# Size matters? Exploring scale for neighbourhood effects

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The literature on neighbourhood effects – the influence of the residential socio-environmental context on individual outcomes – emphasizes that there is a variety of spatial contexts, ranging from very local to regional, through which influence may be exerted (see Van Ham, Manley, Bailey, Simpson, & Maclennan, 2012, 2013). Galster (2012) established that there were multiple mechanisms through which this influence may be gained. It is feasible that each of these mechanisms can potentially occur at different spatial scales and there is no reason to expect that this scale remains constant across different urban settings (Manley, Flowerdew, & Steel, 2006; Van Ham & Manley, 2012). Furthermore, literature on the modifiable areal unit problem (MAUP) emphasises that changes in the structure of areal units in terms of spatial scale and zonation can result in the same data giving different results of analyses (Manley, 2014; Openshaw & Taylor, 1979).

Unlike the theoretical considerations on the role of scale in understanding neighbourhood effects, empirical studies on neighbourhood effects have paid less attention to the issue of scale as a critical dimension of identifiable social and physical features of an environment (Reardon et al., 2008; Smith, 2000). So whilst some empirical studies test the effect of multiple scales of the socio-environmental context (see, for instance, Bolster et al., 2007; Duncan et al., 2014; Overman, 2000) and find that smaller scale give stronger effects than larger scales, an in-depth analysis of scale is missing. One possible reason for this is that most studies have to use standard administrative units, while a thorough exploration of the importance of scale requires more detailed geo-coded data and substantial geo-computational input to generate multiple scalar realisation. Furthermore, most current research concentrates on one city or one country and does not give sufficient attention to differences in neighbourhood definitions between cities.

This poster presents a systematic exploration of a crucial methodological issue in neighbourhood effect research: the impact of scale on the measurement of neighbourhood characteristics. We incorporate the notions of distance, individual exposure and urban form in the discussion of the importance of spatial scale for understanding neighbourhood effects, and we provide an empirical demonstration of elaborate multi-scalar measures of contextual characteristics. The aim is to gain insight into the effect of measuring socio-environmental characteristics across the following three dimensions: at multiple scales, for different places, and within different urban settings.

We demonstrate the relevance of scale by using the share of people with a non-Western background as an exemplar. The ethnic composition of neighbourhoods is often considered in empirical studies as one of the most compelling sources of neighbourhood effects on a variety of individual outcomes (see, for instance, Clark & Drinkwater, 2002; Friedrichs, Galster, & Musterd, 2003). To explore the impact of scale on measuring neighbourhood characteristics, we consider three Dutch cities with different urban forms: Amsterdam, Utrecht, and Groningen. We measured the ethnic composition of bespoke neighbourhoods – areas centred around each individual (introduced by Buck, 2001; Johnston et al., 2000; MacAllister et al., 2001) at 101 spatial scales, using individual level geo-coded register data including the full population of the Netherlands. The smallest scale at which the data are available is in 100 by 100 meter grid cells, allowing us to capture very diverse spatial scales ranging from the immediate surroundings of a dwelling, to much larger areas, most of which are often omitted in the neighbourhood effect studies. Using these multi-scalar measures we produced a series of uniform maps of ethnic exposure surfaces in order to demonstrate how using different spatial scales can modify our view of exposure to different ethnic groups. Finally, we constructed distance profiles of ethnic exposure: both individual profiles, which encompass the whole range of bespoke neighbourhoods for each individual and as such can be implemented in the models of neighbourhood effects, and cumulative profiles, which should highlight the role of urban form in dealing with the issue of spatial scale. Apart from the general impact of scale, we conclude that the way in which scale matters for understanding neighbourhood effects varies both within a single city and between multiple cities due to the fact that urban form influences how different scales lead to different measures of socio-environmental characteristics.

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