Crime Pattern Theory

Expanding our Understanding of Crime Using New Computational Strategies

Part 3
Crime Generators and Crime Attractors
Crime Generators

- Channel large numbers of people past a set of criminal opportunities.
- Some potential offenders are mixed into groups of people passing the opportunities.
- Crimes occur opportunistically.
Crime Attractors

- Attract strongly motivated offenders intending to commit a crime.
- Attraction is created by an ecological label.
- Offenders may travel long distances to reach an attractor location.
- Crimes often committed by area outsiders.
- Offenders often follow a muti-step target search process once they reach the attractor neighbourhood.
BURNABY CRIMINAL CODE CALLS 1991
3D Visualization of major mall - 2001-2006

(ArcScene, Kernel Density Map(12,200m))
Cross section of Crimes Across Kingsway in MT mall

(Kernel Density Map)

Metrotown Mall Across Kingsway

Kingsway

Justin Song 10/3/2011
Cross section of Crimes Along Kingsway in MT mall

(Kernel Density Map)
Offenders’ Home Location (City)
(based on Metrotown Mall Centre crimes)

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<table>
<thead>
<tr>
<th>City</th>
<th>Offenders Count</th>
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<tr>
<td>VANCOUVER</td>
<td>1400</td>
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<tr>
<td>BURNABY</td>
<td>1200</td>
</tr>
<tr>
<td>SURREY</td>
<td>1000</td>
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<tr>
<td>PORT MOODY</td>
<td>800</td>
</tr>
<tr>
<td>COQUITLAM</td>
<td>600</td>
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Criminal Networks
Networks

• Networks of people can structure crime patterns by:
  ▫ Changing each other’s awareness and activity spaces
  ▫ Providing multiple starting points for criminal target searches

• Networks of interest should include:
  ▫ Criminal Associates and Co-Offenders
  ▫ Girlfriends or significant others
  ▫ Family
  ▫ Friends

• Networks can be analyzed to:
  ▫ Identify a spatially likely suspect for a set of crimes
  ▫ Identify a set of crimes that relate to a set of offenders
  ▫ Understand larger crime patterns
A's Awareness Space

B's Awareness Space

C's Awareness Space

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FLINTS NETWORK NODES WITH INTELLIGENCE

Co-Defendant Link

IMS Link

Co-Defendant & IMS Link
Focus on Prolific Offender Networks

- Analyze police and court data
- Explore networks of frequent offenders
- Identify prolific offenders who are also key to keeping the network of offenders active
- Target investigations on offenders who are most important to offending capacity of the entire network
- Shred network
Graffiti Vandal Network
Key Players Jailed:

Network Disintegrates  Vandals become less active
Secondary players can be targeted
A Co-Offending network meeting the legal definition of an Organized Crime Group

Source: Brantingham, Brantingham, Glaesser & Tyebi (2012) AN ANALYSIS OF RCMP ``E`` DIVISION DATA TO ESTIMATE POSSIBLE CRIMINAL ORGANIZATIONS: FINAL DESCRIPTIVE REPORT. OTTAWA: PUBLIC SAFETY CANADA.
Road Network Analysis

- **Ease of Movement**
  - Formal road network analysis
    - beta scores – ease of flow measurement
    - Tells us likelihood of offender or target from Point A to Point B on the network
    - Tells us most likely path

- **Directionality**
  - Establishes resistance to movement
  - Calibrates weights of competing nodes
Structuration of Burglary

The road network, land use and zoning as key determinants of the crime pattern

Research by Rob Tillyer and Patricia Brantingham
Residential B&E's in Burnaby, BC
Add Street Network
Streets in Buffer along Main Roads
Commercial Zoning
Commercial Streets

Summed residential break and enter.shp

1
2 - 3
4 - 7
8 - 11
12 - 16
Commercialstreets.shp

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High Density

Summed residential break and enter.shp

1
2 - 3
4 - 7
8 - 11
12 - 16

Highdensity.shp

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SFU
SIMON FRASER UNIVERSITY
High Density and Commercial
Land Use analysis

• Criminality of land use mixtures
  ▫ Is a pub near a high school more problem than a pub near a hospital?
  ▫ Is a school near a parking lot more problem than a school near a bank?
  ▫ Is a convenience store more problem next to a school or a bar or a hospital?

• Crime fields of nodal uses
  ▫ How far will a thief travel to reach a convenience store, a supermarket, a shopping centre?
  ▫ How far will a customer travel to reach a drug market or a prostitution stroll?

• Housing mix
  ▫ What blend of different housing forms maximizes or minimizes criminal event volumes?
A Conceptual Model for Anticipating Crime Displacement

Patricia L. Brantingham and Paul J Brantingham

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Simon Fraser University
<table>
<thead>
<tr>
<th>Displacement Type</th>
<th>Geographic</th>
<th>Temporal</th>
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<tr>
<td>Adults with Low Commitment</td>
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<td>Low</td>
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Spatial Displacement

• Most criminal events do not displace when some intervention eliminates the opportunity

• The relatively small proportion of criminal events that displace do so in predictable ways.
Journey to Crime

