AUNT-SUE Research Symposium

Modelling Fear of Crime in an Urban Environment

13th January 2010 – 11:00 – 11:30

LONDON metropolitan university

Modelling Fear of Crime in an Urban Environment

- Outline
  - Importance of Fear of Crime in Transport and Social Exclusion
  - Predicting Fear of Crime
    - ‘Broken Windows’ and New Urbanism
    - Prospect/Refuge Theory
  - Modelling Fear of Crime in a GIS
  - Validation and Results - Overview

Fear of Crime and Social Exclusion

- Importance of Fear of Crime in Transport and Social Exclusion
  - *"Many older people can end up isolated and unwilling to leave their homes because of a fear of crime, even if crime levels are relatively low. It is important for the police to engage with communities to make people of all ages feel secure." (Write 2009)*

Fear of Crime and Social Exclusion

- Importance of Fear of Crime in Transport and Social Exclusion
  - Some statistics:
    - Over 11% of the public would travel more if they felt safer on the transport system DfT 2004).
    - 13% of people report feeling unsafe, and 21% reporting feeling a bit unsafe, when walking in their local area after dark.
    - 68% of those aged 60 and over say they never walked in their local area after dark (Town et al. 2003).

Fear and Social Exclusion

- Importance of Fear in Transport and Social Exclusion
  - Some stats:
    - In 2002/03, the average risk of becoming a victim of crime was only 4.1%, with the highest risk being for young men aged 16 to 24, at 15.1% (Town et al. 2003).

Fear of Crime and Social Exclusion

- Importance of Fear of Crime in Transport and Social Exclusion
  - Some stats:
    - In 2002/03, the average risk of becoming a victim of crime was only 4.1%, with the highest risk being for young men aged 16 to 24, at 15.1% (Town et al. 2003).

Fear of Crime and Social Exclusion

- Fear of on-street crime is one factor leading to social exclusion, defined as:
  - "…a dynamic process of being shut out, fully or partially from any of the social economic, political and cultural systems which determine the social integration of a person in society" (Walker and Walker, 1997 in Shaw, 2005)

Predicting Fear of Crime

- Broken Windows and New Urbanism
  - Broken Windows (Wilson and Kelling (1982 cited in Doran and Lees 2005)
    - If a window in a building is broken and left unrepaired, the other windows will soon be broken as the first broken window is taken as a sign that no-one cares
    - The general degeneration of an area leads to a withdrawal of people from the street, increasing the opportunity for crime (and further broken windows)

Predicting Fear of Crime

- Broken Windows and New Urbanism
  - New Urbanism
    - The presence of people on the street will deter criminals and reduce the opportunity for offending.
    - Encourages an open network of streets accessible and friendly to pedestrians
    - Eyes on the street are important – buildings should have large front windows and be set-back from the street by a minimum distance.

Predicting Fear of Crime

- Prospect Refuge (Fisher and Nasar in 1992, cited in Petherick 2000)
  - The level of fear felt depends on two factors:
    - Prospect – how far ahead you can see and how wide is the view
    - Refuge – how many potential hiding places there are for people to jump out from

Predicting Fear of Crime

- Prospect/Refuge

		Prospect (Victim)	
Refuge (Offender)		HIGH (Open prospect)	LOW (Blocked Prospect)
	LOW (no hiding places)	Most Safe	Moderately Safe
	HIGH (Many hiding places)	Moderately Unsafe	Most Unsafe

