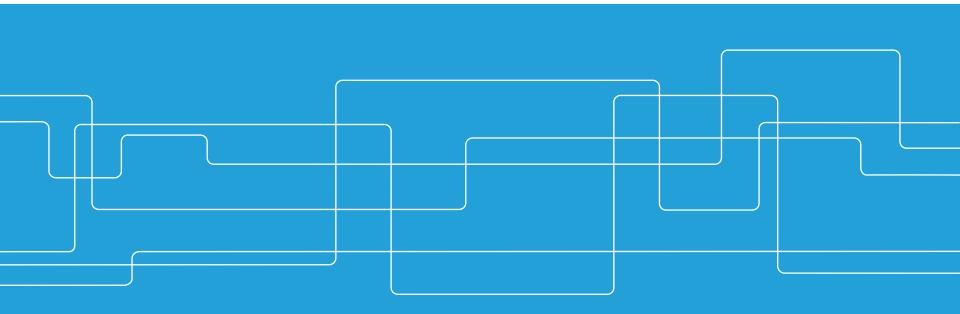


Visualisation of crime in shopping centres

Vania Ceccato, Örjan Falk, Pouriya Parsanezhad & Väino Tarandi School of Architecture and the Built Environment (ABE) Royal Institute of Technology





'Going shopping' is perceived to be an activity filled with great pleasure (Bamfield, 2012)



Sweden has about 300 shopping centres today, double as much as the country had ten years ago (Sörbring, 2012)



More than shopping: Shopping centers as places of entertainment



Shopping centers have evolved from a group of stores to large enclosed malls with an eclectic number of services and functions, including sports, culture and entertainment



More than shopping: Shopping centres as criminogenic places

- Shopping centers are regarded as safe places (Salcedo, 2003)
- But they are also targeted by crime (Savard & Kennedy, 2014), place of 'convergence' time-space variations
- The challenge for shopping malls is to create an environment that is at the same time entertaining and safe (Kajalo & Lindblom, 2016)

prevent crime – against visitors (Farrag *et al.*,2010) against themselves (Perlman & Ozinci, 2013)



Aim & objectives

Aim

to understand the nature of crime in space and time in a shopping centre using three-dimensional visualization techniques

Objectives

- 1. to create a BIM model that allows crime mapping and three-D visualisation
- 2. to detect areas that run higher risk of crime (types of crime/time) using BIM

3. to assess places in the shopping centre that are in most need of intervention through fieldwork inspection and CPTED principles



Previous work

1) Rengert et al. (2000) +

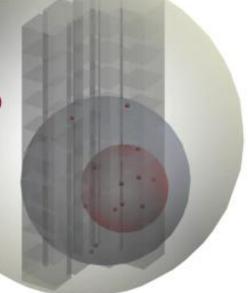
Rengert, G & Ratcliffe, J. (2000/5) Inmate Violence Against Correctional Staff: An Environmental Analysis of Risk.



CAD + GIS Data surveys

Step 3: Sphere Encompassing 75 Percent of Crimes within Building (Removing Outliers)

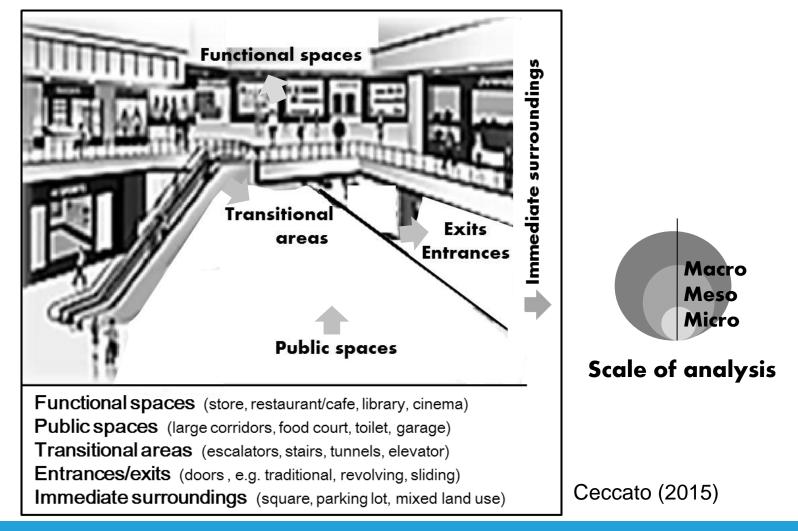
Volume of Sphere Encompassing 75% / Volume of Sphere Encompassing all Crimes within Building



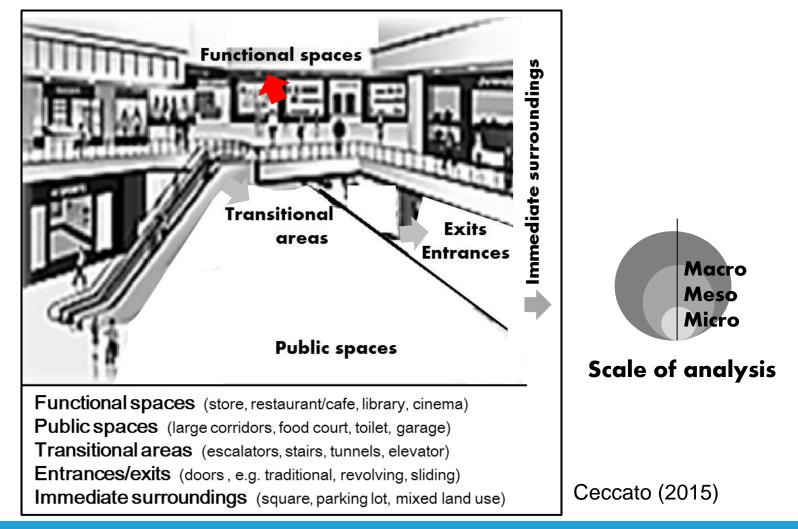
2) "The law of crime concentration", Weisburd (2015)

3) Situational crime prevention, Clarke (1995)

