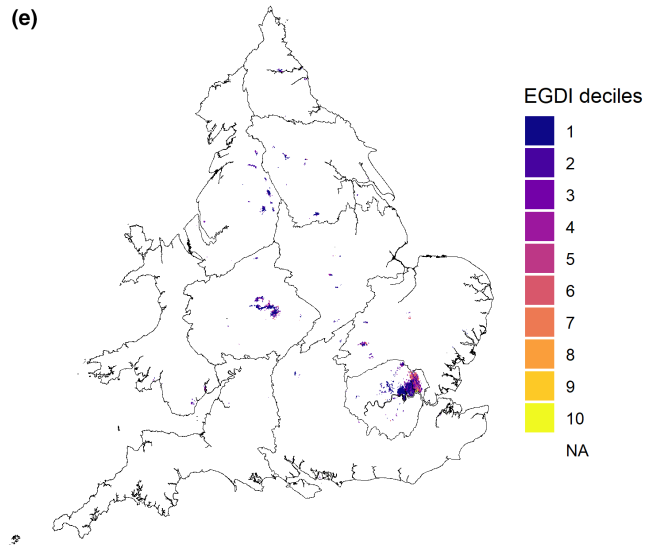


FIGURE 2 Ethnic Group Deprivation Index (EGDI) values by ethnic group for (a) White British, (b) Other White, (c) Black African, (d) Black Caribbean, (e) Bangladeshi, (f) Pakistani, (g) Indian, (h) Other Asian. The 'NA' fields indicate Lower Layer Super Output Areas (LSOAs) where the population of the ethnic group in question was below the threshold of 30. Region boundaries are superimposed on the maps; regions are labelled in map 'Area cartogram showing Wales, regions of England, and selected cities and towns' in [Supporting Information S1](#). Source: Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

those shaded green and yellow), some groups experience relatively high rates of deprivation, while other groups in the same locale have relatively low deprivation levels. The places with the most intense differences in deprivation within areas between ethnic groups are in urban areas; they are most prevalent in the LA districts on the outskirts of London (e.g., Watford, Slough, Stevenage and Harlow) and LSOAs in Tower Hamlets. These patterns are not, however, just restricted to larger urban areas. There are many more sparsely populated places where differences in deprivation levels are marked (that is, more than four deciles) and thus identify where there are experiences of within-neighbourhood inequality between ethnic groups. In some LSOAs, the group with the highest or lowest deprivation may have a very small denominator. In these cases, the whole-group deprivation measure may be representative of most people living in the LSOA. However, there is a large number of LSOAs where the denominators for both groups with the highest and the lowest deprivation levels are large and the range is also large. In these cases, whole group deprivation measures will not

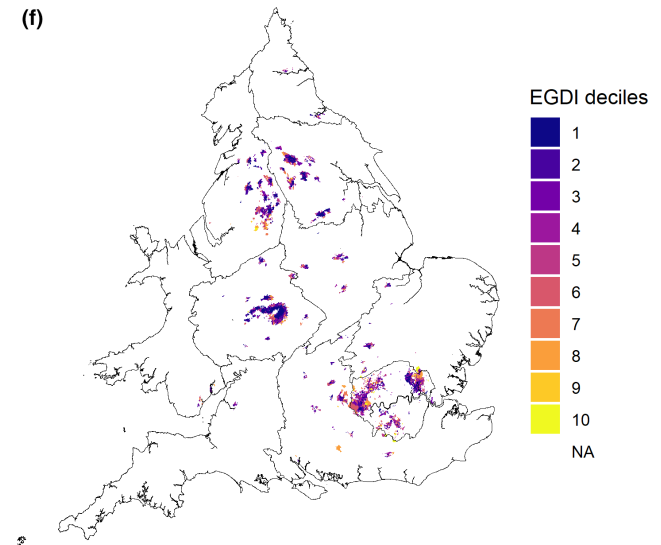
Bangladeshi

(e)



