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Featured graphic. Transport mode choice and the commute to work

Travel-to-work data have been made available for a number of previous censuses (Stillwell et al, 2010), and have been integral to a range of applications, including the delineation of labour-market areas (Coombes and Openshaw, 1982) and the modelling of commuting patterns over multiple scales (Lovelace et al, 2013; Ozkul, 2014). Such data have now been derived from responses to the UK 2011 Census of the Population, creating counts of people travelling between origin–destination pairs, and including disaggregation by travel mode choice amongst other attributes. These data were recently released by the Office for National Statistics for middle layer super output areas (MSOAs) in England and Wales, which is a zonal geography pertaining to units that contain between 5000 and 15 000 people.[(1)]

This featured graphic presents a series of flow maps presented as small multiples for Kingston upon Hull. However, these images are part of a much larger set generated as part of a wider project that automated the production of a Transport Map Book for each local authority district in England.[(2)] In addition to mapping flow data, these outputs also comprised a series of choropleth maps detailing commuting mode choice within domicile output areas and workplace zones, Department for Transport accessibility statistics[(3)] and modelled CO_2 emissions linked with the commute to school (Singleton, 2013). Although there are multiple ways in which map production of this scale could have been automated, the statistical programing language R (R Core Team, 2013) was used here to generate graphical outputs, write a text file containing LaTex[(4)] (a document processing language) that arranges the graphics appropriately with a hyperlinked table of contents, and finally, call a terminal command that renders the LaTex document with graphics as a PDF and appends a cover.

For each combination, the top sixty flows were extracted, as this was found to provide a useful level of detail emerging between geographic contexts. An automated method of arranging the values into different mapping classes [Jenks/Natural Breaks (Jenks, 1967)] was then applied to group the flows into five discrete categories, which were then used to assign both line widths (0.3, 0.5, 1, 2, 4) and colour choices based on a five-category yellow–orange–brown colorbrewer pallet (Harrower and Brewer, 2003). Given the different location and mode choice combinations, these break values differed for each of the maps. More dominant flows (with wider line widths) were plotted last, and thus were highlighted in the graphic more prominently. Legends were then added to the plot.

The presented graphic highlights locational differences in commuting transport modes. In particular, nondriving commuting methods outline three main areas of employment which are particularly prominent in the bicycle map. Although active travel is prevalent (walking and cycling), walking is more concentrated than cycling, with the main flows observed in the central business/retail area. Another interesting pattern to emerge from these data are the more defuse commuting patterns of motorcycle users, perhaps relating to greater efficiency of travel during heavy traffic, or enhanced or cheaper parking opportunities at destinations.

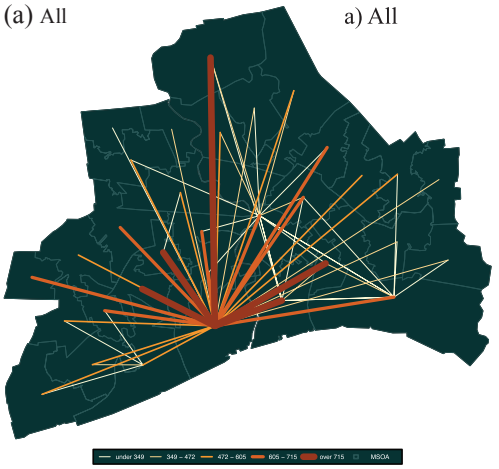
[(1)] 2011 Census travel-to-work origin–destination data are available from Nomis: https://www.nomisweb.co.uk/census/2011/origin_destination

[(2)] Transport Map Books are available for all local authority districts in England here: http://www.alex-singleton.com/Transport-Map-Book/; links to the code used to produce the maps are also provided.

