

Diversity and Burglary: Does Community Cohesion Matter?

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Abstract

Diversity within a population has been linked to levels of both social cohesion and crime. Neighbourhood crimes are a result of a complex set of factors, one of which is weak community cohesion. This paper seeks to explore the impacts of diversity and social cohesion on burglary crime in a range of neighbourhoods, using Leeds, UK, as a case study. We propose a new approach to quantifying the correlates of burglary in urban areas through the use of diversity metrics. This approach is potentially useful in unveiling the relationship between burglary and diversity in urban communities. Specifically, we employ stepwise multiple regression models to quantify the relationships between a number of neighbourhood diversity variables and burglary crime rates. The results of the analyses show that the variables that represent diversity performed better when regressed against burglary crime rates than the absolute socio-demographic data traditionally used in crime studies, which do not account for diversity. The findings of this study highlight the importance of neighbourhood cohesion in the crime system, and the key place for diversity statistics in quantifying the relationships between neighbourhood diversities, social cohesion and crime. The study highlights the importance of policy planning aimed at encouraging community building in promoting neighbourhood safety.

Key words: Diversity, Cohesion, Burglary, Neighbourhoods.

1. Introduction

Measurement of crime is necessary for any quantitative assessment of crime policy change (Ludwig and Marshall, 2015). Urban and regional planners, policy makers and policing agencies have all recognised the importance of better understanding the dynamics of crime (Murray et al., 2001). Of particular interest in this regard is the place of community cohesion in the crime system. Community cohesion generally acts to increase the safety of communities throughout the development of crimes, from reducing the socio-economic drivers of crime, through maintaining oversight of those potentially moving into criminal lifestyles ((Lee, 2000), to increasing the oversight of potential sites of crime, and reporting crimes when they occur. However, cohesion is a nuanced concept (there is considerable cohesion in communities ruled by criminal gangs) and cohesion is ill-represented by standard socio-demographic variables (both middle and working class communities can experience a wide range of levels of cohesion). Standard variables are probably, in part, representing community cohesion.

In this paper, we will suggest that the treatment of standard regression variables can be adjusted to better capture a range of loci in which social cohesion plays a part across the crime system. For example, rather than looking at the percentage of a specific age group, we look at the diversity of ages within a community. In addition, we show that when these adjustments are made, these variables become more

strongly predictive of crime than standard treatments, suggesting the strong part social cohesion plays in the crime system and the strong part it plays as the link between standard regression variables and crime rates.

2. Data and methods

2.1 Data

The crime data used for this study were obtained from the ‘*police open public monthly data of reported crimes*’ provided by West Yorkshire Police for the period 2011-2015 (n= 51,800) using burglary rate per 1000 population for the city of Leeds. The geographical neighbourhoods of analysis used in this paper are the 482 lower super output areas (LSOAs) of Leeds. The LSOA geography has been chosen because it is small enough to capture neighbourhood effects but large enough to represent coherent community groups.

The remaining data was derived from UK 2011 census data, supplied by UK data service downloaded from <http://infuse.mimas.ac.uk>.

Table 1. The core components of crime and community cohesion, and the variables used to represent them in the model.

Component	Standard Variable	Diversity Variable
Age distribution	Number of young persons (16-24)	Age diversity
Family structure	Lone parents	Diversity of family structure
Identity	Ethnic minority population	Ethnic diversity
Affluence / wealth	Age 16-64 economically inactive	Diversity of employment type
Educational attainment	Age 16 over no qualification	Diversity of educational attainment
Residential instability	Resident less than 2 years	Length of residence diversity

2.2 Method

In this study, we compare diversity indices with non-diversity variables to examine which one of them performs better when regressed against burglary crime rates. Table 2 shows the different components included to measure diversity. A number of methods can be used to measure diversity (see Morris et al., 2014); we used Simpson’s (1949) diversity index (D) which reports the probability that two individuals taken at random from a population are different (Baltit, 2005; Tuomisto, 2010). Simpson’s diversity index (Equation 1) ranges between 0 and 1, values towards 0 indicating no diversity and values towards 1 indicating the presence of diversity.

$$D_i = 1 - \frac{\sum_i n_i(n_i - 1)}{N(N - 1)} \quad (1)$$

Where n_i is the proportion of a population in an area falling into a category, i , and N is the total population of that area.

