

## **Does neighbourhood context impact on attitudes to inequality and redistribution: questions of scale and patterning**

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This paper seeks to extend the ‘neighbourhood effects’ literature by exploring the impacts of context on political attitudes, specifically: does increasing spatial segregation erode concerns about inequality and hence reduce support for redistribution? We theorise that context may shape attitudes because it is an important source of knowledge and understanding about inequality. In addition, we conceptualise neighbourhood context as having multiple scales, and as being influenced by the patterning of deprivation and affluence, not just by aggregate characteristics. We test the impacts of context on attitudes through multilevel modelling of data on attitudes from a nationally-representative sample survey for England, with measures of neighbourhood context attached. We show that the immediate neighbourhood does appear to shape attitudes, consistent with the idea that income segregation erodes support for redistribution, but that there are no additional contextual effects from levels or patterns of deprivation or affluence in surrounding areas.

**Key words:** attitudes; inequality; redistribution; spatial segregation; neighbourhood; neighbourhood effects

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## 1. Introduction

In common with many developed countries, Britain has been witnessing rising levels of income inequality in recent decades. From the mid-1980s to the mid-2000s, incomes for the bottom decile in the UK rose by 0.9 per cent per annum compared with 2.5 per cent for those in the top decile, and the Gini coefficient rose from 0.29 to 0.32 (OECD, 2011). In part, this results from changes in the distribution of earned income, through rising inequality in individual wages and in household earned incomes (reflecting the distribution of paid work). It has also been produced by a relative weakening in the effectiveness of redistributive impacts of the tax and benefit systems. One consequence of this rise in income inequality is greater spatial segregation (Dorling and Rees 2003).

This paper is concerned with the potential consequences of this and, in particular, with the question of whether spatial segregation may act as a feedback mechanism. One possible result of increasing physical separation in daily lives might be a reduction in awareness of the level of inequality and its consequences, and even a reduction in the sympathy of more affluent groups for those at the bottom of the distribution – social cohesion, in a broad sense. This may in turn lead to the erosion of public support for the redistributive policies of the state, reinforcing social inequality and further fuelling spatial segregation in a vicious circle. The substantive focus of the paper, therefore, is to the question of whether the places in which people live impact on their attitudes to inequality and their support for redistribution.

More specifically, however, the paper is concerned to explore the question of scale and patterning in relation to this particular ‘neighbourhood effect’. As with all research on neighbourhood effects, to begin to address the question of the influence of neighbourhood context, we first need to provide an answer to the question of what we mean by the ‘neighbourhood’. This is, of course, the subject of a long-standing debate although it is clear that individuals have both varying subjective perceptions of the boundary of their neighbourhood, and that they think about their neighbourhood at a range of different scales. Neighbourhood effects researchers have been exhorted to make choices about boundaries based on the causal theories they are working with (Galster, 2012).

In our case, we argue that a multi-scalar approach appears appropriate. In the case of political attitudes, we might expect the effects of neighbourhood context to operate at multiple scales: aspects of the more immediate context may shape possibilities for social interaction while aspects of the broader location may shape opportunities for observation or experience. Furthermore, we argue that we might also expect that the patterning of deprivation and affluence in nearby areas may be as important for perceptions as aggregate levels. The aim of this paper is therefore to operationalise a multi-scalar (and multi-dimensional) conception of ‘neighbourhood context’ which captures aspects of the patterning as well as aggregate characteristics, and then to explore how context understood in this way relates to individual attitudes to inequality and state redistribution in practice.

## 2. Attitudes to inequality and redistribution

Neighbourhood effects research has paid limited attention to possible impacts on political attitudes, while work in political science on the role of neighbourhood has focussed more on political behaviours such as participation or voting. To begin with, we discuss existing research on the individual factors shaping attitudes to inequality and redistribution. We then consider the potential role for neighbourhood context to influence attitudes, drawing parallels with existing neighbourhood effects research. After that, we move on to a discussion of the potential importance of scale and patterning.

### *Individual determinants of attitudes to inequality and redistribution*

Three broad theories attempt to explain why individuals hold particular attitudes towards inequality and redistribution.

#### *Self-interest*

The first theory suggests that a key driver of attitudes is self-interest: more affluent people are less likely to express concern about inequality and less likely to support redistributive policies as they stand to lose personally from any changes rather than gain (Piketty 1995; Svallfors 1997; Linos and West 2003; Sefton 2005). Those with more to gain from redistributive policies – ‘transfer groups’ such as welfare benefit recipients or those in social housing, for instance – may be more likely to support redistributive policies (Hasenfeld and Rafferty 1989; Papadakis and Bean 1993; Taylor-Gooby). Other socio-demographic or life stage factors are also seen as potentially important in influencing views on redistribution as they shape the risks of low income. For example, women are seen as more likely to support redistribution in part because they are more likely to be low paid, in work that is insecure or to undertake caring roles which are unpaid (Svallfors 1997).