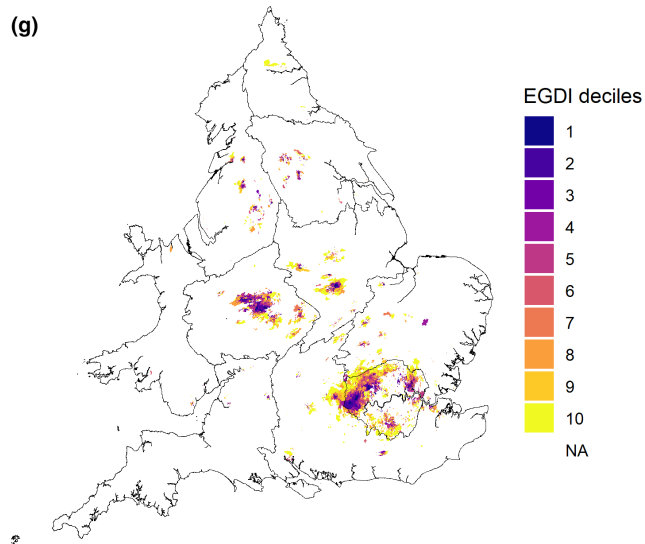
Pakistani

(f)



Indian

(g)



Other Asian

(h)

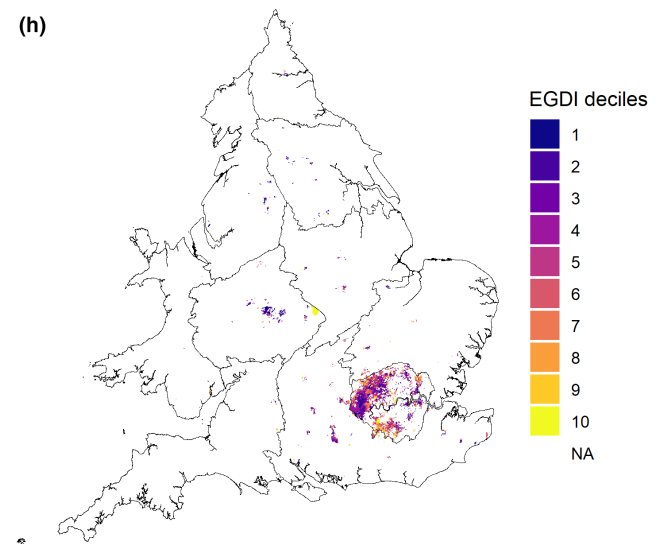


FIGURE 2 (Continued)

be representative of the whole population due to intra-group heterogeneity. As a means of assessing this, the following procedure was adopted: the denominators for both the most and least deprived groups in each area were extracted and the smallest of these two values was then multiplied by the range. Thus, large values indicate cases with large ranges but *also* large denominators for both of the most and least deprived groups. Figure 4b shows the end result. In this map, as a rough guide, values of greater than 25 tend to indicate relatively large ranges *and* fairly large denominators. Hence, there are many locations with large populations of both the most and least deprived groups and large differences in deprivation levels between them.

Table 5 summarises the geographies depicted in Figure 4a and shows the ranges of EGDI scaled ranks by LSOA, by region/nation (the nine regions of England plus Wales; see map in Supporting Information S1) and total (England and Wales as a whole). In nearly 38% of LSOAs where more than one ethnic group meets the threshold (sum of final three cells), the difference in EGDI scores between ethnic groups is more than four deciles. The region with the largest share of LSOAs with ranges greater than four deciles is London, at 55%. The smallest equivalent share is found in the South West (24.5%). This table highlights the profound differences in deprivation found between ethnic groups in some areas. The findings suggest that the EGDI is identifying important differences between groups that the full population LSOA