We utilise stepwise multiple linear regression to construct a model of correlates with crime. Equation 2 for linear multiple regression is given based on (Charlton et al., 2009).

Table 2 Components used to measure diversity

Diversity	Components included
Age	10-14, 15, 16-17, 18-19, 20-20, 25-29, 30-44, 45-59, 60-64, 65-74
Family structure	Lone parent no dependent, Lone parent one dependent child, Lone parent two or more dependent children, Married couple no children, Married couple one dependent child, Married couple two or more children
Ethnic	All 18 ethnic groups included
Employment	16-64 Managers/Directors, 16-64 Professionals, 16-64 Associate Professionals, 16-64 Administration and Secretariat, 16-64 Skilled Trade, 16-64 Caring Leisure and Services, 16-64 Customer Services, 16-64 Process Plants and Machines, 16-64 Elementary Occupation
Education	16-over qualification level 1, 16-over qualification level 2, 16-over qualification level 3, 16-over qualification level 3, 16-over qualification level 4
Residence length	Length of residence: Less than two years, Less than five years, More than five years, Ten years above, Born in the UK

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots \beta_n X_n + \varepsilon \quad (2)$$

Y is the value of the dependent variable, β_0 is the constant intercept, $\beta_1, \beta_2, \beta_3$ are the slope coefficients of X_1, X_2, X_3 and X_1, X_2, X_3 are the independent variables while ε is the standard error of coefficients.

3. Results

Eight models were developed, (Table 3). The addition of further variables produced only statistically insignificant changes to model the R squares. Table 4 presents the contribution of each variable and its correlation with the dependent variable, as well as the direction of the relationship for the strongest model.

Table 3 Model summary of stepwise regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.358	.128	.126	32.061
2	.416	.173	.170	31.250
3	.442	.195	.190	30.867
4	.469	.220	.213	30.427
5	.478	.229	.221	30.275
6	.494	.245	.235	29.999
7	.507	.257	.246	29.778
8	.518	.268	.256	29.586

Table 4 Model coefficients^a

	Unstandardised B	Coefficient Std.Error	Standardised Coefficient Beta	t	Sig.
Model (Constant)	153.999	34.057		4.522	.000
8 Age diversity	123.242	19.049	.593	6.470	.000
Age16OverNoQualificaton	.082	.015	.299	5.491	.000
Age16-64EconInactive	-.105	.018	-.653	-5.827	.000
Ethnic diversity	143.557	30.113	.918	4.767	.000
ResidenceLength diversity	-208.431	48.988	-.912	-4.255	.000
ResidenceLessthan2yrs	.209	.047	.390	4.480	.000
Education diversity	-113.966	36.113	-.221	-3.156	.002
Employment diversity	-77.081	28.782	-.195	-2.678	.008

a. Dependent Variable: Burglary rate

5. Discussion

The most notable result of the above analysis is the almost complete exclusion of standard variables in preference for diversity statistics. Model 8 is the best performing model represented in the form of Equation 3, below:

$$\begin{aligned} \text{Burglary rate} = & (.008123 * \text{Agediv}) + (.0082 * \text{NoQual}) + (-.00105 * \text{EcoInactive}) + \\ & (.00144 * \text{Ethdiv}) + (-.00208 * \text{ResLengthdiv}) + (.00209 * \text{ResLess2yrs}) + \\ & (-.00114 * \text{Edudiv}) + (-.0077 * \text{Empldiv}) + 153.10 \end{aligned} \quad (3)$$

Age diversity plays to studies that have shown that offenders are commonly drawn from younger age groups than the elderly people (Farrington, 1986; Gottfredson and Hirschi, 1990; Sampson and Laub, 2003; McVie, 2005; Blonigen, 2010; McCall et al., 2013; Sweeten et al., 2013), and, specifically, it is likely that a wide age diversity puts young offenders in close proximity with older victims with, potentially, more to steal.

