MODELLING FEAR OF CRIME AREA VARIATION OF PEOPLE IN ENGLAND

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AIM

The overall aim of this research is to model fear of crime quantitatively and holistically to understand the context of fear of crime with its varying dimensions. This research considers that advances in multilevel modelling, the availability of large datasets, and Bayesian statistics using high-performance computing might usefully extend and develop the context within which we understand, quantitatively, fear of crime.

FEAR OF CRIME MEASURES IN CSEW 2008-2009

Broad category	Measure	Module In the BCS 2008-2009	Description	Values	sample size
Specific worry	wmugged	C	How worried about being mugged and robbed	1=very worried, 2=Fairly worried, 3=Not very worried, 4=Not at all worried	10475
	wattack	C	How worried about being physically attacked by strangers	1=very worried, 2=Fairly worried, 3=Not very worried, 4=Not at all worried	10489
	winsult	C	How worried about being insulted or pestered by anybody	1=very worried, 2=Fairly worried, 3=Not very worried, 4=Not at all worried	10476

FEAR OF CRIME MEASURES IN CSEW 2008-2009

Broad category	Measure	Module In the BCS 2008-2009	Description	Values	sample size
Perceived level of likelihood (general)	pervict	A, B,D	How likely do you think you personally are to be a victim of crime in the next year	1=very likely, 2=Fairly likely, 3=Fairly unlikely, 4=very unlikely	30866
Perceived level of likelihood (specific)	burgreg	D	How likely is it you will be burgled in next year	1=Very likely, 2=Fairly likely, 3=Fairly unlikely, 4=Very unlikely	10276
	mugrob	D	How likely is it you will be mugged or robbed	1=Very likely, 2=Fairly likely, 3=Fairly unlikely, 4=Very unlikely	10273
	attack	D (Adhoc crime)	How likely will be attacked or physically assaulted	1=Very likely, 2=Fairly likely, 3=Fairly unlikely, 4=Very unlikely	10266

KNOWLEDGE GAPS

- There is a little agreement exists among criminologists about the precise nature of fear of crime.
- Researchers in criminology question whether measures related to fear of crime in the CSEW relate to general level of worry or specific worry, or some kind of fear among the respondents.
- Fear of crime is a multidimensional concept that consists of three dimensions: emotional, cognitive and behavioural.
- Much less is known from the previous research about the impacts of multiple deprivation of smaller areas in fear of crime area variations.

KNOWLEDGE GAPS (CONTINUED)

- Modifiable Area Unit Problem
- Relation between Police recorded crime and the socioeconomic disadvantage
- Markov Chain Monte Carlo (MCMC) method in checking the stability of the coefficients from the multilevel models

RESEARCH QUESTIONS

There are six research questions:

- Can we model emotional and cognitive dimensions of fear of crime quantitatively and holistically?

- What are the measures or variables that correlate to the construction of emotional and cognitive dimensions of fear of crime?

- Is there any interaction effect between different measures at three levels (individual, LSOAs and Local Authority Districts) in the multilevel models?

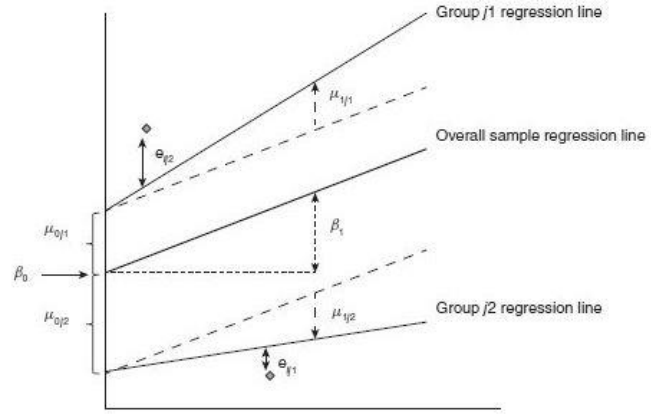
RESEARCH QUESTIONS (CONTINUED)

- Is there any difference between the multilevel models of fear of crime, based on large geographical areas (from previous research) and much smaller (five times) geographical areas (this research), so as to impact on the model of fear of crime?