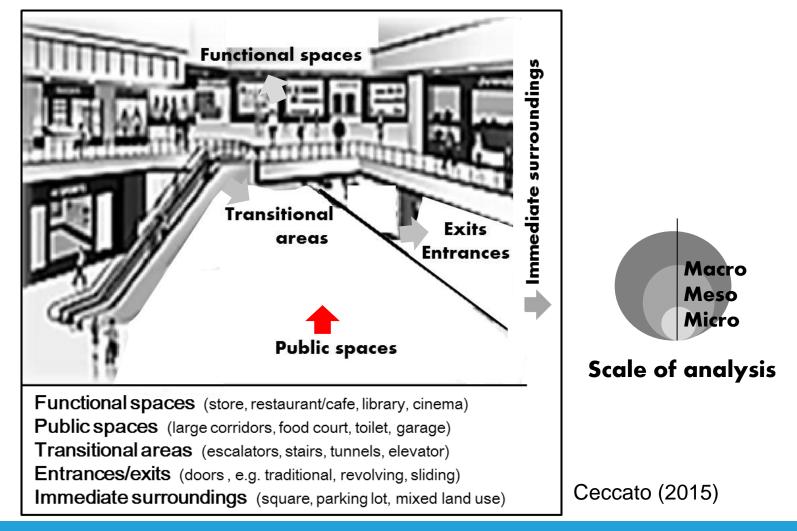




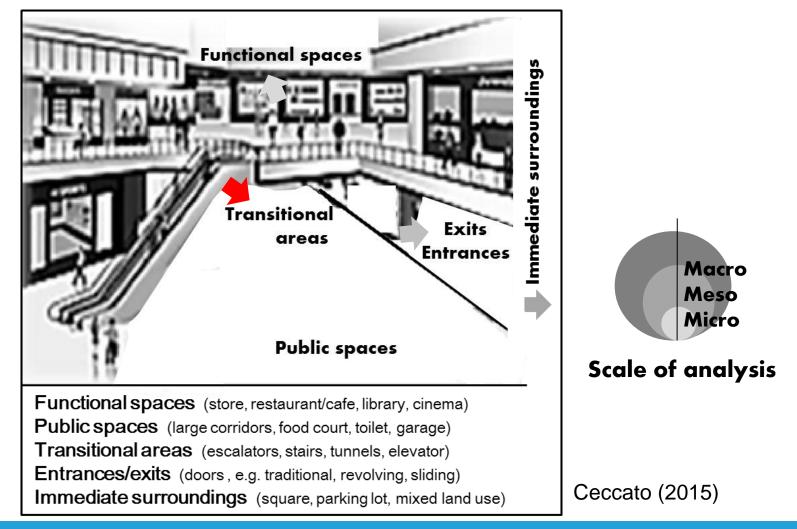




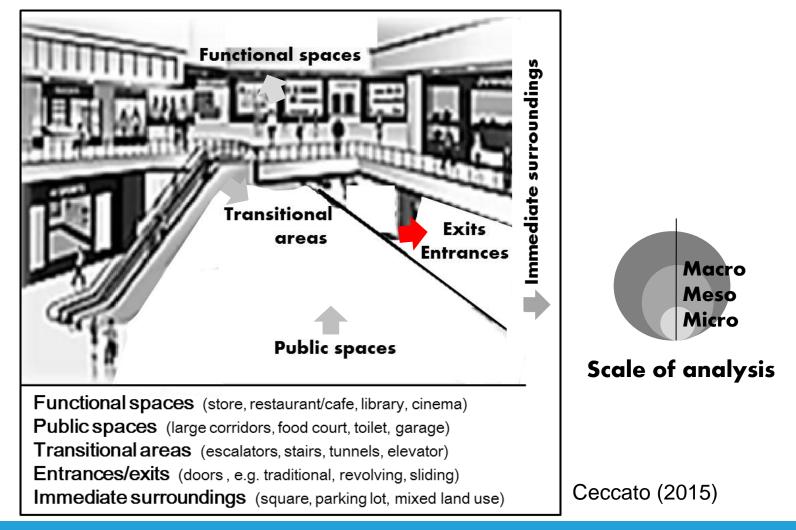




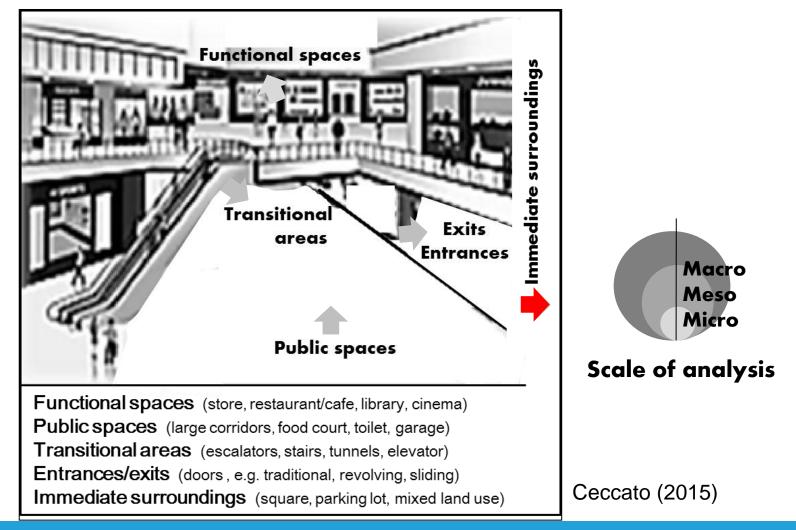








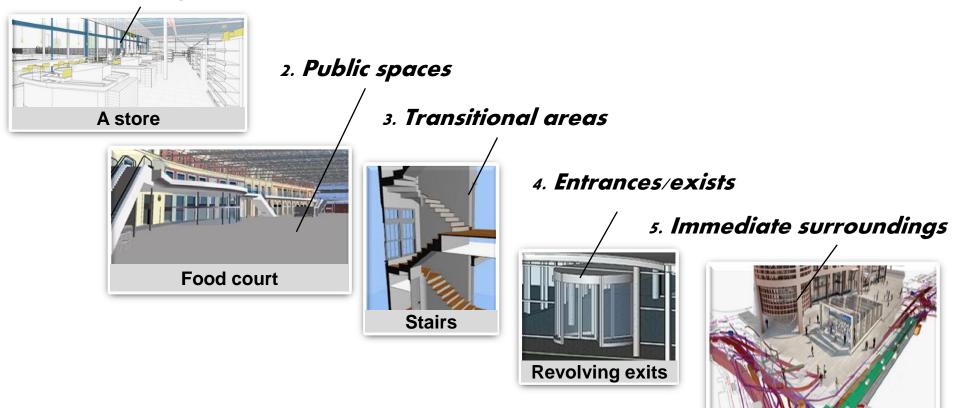




The conceptual model

Spaces that are *criminologically relevant* to crime & perceived safety in shopping centres

