

Changing neighbourhoods, residential segregation and spatial inequalities: Community, belonging, and health

Tuesday 2 September, 4.45pm

Classifying Neighbourhoods by Service Access Across the United Kingdom: Methodology for Evaluating '20-Minute Neighbourhood' Typologies

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Background: Improving access to essential services is a growing priority in public health and urban planning. The 20-minute neighbourhood—where daily needs are within a 10-minute walk, wheel, or cycle—has gained policy traction in the UK and abroad. Yet evidence remains limited on how, for whom, and under what conditions these neighbourhoods affect health—and whether they may deepen inequalities. This study aims to address this gap by developing and exploring UK-wide, service-based neighbourhood typologies.

Data & Methods: Using public datasets (Ordnance Survey, Bus Open Data Service), we map the distribution of 16 service variables (e.g., healthcare, food outlets, schools, natural spaces, and public transport) across 1,734,361 postcode-level 20-minute catchment zones. Hierarchical clustering will classify service-based typologies, which will be linked to demographic data (from the Office of National Statistics, National Records of Scotland, and synthetic populations) to identify 'left behind' areas where services do not meet local needs and areas experiencing poorer health.

Results: Early findings show notable variation in the number of services available across zones, particularly in access to public transport (Mean (M) = 20.0, SD = 16.3), natural spaces (M = 18.3, SD = 15.8), eating establishments (M = 14.5, SD = 53.2), and unhealthy food/drink retailers (M = 15.2, SD = 34.3).

Discussion & Outlook: This work offers a scalable method for classifying neighbourhoods, with a goal of integrating synthetic population data at the small-area level. The findings aim to support more equitable planning and reduce the risk of unintended harms from well-meaning policies.

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Studying changes to neighbourhoods and the social determinants of health: A full-scale synthetic population dataset for Scotland

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BACKGROUND: The absence of a comprehensive register-based system for Scotland limits research seeking to explore how health, employment, or education interact with the built environment. Here, data gaps arise particularly when a dedicated local focus is required. We describe the creation and validation of a full-scale synthetic population – capturing all of Scotland at a small-area level and with the potential to support applications seeking to model changes in populations and their built environment.

DATA AND METHODS: We aligned micro data on key life domains describing individuals and households, obtained from the UKHLS survey ("Understanding Society", wave 14/"n"), with open-access aggregate-level population statistics, obtained from the 2021/2022 census. Census data covered all 46k+ output areas, each reflecting N=53 households on average. We then utilised a combinatorial optimisation algorithm (simulated annealing) to allocate households and individuals, captured in the UKHLS survey, to these areas.

RESULTS: First results of the external validation – comparing information on demographic characteristics (e.g., age, sex, ethnicity), health (e.g. general health status), and education (e.g., highest achieved qualification) obtained from the synthetic dataset against suitable references – generally suggest a good representation at the small-area aggregate-level. In addition to further validation, improvements to the methodology are required to better capture areas in which particular household-types are currently under-represented (e.g. student quarters in cities).

OUTLOOK: While already trialled in geospatial ABMs and microsimulations, further work will (1) address under-representation and duplication of households (e.g. through GANs), (2) improve the simulated annealing, (3) establish a methodology of assigning households to dwellings.

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Do Social Frontiers Matter for Mental Health? Estimating the association between social frontiers and neighbourhood depression rates in England

Duncan Lee - University of Glasgow, Gwilym Pryce - University of Sheffield, Miguel Ramos - University of Birmingham

Previous research on the links between residential segregation and mental health has largely ignored the effect of abrupt borders ("social frontiers") between communities. This is an important omission because social frontiers may heighten territorial and defensive behaviour, reduce opportunities for positive contact between groups, and exacerbate the sense of outgroup threat, resulting in a negative impact on mental health for residents living in neighbourhoods bounded by social frontiers. To study the association between social frontiers and mental health we link Place Based Longitudinal Data Resource data on the numbers of depression diagnoses and antidepressant drugs prescribed by GPs with estimates of ethnic and religious social frontiers produced from the 2011 and 2021 Census for all Lower Super Output Areas in England. These estimates are produced from spatial binomial / Poisson models that allow for spatial autocorrelation via a simultaneous autoregressive (SAR) type structure. We find strong and consistent evidence of an association between the prevalence of mental health problems and the intensity of ethnic and religious social frontiers for neighbourhoods (Lower Super Output Areas) in England. For example, in 2021 depression rates were between 1% and 67% higher for every 10% point increase in the intensity of social frontiers between Pakistani and non-Pakistani residents. Living in an area segregated by social frontiers is potentially detrimental to mental health. These results demonstrate the importance of understanding the role of community boundaries when considering the links between segregation and wellbeing.