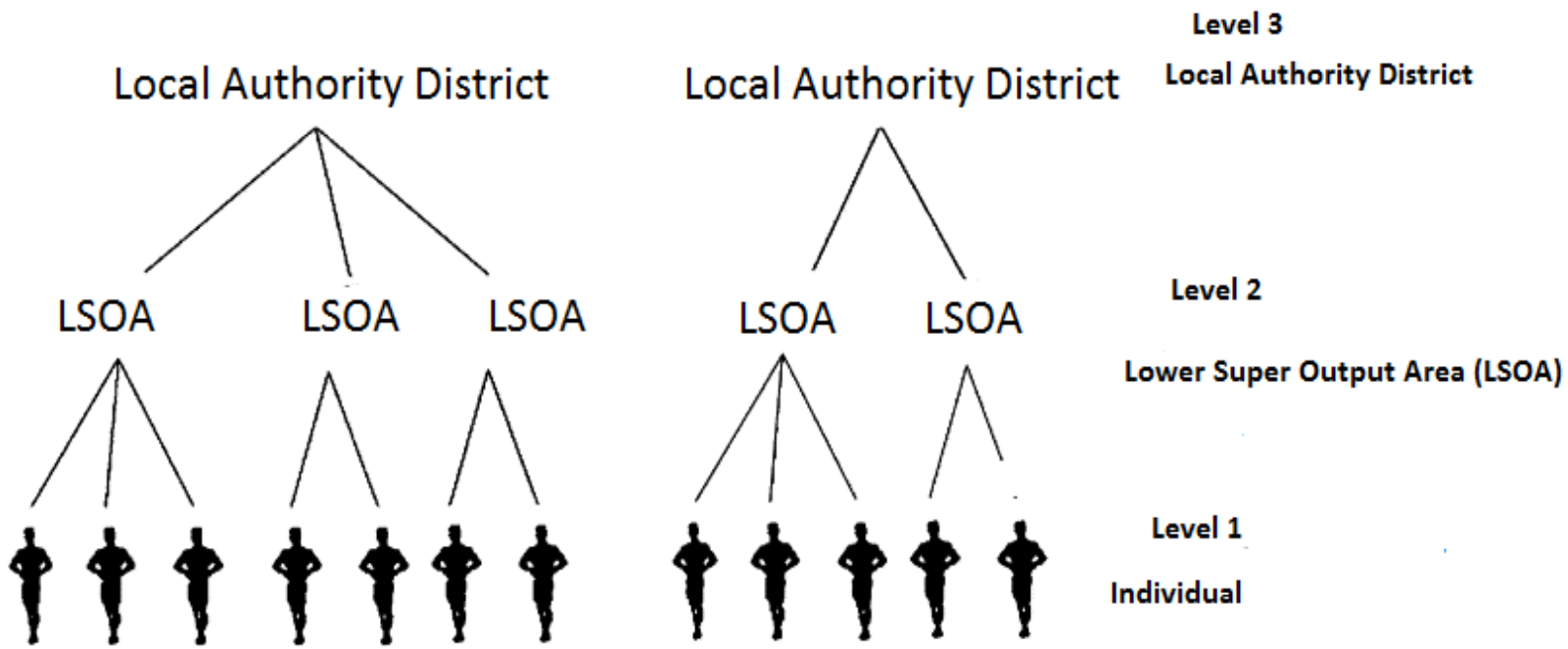
- Are there any measures that explain the differences in fear of crime between geographical areas i.e. *in-between* variances?

- What are the impacts of modelling Ordered Categorical models using MCMC estimation? Are there any differences using other estimation methods such as 2nd order Penalised Quasi Likelihood (PQL2) rather than the MCMC?