#### *Values, and other attitudes and beliefs*

Although the relationship between material position and attitudes to inequality and redistribution is well-established, it is clear that income and occupational status remain relatively weak predictors overall (Piketty 1995; Linos and West 2003; Sefton 2005). Other researchers have therefore emphasised the importance of personal values, or of other attitudes and beliefs and hence of processes of socialisation. These two sets of factors are rather different in nature, however, so it is helpful to separate them out.

**Values** are defined as moral principles which an individual holds and which are important influences on attitudes, and ultimately on behaviours (Rokeach, 1969, 1973). The structure of personal values is seen as relatively consistent across many countries. These values are thought to be formed through socialisation in childhood, although there is also growing evidence of the influence of genes. While not immune to change, the crucial point is that values are seen as being durable and resistant to influence by information (Stern et al, 1995: p1615). We tend to draw on a subset of our values when making judgements about particular issues (Stern et al 1995; Thøgersen and Grunert-Beckmann, 1997). In relation to inequality

and redistribution, the critical values are those concerned with altruism – where one places concern for others compared with concern for oneself (Hedges 2005; Sefton 2005; Park et al 2007; Castell and Thompson 2007).

Many studies of inequality and redistribution have also cited the importance of looking at *other attitudes or beliefs*, notably views about the causes of inequality or about the consequences of it (Castell and Thompson, 2007; Park et al 2007; Bowles et al 2001; Piketty 1995; Linos and West 2003). In contrast to values, however, attitudes and beliefs are seen as more easily shaped or re-shaped by current experiences or information (Thøgersen and Grunert-Beckmann, 1997). One problem with this work is that it is difficult to identify the direction in which causality works: do attitudes to inequality flow from beliefs about the causes of inequality, or the other way around? Or are the two simultaneously determined, and influenced by other factors? Previous research in this area has been inconsistent (Hasenfeld and Rafferty 1989). In our work, we have therefore adopted a more cautious approach. We test models with and without these attitudes and beliefs (see below), so we can see whether results are consistent.

#### *Knowledge and social networks*

The third kind of theory about attitudes is that these are shaped by the knowledge we derive from our personal networks or social relationships. This links to Runciman's (1966) relative deprivation thesis which argues that people make comparisons only with a limited 'reference group' comprised of close friends and acquaintances rather than with society as a whole. Runciman argued that reference groups were shaped by proximity in a social sense although clearly these groups may also be influenced by spatial factors given the 'friction of distance'. One consequence of the limited scope of reference groups is that people tend to underestimate the extent of inequality in society (Sefton 2005). When people are presented with information about actual income differences, Bamfield and Horton (2009) find that their criticisms of inequality and their support for redistribution tend to grow. Little if any past empirical work has tried to measure the effects of 'reference group' on attitudes. It is perhaps assumed that it is captured by the combination of material position (which shapes 'reference groups' membership) and by other attitudes or beliefs (which may reflect the knowledge gained).

#### *Neighbourhood and attitudes to inequality and redistribution*

One possibly neglected factor in this work is the neighbourhood. In spite of increased mobility and more spatially diverse social networks (Savage et al 2005), neighbourhoods are still important places in people's daily lives, shaping opportunities for social interaction and for more impersonal observation and experience. Both mechanisms have been highlighted in previous studies on neighbourhood effects. In relation to socio-economic outcomes, for example, Atkinson and Kintrea's (2001) typology of area effects identifies the potential influence of both direct social interactions or personal ties (through the impacts of peer effects on socialisation, or of personal networks on access to employment, for example) as well as more impersonal observation or experience (through role models impacting on

attitudes to work, for example). Within political science, neighbourhood context has been shown to impact on political activity, political identity and voting choices, and even trust in the political system (Butler and Stokes 1974; Miller 1978; Huckfeldt 1986; Johnston et al 2005a; Marschall and Stolle 2004). Again, both mechanisms have been highlighted.

In the case of attitudes to inequality, we might also hypothesise that the impacts of neighbourhood context will be rather different for those on different incomes. People on lower incomes do not need to live in a deprived neighbourhood to know about the existence of material disadvantage. So whether there is an aggregate effect of neighbourhood deprivation on attitudes, we might also expect the effect to be greater for more affluent individuals. Conversely, we might expect low income groups to express greater dissatisfaction with inequality where they live in a more affluent area.

### ***Neighbourhood context – scale and patterning***

If we wish to assess the effects of neighbourhood context, we first need to define what this is comprised of.

#### ***Boundaries and scale***

There is a longstanding debate about how the boundaries of neighbourhoods should be identified or defined. Individuals within a particular location will have different subjective perceptions of the boundaries of their neighbourhood. Factors such as the length of time lived in an area, age or whether the person has children may all play a part in how the neighbourhood is perceived or defined. In quantitative research, the issue is often reduced to a debate about the most appropriate size of spatial units to use since the choice is usually between a small number of existing boundary sets. ‘Objectively-defined’ boundaries may fit subjectively perceived boundaries to varying degrees but, even in the absence of a good fit, may provide a reasonable approximation to the characteristics of the perceived neighbourhood if that is important.