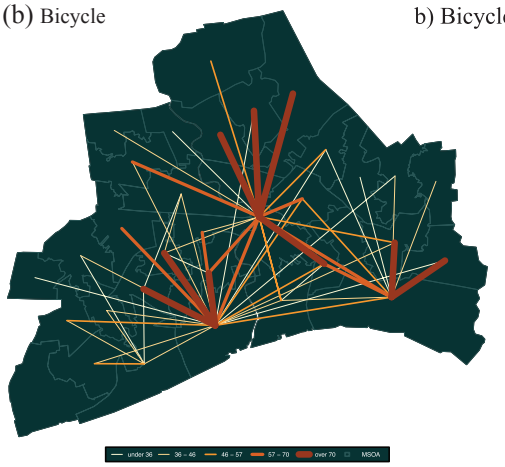
[(3)] https://www.gov.uk/government/collections/transport-connectivity-and-accessibility-of-key-services-statistics

[(4)] http://www.latex-project.org/

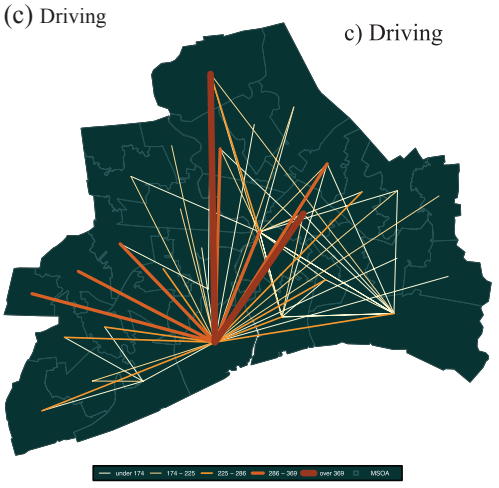
(a) All



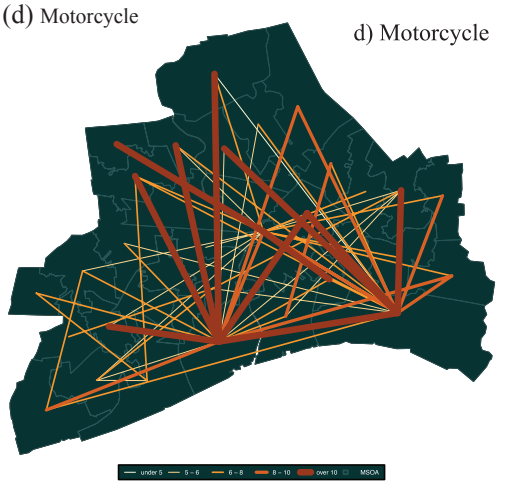
(b) Bicycle



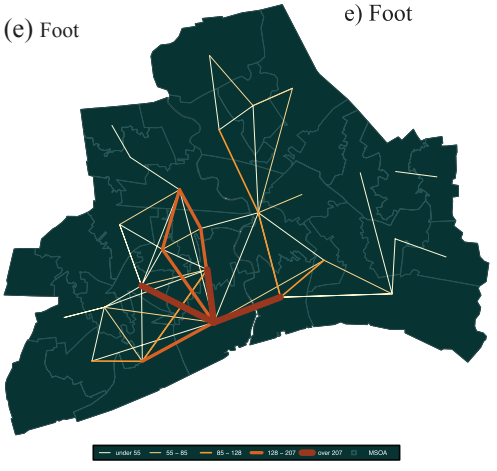
(c) Driving



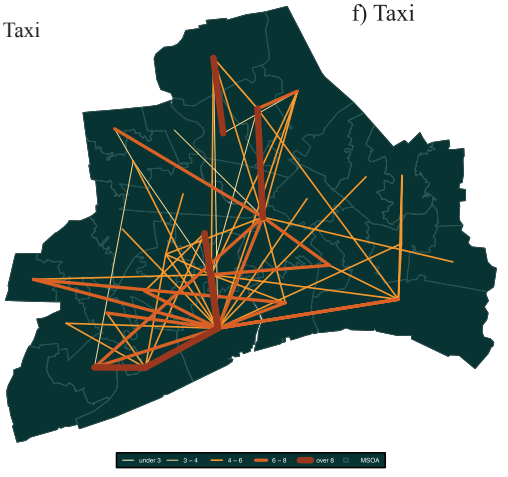
(d) Motorcycle



(e) Foot



(f) Taxi



The code used to create these maps can be found on github,[5] and R can be downloaded from: http://www.r-project.org.

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[5] https://github.com/alexsingleton/Transport-Map-Book