1. Functional spaces



Transportation hub



Method & data

Our approach:

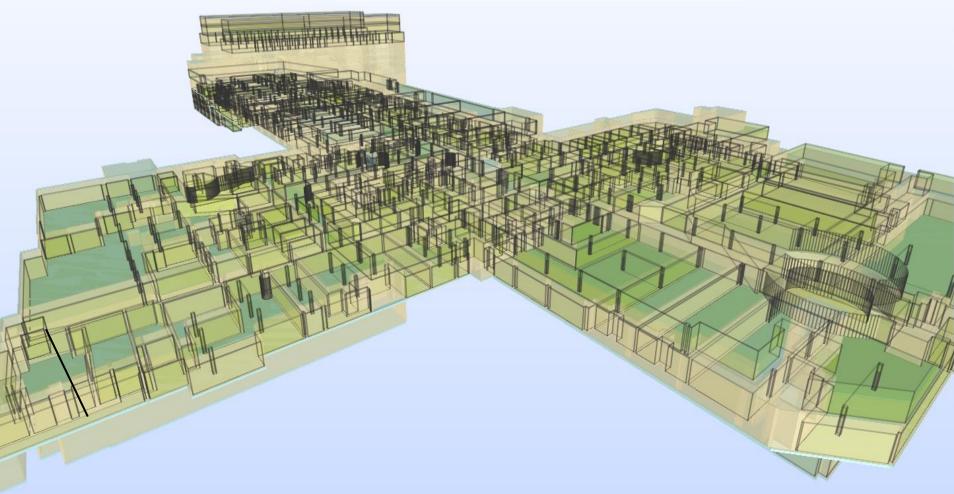
Visualisation of crime records on BIM – Building Information Modelling & Crime Prevention Through Environmental Design

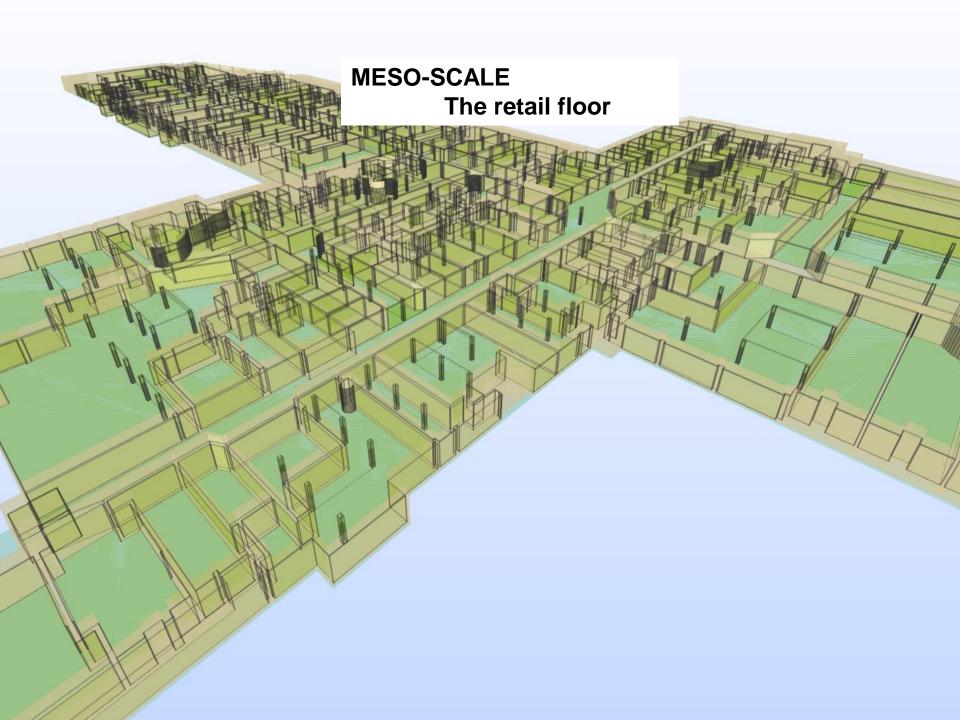
Data: 17 months of records (2014-2015) from security company in the Shopping center, in a total of 5780 records

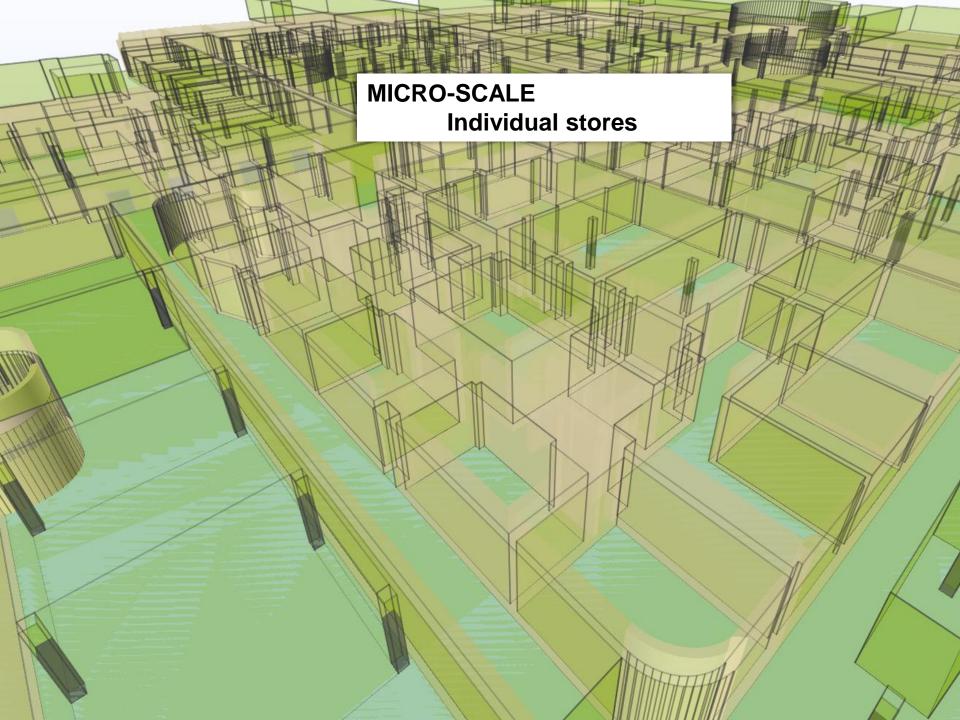
Tools: Revit 2013, Solibri v. 9.6, in-House tool Crime2IFC

