

Characterising Small Areas for Resilience and Inclusion

Geo-demographic profiles have been produced by using census and other data (Brunsdon et al., 2018; Gale et al., 2016; Singleton et al., 2020), to condense demographic and geographic information into classes that can be mapped. Here we follow a similar approach to generate 6 k-means clusters after dimension reduction via a principal components analysis, using output-area level census data for Wales and England (2021), in addition to open street map (OSM) data, and Ordnance Survey (OS) Open Greenspace data.

We use the mean values of each cluster by selected census variables (ONS 2021), in addition to greenspace access (Ordnance Survey, 2022), and walkability components (Open Street Map, 2022). Shown right in the heatmap, where red is high and blue is low.

Interpretation of the clusters will depend on the purpose, here we are looking for attributes that may indicate inclusion and/or resilience.

More Resilient

More Diverse

More Vulnerable

1 Striving

Mainly white striving families and their close relatives in own homes, in less densely-populated areas with lower access to amenities but at least one car.

2 Young Shoots

Mainly younger diverse Striving Communities and Students in Rented Accommodation, higher access to greenspaces, services and transport links, prefer to walk, cycle or use public transport to get to work

3 Rooted

Mainly multi-national families, slightly older, larger households in densely populated areas, likely to live in own home. Range of occupations and caring responsibilities, has at least one car and tends to drive to work, if not retired. Not as highly connected to amenities.

4 Eager

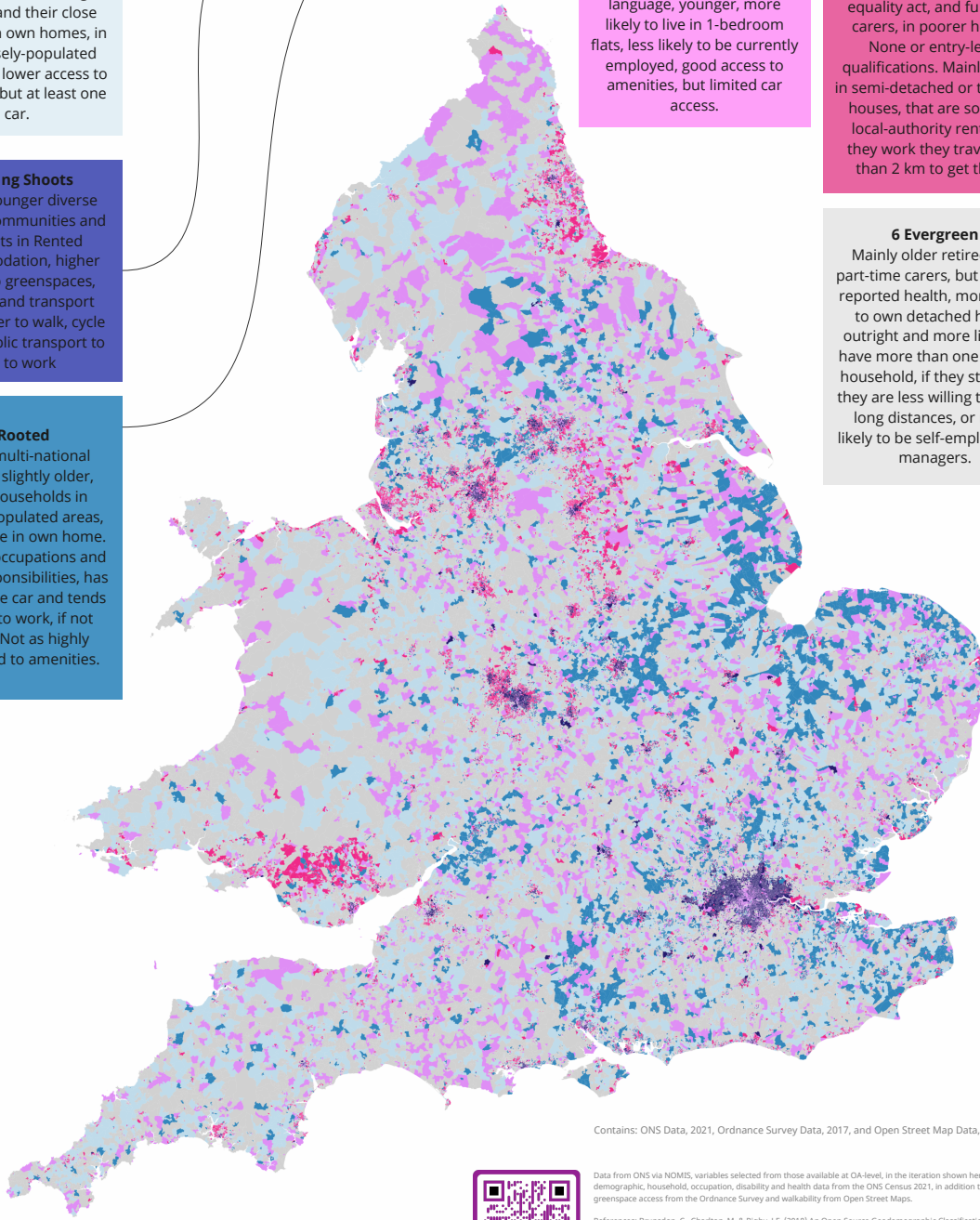
Comparatively fewer people who speak English as a main language, younger, more likely to live in 1-bedroom flats, less likely to be currently employed, good access to amenities, but limited car access.

5 Struggling

Mainly long-term sick or defined as disabled by equality act, and full-time carers, in poorer health. None or entry-level qualifications. Mainly living in semi-detached or terraced houses, that are social or local-authority rented. If they work they travel less than 2 km to get there.

6 Evergreen

Mainly older retired and part-time carers, but in good reported health, more likely to own detached home outright and more likely to have more than one car per household, if they still work they are less willing to travel long distances, or more likely to be self-employed or managers.



Contains: ONS Data, 2021, Ordnance Survey Data, 2017, and Open Street Map Data, 2023.



Data from ONS via NOMIS, variables selected from those available at OA-level, in the iteration shown here we included demographic, household, occupation, disability and health data from the ONS Census 2021, in addition to open greenspace access from the Ordnance Survey and walkability from Open Street Maps.

References: Brunsdon, C., Charlton, M. & Rigby, J.E. (2018) An Open Source Geodemographic Classification of Small Areas in the Republic of Ireland. *Appl. Spatial Analysis* 11, 133–204.
 Gale, C.G., Singleton, A.D., Bates, A.G., Longley P.A. (2016). Creating the 2011 area classification for output areas (2011 OAC) *Journal of Spatial Information Science*, 12.
 Singleton, A., Alexiou, A., Savani, R. (2020). Mapping the geodemographics of digital inequality in Great Britain: An integration of machine learning into small area estimation. *Computers, Environment and Urban Systems*, 82.