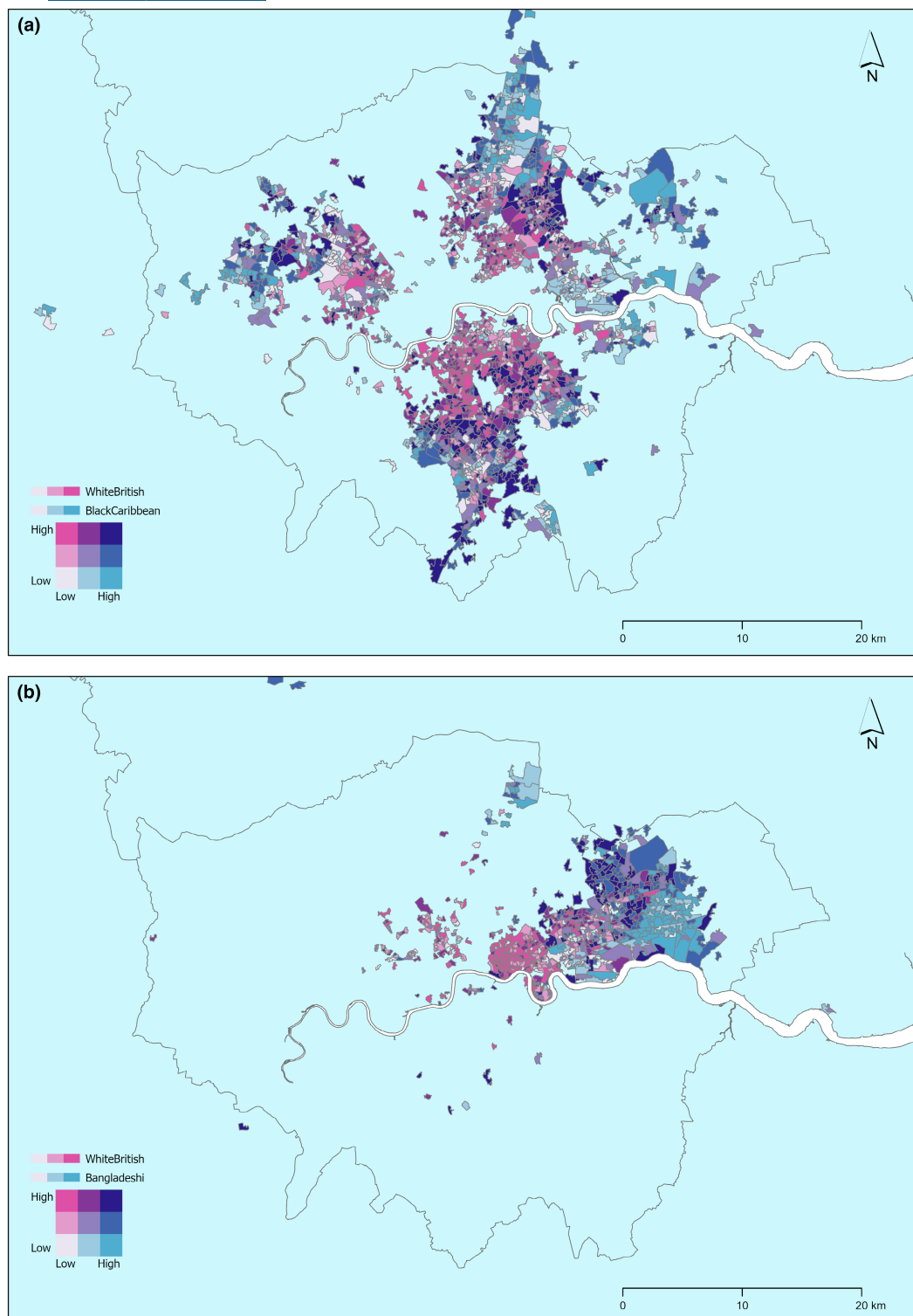


FIGURE 3 Bivariate maps of Ethnic Group Deprivation Index (EGDI) scaled ranks in London for (a) White British and Black Caribbean and (b) White British and Bangladeshi. In both cases, Lower Layer Super Output Areas (LSOAs) are only shown where both groups compared meet the threshold of 30. As an example, high EGDI ranks for both groups are shown as dark blue. *Source:* Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

deprivation measures cannot fully capture. Crucially, different groups are deprived in different ways, in different places. This place-based heterogeneity is even more apparent when we shift scale to LA districts. [Table 6](#) lists in descending rank order the top 10 LA districts with the highest percentage of LSOAs registering a difference of at least six deciles between the most and least deprived ethnic group. Tower Hamlets stands apart from other districts: an astonishing 68% of its