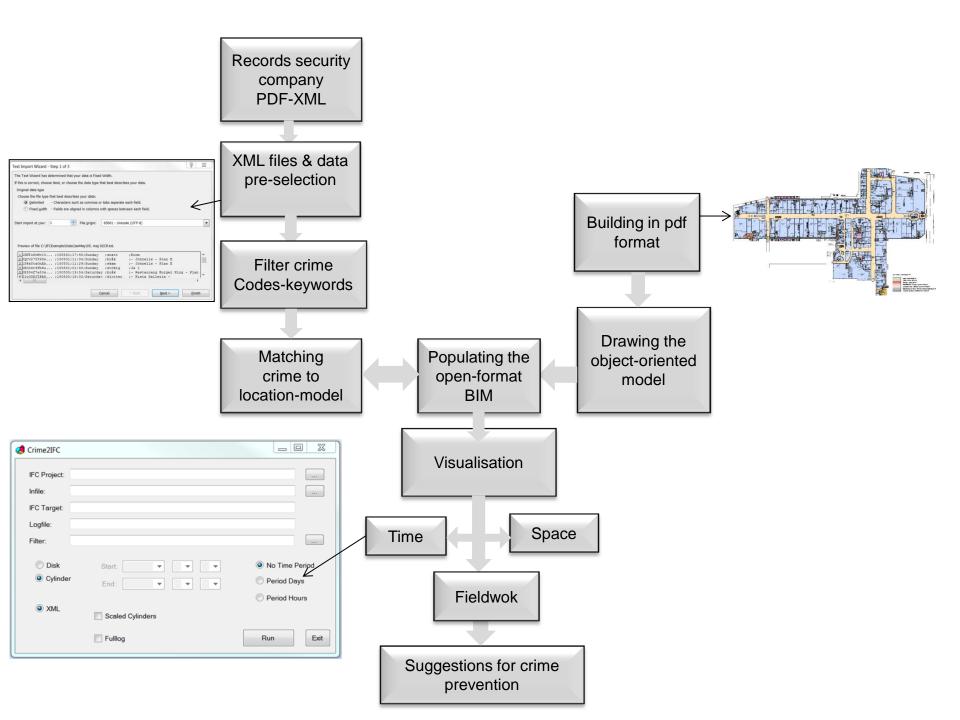
- fieldwork inspection \rightarrow suggestion for improvements













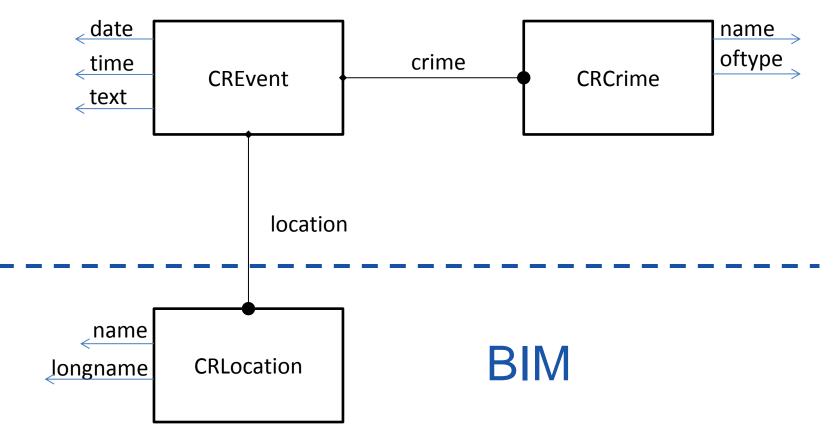


Figure Simplified schema of Crime2IFC

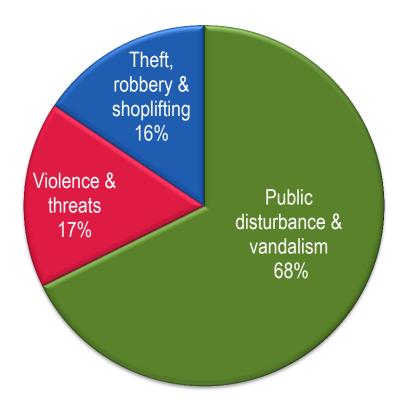




What, when and where?



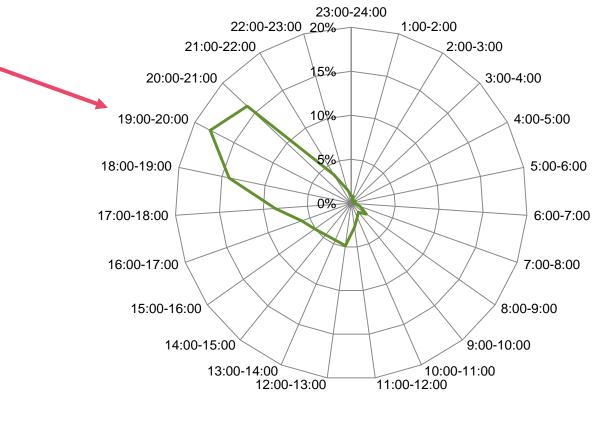
Which are the most common events?



Jan 2014-May 2015
N=5768 events11,2 cases per dayabout 1 event per open hour



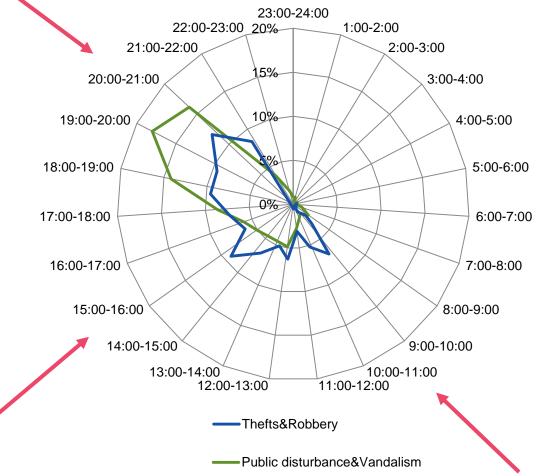
When do most events happen?