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Making a community: an intergenerational socio-spatial justice perspective on creating communities

Alice Butler-Warke - University of St Andrews, Nissa Finney - University of St Andrews, Rachel Wilkie - University of St Andrews, Qiong He - University of St Andrews, Jo Mhairi Hale, University of St Andrews Elspeth Graham, University of St Andrews

Global policies on 'age-friendly cities and communities' have shaped narratives about intergenerational mixing in urban (and non-urban) spaces (Buffel et al., 2024). Academic and policy literature increasingly recognises the potential benefits of diversity and age mixing in a community (Buffel et al., 2014; Peters et al., 2021). We are interested in understanding sense of place-based belonging and community development across generations rather than the 'bookend approach' that prioritises oldest and youngest members' experiences (Hopkins and Pain, 2007; Vanderbeck and Worth, 2015).

This paper draws on our qualitative fieldwork in Stobswell, an urban neighbourhood within the city of Dundee where we have worked alongside community organisations and a local school to explore what it takes to 'make' a community that is socio-spatially just and resilient across generations, and how we can conceptualise such socio-spatial justice at a community level. Using a range of qualitative methods (sit-down interviews, go-alongs, object and photo elicitation, and mental mapping) our results suggest that even in long-standing neighbourhoods, the process of 'doing community' is ongoing and emphasise the co-existence of multiple communities of experience in one geographic area. The collective commitment to and navigation of what constitutes community and intergenerational just ways of making place is crucial for both liveability and longevity of neighbourhoods. 'Resilient' neighbourhoods need to make and re-make community according to residents' needs and preferences, as well as in response to external contextual pressures and a changing funding and policy landscape.

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Changing neighbourhoods, residential segregation and spatial inequalities: Segregation, housing, and residential mobility

Thursday 4 September, 9am

Multiple Dimensional Segregation: Exploring the co-incidence of ethnic, economic and social segregation in England and Wales using 2021 Census data

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The residential segregation literature has traditionally focused on singular types of segregation, highlighting either ethnic, economic, social or another type of segregation as if it were experienced in isolation. This paper is novel in that it seeks to explore the co-incidence of ethnic, socio-economic, and age segregation within residential neighbourhoods. We ask if neighbourhoods with higher (relative) levels of ethnic segregation are also segregated by age, or socio-economically. We explore where these different forms of segregation co-occur, and consider what this might tell us about the ways in which people share residential space.

We use 2021 Census data for England and Wales for Lower Layer Super Output Areas (our proxy for neighbourhoods) and Travel to Work Areas (TTWA). TTWAs were chosen as the larger spatial unit as a way of capturing housing and labour markets. Using a combination of the Index of Dissimilarity (D) and the multiple group D we explore ethnic, socio-economic and age segregation levels, for neighbourhoods within TTWAs. We know that, in England and Wales, ethnic segregation has been steadily declining over time. By contrast, both socio-economic segregation and age segregation have been increasing in many urban settings. We explore the co-incidence (or 'intersection') of high or low segregation for all three characteristics and reflect on the potential of an intersectional framework for segregation. Such an approach could aid in recognising the pluralities of residential experiences and unequal opportunities and constraints.

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Urban-rural shifts in age segregation and age diversity in Scotland, 2011-2022

**Rachel Wilkie - University of St Andrews, Nissa Finney - University of St Andrews, Alice Butler-Warke - University of St Andrews, Qiong He - University of St Andrews, Jo Hale, University of St Andrews
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Like other High-Income countries, Scotland is experiencing rapid population ageing, with evidence of spatial polarisation of age groups. This study uses the Scottish Censuses of 2011 and 2022 to understand patterns and trends in the geographies of ageing and age-mixing. With attention to urban-rural differences, we examined, at data zone level, spatial segregation between older and younger people using the Dissimilarity Index and local age-diversity using Simpson's Diversity Index.

Our results show new emerging landscape of geographies of age segregation and age diversity between 2011 and 2022. In general, most areas saw small changes in age segregation, except for accessible rural areas which saw a large increase in age segregation. In contrast, we see a different urban-rural shift in age diversity: remote and very remote rural data zones experienced decreased age diversity whilst urban data zones experienced increased age diversity. While most large urban data zones are becoming older and increasingly diverse, a relatively high proportion are experiencing the opposite trend of an increasingly youthful age structure and decreased age diversity. Furthermore, we found that a relatively high proportion of data zones in accessible rural areas, predominantly in the Central Belt, are characterised by a younger age composition and increased age diversity. This paper contributes new findings on the spatial and temporal patterns of ageing and age-mixing in Scotland, with relevance for broader debates on health and social care provision, housing accessibility and equity, and population sustainability.