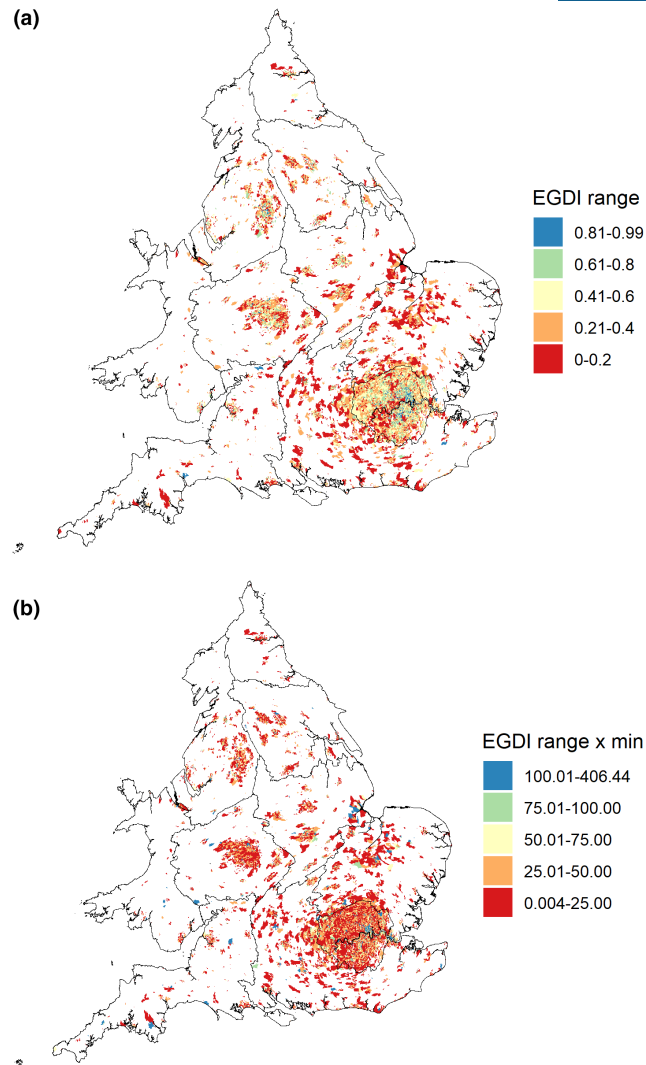


FIGURE 4 (a) Between group difference in deprivation by Lower Layer Super Output Area (LSOA) (range) and (b) range multiplied by smallest denominator of group with either highest or lowest deprivation levels. Range of scaled Ethnic Group Deprivation Index (EGDI) ranks: values closer to one indicate large differences in deprivation within LSOAs by ethnic group. In LSOAs coloured grey, only one ethnic group is represented in the dataset (because no other group is present in that locale, or their population is not large enough to meet the threshold). *Source:* Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

LSOAs exceed this criterion. Even in the 10th ranked district, Waltham Forest, nearly 27% of the LSOAs record at least a six-decile gap between most and least deprived ethnic groups, a substantial proportion. Notably, nine of the top 10 LA districts with the largest within LSOA variation in deprivation are in London, with one in the East of England. These are the districts in which summary measures of deprivation for the population of LSOAs are most at risk of obscuring substantial group variance in this outcome.

Figure 5 shows the minority ethnic group with the highest EGDI score in each LSOA (only for ethnic groups other than White British which have the highest deprivation score in more than 100 LSOAs, in order to aid visual interpretation). This map shows that, while the places where people in these groups are experiencing the highest deprivation levels are predominantly in urban areas, there are many suburban and rural areas containing LSOAs where people in minority ethnic groups are the most deprived. These pockets of marked deprivation for people in minority ethnic groups—such as in areas of the South East and East of England for the Other White ethnic group, or parts of Yorkshire and the Humber and the North West for the Pakistani group—should not escape our attention. Most regions demonstrate variation across their LSOAs in the ethnic groups experiencing highest levels of deprivation. This illustrates the existence of spatial inequalities between ethnic groups at small scales, and that the geographies of ethnic inequalities are complex even when only the most deprived ethnic groups are considered—let alone when the full distributions of deprivation by all ethnic groups are accounted for.