Some studies have attempted a partial compromise, building “bespoke neighbourhoods” by aggregating from very small spatial units, with each ‘neighbourhood’ centred on the individual’s home (Johnston et al 2004). These units do not reflect subjective understandings but do permit the measure of context to vary between people living even in fairly close proximity. Of course, this approach may be as flawed as using standard administrative or statistical units. “Bespoke neighbourhoods” imply equal interactions with people in all directions. Implicitly, they assume that everyone lives at the centre of their neighbourhood and no-one lives near the edge of it.

The question of scale is not just one for researchers, but is also crucial for policy. Many Governments have established policies to promote ‘mixed communities’ through a range of mechanisms. Each of these operates with a set of objectives or desired benefits from mix and with at least an implicit understanding of what the most appropriate scale is to produce these.

Better understanding of the scale at which effects operate might support more informed interventions.

### *Multi-scalar definitions*

To complicate matters further, people operate with multi-scalar understandings of 'neighbourhood'. Suttles (1972) argues that people perceive four levels to their neighbourhood context from 'block face' to 'sector of city', and Galster (2001) finds evidence to support this. In relation to neighbourhood effects research, Galster (2008, 2012) also argues that the choice of neighbourhood scale should be driven by consideration of theory or the mechanisms thought to be at work as these may stem from very different scales; peer effects may be very localised but stigma may be driven by external perceptions about a much wider area. He also notes that, in practice, measures at different scales tend to correlate highly making the estimation of the effects of different scales problematic.

Various statistical techniques can be employed in analyses which place individuals into not just a single neighbourhood but a more complex, multi-level spatial structure. Since the 1950s, there has been an increasing focus on spatial statistics which try to account for the leakage of effects across boundaries. It was not until computing power increased that more complex spatial matrix analysis was possible. Anselin (1988) first introduced spatial regression methods in the 1980s and there has been a steady interest in spatial modelling since, aimed at accounting for the influence of proximity (Anselin 1988; LeSage 2009; Fotheringham 2002).

For analyses based on survey data, however, there may be significant barriers to implementing such approaches. These analyses require detailed locational information on individuals which data custodians may not be willing to provide since it constitutes a major threat to confidentiality. One alternative is to attach to each individual record measures of 'neighbourhood context' which incorporates multiple scales. For example, Johnston et al (2004) hypothesise that the different mechanisms they examine may operate at different scales: the 'immediate milieu' provides the context for formal and informal social contact but the wider neighbourhood provides much of the setting for what you know about how society or the economy is faring. They use a total of 14 different thresholds based on distance or population, exploring which single scale best predicted political affiliations but also whether using combinations of two scales could improve model fit. Similar multi-scalar analysis has been carried out by the same team looking at mental health (Propper et al 2004). Like Galster (2008), they find that correlations between measures at different scales tend to be very high.

One issue with Johnston et al's approach is that larger scale units have been defined to include the smaller scale, so they are not technically independent. In this paper, we operate with neighbourhood context defined at two scales: a core neighbourhood; and a ring of contiguous neighbourhoods (not including the core).

### *Patterning*

In the context of attitudes to inequality and redistribution, we might also hypothesise that the ‘patterning’ of areas around the neighbourhood may have a bearing on attitudes, not just aggregate characteristics. The term patterning has been used in different ways in the debates about segregation. In Massey and Denton’s (1988) typology of segregation measures, one aspect of patterning is captured by the dimension they label ‘clustering’ – the degree to which neighbourhoods with high concentrations of a particular group tend to be found in the same part of the city or dispersed across it. Galster et al (2001) provide an alternative approach.

Both are concerned to measure patterning as a characteristic of the urban area as a whole. In this paper, we use patterning to refer to the distribution of groups within the ring of neighbourhoods surrounding each individual core neighbourhood. In other words, we are not only interested in the aggregate characteristics of the population in the ring but also in whether there are strong clusters of particular groups within the ring.

The focus on patterning is driven by theoretical concerns. Thinking about daily observation or awareness rather than social interaction, we argue that such awareness may be driven more by the existence of a single very deprived or very affluent neighbourhood in close proximity rather than by the average level of deprivation or affluence across the ring. We therefore explore whether the presence of a particularly deprived or affluent neighbourhood nearby affects attitudes, and whether the diversity of neighbourhoods has an effect.

### *Research questions*

So this analysis seeks to develop multi-scalar measures of context which also reflect patterning, and to examine their relationships with attitudes:

- Are attitudes associated with the degree of deprivation or affluence in the neighbourhood and does the effect vary between income groups?
- Does the effect appear to operate additively at the two scales identified or is it captured by just one?
- Is there evidence that the patterning of deprivation in surrounding areas impacts on attitudes?

### 3. Data and Analysis

#### *Individual data - the British Social Attitudes Survey*

Individual data comes from the 2009 British Social Attitudes Survey (BSAS), a long-running independent social survey which is part of the International Social Survey Programme. The BSAS 2009 includes a module on inequality and wealth redistribution. The BSAS is constructed to provide a random sample of the population 18 and over living in private households (Park et al, 2005). The sample has a clustered sample design with Primary Sampling Units (PSUs) chosen by a stratified random sample of postcode sectors. Within each PSU there is a random selection of addresses and then a random selection from the adults in the house. The survey applies weights to the correct for the unequal chance of being selected and for non-response, matching the sample to the known population distribution in terms of age, sex and region. The weights are used throughout the paper.