Modelling Fear in a GIS

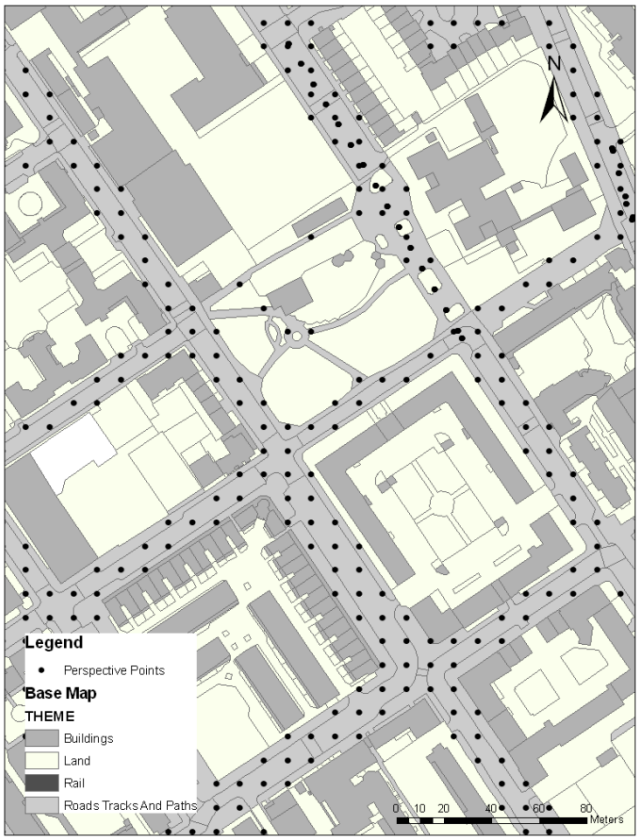
- Developing the Model
  - Our test area is Somers Town, near Euston and Kings Cross Stations in London
  - Somers Town is surrounded by main roads and two main transport interchanges, yet is one of the most deprived areas in England
  - Features are mapped on a GIS (through an on-site survey and using existing datasets)

Modelling Fear in a GIS

- Developing the Model
  - The concept of Isovists is used to identify features that can be seen from a particular point (using a point, line or polygon-in-polygon calculation)

Modelling Fear in a GIS

- Developing the Model
  - A grid of such isovists is created to cover the entire test area
  - Each point represents a potential location of a pedestrian



Pedestrian Positions on a Grid, (©2009 Crown Copyright)

Modelling Fear in a GIS

- Street Environment Index (SEI)
  - Combines elements from Broken Windows and New Urbanism
  - Model uses the features to determine how likely a potential victim is to be observed (and thus potentially rendered assistance)

Modelling Fear in a GIS

- Street Environment Index
  - Urban Features include:
    - Windows at ground floor and above ground
    - Walls, railings and fences
    - Graffiti and fly-tipping
    - Building and garden upkeep
  - Each feature is assigned a weighting, decided through a questionnaire completed by 40+ people

Modelling Fear in a GIS

- Street Environment Index
  - The features inside each Isovist are then identified and an SEI score calculated using the weightings gathered from the questionnaires
  - Objects closer to the pedestrian (i.e. To the centre of the isovist) are given more importance than those further away
    - An inverse distance weighting approach is used

Modelling Fear in a GIS

- Generating the Map
  - The resulting SEI values are interpolated to create a map which theoretically predicts where pedestrians feel more or less scared
  - Orange/Red areas indicate areas where the method predicts greater fear

SEI Surface of Somers Town, (©2009 Crown Copyright)

Modelling Fear in a GIS

- Prospect/Refuge Theory
  - As with the SEI, Isovists are used to model Prospect/Refuge Theory in a GIS
  - The larger the Isovist, the more area a person can see and hence the higher the prospect value

Modelling Fear in a GIS

- Prospect/Refuge
  - Refuges are measured through an on-site survey which counts objects behind which a person could hide, including:
    - Trees
    - Recessed doorways
    - Alley Ways

Modelling Fear in a GIS

- Prospect/Refuge
  - The Isovists are categorized into equal intervals by size, and the number of refuges also grouped