The feeling of disparity between wealthy and poor people increases antagonism, with a resultant increase in crime (Fajnzlber et al., 2002; Rufrancos et al., 2013) and inequality is generally associated with high crime figures (Witt et al., 1998; Kelly, 2000; Demombynes and Özler, 2005; Reilly and Witt, 2008). Here, however, we find that higher employment diversity results in lower crime figures. This is likely to be due to high employment diversity signalling communities with a wide and healthy range of economic opportunities, though this notably also plays to narratives, popular with planners, of economically mixed communities stabilizing under the influence of the more affluent elements (Tunstall and Lupton, 2010). The relationship here points up the complexity of the relationship between diversity and community cohesion and crime; it is possible more nuanced diversity statistics (for example looking at looking at level biomodalism in a distribution) would give alternative results.

Educational attainment has great influence on individuals' social behaviour as well as income. Education attainment determines wages (Green et al., 2006) as well as the propensity of an individuals' to commit a crime (Reynolds et al., 2001). In this study, however, *diversity* of educational attainment negatively correlates with burglary crime, meaning that the smaller the diversity of educational attainment, the more propensity there is to commit crime in an area. This requires further research, but immediate hypotheses are that low diversity of educational attainment is correlated with deprivation, and/or that low diversity

areas include student residential areas, which in Leeds are very homogeneous communities with a high level of victimisation. Previous studies have found support for relationship between income inequality and property crime (Witt et al., 1998; Kelly, 2000; Demombynes and Özler, 2005; Reilly and Witt, 2008). Recent statistics in the UK show that economically inactive people are likely to be twice victims of burglary crime than economically active, considering this category of population comprise of students, retired and people with long term health challenges (ONS, 2014). Nevertheless, in this study, we found a statistically negative correlation between economically inactive population and burglary crime. This warrants further investigation, but current hypotheses centre on the city's very large student population having a lower than expected crime rate for their level of economic inactivity (though high generally).

Heterogeneous communities are often characterised by distrust, low levels of social cohesion and disputes (Sturgis et al., 2014) which negatively affect individual behaviours (Mellgren, 2011). Recent study into the spatial distribution of neighbourhood crime consistently shows that areas characterised by ethnic diversity have high rates of crime (Gartner, 2013; Takagi and Kawachi, 2014). In this study, we have also found strong support for this relationship between ethnic diversity and rates of burglary crime.

Finally, studies have demonstrated that the creation of social ties is associated with the length of residence in an area (Yamamura, 2011; Keene et al., 2013). Residential instability also reduces the potential for the generation of social capital (Thomas et al., 2016), and the tendency to commit a crime is related to length of residence, that is, crime reduces as length of residence increases (Bell and Machin, 2011). In this study, we found a significant positive relationship between low lengths of residence and burglary crime. However, we also found a negative relationship between residential length diversity and crime showing that varied communities have lower crime. Again, this warrants further investigation, but may be related to popular areas of starter-home housing with high turnovers. Again, alternative measures of diversity may reveal different facets of this dynamic.

6. Conclusion

This study explores the impact of community cohesion on burglary crime in the Leeds district, UK using diversity statistics. We show that diversity based statistics are a better correlate with crime than most standard metrics, highlighting the importance of diversity in the crime system, and suggesting the importance of social cohesion in preventing crime. Nevertheless, this study points up some of the complexities of elucidating this relationship. We find age and ethnic diversity to have a positive relationship with crime, but economic and residence level diversity to be negatively related to crime. These relationships require further investigation, and it is likely that different diversity statistics will reveal different nuances of these dynamics. For the moment, this study has shown the power of diversity statistics generally over standard statistics within crime studies, and encourages their use to tease apart some of the debates around defining community cohesion, and relating it to diversity and crime.

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