Many of the questions of interest to us were only put to a two-thirds of those interviewed, selected at random, reducing the starting sample to 1245 cases (after the effects of individual non-response). Questions on some attitudes and beliefs were asked of just one-third. Analyses including those questions were reduced to 506 cases (again also allowing for individual non-response).

#### *Dependent variable*

The BSA has a range of questions on attitudes to current levels of inequality and redistribution as well as a broader set of questions on attitudes to welfare, taxation, benefits and public expenditure. Initially we considered analysing these separately but factor analysis suggested that the four variables reflected the same set of underlying concerns. We therefore combined them into a single index of attitudes to inequality and redistribution. The variables can be seen in Table 1.

*Table 1: Questions underlying the dependent variable*

Variable
Differences in income in Britain are too large. [IncDiffs]
Ordinary working people do not get their fair share of the nation's wealth. [Wealth]
Government should redistribute income from the better-off to those who are less well off. [Redistrb]
It is the responsibility of the Government to reduce the differences in income between people with high incomes and those with low incomes. [IncDiff]

Note: Variable names from BSAS shown in brackets.

Answers from the four variables were combined in a simple additive index (all had a similar 5 category scale) and rescaled to produce an index from 0-100, with higher values representing greater concern with inequality and support for redistributive policies. Internal consistency was tested using Cronbach's alpha test giving a result (0.79) which is generally considered 'acceptable', and close to 'good'. The variable has a mean of 59.6 (SD 19.6) but scores range from 0-100.

### ***Individual-level independent variables***

The BSAS provides data on a range of individual characteristics, including demographic characteristics (gender, age, household situation), education and housing tenure. The survey collects data on household incomes in 17 pre-set bands; these were equalised using the standard modified OECD scales.

On values, the BSAS includes a measure of how altruistic respondents consider themselves. People are asked to indicate their support for the following statement: "Some people think it is important to put yourself first whilst other people think it is more important to think about others". Respondents have the following options:

- Put yourself first and leave others to do the same
- Put yourself first but also consider other people's needs and interests
- Consider everyone's needs and interests equally, including your own
- Put other people's needs and interests above your own

Respondents in one of the last two categories were considered more altruistic, and contrasted with those who put themselves in the first two categories.

On other attitudes and beliefs, the survey includes a number of potentially relevant questions. Factor analysis identified four different factors or underlying attitudes and beliefs. The groups of questions can be seen in Table 2. Two relate to causes of inequality ('class divide' and 'hard work') and two relate to the consequences ('immoral' and 'inevitable'). As with the dependent variable, factor loadings did not vary substantially so questions were combined through simple addition. All four scores were then reduced to dummies, dividing responses into roughly equal groups, partly for ease of interpretation of the models and partly for comparability with altruism.

*Table 2: Survey questions underlying the other attitudes and beliefs variables*

<b>Belief variable</b>	<b>Question</b>
Class Divide	For getting ahead in life, how important is a wealthy family? [Ahead1]
	For getting ahead in life, how important is knowing the right people? [Ahead7]
	For getting ahead in life, how important is political connections? [Ahead8]
	For getting ahead in life, how important is well-educated parents? [Ahead2]
Work ethic	For getting ahead in life, how important is having ambition? [Ahead4]
	For getting ahead in life, how important is hard work? [Ahead6]
Immoral	Large differences in income are morally wrong. [IncWrng]
Inevitable	Large differences in income are inevitable. [IncInev]
	Large differences in income are necessary for Britain's prosperity. [IncNec]

Note: Variable names from BSAS shown in brackets.

### *Neighbourhood context*

The BSAS is a national survey where confidentiality and anonymity are carefully preserved and location of the respondent's neighbourhood is not available. However, permission was obtained from NatCen, the data custodians, to attach neighbourhood contextual variables to the individual respondent data to allow for this analysis.

### *Neighbourhood scale – core and ring*

This paper uses Lower Super Output Areas (LSOAs) in England as its primary geographical unit of neighbourhood. Only data from England have been used because of the incompatibility of data and geographic areas between England and the rest of the UK. LSOAs were chosen as the smallest scale for a number of reasons. First, they have been specifically designed for the presentation of "neighbourhood" statistics by the Government. These areas are designed to be relatively homogeneous in terms of levels of deprivation. They are built from the lower census geography of output areas and were designed to take into account social homogeneity. The average population of an LSOA is around 1500 people. The relatively small size of LSOAs, compared to other geographies such as electoral wards,

makes it more likely that they represent the geographical scale at which people are most likely to interact on a daily basis and therefore a better representation of a neighbourhood than other, larger, spatial units. A wide variety of data is available for these units, including data derived from welfare benefits.

LSOAs were taken as our units to represent the smaller scale. The second level – the surrounding ring – is comprised of all neighbouring LSOAs. There on average six contiguous neighbourhoods giving an average population of 9,000. Alternative approaches to defining different scales could have been chosen. For instance Johnstone et al (2005) define alternative scales using concentric circles with both distance and population thresholds.