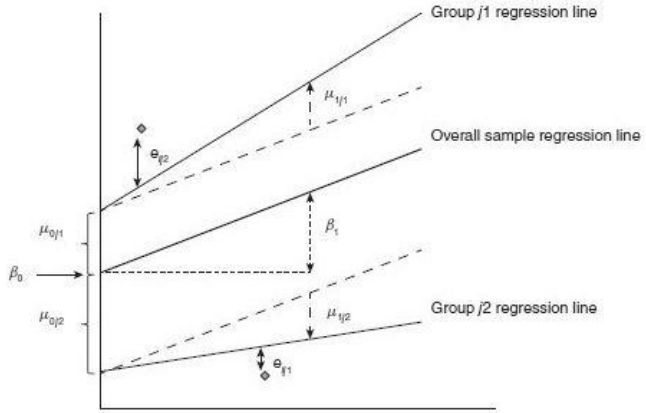
METHODOLOGY



3 level multilevel models (individuals, Lower Super Output Areas and Local Authority Districts)



METHODOLOGY (CONTINUED)



- All the multilevel models use **Ordered Categorical** outcome variable.
- Four different outcome variables have been modelled: wmugged, wattack, winsult, and pervict. Each of these variables have four categories (1,2,3, and 4).
- All of the independent variables relate to the three individual levels, i.e. level 1(individuals), level 2 (LSOAs) and level 3 (Local Authority Districts).
- The parameters or values of the models have been estimated using the **MCMC (Markov Chain Monte Carlo) method.**
- **Software used:** SPSS for data preparation and MLwiN for multilevel modelling

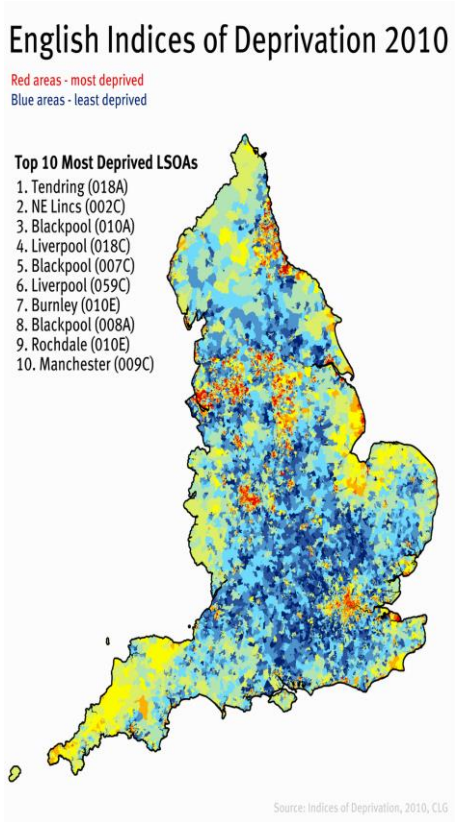
DATA SOURCES

Economic and Social Data Service

Core Data sources

- The BCS 2008-2009 for England and Wales (known as Crime Survey for England and Wales after 1st April, 2012) (Total sample size: 46,286 and Without Wales sample size: 42144)

- Updated British Crime Survey 2008-2009, Special Licence Access, Low Level Geographic Data (published 3rd April 2012)



DATA SOURCES

Economic and Social Data Service

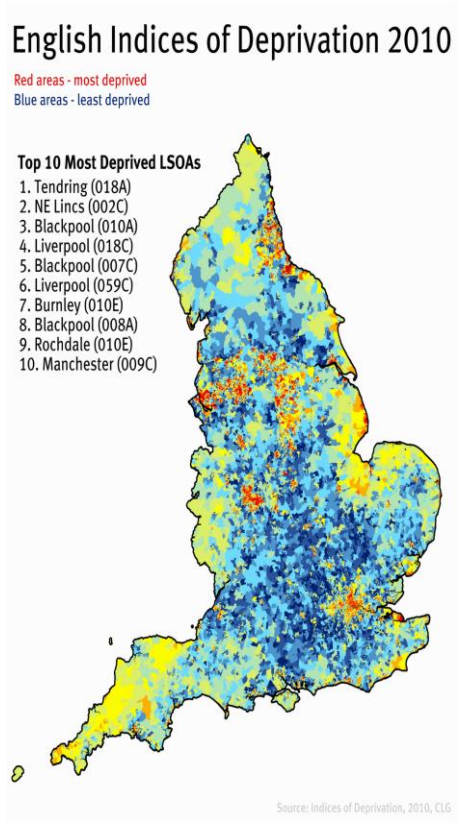
Other external datasets linked with the core datasets