TABLE 5 Summary statistics for ranges of Ethnic Group Deprivation Index (EGDI) scaled ranks by Lower Layer Super Output Area (LSOA), for all LSOAs where more than one ethnic group meets the threshold, by region/nation and total.

Region/nation	Range				
	0.0–0.2	0.21–0.4	0.41–0.6	0.61–0.8	0.81–0.99
East Midlands	37.27	34.32	20.11	7.63	0.67
East of England	39.91	32.63	19.72	6.55	1.19
London	15.51	29.39	31.80	18.28	5.01
North East	46.78	27.49	16.96	8.19	0.58
North West	36.72	29.51	21.31	10.33	2.13
South East	39.00	32.46	19.96	7.70	0.88
South West	42.27	33.21	16.73	7.02	0.77
West Midlands	34.87	32.05	22.37	9.38	1.35
Yorkshire and The Humber	38.72	31.90	18.89	8.50	1.99
Wales	35.98	30.84	23.83	8.41	0.93
Total	30.82	31.23	23.99	11.48	2.47

Source: Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

TABLE 6 Summary statistics for ranges of Ethnic Group Deprivation Index (EGDI) scaled ranks by count and percentages of Lower Layer Super Output Area (LSOAs), for all LSOAs where more than one ethnic group meets the threshold: by Local Authority.

Rank	LA district	Region	Range of scaled ranks					Total	% > 0.6	% 0.8–0.99
			0–0.2	0.21–0.4	0.41–0.6	0.61–0.8	0.81–0.99			
1	Tower Hamlets	London	3	12	39	43	70	167	67.66	41.92
2	Hackney	London	9	29	30	61	20	149	54.36	13.42
3	Lambeth	London	11	29	56	58	26	180	46.67	14.44
4	Islington	London	7	28	38	41	9	123	40.65	7.32
5	Southwark	London	21	30	60	48	12	171	35.09	7.02
6	Basildon	East of England	2	6	5	5	1	19	31.58	5.26
7	Westminster	London	23	32	29	25	12	121	30.58	9.92
8	Camden	London	29	31	32	21	17	130	29.23	13.08
9	Lewisham	London	5	58	62	38	12	175	28.57	6.86
10	Waltham Forest	London	10	40	56	35	4	145	26.90	2.76

Note: Counts and percentages are only for LSOAs with more than one ethnic group represented.

Source: Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

Table 7 provides several specific examples of these localised differences in deprivation across ethnic groups. Included are the range (difference in scaled ranks—the scaled ranks themselves are not included in the table), minimum denominator (that is, the smallest denominator across the four domains), and EGDI deciles. These are all LSOAs which have relatively large populations for highly deprived groups (EGDI deciles 1–2) and for groups with relatively low deprivation levels (EGDI deciles 9–10). In these LSOAs, the population of one ethnic group might have low levels of deprivation, living alongside other ethnic groups who are experiencing high levels of deprivation. The top two rows depict two LSOAs in the Tower Hamlets LA district in which Bangladeshis suffer the greatest deprivation and live in close proximity to White groups (British and Other) who experience low rates of deprivation. The bottom two rows show the same for two LSOAs (in Manchester and Newcastle) where people in the Pakistani group are recorded as enduring high levels of deprivation while living proximate to White British people with much lower levels of deprivation. The middle two rows, drawn from data for Birmingham and Greenwich (London), record LSOAs where White British people live with high rates of deprivation, while people in the Other White group