### *Neighbourhood characteristics*

A database of neighbourhood characteristics were calculated for all LSOAs in England (32,482). Data for these neighbourhoods comes from a number of sources, including the 2001 census and other sources of neighbourhood statistics such as the Government's Indices of Multiple Deprivation (IMD) (Noble et al, 2006) and the General Land Use Database (GLUD). At the neighbourhood level these were reduced to five factors by the use of factor analysis. Three of these factors represented socio-economic differences and, as they had no bearing on the attitudes being studied here, they are omitted. The remaining two identified deprivation and density. As the factor analysis was based on an oblique rotation, they had a modest correlation (around 0.4) as might be expected.

Factors scores for deprivation and density for both the core and ring were added to the individual data. For the ring, we also attached the deprivation score for the most and the least deprived adjoining neighbourhood to capture that aspect of patterning.

### *Analysis*

Data were analysed in multilevel models using MLWin (version 2.25) with Restricted Iterative Generalised Least Squares estimation (Rasbash et al, 2010). At time of writing, the weights facility in MLWin is still considered a beta version but, as the BSAS weights make the sample substantially more representative, they have been used in all analyses here

The models have three levels: the individual (Level 1); the neighbourhood (LSOA) (Level 2); and the PSU (Level 3) to adjust for the clustered sample. Neighbourhood characteristics of both the core and the ring are included at the second level. With over 1000 LSOAs covered by the dataset, the data is relatively sparse at level 2 (an average of 2.3 level 1 units per level 2 unit) and there is a relatively high proportion of 'singletons' (level 2 units with just one level 1 case). Simulation research suggests that this design does not affect the validity of the modelling approach. There is some evidence that having a small number of higher level units can lead to problems of bias, particularly in the estimation of variance components (Maas and Hox, 2005; Bell et al, 2008). Where the number of higher level units is large (500 or more),

however, neither point nor interval estimates appear biased even with high proportions of singletons and complex data structures (Bell et al, 2008).

The analysis starts with models for individual determinants of attitudes. Separate models are produced for: (i) socio-demographic characteristics and the more durable value of altruism; and (ii) those characteristics and other attitudes and beliefs. As noted previously, it is less clear that other attitudes and beliefs can legitimately be considered as causally prior to our dependent variable so separating out the analysis in this way allows results to be judged with and without these factors. In addition, including these factors reduces the number of cases significantly.

The analysis then moves on to add various neighbourhood characteristics to the two models already identified. Parallel sets of results are presented in two tables (Tables 3 and 4) to facilitate comparisons and to permit us to test whether any overall improvement in model fit is significant. We test the effect of adding: (i) deprivation and density for the core; (ii) deprivation and density for the core and ring together; (iii) deprivation and density for the core plus the highest and lowest deprivation scores for the ring, and the spread of deprivation scores in the ring. By proceeding in this manner we can compare the effect of scale and patterning on both the more restricted model and the model that includes the less consistent attitudes and beliefs.

### ***Methodological issues***

#### *Selection or omitted variable bias*

One problem which confronts all studies of contextual effects is the problem of selection which can also be seen as a special case of omitted variable bias (Galster et al 2008). Characteristics which affect individual attitudes may also affect the choice of neighbourhood. If we fail to control for all of these characteristics, estimates of the impacts of neighbourhood on attitudes may be biased. Various econometric techniques have been implemented to respond to these challenges, mostly based on longitudinal data (Galster et al 2008). This paper is restricted to the analysis of cross-sectional data. The extensive range of controls at the individual level, reflecting the theoretical discussions above, is designed to reduce the potential for such bias although it cannot eliminate it.

#### *Endogeneity*

A further potential problem identified above is that of endogeneity – the simultaneous influence of one set of attitudes on another. Where we have most reason to be doubtful about the direction of causality, notably in relation to other attitudes and beliefs, we present results with and without those variables.

## 4. Results

### *Individual-level model*

The individual level model is the basis for the analysis. This model controls for a number of basic socio-demographic variables including income as well as other possible indicators of self-interest (access to a car, social renting and public sector employment). As well as indicating particular material interests, public sector employment may also encompass a socialisation effect where contact with service recipients changes attitudes. As anticipated, those on higher incomes (and those with access to a car) express lower support for redistribution while social renters and those currently employed in the public sector are more supportive. Details are given in Table A1 in the appendix to the paper.

When the measure of altruism is added to the model (Table A1, model 2), we see that altruists are more supportive of redistribution ( $p < 0.01$ ) as expected, while the income effect remains. We explore the possibility that the effect of income may be different for altruists and non-altruists but there is no significant relationship (result not shown). The same model is shown in Table 3, Model 1 for comparison but with only the coefficients for income and altruism.

In Table 4, Model 1, we show the effect of adding other attitudes and beliefs to the model. For each of the belief variables an interaction term with income is added to test for an income effect associated with these measures. Those who view inequality as immoral are more likely to support redistribution, as are those who see society as class divided. Respondents who believe inequality is inevitable are less likely to support redistribution. From the interaction between this variable and income, we see that support for redistribution falls particularly quickly as income rises if you also express the view that inequality is inevitable. For those who disagree with this view, the effect of income is no longer significant (although the coefficient remains negative).