Public disturbance&Vandalism

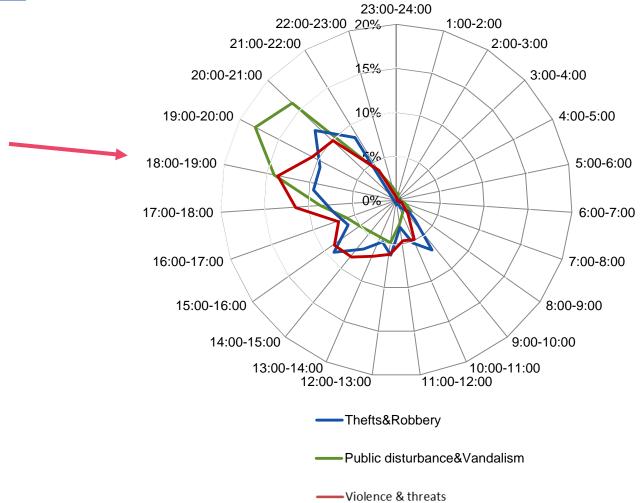


When do most events happen?





When do most events happen?





Weekdays-Weekend variations 16%16% 14% 15%15%15% 15% 14% 14%15% 15% 15% 14% 13%13% 13% 12% 13% 12% Monday Friday Tuesday Wednesday Thursday Saturday Sunday Violence & Threats Thefts&Robbery Public disturbance&Vandalism