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Inequalities in private renting among young households in Scotland between 1999 and 2022.

Louis MacPherson - University of Strathclyde

In recent decades, due to increased difficulties to access social housing or homeownership, more young people in Scotland have been confronted with the choice of whether to live in the family home, or to privately rent, thus living in a sector associated with greater residential instability, higher mental and physical health risks, and delayed family formation. In light of such potentially adverse life outcomes, it becomes crucial to understand if some socio-demographic groups are more likely to live the PRS, and whether inequalities between them have widened over time. We use the Scottish Household Survey (SHS), a repeated cross-sectional study, surveying around 10,000 households between 1999/2000 and 2022 to focus on young households (aged<45) and address the following research questions: 1) Are there differences in the likelihood of living in the PRS by household type? 2) Are there (individual and area-level) socio-economic inequalities in the likelihood of living in the PRS? 3) And have these inequalities widened over time? Initial analyses suggests that young single-person households, in lower-middle deprivation areas, and in larger cities, have greater odds of residing in the PRS. Moreover, inequalities between households with and without children, and between the most and least disadvantaged, have increased over time. Future refinements of the analyses will investigate whether the various dimensions of inequalities intersect to define particularly vulnerable population groups. Findings will help assess whether policies like 'Housing to 2040' are well designed to support these groups.

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The nexus between parental proximity and ethnic residential segregation: migrant-native differentials in spatial mobility among young adults' in Belgian urban areas

Jorbe Renders - University of Antwerp, Karel Neels - University of Antwerp, Jonas Wood - University of Antwerp

Belgium is characterized by high levels of ethnic residential segregation from a European perspective, which are linked to the increasing share of migrant populations that primarily reside in Belgian urban areas. Little is known, however, about the underlying factors related to segregation dynamics, especially among intermediate and second generation migrants. Previous research aiming to explain ethnic segregation has focused on socio-economic and acculturation differences between migrant groups, discrimination, and ethnic preferences. A growing body of literature additionally suggests that kinship ties are important in shaping residential mobility, particularly among non-European migrants and individuals with a disadvantaged socio-economic status. In this light, first generation migrants may anchor subsequent generations to certain neighborhoods, which may further perpetuate ethnic segregation. Using Belgian register data for the period 2011-2015 and competing risks models, this paper aims to i) determine how parental proximity and ethnic segregation shape patterns of spatial mobility among young adults, ii) compare spatial mobility patterns of young adults across origin groups, including natives and West- and North-European, Southern-European, Central- and Eastern-European, Turkish, Maghrebi, and other non-European intermediate and second generation migrants, and iii) explore how demographic, socio-economic and neighborhood characteristics account for these migrant-native differentials. By focusing on the offspring of first generation migrants – who are becoming increasingly relevant in terms of their demographic behavior – this study provides insights into whether and how ethnic segregation is perpetuated and passed down across generations.

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Reimagining Ethnic Residential Segregation: Intersectionality and the Life Course in Urban Space

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Ethnic residential segregation remains a persistent feature of contemporary cities, even as urban landscapes grow increasingly superdiverse through globalization, migration, and the emergence of complex social identities. Traditional frameworks tend to treat segregation as the product of static categories—such as race, class, or immigrant status—, while overlooking how these categories intersect and shift across time. This paper rethinks segregation not as a fixed spatial outcome, but as a dynamic, lived process shaped by intersecting identities and unfolding life trajectories. Integrating insight from intersectionality and the life course perspective, it reimagines our understanding of ethnic residential segregation by examining how race,

gender, class, immigration status, and age interact across time, life stages, and urban contexts. The intersectional lens shows how segregation emerges from the collision and co-construction of multiple social positions within broader structures of power, while the life course perspective adds a temporal dimension, revealing how segregation and spatial constraints are produced, reproduced and contested across key transitions—from childhood to old age. Drawing on empirical findings from Belgian cities, the paper demonstrates how lived experiences of segregation differ across intersecting social positions and life stages. In doing so, it challenges one-size-fits-all policy frameworks and calls for a more temporally and socially attuned understanding of segregation—one that sees people not as passive subjects of spatial forces, but as agents shaping and contesting urban space.

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