### *Neighbourhood context – scale*

#### *Core only*

In the next stage of the analysis we explored the impacts of adding characteristics for the neighbourhood. To begin, measures of deprivation and density for the core neighbourhood were added to the model (Model 2 in Tables 3 and 4). Interaction terms with income and altruism were included to allow the effect of neighbourhood context to vary. With only a control for altruism (Model 2 in Table 3), deprivation and density are both associated with greater support for redistribution. For the former, the effect is even greater for higher income groups – as hypothesised above. There is some evidence that altruists not only have higher support for redistribution on average but that they are also less affected by neighbourhood deprivation although the effect is not significant.

The impact of density on support is not something explored in the theoretical discussion. We could interpret this simply as the effect of higher density within the neighbourhood but it seems equally plausible that it indicates the effect of living in larger (and hence denser) towns and cities. The effect of density applies only to those who are less altruistic in outlook, as the interaction term shows.

This extended version of this model, including other attitudes and beliefs, is shown in Model 2 of Table 4. For clarity, we include all the main terms but only include interactions with neighbourhood variables where significant. The effect of deprivation remains similar to that in the previous model but the interaction terms suggest that it now only applies to those who do not already regard inequality as immoral. The density effect, and its interaction with altruism, remain the same.

### *Core and ring*

In Model 3 in Tables 3 and 4, we begin to explore the effects of scale by adding in deprivation and density for the ring of contiguous neighbourhoods. Taking into account results for the core, the effects of deprivation were allowed to vary by whether people viewed inequality as immoral or not, and the effects of density were allowed to vary with altruism. None of the coefficients for the ring variables are statistically significant and their addition does not improve the fit compared with the previous model. Adding the ring characteristics also alters the apparent effect of core characteristics in ways we might expect given the high correlations between these terms.

This would indicate that, in this instance, the core characteristics capture any effect of neighbourhood on attitudes. This is not to say, however, that the scale at which effects operate is necessarily the same, as we discuss below.

### *Neighbourhood context – patterning*

The final part of the analysis explores whether the patterning of deprivation in the surrounding ring of neighbourhoods has an impact on attitudes. Instead of including the average level of deprivation for the ring as we had done previously, we explore whether a single extremely deprived or extremely affluent neighbourhood in the ring affect attitudes and whether the diversity of range of values has an effect. Results are shown in Models 4, 5 and 6 respectively.

There are only limited signs that the patterning of deprivation within the ring impacts on attitudes. In the model including a term for the highest level of deprivation in the ring, the effect of deprivation in the core (and the interaction with views on the morality of inequality) shift to the ring. Deprivation in the core and ring both now appear to contribute to greater support for redistribution (though neither term is significant), but only for those who do not already see inequality as immoral. Overall, however, the model makes less substantive sense and, given the improvement in fit is so modest, it does not represent an improvement over the version built on core characteristics alone.

For the other five models, none of the terms for the ring achieves statistical significance and none provides a better fit. We conclude overall, therefore, that the measures for the core capture the bulk of any effects.

Table 3: Neighbourhood determinants of attitudes - with altruism only

	Model 0 Null	Model 1: Individual	Model 2: Core	Model 3: Core+ring	Model 4: Core+max	Model 5: Core+min	Model 6: Core+diff
<b>Fixed Part</b>							
Individual							
Income		-0.371	0.055	-0.335	0.055	-0.337	0.055
Income sqrd		0.003	0.002	0.003	0.002	0.003	0.002
Altruistic (dummy)		3.524	1.082	3.664	1.056	3.605	1.051
Core							
Deprivation			2.028	0.865	1.589	1.262	1.871
Deprivation x Income			0.100	0.035	0.116	0.054	0.061
Deprivation x Altruistic			-0.657	0.950	0.277	1.513	-0.188
Density			3.790	1.010	3.262	1.501	3.767
Density x Income			0.016	0.033	0.057	0.054	0.014
Density x Altruistic			-3.706	1.198	-2.423	1.753	-3.669
Ring							
Deprivation				0.689	1.340		
Deprivation x Income				-0.012	0.055		
Deprivation x Altruistic				-1.264	1.578		
Density				0.625	1.582		
Density x Income				-0.055	0.070		
Density x Altruistic				-1.587	1.794		
Ring - max							
Most deprived					0.269	1.099	
Most deprived x Income					0.037	0.042	
Most deprived x altruistic					-0.788	1.335	
Ring - min							
Least deprived						1.484	1.830
Least deprived x Income						-0.031	0.074
Least deprived x altruistic						-1.464	2.324
Ring - rang							
Deprivation range							-0.276
Deprivation range x Income							0.048
Deprivation range x Altruistic							-0.285
<b>Random Part</b>							
Variance							
Level 3 (PSU)	22.5	8.9	10.7	7.0	10.7	6.8	10.8
Level 2 (LSOA)	46.4	15.5	30.1	13.7	22.9	13.5	23.2
Level 1 (Indiv)	289.1	18.4	267.6	17.0	266.5	17.2	266.8
Deviance (-2*loglikelihood)	10853.9	10663.9	10626.6	10623.1	10625.0	10625.7	10624.3
Units							
Level 3 (PSU)	194	194	194	194	194	194	194
Level 2 (LSOA)	816	816	816	816	816	816	816
Level 1 (Indiv)	1245	1245	1245	1245	1245	1245	1245
Change in deviance		190.0	37.3	3.6	1.7	0.9	2.4
Degrees of Freedom		4	4	4	4	4	4
Significance		0.000	0.000	0.469	0.792	0.924	0.669
R squared		13.8%	16.1%	16.0%	16.1%	16.0%	16.1%

