Crime and the Night-Time Economy (NTE): Multi-Classification Crime (MCC) hot spots in time and space

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Dr Andrew Newton
Reader in Criminology
The Applied Criminology Centre
The University of Huddersfield
a.d.newton@hud.ac.uk
Overview

• What on earth are MCC hot spots and why would I care?

• Is there a need to re-think how we do crime analysis?

• What are the implications of MCC hot spots for practice?
Introduction

• What on earth are MCC hot spots?
Introduction

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Introduction

• What on earth are MCC hot spots?
I. Crime hot spots
II. Contain more than one crime classification
Re-thinking hot spot analysis

- Why do hot spots emerge?
Re-thinking hot spot analysis

• Key Drivers (universal characteristics)

Repeat and Near Repeat Victimisation

Crime Generators
The analysts role?

• Analysis of crime data
  – Daily, weekly basis
  – Burglary

• Further analysis
  • Offender/Victim
  • Time
  • Place
  • MO
  • (WWW),W? +W?

• Identify Response

• Problem Solving
• SARA/COMPSTAT
• POP/ILP
• Hypothesis Testing
• Evidence Based Prevention
Identify hot spots

• Create crime map
  – Points/pins
  – Choropleth/thematic
  – Clustering/interpolation algorithm
    • STAC, NNH, KDE, GI*

➤ Get officers in right place
➤ Target Resources

Maps are Spencer Chaineys!!!
Identify hot spots in time

- Get officers in right place at right time
- Hot Spot Policing (possible tactic)

Animation - Spencer Chainey
Animation – Jerry Ratcliffe
Why rethink

• Crime Analyst
  – analysis & thinking crime specific
  – burglary increased
  – focus on burglary
  – intuitively makes sense

• Mapping all crime problematic
  – Burglary of house
  – Theft from shop
  – Violence in street
  – Criminal damage in a park
Think back to offenders

- Places that are hot spots
  - RV, NRV, Crime Generators

1. (likely) multiple offenders
2. numerous targets
3. offenders are opportunistic
4. offend in more than one way
5. commit more than one type of crime**
Re-thinking hot spots

- If identify place as hot spot (e.g. drugs hotspot)
- Is this location
  - Also a hot spot for other types of crime? (MCC hot spot)
- And if so, is it a
  - A hot spot for other types of crime at the same time?
  - A hot spot for other types of crime at different times?
- If different time of day does time vary by
  - Hour of day, day of week; weekend-weekday; school-non school day; months; seasons etc.
Using NTE as an example

• Anonymised case study area
  – Residential population ~1.5 million persons
  – Mixture of large towns and several rural villages
  – Covering geographical area ~600 km2.

• Crime data
  – 36 months offence data (January 07 to December 09)
  – 12 months Incident data (2007)

• Licensed premise database

• Analysis used 250m grid squares
### Table 1
Average distances of offences to licensed premises (metres)

<table>
<thead>
<tr>
<th>Offence/incident</th>
<th>N</th>
<th>Distance to nearest licensed premise (m)</th>
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<th></th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>SD</td>
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<tr>
<td>Disorder</td>
<td>346,022</td>
<td>167.5</td>
<td>119.5</td>
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<td>Violence against person</td>
<td>64,640</td>
<td>132.4</td>
<td>84.2</td>
<td>173.4</td>
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<tr>
<td>Criminal damage</td>
<td>83,159</td>
<td>163.4</td>
<td>124.6</td>
<td>178.6</td>
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<tr>
<td>Drugs</td>
<td>18,270</td>
<td>149.1</td>
<td>85.4</td>
<td>225.6</td>
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### Table 2
Percentage of offences and incidents near licensed premises (within 250 m)

<table>
<thead>
<tr>
<th>Offence/incident</th>
<th>N &lt; 250 m</th>
<th>Percentage</th>
<th>Total N</th>
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<tbody>
<tr>
<td>Disorder</td>
<td>188,756</td>
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<td>Violence against person</td>
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<tr>
<td>Criminal damage</td>
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<td>Drugs</td>
<td>11,870</td>
<td>65.0</td>
<td>18,270</td>
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### Table 3
Correlations between licensed premises and crime hot spots (250 m grid based analyses)

<table>
<thead>
<tr>
<th>Spearman’s Rho correlation with licensed premises</th>
<th>VAP</th>
<th>CD</th>
<th>Drugs</th>
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Fig. 2
Case study area with 250 m grids and licensed premises

Fig. 3
G1* hot spot maps of crime and licensed premises by each of four crime types (a–d) (>99% significant hot spots shown). CD criminal damage, VAP violence against person.
## Table 4
Hot spot grids (99% significance) and crime and disorder types