- The English Indices of Deprivation 2010 (Seven domains: Income, Employment, Health, Education and training, Living Environment, Barriers to Housing and Services and Crime Score)

- Internal Migration by local authorities in England and Wales, mid-2009 (Table produced by Migration Statistics Unit: in migration and out migration)

- Lower Super Output Area population Estimates –mid 2007 (Released date, 16th September, 2010)

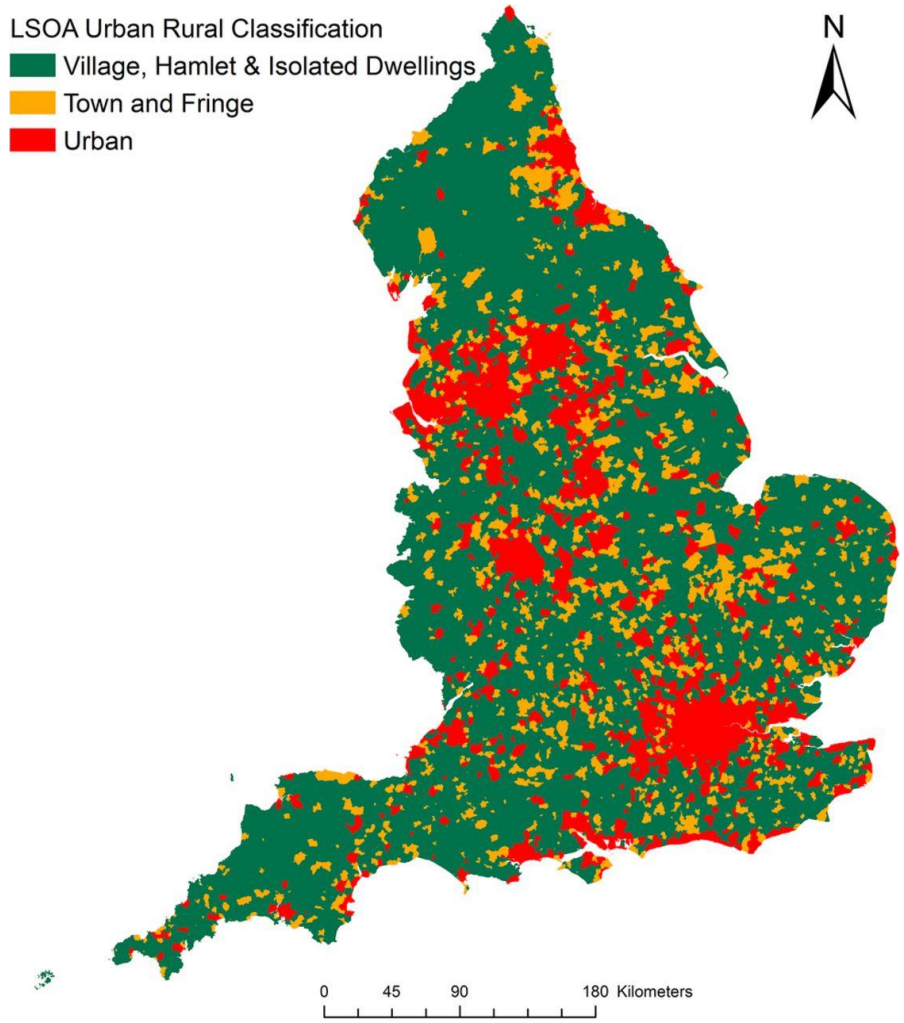
- Multiple Ethnic Groups (2001 census) (date first added: 09/02/2010 and date updated: 27/06/2012) (For Ethnic Heterogeneity at Local Authority District Level)



SUMMARY OF GEOGRAPHY

Lower layer or Lower Super Output Area (LSOA) typically contains 4 to 6 Output Areas (OAs) and is constrained by the boundaries of the Standard Table (ST) wards used for 2001 census outputs. There are 32482 LSOAs in England. Minimum population in each LSOA is 1000; the mean population is 1500 and average number of household is 400 (in 2001).