Table 4: Neighbourhood determinants of attitudes - with other attitudes and beliefs

		Model 0 Null	Model 1: Individual	Model 2: Core	Model 3: Core+ring	Model 4: Core+max	Model 5: Core+min	Model 6: Core+diff							
<b>Fixed Part</b>															
Individual	Income		-0.229	0.121	-0.208	0.115	-0.209	0.115	-0.210	0.118	-0.208	0.116	-0.245	0.120	
	Income sqrd		0.001	0.002	0.000	0.002	0.000	0.002	0.000	0.002	0.000	0.002	0.000	0.002	
	Altruistic (dummy)		1.973	1.824	2.321	1.676	2.311	1.654	1.932	1.651	2.375	1.672	2.268	1.673	
	Class divide (dummy)		4.888	1.414	4.439	1.359	4.415	1.370	4.374	1.329	4.410	1.362	4.829	1.364	
	Hard work (dummy)		0.705	1.587	0.924	1.519	1.055	1.521	1.030	1.509	1.001	1.515	0.987	1.507	
	Immoral (dummy)		12.792	1.623	12.723	1.581	12.650	1.588	12.790	1.589	12.662	1.591	12.773	1.588	
	Inevitable (dummy)		-6.279	1.618	-6.572	1.562	-6.881	1.617	-6.794	1.610	-6.606	1.580	-6.526	1.591	
	Class divide x Income		0.051	0.089	0.051	0.089	0.057	0.093	0.051	0.094	0.054	0.090	0.054	0.091	
	Hard work x Income		-0.147	0.092	-0.139	0.090	-0.137	0.089	-0.130	0.091	-0.138	0.091	-0.130	0.090	
	Immoral x Income		0.163	0.111	0.088	0.119	0.077	0.120	0.073	0.125	0.082	0.119	0.109	0.117	
	Inevitable x Income		-0.321	0.104	-0.257	0.103	-0.280	0.103	-0.253	0.104	-0.264	0.103	-0.210	0.109	
Core	Deprivation				2.751	1.048	3.115	1.410	2.059	1.278	3.080	1.224	2.955	1.070	
	Deprivation x Immoral				-3.627	1.323	-1.211	2.142	-1.072	1.827	-3.000	1.959	-3.541	1.309	
	Density				5.653	1.319	5.634	2.070	5.604	1.312	5.781	1.334	5.757	1.293	
	Density x Altruistic				-5.456	1.642	-5.824	2.503	-5.355	1.656	-5.449	1.635	-5.648	1.649	
Ring	Deprivation				-1.009	1.546									
	Density				-3.842	2.267									
	Density x Altruism				-0.508	2.131									
	Deprivation x Immoral				-0.262	2.356									
Ring - max	Deprivation							1.087	1.186						
	Deprivation x Immoral							-4.713	1.957						
Ring - min	Deprivation									-1.133	2.011				
	Deprivation x Immoral									-1.838	3.355				
Ring - diff	Deprivation range												-0.274	0.919	
	Deprivation range x Income												0.099	0.052	
<b>Random Part</b>															
Variance	Level 3 (PSU)	39.7	16.7	10.8	8.8	6.8	8.7	6.2	8.4	4.8	8.6	6.8	8.6	5.7	8.6
	Level 2 (LSOA)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Level 1 (Indiv)	337.3	28.4	236.1	18.2	227.6	17.9	226.1	17.9	226.0	18.7	228.0	17.8	228.0	17.8
Deviance (-2*loglikelihood)		4435.4		4197.5		4167.8		4159.3		4158.1		4166.5		4164.2	
Units	Level 3 (PSU)	179		179		179		179		179		179		179	
	Level 2 (LSOA)	427		427		427		427		427		427		427	
	Level 1 (Indiv)	506		506		506		506		506		506		506	
Change in deviance				237.9		29.7		8.5		9.8		1.3		3.6	
Degrees of Freedom				30		5		5		2		2		2	
Significance				0.000		0.000		0.131		0.008		0.522		0.162	
R squared				30.0%		32.5%		33.0%		33.0%		32.4%		32.4%	

## 5. Discussion

This paper has used multilevel modelling to investigate the factors that influence individual attitudes to inequality and redistribution. As hypothesised in the literature on individual determinants, self-interest, personal values and other political attitudes are important factors driving attitudes to inequality and redistribution. Once we account for these, however, the nature of the ‘neighbourhood’ does appear to have an additional influence in ways that fit well with our hypotheses but which also go beyond them.