- Most crimes are committed opportunistically as a result of the offender discovering the opportunity in the course of routine, non-criminal activities.
- Crime trips are short, and occur in the offender’s home neighborhood or some adjacent area.
- Crime trips that leave an offender’s home neighbourhood travel to other similar neighbourhoods or to some wider activity node – some crime attractor or crime generator.
- Crime trips by offenders living in the same neighbourhood tend to be vectored in the same direction.
- Crime trip distances vary with the type of crime in question.
- Crime trip distances vary with the age of the offender, increasing as the offender ages.
- Crime trip distances vary with social class, increasing as social class increases.
Aggregate Directionality Offenders Metro Vancouver
Displacement Implications Journey to Crime

- Criminal activity will displace the shortest possible distance within the neighbourhood.
- Criminal activity that displaces from the immediate neighbourhood will displace to the next neighbourhood offering a similar setting and adequate supply of opportunities.
- Criminal activity will displace outside the neighbourhood in the direction of a major activity node, often the CBD.
- The social and demographic characteristics of the neighbourhood in general will set limits on the distance criminal activity will displace from the original neighbourhood to other neighbourhoods.
- Criminal activity is unlikely to displace outside the neighbourhood to areas of substantially different character except to crime generator and crime attractor nodes.
Paths and Barriers

• Road networks and transit systems channel activity in general and criminal activity in particular into specific, narrow lines of movement.

• Destination points create crime generators by channelling large numbers of people into some neighbourhoods and not others.

• The permeability of a neighbourhood defined in terms of its path connectivity sets limits on the likelihood that an outside offender will enter the neighbourhood to search for targets.

• Topographical and built features of the environment form barriers that prevent movement between adjacent areas.

• Social differences create barriers to penetration of neighbourhoods by outsiders.
Crime clustering on arterial and collector roads
Displacement Implications
Paths and Barriers

• Crime will displace toward and along traffic arterials.
• Crime will displace along traffic arterials in the direction of some major activity node.
• Crime will only displace off a traffic arterial into neighbourhoods that have permeable, predictable and highly connected internal path networks.
• Major traffic barriers also constitute barriers to crime displacement.
• Crime displacement along a rapid transit system is confined to areas close to the transit stations.
• Crime will not displace into neighbourhoods that are substantially different in character from the offender’s home neighbourhood.
Crime Generators

• Crime generators produce crime by channelling large numbers of people past a set of criminal opportunities.
• Some potential offenders are mixed into the people gathered at generator locations.
• Crimes occur opportunistically.
Displacement Implications
Crime Generators

- Criminal activity associated with a crime generator is unlikely to displace.
- Potential offenders will be deflected into non-criminal activity.
Crime Attractors

- Crime attractors are places to which strongly motivated, intending criminal offenders are attracted because of opportunities for crime.

- The attraction is created by an ecological label, often supplemented by the intending offender’s personal past history, establishing that particular location as a known place to go for some specific kind of crime.

- Strongly motivated offenders will travel relatively long distances in search of a target.

- Crimes in such locations are often committed by area outsiders.

- Offenders engaging in crime at crime attractor locations are likely to engage in a staged target search process in the vicinity of the crime attractor.
Crime Attractor
Crime Attractors Displacement

Implications

• Criminal activity at crime attractors is likely to be displaced, in the first instance, into the neighbourhood surrounding the attractor.

• Criminal activity is likely to be displaced back into the offender’s home neighbourhood rather than to nearby similar neighbourhoods.

• Criminal activity is likely to be displaced to other important attractor nodes.
A process for predicting displacement locations

Analogous to Hot Spot prediction
Analyze the character of the intervention site.

- Is it a crime attractor, a crime generator or crime neutral?
- If a pure crime generator, little displacement is likely.
- If a crime attractor, a crime neutral site or a mixed attractor-generator site some displacement is possible.
Analyze intervention neighborhood

- Analyse the social, cultural, economic characteristics of the intervention target’s neighbourhood.
  - Social area analysis
  - Topological neighbourhood analysis
- Identify other neighbourhoods with similar characteristics. Map the similar neighbourhoods.
Analyse characteristics of the probable displaced offenders.

- Utilise information from planning and movement geography literatures to estimate a likely maximum range of movement for the displaced offender group.
- Identify neighbourhoods from the ‘similar neighbourhoods’ map that fall within this activity range.
- If site is a crime attractor, identify probable home neighbourhoods of displaced offenders. Utilise:
  - police information on home neighbourhoods of arrested offenders,
  - planning department information on home location of site users in general.
Analyse land uses.

- Identify major activity nodes.
- Weight the activity nodes utilising some combined volume and distance measures.
  - Gravity potential
  - Hierarchical diffusion
- Rank activity nodes in terms of weighted importance.
Analyse the street network.

- Identify arterial roads flowing most directly from the police intervention location toward the major activity nodes using some measure such as the beta statistic.

- Identify neighbourhoods from the “similar neighbourhood” map that are characterised by high entry permeability.
  - White (1990) is likely approach.
  - Johnson and associates are developing additional permeability measurements – watch for new technical publications.
Analyse transportation network.

- Identify major entry and exit points.
- Identify search ranges around each entry and exit point.
  - There is a crime risk zone around rapid transit stations in North America that start ~50 meters out from the station and may extend for additional 200 meters (Chicago, Vancouver studies)
Combine Analyses and Take Action

- Combine these analyses to identify specific potential displacement sites.
- Rank order on basis of combined likelihood score
- Provide intelligence on known offenders who might be displaced to police units responsible for most highly ranked displacement sites
- Provide crime prevention advice to residents of displacement areas.