Days of the week

3

2,5

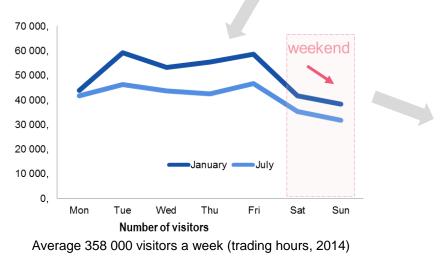
2

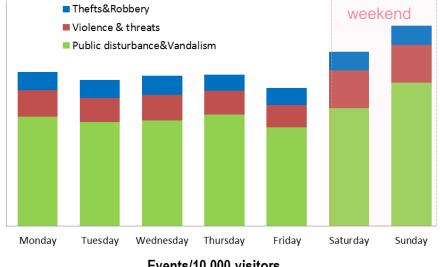
1,5

1

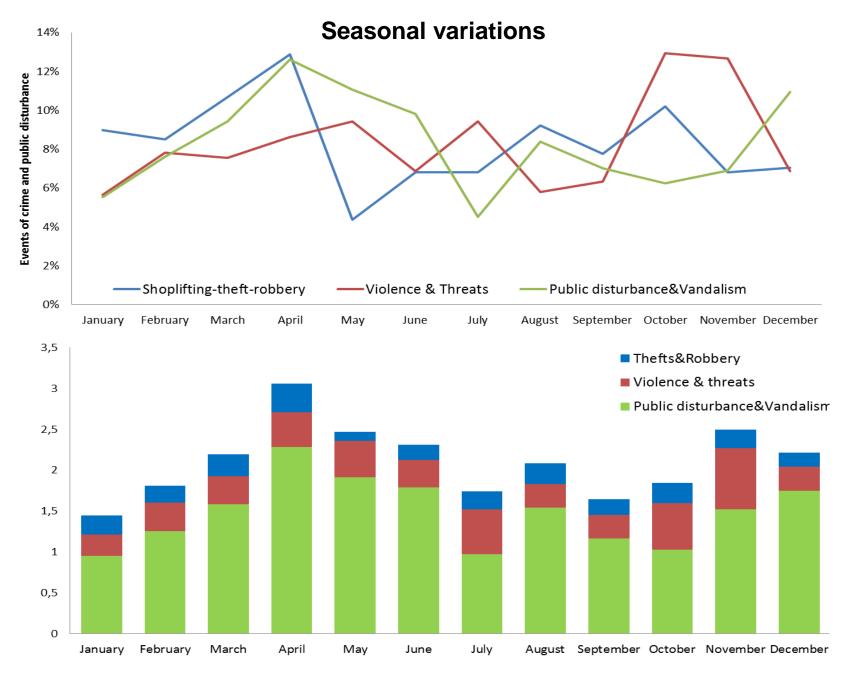
0,5

0

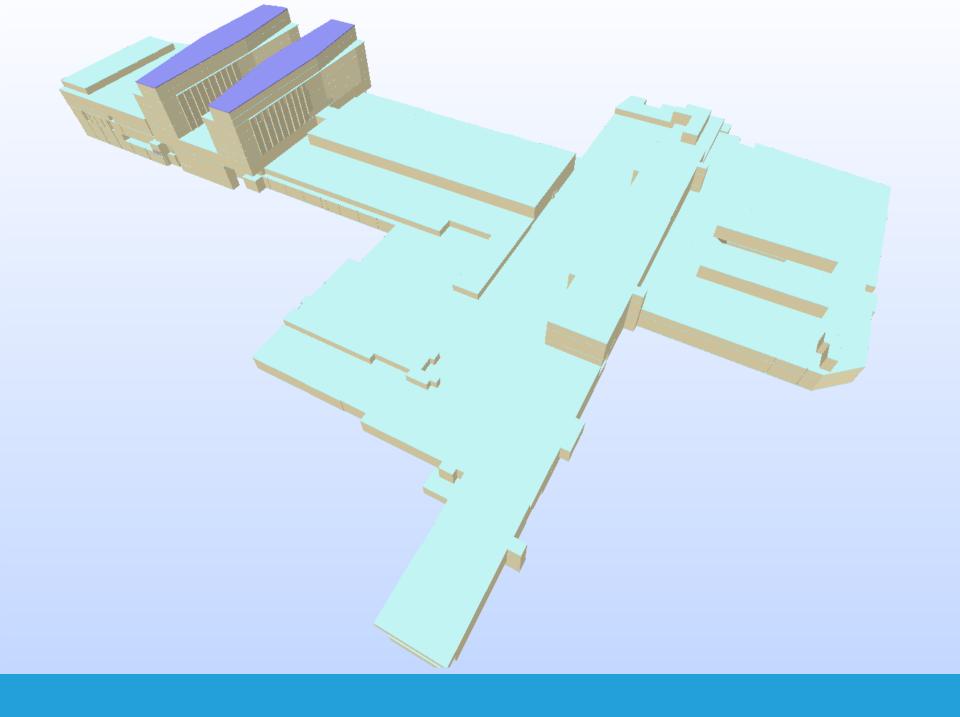




Events/10 000 visitors



Events/10 000 visitors





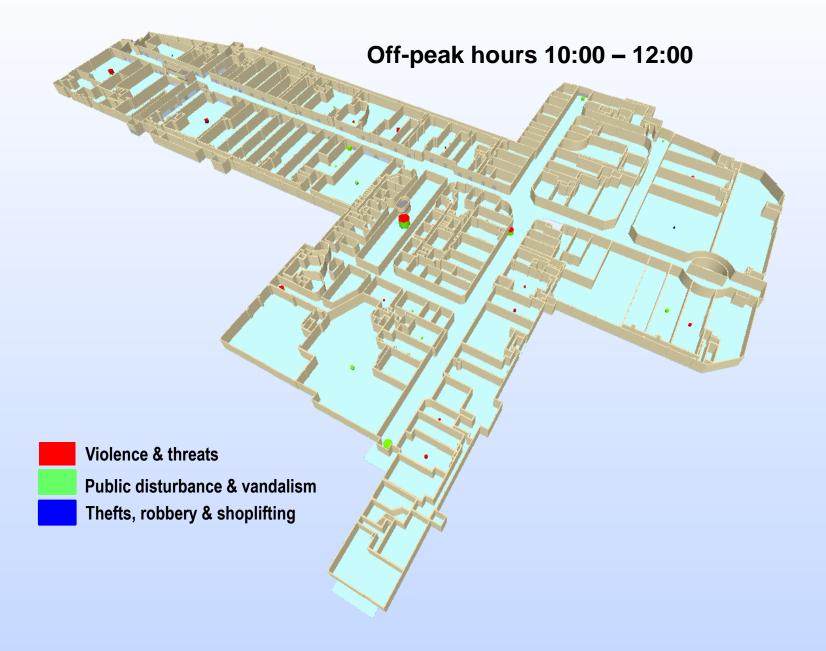
Crime prevention requires crime profiles in time & space

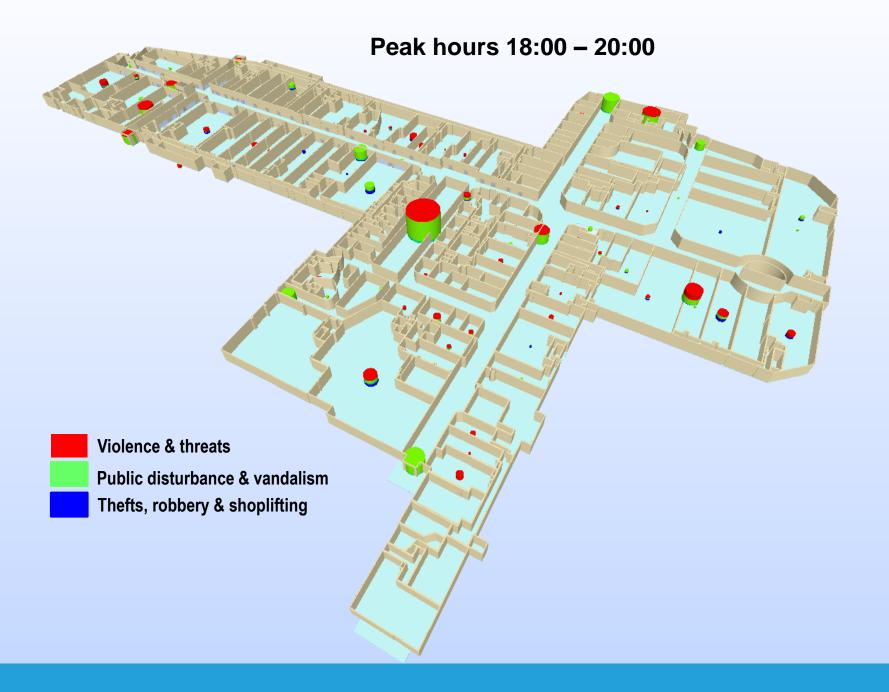
• By crime type



Crime specialisation

• By time







Conclusions and looking ahead

RESEARCH

- Distinct space-time patterns of crime at micro-meso scales
- Beyond the prototype: A 3-D visualisation tool on daily basis in shopping centers
- Modelling shopping center environment & crimes
- Crime & fear in shopping centers



Conclusions and looking ahead

IMPLICATIONS TO PRACTICE

Business specific!

There are 3 types of places most in need

 Public spaces
 The food court

 Entrances
 Entrance(s)

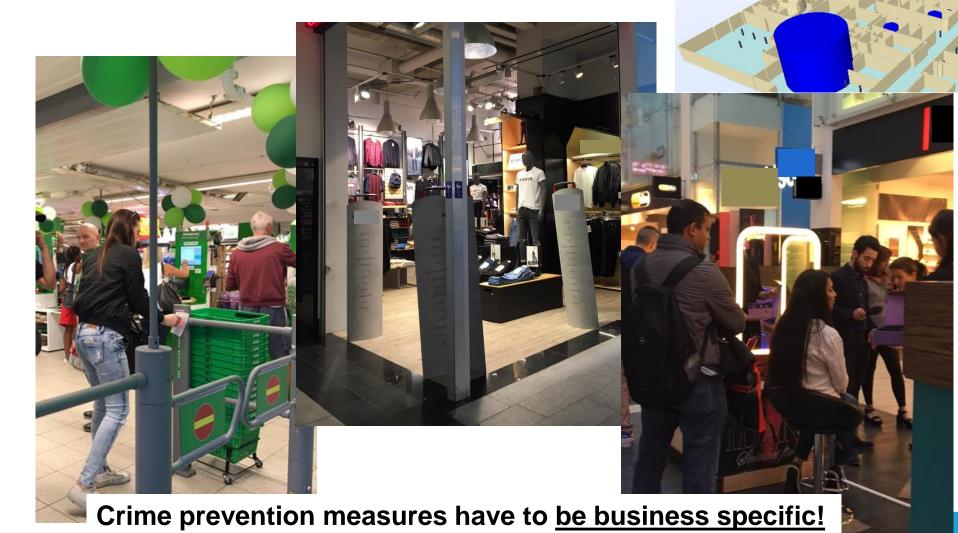
 Funtional spaces
 Particular premisses



More than formal social control, security of the food court can be improved by dealing with issues of design ----- **permeability and territoriality**