Support for redistribution rises with levels of deprivation in the core neighbourhood and does so at a greater rate for those on higher incomes. If we control for a wider range of political attitudes and beliefs, these take over from the effect of income (and hence the interaction of income and deprivation) but the effect of neighbourhood deprivation remains. Support for redistribution also rises with density. We interpret this as indicating an effect from living in larger (denser) towns and cities. This might reflect social contact and observation, or the influence of a distinct ‘urban’ culture.

These have intriguing implications for urban policy. They suggest that trends of rising spatial segregation and suburbanisation or decentralisation of our cities will tend to erode the kinds of support which underpin collective action to reduce social inequality. They suggest that segregation and sprawl reduce social cohesion in the broad sense of concern for the welfare of others and, in that sense, they threaten to further fuel rises in social inequality. They suggest that policies to promote mixed communities and ‘compact cities’ may have important political as well as social or environmental impacts.

In relation to the wider literature on neighbourhood effects, there is evidence that the effects of location may vary with individual characteristics. More specifically, they vary with the kinds of characteristic which have not generally been included in traditional neighbourhood effects models. It is people who are less altruistic who see support for redistribution rise with density, and it is people who do not see inequality as immoral who see support rise with deprivation. People who are (arguably) more inclined to think about the welfare of others (altruists and those who view inequality as immoral) are much less affected by where they live. Some of these characteristics (e.g. the value placed on altruistic behaviour) are relatively durable or time-invariant so could be controlled for using statistical techniques such as differencing. Others are more likely to vary over time. As Bailey et al (2012 forthcoming) have argued, there would be a value in neighbourhood effects research paying more attention to the issue of *who* is affected by the neighbourhood, as well as the aspects of neighbourhood which may be important.

On the questions of scale and patterning, we find that extending our measure of neighbourhood context to capture diverse characteristics of the surrounding set of neighbourhoods adds very little to our understanding. *Measuring* neighbourhood at the scale of the LSOA (around 1500 people) appears to capture most of what we need to know. Previous studies have identified that measures at different scales correlate very highly. We

add to that evidence here, also showing that measures of patterning also correlate highly as well. This is not to argue that the nature of surrounding areas is not important, nor are we arguing that the LSOA is therefore the actual scale at which the effects we are studying operate. We cannot help policy makers, for example, identify the most appropriate scale at which to pursue social mix in relation to this set of effects. For researchers, we can suggest that the issue of scale (and of patterning) is not so important, precisely because measures correlate so highly.

All of these results stem from the analysis of a cross-section survey. We cannot discount the possible influence of selection effects although the range of controls, particularly for personal values and other political attitudes must go some way to limiting the scope for these to influence outcomes. A more robust test could be constructed by tracing changes in attitudes over time using longitudinal data, and that is one obvious direction in which to develop this work. Another approach would be to pursue more qualitative investigations to explore how people talk about their neighbourhoods and surrounding areas in relation to views about inequality.

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## Appendix

**Table A1: Individual determinants of support for redistribution**

		Model 1		Model 2	
Fixed part		Regression coefficient	S.E.	Regression coefficient	S.E.
Constant		65.83	2.10	64.44	2.16
Gender	Female	-0.87	0.98	-1.45	0.99
Age	Age	0.02	0.04	0.02	0.04
	Age sqrd.	-0.01	0.00	-0.01	0.00
Children in hhld (No)	Yes	-3.32	1.26	-3.36	1.25
Hhld type (Single adult)	Couples	1.20	1.22	1.06	1.23
	Nondep adults	1.02	1.60	0.99	1.59
Region (South)	North	0.88	1.31	0.71	1.32
	Mid	2.23	1.34	2.26	1.35
Educational attainment	Degree	-1.64	1.82	-2.11	1.83
	Mid level	-2.90	1.30	-3.17	1.32
Housing tenure	Social rent	4.29	1.33	4.51	1.33
Main source of income (employment)	Private pension	-1.98	2.10	-2.27	2.09
	State benefits	-0.27	1.83	-0.43	1.80
	Other	-2.16	5.07	-2.01	4.80
Occupational class (Manual/technical)	Intermed/prof	0.41	1.17	0.49	1.17
Public sector worker – current (No)	Yes	3.88	1.56	3.66	1.53
Public sector worker – past (No)	Yes	2.99	1.98	2.92	1.96
Car access (No)	Car access	-3.83	1.21	-4.02	1.20
Income (annual equivalised )	Income	-0.38	0.06	-0.37	0.06
	Income sqrd.	0.00	0.00	0.00	0.00
	Altruistic			3.52	1.08
Random part		Variance component	S.E.	Variance component	S.E.
PSU (level 3)		10.16	7.06	10.70	6.96
LSOA (level2)		28.60	13.88	30.10	13.71
Individual (level 1)		271.70	17.29	267.61	16.97
Change in deviance (-2*loglikelihood)				189.96	
Number of cases					
PSU (level 3)		194		194	
LSOA (level 2)		816		816	
Individual (level 1)		1245		1245	