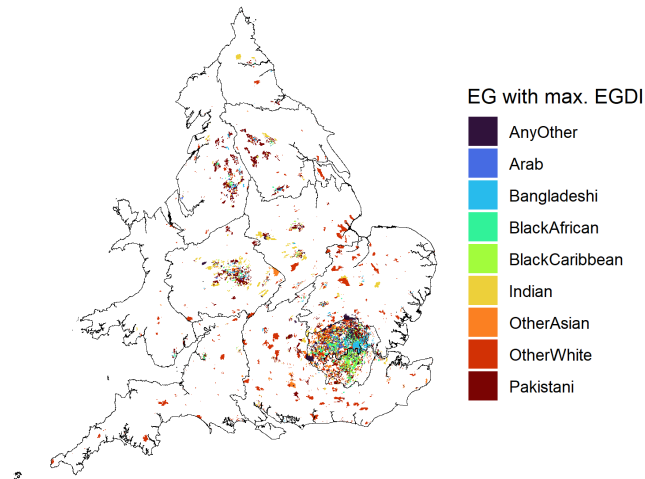


FIGURE 5 Minority ethnic group with the highest Ethnic Group Deprivation Index (EGDI) score in each Lower Layer Super Output Area (LSOA) for LSOAs where more than one ethnic group exceeds the threshold. Includes all ethnic groups other than White British with more than 100 LSOAs (see Table 3). *Source:* Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

experience very low levels of deprivation. In cases such as these, an aggregate (all group) deprivation measure would obscure marked differences in deprivation levels between ethnic groups.

5 | CONCLUSIONS

This paper has introduced a novel ethnic group specific deprivation measure—the EGDI. This index draws on data on employment, housing, education and health by ethnic group, and is designed to capture the small area geographies of ethnic inequalities. We broadly followed the methodology underlying the indices of multiple deprivation (IMDs) based on distinct deprivation domains, but which we combined into an index including *each* individual ethnic group separately. The new method distinguishes levels of neighbourhood deprivation among different ethnic groups. Empirically, this approach provides new insights and evidence that a place that is deprived for one ethnic group is not necessarily deprived for another. In other words, the EGDI reveals neighbourhood geographies of deprivation for ethnic groups and shows that they are not ubiquitous across groups. Uncovering this heterogeneity of deprivation experience is crucial in designing appropriate interventions that target not only the most disadvantaged neighbourhoods, but also the most vulnerable groups within those neighbourhoods.

Mapping the EGDI results for England and Wales shows that the neighbourhood (LSOA) geographies of relative deprivation differ across ethnic groups. Before this research, we knew that deprivation was highly uneven across England and Wales and across districts. Our findings show that deprivation can also be uneven within small geographic areas such as LSOAs. Moreover, we illustrate a further layering of unevenness such that within a single LSOA one ethnic group might be experiencing the most extreme deprivation, while another ethnic group lives with some of the lowest levels of deprivation.

Important implications follow. Policy and practice concerned with socio-spatial inequalities, including within the ‘levelling up’ agenda (Fransham et al., 2023; Martin et al., 2022), need to urgently pay greater attention to the place-specific circumstances of population subgroups. This research complicates the measurement and reporting of area-level circumstances, providing an important complement to the official measures of deprivation in England and Wales—the IMDs. Pursuing this complication via ethnicity is important, we argue, because the known drivers of socio-spatial inequalities—that reflect divergent experiences in the housing and labour markets, and in education and health—intersect with racism. Nazroo et al. (2023, pp. 208–209) argue that policies that ‘downplay—indeed, deny—the significance of racism to our society’ serve to ‘even out inequalities between population groups and places (but not to reduce inequality) without paying attention to the fundamental causes of these inequalities’. Our work provides a new entry point into this discussion: we need to better understand how neighbourhoods both shape, and are shaped by, ethnic inequalities, racialisation and racism. The EGDI will also be used for future research which reveals how people in different ethnic groups

TABLE 7 Example Lower Layer Super Output Areas (LSOAs) with large differences in Ethnic Group Deprivation Index (EGDI) ranks.