Middle Super Output Area (MSOA) is built from groups of LSOAs and constrained by the 2003 local authority boundaries. There are 6780 MSOAs in England. Each MSOA consists of minimum population of 5000; the mean population of 7200 and average number of household is 2000(in 2001).



SUMMARY OF FINDINGS

DIMENSIONS IN FEAR OF CRIME

The findings from this research provide strong empirical confirmation of **two distinct dimensions** in fear of crime which previous quantitative studies have lacked any convincing evidence for : firstly, an **emotional dimension** related to worries or crime-related anxieties with a strong gender difference and secondly, a **cognitive dimension** that is related to perceived likelihood of criminal victimisation with a marginal gender difference. The research finds that educated females have less emotional fear of crime.

AREA VARIATIONS IN FEAR OF CRIME

- Fear of crime of local authority districts has strong association with the measures of out-migration of the local authority districts.
- Socio-demographic characteristics impact the degree of fear of crime in smaller areas of the LSOAs.
- Particularly, socio-economic disadvantages measured by the Indices of Multiple Deprivation (IMD) of smaller geographical areas (LSOA) have strong association with the police recorded crime of these LSOAs.
- People living in the socio-economically disadvantaged areas are more fearful of crime than people living in less socio-economically disadvantaged areas.

MODELLING FEAR OF CRIME THROUGH BAYESIAN STATISTICAL METHOD SUCH AS THE MCMC

- With the availability of powerful computer (faster processor and larger memory), the estimation of statistical models through Bayesian method has now been the reality.

- Markov Chain Monte Carlo (MCMC) method provides reliable estimates of the parameters from the statistical models.

- More importantly, in case of multilevel modelling where the sample size decreases due to nesting of one level within the other, the MCMC method provides a reliable estimates of the variables.

A VISUAL COMPARISON OF SUMMARY OF VARIABLES OR CORRELATES OF FEAR OF CRIME

Key:	
	Importance stated in literature and results from our multilevel models also show strong evidence
	Multilevel models do not show any strong evidence

A VISUAL COMPARISON OF SUMMARY OF VARIABLES OR CORRELATES OF FEAR OF CRIME

variables	Importance in the context of fear of crime
Gender (Male and Female)	
Age	
Educational qualification(Reference: No Qualification)	
0 Level/ GCSE	
Apprenticeship or A/AS level	
Degree or diploma	
Other	
Ethnic Classification(Reference: All White)	
Asian	
Black	
Mixed / Other	

A VISUAL COMPARISON OF SUMMARY OF VARIABLES OR CORRELATES OF FEAR OF CRIME

Occupation (Routine or Semi-routine)	
Professional or Managerial	
Higher supervisory role	
Intermediate Occupation	
Large and small employer	
Own account workers	
Lower supervisory and lower technical role	
Never worked	
Full time students	
Not stated and not classified	
Newspaper Readership (Reference: No National Newspaper)	
Tabloid Newspaper	
Broadsheet and Berliner Newspaper	
No one in particular or some other	
Personal victimization experience (Reference: Non-Victim)	
Personal crime (once)	
Personal crime (multiple)	
Household crime (once)	
Household crime(multiple)	

A VISUAL COMPARISON OF SUMMARY OF VARIABLES OR CORRELATES OF FEAR OF CRIME

Length of residence in the LSOA	
Interviewer rated disorder of the LSOA	
Health (Reference: Not ill)	
Non limiting disability / illness	
Limiting disability / illness	
Interaction between Gender and Education	
Female.0 Level/ GCSE	
Female.Apprenticeship or A/AS level	
Female.Degree or diploma	
Female.Other	
Index of Multiple Deprivation of LSOA	
Police recorded crime of LSOA	

A VISUAL COMPARISON OF SUMMARY OF VARIABLES OR CORRELATES OF FEAR OF CRIME

Ethnic Heterogeneity of the LSOA	
Older People Profile of the LSOA	
Urban (Reference: Rural)	
Types of LAD (Reference: London Borough incl. City of London)	
Metropolitan district	
Non-metropolitan district	
Unitary authority	
(OutMigration)	
Interaction between Gender and Police Recorded Crime	
Female.(CRIME_SCORE of LSOAs)	