<table>
<thead>
<tr>
<th>Crime type</th>
<th>VAP</th>
<th>CD</th>
<th>Disorder</th>
<th>Drugs</th>
<th>Total</th>
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<td>Number of grids</td>
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<td>2385</td>
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<td>Percentage of grids (%)</td>
<td>83.7</td>
<td>80.3</td>
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### CCA analysis of grids by hot spot types

(Conjunctive case analysis)

<table>
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<tr>
<th>Presence (1) or absence of a hot spot (0) of a hot spot</th>
<th>VAP</th>
<th>CD</th>
<th>Disorder</th>
<th>Drugs</th>
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### Table 5
Top 20 grid profiles (the hottest hot spots)

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<th>Grid_ID</th>
<th>Premises (N)</th>
<th>VAP (N)</th>
<th>VAP (z score)</th>
<th>Disorder (N)</th>
<th>Disorder (z score)</th>
<th>CD (N)</th>
<th>CD (z score)</th>
<th>Drugs (N)</th>
<th>Drugs (z score)</th>
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<th>All Crime (N)</th>
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*Z score based on Getis Ord (GI*) hot spot significance (>2.576 = 99 % significant)*
Fig. 1
Weekly-hourly crime frequencies (Sunday to Saturday) for each of four crime types (a–d). CD criminal damage, VAP violence against person.
Fig. 4
The ‘Hottest’ hot spot profiles by time of day and crime type (MCC hot spots): values indicate crime counts
Findings 1 (top 20 hot spots)

- The top 20 ‘hottest’ hot spots (250m grids)
  - 0.3% grids with crime (6165)
  - over 5% crime
- 7 h time window
  - Thursday 2-3am, Friday 1-2am; Saturday midnight -3am
  - 4% of the 168 WH intervals over a week
  - 15% all crime at these top 20 hot spots alone
- 7h window important
  - MCC hot spots co-existed in time & place
  - all four crime classifications (VAP, CD, Drugs, ASB)
Key Findings 2 (top 20 hot spots)

• At other times MCC hot spots evident
  – not for all four crime types.

• Friday and Saturday
  – disorder 6.00 p.m. > early hours of morning
  – criminal damage offences earlier than violence
  – violent offences tended to occur after midnight
  – drugs 1h peaks Sunday midnight

• Spatial lag Friday v Saturday
  – similar patterns
  – offences are approximately 1 h earlier on Fridays
Explanations

- High volumes of persons present at these times & places
- Creates multiple opportunities for crime (CPT&RAT)
- Coterminous suitable targets and lack of capable guardians in these micro places
  - drugs, criminal damage, disorder and violence
- Similar to signal crimes (Innes):
  - what happens earlier in day indicative of later
- Later>more violent crimes
  - Fewer premises open, more concentrated, more alcohol and cumulative stresses
- Friday Saturday 1h lag may be cultural?
Implications

• Hot spot policing at MCC hot spots
  – Tactics to address multiple crime problems?
  – Require range of measures?

• More or less effective than hot spot policing?
  – More offenders present at MCC hot spots than single crime hot spots?
  – tactically may be more difficult to police MCC areas
  – targeting multiple types of crime require several concurrent tactics that may conflict
Limitations

• Data
  – Hot spots function of police presence
• Limitations of recorded crime data
  – VAP and NTE under-reporting

• Analysis
  • Using 250m buffers
  • GI* identifies too many hot spot areas significant at 99 %
  • Not tested for significant correlations temporally

• Implications
  • NTE phenomena only
Alternative MCC hot spots

• Other MCC configurations?
  – Burglary; theft of, and theft from vehicle?
  – Street robbery; pickpocketing; and theft from person
  – drug locations – other crimes associated with illicit trade?

• For space-time analysis
  – MCC principles increase data sample
  – When segmenting data by time and day
    • fewer numbers for running analysis
  – Group together ‘related’ crime types
Summary

• What on earth are MCC hot spots and why would I care?

• Is there a need to re-think how we do crime analysis?

• What are implications of MCC hot spots?
Summary

• What on earth are MCC hot spots and why would I care?

• Is there a need to re-think how we do crime analysis?

• What are implications of MCC hot spots?
  – theory; analytical; operational; tactical; strategic
Dr Andrew Newton
Reader in Criminology
Associate Director – Applied Criminology Centre

+44 (0) 1484 473837
a.d.newton@hud.ac.uk
www.hud.ac.uk/research/researchcentres/acc/staff/drandrewnewton.php

The Applied Criminology Centre | HHR2/13
University of Huddersfield | Queensgate | Huddersfield | HD1 3DH