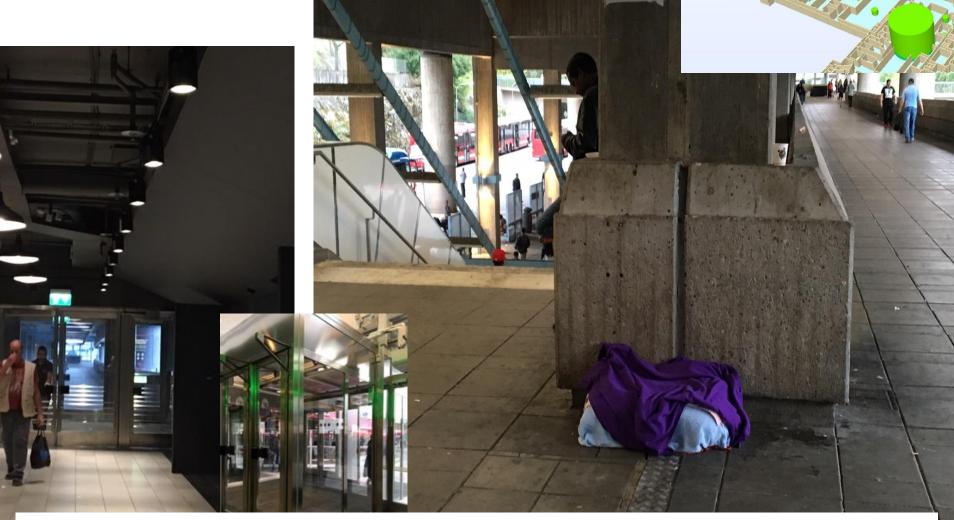








Entrances/exits

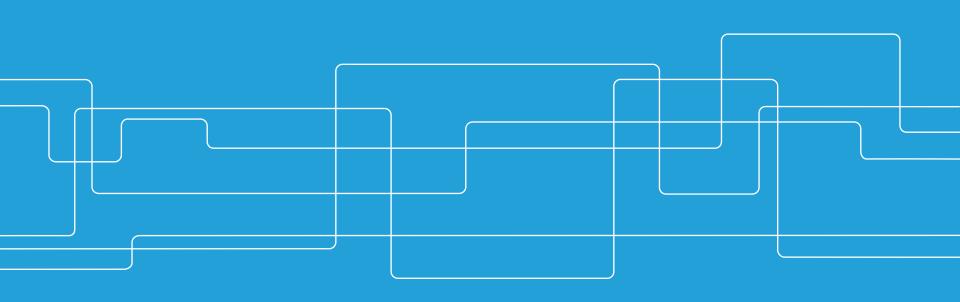


Safety problems require a multi-pronged approach, in collaborative schemes!

KTH ROYAL INSTITUTE OF TECHNOLOGY



Thank you!



The importance of neighbourhood context in understanding the risk from shop theft

Dr. James Hunter and Dr. Laura Garius, Quantitative & Spatial Criminology Research Group, Nottingham Trent University



Overview of research project

POOR KNOWLEDGE OF TRUE SCALE OF SHOP THEFT IN CORE CITIES

Support

POOR UNDERSTANDING OF MOTIVATION, MODE OF OPERATION AND BACKGROUND OF OFFENDERS

EFFECTIVENESS OF SECURITY MEASURES

NEW ESTIMATES OF SHOP THEFT AT THE NEIGHBOURHOOD LEVEL

INTERVIEWS WITH PROLIFIC SHOP THEFT OFFENDERS IN NOTTINGHAM ANALYSIS OF OFFENDER NEIGHBOURHOODS OF ORIGIN AND DISTANCE TO TRAVEL.

RISK OF SHOP THEFT BY RETAIL SECTOR AT NEIGHBOURHOOD LEVEL

Are shop theft offenders *over-represented* in certain neighbourhoods?

What type of neighbourhoods are these?

How can this help retailers understand the shop theft risk threat they face?

Core City A in England, 2003-2014 – 95,700 police recorded offences where crime and offender home postcodes are known

Why does neighbourhood matter? Place poverty and neighbourhood effects

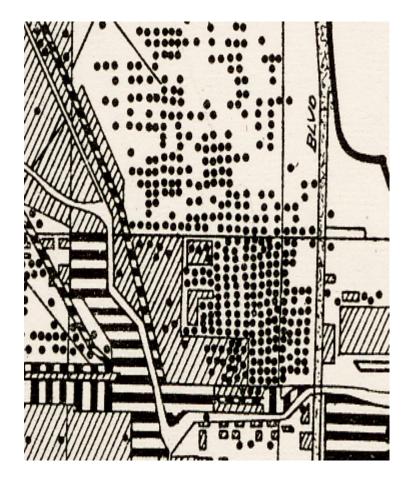
"People poverty occurs where lowincome people occupy certain parts of a city by virtue of their low income – <u>but their money incomes are not low</u> <u>because of where they live</u>" (Smith, 1977).

"Place Poverty: People are poor because where they live compounds the advantages or disadvantages of particular groups by virtue of where they live" (Smith, 1977)

NEIGHBOURHOOD EFFECTS:

- Function of, and relationship between, neighbourhoods;
- Spill over effects;
- Physical infrastructure, built environment and use of public spaces;
- Social networks, social capital and well-being;
- Access to, and use of, political networks;
- Quality of public services, partnership and strategic leadership;
- Identity, ownership and attachment.
 (Hunter, 2011)

Crime hotspots and offender neighbourhoods



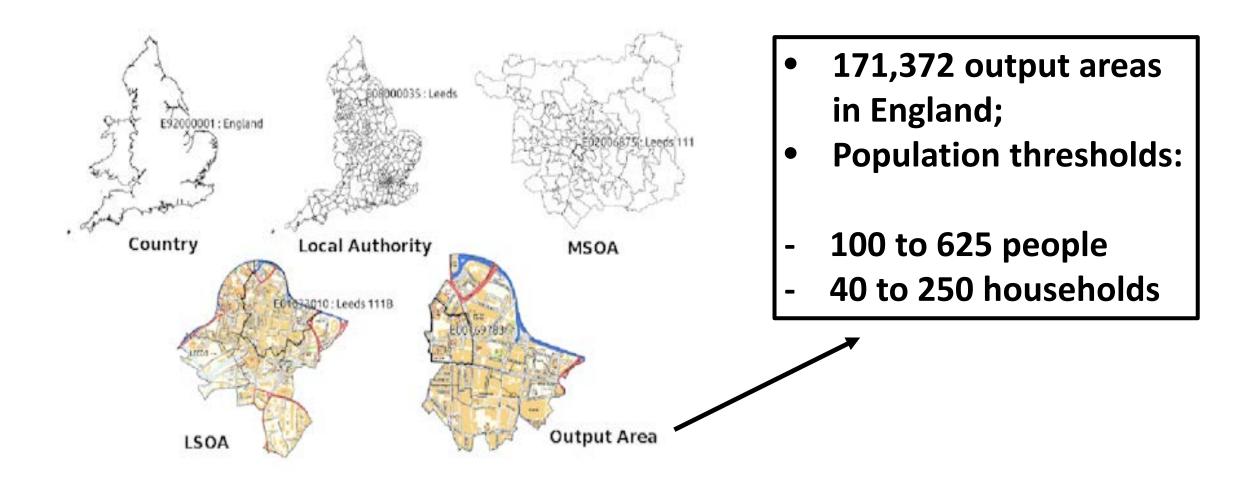
Park, Burgess & McKenzie (1925) – zones of 'transition' and 'stability'

