Geoprofiling Crime: Engaging students with lessons from applied geography

Stephen Matthews
Ballarat Grammar
Former Consultant Criminal Intelligence Analyst (Geographic Profiler) Victoria Police
Presentation overview

• Context
  – My background

• Purpose - practical lessons
  – Making geography real and accessible
  – Thinking/working geographically ‘by default’
  – Spatial technologies at work

• Case studies

• The Australian Curriculum

• Questions/discussion (if time!)
Crime and Geographic Information Systems

Road and address base maps
Victoria Police records (LEAP)
CAD data – Intergraph
 ie, 000 calls
ABS Census (demographic) data
Other Government data
 eg, land-use information
Other sources
 eg, satellite images

- Patterns (where and when crimes occur)
- Trends (increases/decreases, location shifts)
- Hotspots (focuses of activity, movement)
- Profiling (serial crimes, base prediction)
Geography’s key integrating role

Geography

Psychology

Criminology

Spatial crime analysis
Crime mapping, Distribution & patterns, journey to crime (1800s onwards)

Geographic Profiling
(1990s onwards)

Criminal Investigative Analysis
FBI-style profiling – Identification of an unknown offender by their characteristics (1970s onwards)

Behavioural geography/Environmental psychology
Understanding human spatial behaviour – spatial reasoning & decision making (1970s onwards)

Matthews 2012
Some Theory
Place, time, crime

• Crime is not random
  – If it were, there would be an equal chance of crime occurring anywhere at any time
  – Actually crime is not randomly distributed; it clusters, there are spatial and temporal patterns
  – Criminal opportunities are not random; targets/victims have patterns (e.g., land-use and urban morphology or personal activities and routines)

• Both victims and offenders are not pathological in their use of time and space
  – i.e., not the product of mental illness; reasoned, ordered
Spatial decisions – crime templates

• As individuals undertake activities and move through space, they make decisions
  – When activities are repeated frequently, the decisions become regularised
  – Regularisation creates an abstract guiding template
  – For decisions to commit crime, this becomes a crime template

• Templates operate within the built urban environment
  – Urban structure of roads, activity centres, etc
Crime templates continued

- Individuals or networks of individuals commit crimes when:
  - There is a triggering event
  - A process for locating a target/victim
  - A fit with an offender’s crime template

- Criminals accumulate experience which influences and informs future actions
Cognitive (Mental) Map Model

Cognitive (Mental) Map Model Applied to Crime

Sensory input

Primary - experienced

Secondary - indirect

Environmental information

Maps
Images
Media
Other offenders

Perceptual filters

Personality
Organised/disorganised
Success/failure & ‘comfort’ level

Experiences

Culture

Gender

Class

Ethnicity

Potential target
‘suitability’ & availability

Cognitive or Mental Map

Awareness Space + Activity Space = Potential Offence Space

Bases
Visits
Past crimes

Principle of Least Effort

• Time is a commodity and almost all people act in a manner to conserve its use
  – When travelling, people assess factors such as time, effort and cost

• The principle of least effort leads to the effect of ‘distance decay’

• For most persistent offenders the density of their crime sites decreases with increasing distance from home

• Studies show there is a buffer of no offending
Shopper behaviour analogy

• The Principle of Least Effort has a caveat that ties to how people shop:
  – Low order (convenience) goods and services
  – High order (specialty) goods and services

• Impacted by access to/ease of transport and urban morphology

• Therefore, for acquisitive crimes (eg, robbery and burglary), distance has been found to be proportional to anticipated gain
  – Implications for thieves who also commit offences against the person
Urban morphology & distance decay

- Urban areas are constructed from nodes (activity bases), edges (barriers) and paths (transport networks)
- Distance decay models fit offenders in general terms
  - Choice of decay model needs to be made
Making sense of crime space & places

Residence

Family/friends

Target Areas

Offence locations

Buffer zone

Shopping/Entertainment

Recruitment

Matthews, 2013 after Brantingham & Brantingham, 1981
The role of Geographic Profiling

• Mapping all locations linked to a serial crime
• Serial crimes can include robberies, burglaries, theft, arsons, sex offences and homicides
• Many locations are often associated with an incident
• Working back to establish probabilities of offender base location
• Prioritise suspects for investigators
• Prediction of spatial behaviours
• Advise on surveillance locations or areas for intensive investigation, eg, canvasses
The Cases
Case studies

Putting theory into practice...
Hopefully interesting and enlightening!