LSOA code	LA district	Group with max. EGDI	Range	Minimum denominator			EGDI decile					
				White British	Other white	White British	White British	Other white	White British	Other white	Pakistani	Bangladeshi
E01004308	Tower Hamlets	Bangladeshi	0.92	150	155	235	0	10	9	1	0	0
E01035686	Tower Hamlets	Bangladeshi	0.94	170	220	185	0	10	6	1	0	0
E01033630	Birmingham	White British	0.65	235	135	0	0	2	9	0	0	0
E01034177	Greenwich	White British	0.72	240	190	0	0	2	10	0	0	0
E01005299	Manchester	Pakistani	0.79	320	40	0	255	10	7	0	2	2
E01008453	Newcastle upon Tyne	Pakistani	0.78	435	0	25	215	10	0	0	2	2

Source: Census 2021, requested cross-tabulations from ONS. Full table details in footnote 6 and Data Availability Statement.

experience each domain of deprivation, separately and in combination, and how these experiences vary between places. Studies of neighbourhood trajectories reveal important insights as to the persistence of area deprivation (Lloyd, 2022; Norman, 2010; Norman & Darlington-Pollock, 2017), but have not yet focused on ethnic inequalities. The results also set out a new research agenda by opening up questions centred on time as much as space—aimed at understanding why and how these small-area ethnic inequalities have come about and are sustained.

ACKNOWLEDGEMENTS

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DATA AVAILABILITY STATEMENT

The Office for National Statistics (ONS) provided cross-tabulations for LSOAs for 19 ethnic groups for housing, education, employment, health and age via a specific request. As with all user requested datasets produced by ONS, the four sets of cross-tabulations are freely available. In our analysis, we used the following tables, which are all for LSOAs and cross-tabulated by ethnic group: (i) Table 1 (economic activity), Table 3 (highest level of qualification), Table 4 (occupancy rating): <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/adhocs/1323ethnicgroupbreakdownsacrossdifferentoutcomesbylowerlayersuperoutputareasenglandandwales2021> (reference number: 1323), and (ii) Table 1 (general health) and Table 2 (age): <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/adhocs/1373ethnicgroupbreakdownsacrosshealthandagebylowerlayersuperoutputareasenglandandwales2021> (reference number: 1373). Census data for 2021 are available from Nomis (<https://www.nomisweb.co.uk/>). 2021 LSOA and LA boundaries are available from the ONS (<https://geoportal.statistics.gov.uk/>).

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ENDNOTES

¹See www.gedi.ac.uk.

²Further information on ONS Census 2021 geographies can be found at: <https://www.ons.gov.uk/methodology/geography/ukgeographies/censusgeographies/census2021geographies>.

³<https://www.ons.gov.uk/datasets/create>.

⁴<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/methodologies/protectingpersonaldataincensus2021results>.

⁵For more information on cell key perturbation, see: <https://www.ons.gov.uk/census/aboutcensus/censusproducts/multivariateadata>.

⁶In our analysis, we used the following tables, which are all for LSOAs and cross-tabulated by ethnic group: (i) Table 1 (economic activity), Table 3 (highest level of qualification), Table 4 (occupancy rating): <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/adhocs/1323ethnicgroupbreakdownsacrossdifferentoutcomesbylowerlayersuperoutputareasenglandandwales2021> (Reference number: 1323) and (ii) Table 1 (general health) and Table 2 (age): <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/adhocs/1373ethnicgroupbreakdownsacrosshealthandagebylowerlayersuperoutputareasenglandandwales2021> (Reference number: 1373).

⁷Derived experimentally using a range of thresholds.

⁸ An extension to this approach would be to age-standardise unemployment and educational attainment given that these are also sensitive to the differing age distributions between ethnic groups (though, arguably, to a lesser extent than health). In practice, this would be difficult to operationalise given the suppression of cross-tabulated data discussed earlier.

⁹ Ethnic groups were selected based on their group size and residential distribution across neighbourhoods in England and Wales.

¹⁰ Data from Census 2021, Table TS021.

¹¹ The correlation coefficient for the Mixed White and Black African group was 0.90, but the small population size for this group should be noted.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Data S1 Area cartogram showing Wales, regions of England, and selected cities and towns

Data S2 Technical Appendix: Constructing the Ethnic Group Deprivation Index (EGDI)

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