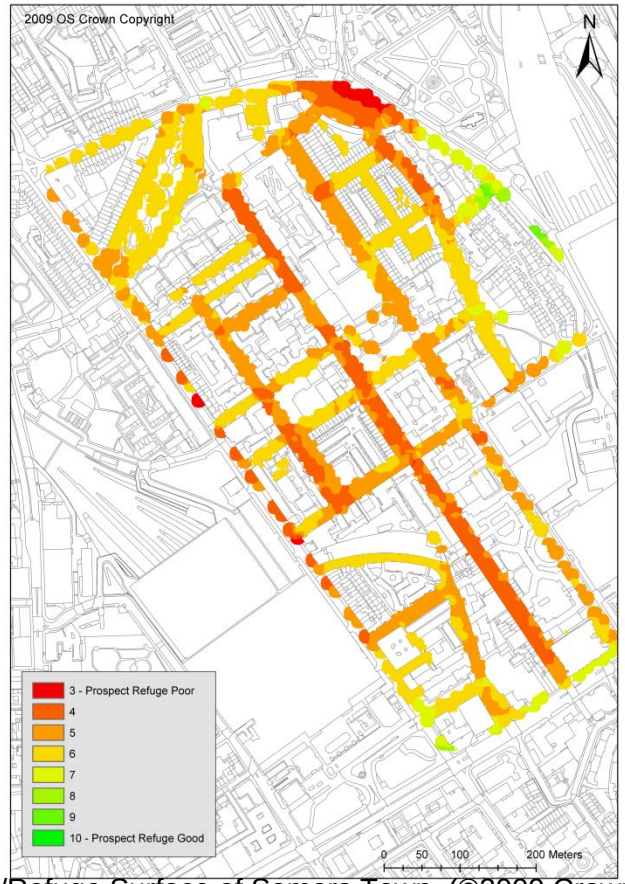
	Prospect Size	**0 – 0.29 sq km**	**030 – 0.59 sq km**	**0.60 – 0.89 sq km**	**0.90 – 1.19 sq km**	**1.20 – 1.49 sq km**
Refuge Count	Category	1	2	3	4	5
0 – 6	5	6	7	8	9	10
7 – 11	4	5	6	7	8	9
12 – 17	3	4	5	6	7	8
18 – 22	2	3	4	5	6	7
23 - 28	1	2	3	4	5	6

Fear and Social Exclusion

- Prospect/Refuge
  - The Grid of potential pedestrian points and associated Isovists is again used to cover the test Area
  - For each Isovist, the number of refuges are counted
  - A total prospect/refuge score is then calculated by from the values in the Matrix

Fear and Social Exclusion

- Prospect Refuge
  - Finally, the resulting SEI values are interpolated to create a map which theoretically predicts where pedestrians feel more or less scared
  - Orange/Red areas indicate areas where the method predicts greater fear



Prospect/Refuge Surface of Somers Town, (©2009 Crown Copyright)

Results

- Validation
  - Was carried out with a number of resident focus groups in Somers Town
  - Public Participation GIS used to identify locations of fear
  - Interpolated map then created and subtracted from the Prospect/Refuge and SEI maps

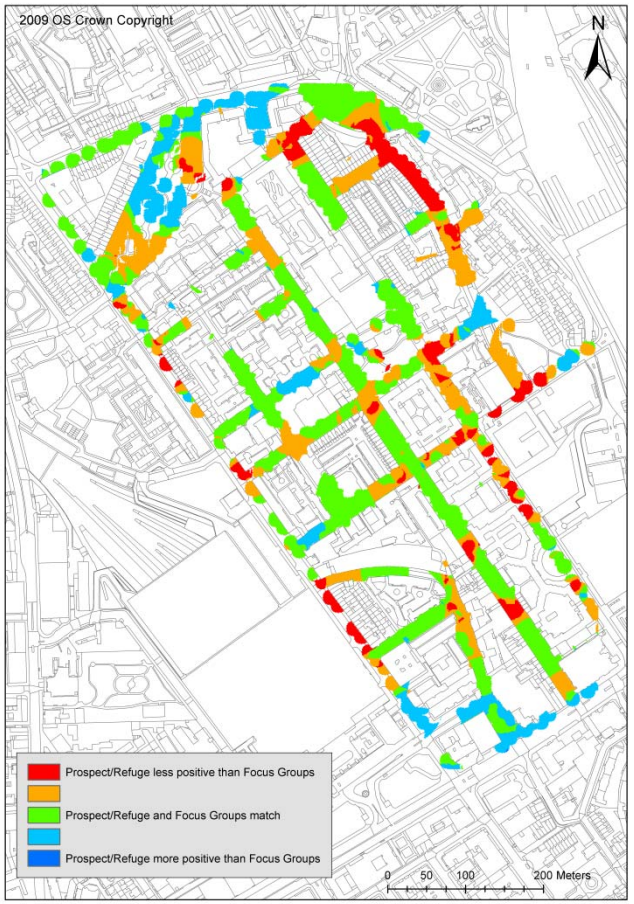
Results

- New Urbanism and Broken Windows

SEI Surface – Focus Group Information for Somers Town, (©2009 Crown Copyright)

Results

- Prospect Refuge



Prospect/Refuge Surface – Focus Group Information for Somers Town, (©2009 Crown Copyright)

Modelling Fear in an Urban Environment

Thank You – Any Questions?