Shaw and McKay (1942) Juvenile offenders neighbourhoods of origin – social disorganisation theory

Robert Sampson – Chicago School approach to the study of crime – collective efficacy

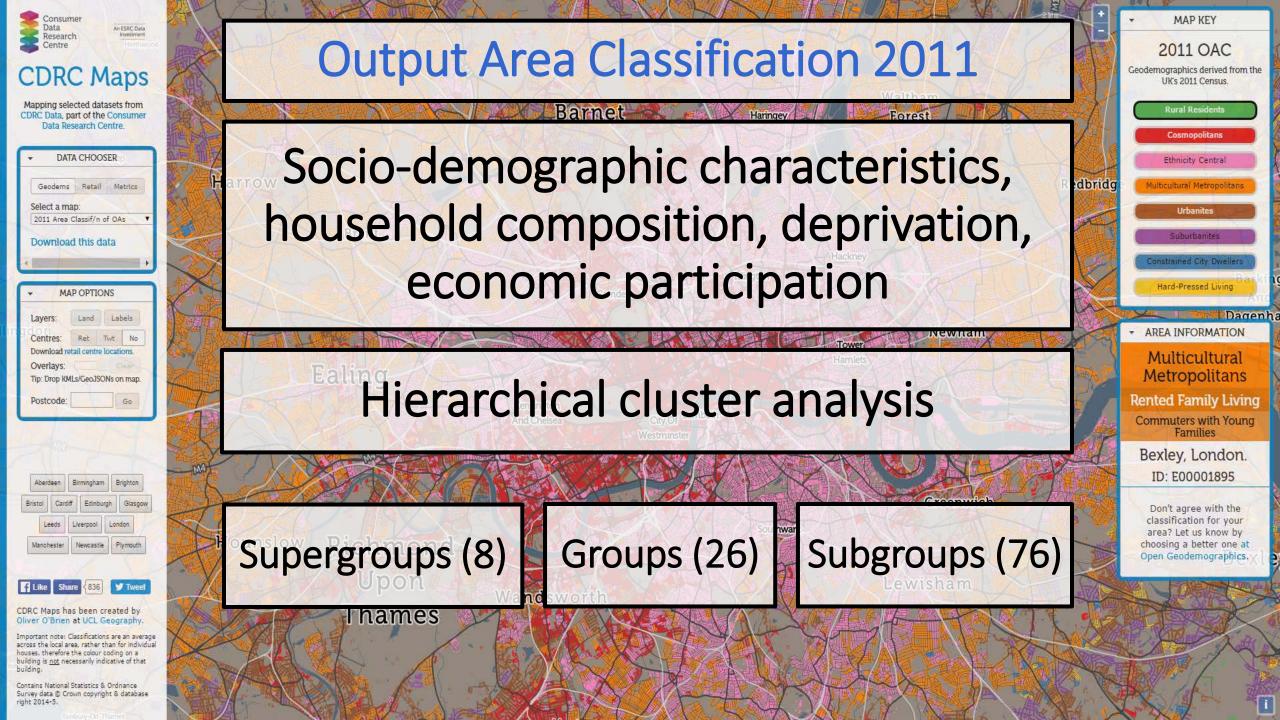
But the vast majority of empirical studies on crime and place focus on crime hotspots in terms of crime incidences

Defining neighbourhoods: Output Areas



How can we identify the over-representation of shop theft offenders in different neighbourhoods?





Output Area Classification 2011:

'Cosmopolitan' neighbourhoods

- Densely populated urban areas;
- Living in flats and communal establishments private renting more prevalent;
- High ethnic integration above average number of residents from EU accession countries;
- Households less likely to speak English as their main language;
- Young adults higher proportion of single adults and households without children;
- Higher proportions of full-time students;
- Predominantly employed in the accommodation, information and communication, and financial related industries - and using public transport, or walking or cycling to get to work.'





Empirical analysis: Which neighbourhoods matter?

Neighbourhood type:	Number of Output Areas:	Mean Shop Theft Location Quotient Score:	Standard deviation:
Cosmopolitan	120	1.14***	.78
Ethnicity Central	67	1.20***	.51
Hard-pressed Living	155	.73 ***	.49
All neighbourhoods	990	.94	.62

*** Significant at 99.9% confidence interval NS not significant

Does this differ in terms of where shop theft offenders head to commit their crime? (Mean Shop Theft Location Quotient Score)

Neighbourhood type:	City Centre:	High Street:	Elsewhere:
Cosmopolitan	.84NS	.99NS	.46NS
Ethnicity Central	1.04***	1.09***	.57***
Suburbanites	.86NS	.68***	.27NS
Constrained City Dwellers	.79***	1.19***	.53***
Hard-pressed Living	.79***	1.00NS	.30NS
All neighbourhoods	.90	1.03	.36

*** Significant at 99.9% confidence interval NS not significant

Policy implications:

- Neighbourhoods characterised by transition are the primary locations where shop theft offenders are disproportionately found;
- Proximity of neighbourhoods to city centre mediates the level of risk;
- Once offence location is taken into account, only transitionary neighbourhoods characterised by ethnic diversity pose a significant threat;
- More complex inter-play between retailer location, neighbourhood characteristics, the concentration of shop theft offenders, and the distance travelled to crime;
- Decisions by retailers over where to locate should be informed by the shop theft offender profiles of nearby neighbourhoods as much as by the consumer household characteristics of these areas.



Thank you for listening

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@placepoverty
@shoptheftrisk