Policing case studies
• Operation Lithgow (residential burglaries)
• Lorimer Taskforce (armed robberies/Police homicide)
• Mikado Taskforce (serial sex offences/serial homicide)

Teaching case study
• Perception versus reality of place (fieldwork)
  – Potential suitability for AC:G Year 7
Operation Lithgow

- Serial burglaries
- Phases with breaks
- Day and night
- Nominated suspect
- Spatial patterns
- Surveillance advice

Prepared by Stephen MATTHEWS
Intelligence Data Centre 13/9/99
IN CONFIDENCE
Focus on urban morphology
Urban morphology

Considerations...

• Ease of ingress and egress
  – Travel mode
  – Travel distance/efficiency
  – Presence of barriers
  – Offence proceeds

• Visibility versus concealment
  – Seeing who is nearby
  – Avoiding being seen
  – Vegetation? Lighting? CCTV?
Lorimer Taskforce

- Operation Hamada – 11 armed robberies, 1998
- Sgt Gary Silk & S/C Rod Miller shot by the offenders whilst on a stakeout, 16 August 1998

- Geographic profiling was requested within weeks of the offence
Lorimer continued...

- Two years of intensive investigation
- Nearly 2000 leads chased down
- Hyundai Excel damaged, 35 000 cars reduced to 2000 to eliminate
- Debs later convicted (2007 and 2011) of two more murders through DNA linking

On TV
*Underbelly: Tell Them Where Lucifer Lives*
9 Network, aired 7 February 2011

Bandali Debs: life, no parole
Jason Roberts: life
The Age, 26 July 2000

There was one lead that looked promising early but had gone nowhere. It was the suggestion that a specific Hyundai Excel had been damaged about the time of the murder.

This car led detectives to a man living in the outer east of Melbourne. It was the area that geographic profiling had flagged as the most likely home of at least one of the killers.
Mikado Taskforce – Peter Norris Dupas

• Committed his first offence at age 15
• In and out of psychiatric facilities and prisons for most of his life
• Re-offended very shortly after release
• Profiled for sex offender research database
• One month later, Nicole Patterson was murdered and mutilated in her home (19 April 1999)
• Intensive analysis and incident linkage including mapping Dupas’ activity space
Mikado continued...

- Other potentially linked homicides identified...

Helen McMahon
Murdered 13/2/85
Open investigation

Renita Brunton
Murdered 11/11/93
Open investigation

Margaret Maher
Murdered 4/10/97
Convicted 11/8/04

Mersina Halvagis
Murdered 1/11/97
Convicted 10/8/07 (appealed)
Re-convicted 19/11/10 (appeal rejected)

Kathleen Downes
Murdered 31/12/97
Open investigation

Nicole Patterson
Murdered 19/4/99
Convicted 17/8/00
Peter Norris Dupas

Dupas was portrayed on TV in *Killing Time*, filmed in 2009 but only aired on 2 November 2011, based on a 2008 book by disgraced lawyer Andrew Fraser.

Sentence: life with no possibility of parole; he will die in custody

... this story continues: second appeal denied in December 2012
Local area liveability perceptions

• One example of a geography class inquiry with fieldwork
  – Potentially suited to *Australian Curriculum: Geography* Year 7 human unit ‘Places are for living in’ (K&U CDs 1-3)

• Identify a range of small sub-areas within a local area that have potentially different perceived characteristics
  – eg, safety/security (crime), residential character, service amenity, public transport access, etc

• Construct a survey to administer in the area that ranks perceptions of sub-areas against these characteristics

• Use official data to test the perceptions against the ‘real’ situation
  – Neighbourhood Watch data in the case of crime
Crime – a great topic for geography

• Crime is *interesting* for, and *relevant* to students (and it makes for good geography!)
  – Very spatial, at a range of scales
  – Relevant: ubiquitous but spatially non-uniform
  – Diverse: nature and characteristics
  – Motivating: the ‘CSI effect’, amateur Sherlock
  – Accessible: data is out there

• An obvious consideration is the of *suitability* of topic material to student age
  – Naturally we are not trying to teach students how to do crime!
Potential benefits to students

• Understanding of a common phenomenon by thinking geographically
  – Practical application of geographic concepts
  – Inquiry methodology applies exceptionally well
  – Spatial technologies (GIS) applications

• Seeing their surroundings with ‘new eyes’

• Application to personal security
  – Knowing how, when and where common offences are committed from a geographic standpoint and taking simple preventative measures for personal safety
Do it yourself?

- Online serial crime case sites
- Reality versus perception – local area crime
- Accessing spatial crime data
  - Local police: make contact
  - Neighbourhood watch: search/make contact
  - State/Territory Police: search online
  - Australian Bureau of Statistics
  - Australian Institute of Criminology
  - Australian Government data
Thank you!

Presentation PDF downloads:

Contact:
Stephen Matthews
Ballarat Grammar
stephen.matthews@bgs.vic.edu.au
@srmdrummer on Twitter